COVER STORY

John S. Niederhauser:

LARRY KLAAS

A Lifetime of Dedication, Decades of Innovation

BY JAN McCOY

Watching thousands of tons of potatoes bulldozed into New York's Long Island Sound some 45 years ago was one of the most disheartening times in John S. Niederhauser's career, but it was also a turning point.

As an assistant professor of plant pathology at Cornell University, Niederhauser and an entomologist colleague were assigned to spend the summer of 1946 helping increase potato production near Riverhead, Long Island. Food production was in critical condition in Europe following World War II and the United States was shipping large quantities of food there as part of the Marshall Plan to help Europe rebuild.

The Cornell scientists, favorable weather, and the first widespread use of a new insecticide called DDT, combined to help double the potato crop that year. But in the fall, Niederhauser was summoned back to Long Island by the county agricultural agent at Riverhead.

"Along Long Island Sound, were thousands of tons of perfectly good potatoes in big piles, painted with a purple dye," Niederhauser says. "They were being pushed off into the Sound. There was no place to store them and nowhere to send them; all the ships and stores were full of potatoes.

"It made for one of the most depressing feelings I've ever had. We'd spent a year producing everything we could and then it was piled up and destroyed."

Two weeks later, Niederhauser phoned George Harrar, who had previously tried to recruit Niederhauser for the newly formed Rockefeller Foundation Mexican Agricultural Program.

"When he first came to see me at Cornell, I told Harrar that the offer was attractive but that I probably would remain at Cornell," Niederhauser says. "But the Long Island experience triggered me off, and I called him back and said I'd like to go to Mexico."

Although first assigned to work for the Mexican Department of Agriculture in Mexico on corn, wheat and bean production—which he did for 15 years—Niederhauser also launched potato production programs in Mexico and Latin America. The Rockefeller Foundation started an international potato program in the 1950s, which spread worldwide.

Today, thanks to Niederhauser, the potato thrives in parts of the world where it was not widely grown before, and with rice, wheat and corn, is one of the four major food crops of the world.

Niederhauser's work with national programs has dramatically increased potato production in many Third World countries, and earned him the foremost international award for achieve ment in improving the world food system—the 1990 World Food Prize. Founded four years ago by Norman Borlaug, the 1970 Nobel Peace Prize winner, the World Food Prize is given to an individual whose work has made a difference toward alleviating world hunger and malnutrition. Niederhauser, 74, received the $200,000 prize Oct. 17, 1990 at the Smithsonian Institution in Washington, D.C. He has been an adjunct professor of plant pathology at The University of Arizona since 1985 and is in great demand as an international food production consultant.

Before Niederhauser arrived in Mexico with the Rockefeller Foundation in 1947, the potato was grown only at high elevations or during the dry season under irrigation.

"That first year in Mexico, I asked a farmer why no potatoes were grown," Niederhauser says. "He told me they just wouldn't grow there. I thought this odd, and so I planted a small plot of potatoes at an experiment station. They were killed by a disease known as potato late blight, which kills the plants and rots the tubers.

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His work with national programs has dramatically increased potato production in many Third World countries, and earned him the 1990 World Food Prize.

PHOTO COURTESY OF JOHN NIEDERHAUSER

(Above) John Niederhauser (at right) and the late George Harrar in a Mexican potato field in the early 1950s. Harrar, the first director of the Rockefeller Foundation Mexican Agricultural Program, recruited Niederhauser to the program in 1947.

THE WORLD FOOD PRIZE

John S. Niederhauser:
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"Being young and enthusiastic, and not bothering to check further, I immediately wrote to my friends at Cornell who had just released some blight-immune potato varieties in New York, and asked them to send me three, 100-pound bags of these new blight-immune varieties. The next spring, I went out to my farmer friends and told them we were going to plant potatoes and that they'd see a miracle. They thought I was out of my mind."

Niederhauser says the potatoes grew well until mid-July when they died of late blight. The Cornell varieties were immune only to a few specific races of blight found in New York.

"Of course, I'd lost a good deal of credibility with my friends by then," he says.

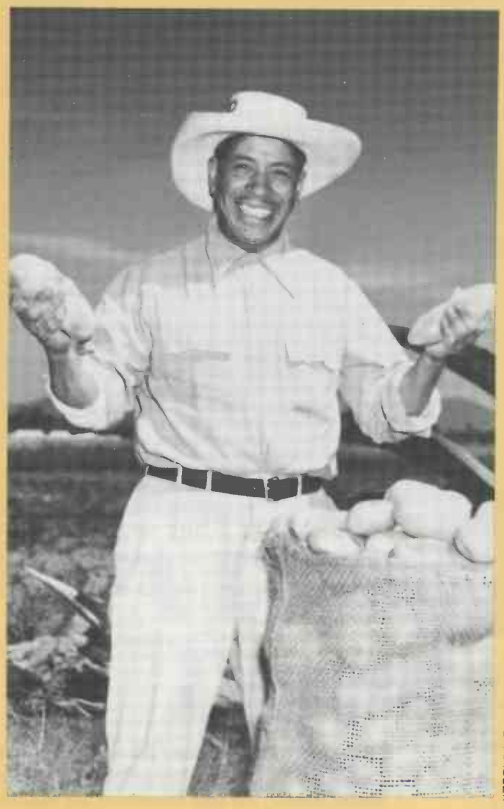
But the year after his first potato trial with supposedly immune varieties failed, Niederhauser planted a small plot of potatoes at the experiment station and secretly sprayed the crop with a "Bordeaux mixture" composed of copper sulfate, lime and water. The mixture was developed by a French scientist in 1882 and had been used by European and American farmers for many years to control late blight.

"I went out to my farmer friends and told them we were going to plant potatoes and that they'd see a miracle. They thought I was out of my mind."

"Protected by this fungicide, this time the potatoes grew, flowered, matured and produced a beautiful crop," Niederhauser says. "Then my Mexican colleagues said 'maybe there is something to what this guy's been saying.'

"So, we found out we could grow potatoes after all," he says, "and that experience in 1949 was the beginning of the potato-growing industry in the high valleys of Mexico."

With that first success in Central Mexico, Niederhauser and his Mexican colleagues moved on to the nearby Toluca Valley and began growing potatoes there, under spray, of course. A few years later, that in-



One of the first potato farmers in Mexico.

PHOTO COURTESY OF JOHN NIEDERHAUSER

When the Mexican potato program began officially in the 1950s, John Niederhauser and his colleagues were impatient to get new blight-resistant varieties in the hands of the Mexican farmers as soon as possible. Instead of presenting the farmers with varieties identified by numerals, Niederhauser gave the varieties the names of young women: Anita, Bertita, Conchita, Dorita, Elenita, Florita, Gabriella, and so on through the alphabet. The potatoes were accepted quickly by the Mexican farmers.

One variety was particularly well-received.

"The name of the Atzimba variety, which we first tested in Michoacan in the late 1950s, came from a bit of Mexican history at the time of the Spanish conquest in the 16th-century," Niederhauser says.

The area of Michoacan where the Tarascan Indians lived was the only area the Spaniards were unable to conquer in the 300 years they occupied Mexico.

The story goes that the Spaniards invited the Tarascan king and his five sons to a peace conference. When the Indians arrived, they were surrounded and slaughtered by the Spaniards. By "beheading" the tribe of its leadership, the Spaniards hoped to end the resistance once and for all. But they failed to consider the slain king's three daughters, who organized their people and kept the resistance alive. The eldest daughter was named Atzimba.

"By calling a resistant variety Atzimba," Niederhauser says, "it was immediately accepted by small Mexican farmers in Michoacan. And it didn't stop there. Today, it is the principal potato variety grown in Costa Rica."

—Jan McCoy

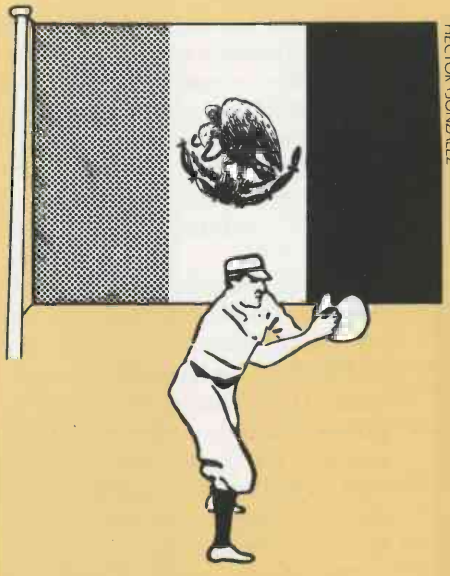
dustry in the Toluca Valley became the basis for a national potato seed program.

Today, the potato is a major crop in Mexico. Niederhauser's work helped increase potato production from about 134,000 metric tons in 1948 to more than 1 million metric tons by 1982.

But Niederhauser also was intrigued by the special conditions in Mexico that made potato late blight so severe there. He began a search for a durable, field resistance to this potato disease that was prevalent throughout the world.

In the 10 years that followed that first potato crop in Mexico, some historic breakthroughs were being reported by Niederhauser and his Mexican colleagues.

They found that more than 20 wild, inedible potato species in Mexico contained a durable field resistance to the *Phytophthora infestans* fungus, which causes late blight. The potatoes are the survivors of an annual battle with the fungus that had been going on for thousands of years. Niederhauser and his colleagues also found that the blight that caused the Irish potato famine from 1845 to 1848 had originated in Mexico. This discovery ended a century-long search for the blight's place of origin.



HECTOR GONZALEZ

The potato wasn't the only thing John Niederhauser brought to Mexico. He was the founder and president of Little League baseball in Mexico from 1954 to 1969 and the Latin American Commissioner from 1957 to 1969. Here's how it all began:

"In 1954, when we were living in Mexico City, several of our boys were of Little League age. (Niederhauser and his wife, Ann Faber Niederhauser, have six sons and one daughter.) As any parent will tell you, it becomes a bit of a concern as to what the kids will do in their spare time. Not only that, and most important, what can families do together? So it occurred to several of us to start a baseball league for our sons, which we named the Aztec League.

"We talked to some of our friends in business there, and four of them agreed to sponsor teams. We had tryouts and selected teams. I coached a team; Norman Borlaug coached a team. The first year, the majority of the players were from American families living in Mexico, and games were played at the American School field in Mexico City. We didn't make any big publicity effort; we wanted to see if it would work. Our first year, scores were very high and games were not well-played. But the game grew more sophisticated over time. Mexican umpires donated their time, and we had a highly successful first season. The games became quite a social event. The next year, we had four leagues: the Aztec, Maya, Toltec and Metropolitan leagues. By the second year, half the players were Mexican, and by the third year, 95 percent of the players were Mexican, as it should be. Today there are hundreds of leagues all throughout Mexico.

"The Mexican Little League spread to Monterrey in 1956. In 1957 and 1958, the Monterrey team won the Little League world championships in Williamsport, Penn.

"The most important thing, though, is that from its humble beginnings, Little League baseball became a social phenomenon in Mexico that brought families together. Our boys look back on their Little League days as their golden days of growing up."

Today, the potato is a major crop in Mexico. Niederhauser's work helped increase potato production from about 134,000 metric tons in 1948 to more than 1 million metric tons by 1982.

Using the resistance found in the Mexican wild potato species, a new strategy of breeding for late blight resistance evolved, which changed the course and success of potato breeding programs all over the world. A large group of potato cultivars with field resistance to late blight emerged from Niederhauser's work in Mexico and were distributed throughout the world, particularly in developing countries.

These varieties, which subsistence farmers can grow without expensive fungicides, are one of the most promising basic food crops available to feed the rapidly increasing popula-

(Continued on next page)

THE WORLD FOOD PRIZE

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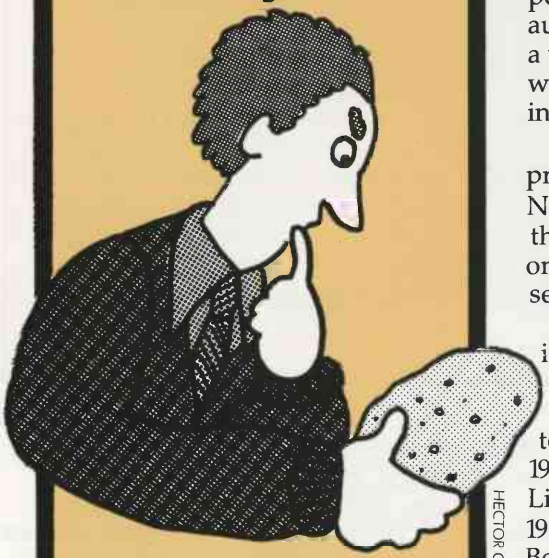
What's in a Potato?

One medium, white potato, raw...

Weight: 100 grams
Calories: 76
Fat: .1 gram
Sodium: 3 milligrams
Water: 79.8 grams
Protein: 2.1 grams
Carbohydrate: 17.1 grams
Crude fiber: .5 gram
Vitamin A: trace
Vitamin C (ascorbic acid): 20 milligrams
Vitamin B-1 (thiamine): .10 milligram
Vitamin B-2 (riboflavin): .04 milligram
Niacin: 1.5 milligrams
Calcium: 7 milligrams
Magnesium: 34 milligrams
Potassium: 407 milligrams
Phosphorus: 53 milligrams
Iron: .60 milligram



HECTOR GONZALEZ

(From: Bowes and Church's Food Values of Portions Commonly Used, 14th edition, revised by Jean A. T. Pennington and Helen Nichols Church, J.B. Lippincott Company, 1985.)

tion of the world. And Niederhauser says it promises to be a truly "green revolution," since the greater food production would be possible using fewer chemical fungicides.

Niederhauser's pioneering work with breeding blight-resistant potato varieties continues throughout the world.

One of the greatest contributions made by Niederhauser is the large number of international scientists and leaders he has trained over the years. His colleagues in national programs throughout the world credit much of the progress in food production to his involvement with national decision makers and scientists in field-oriented programs.

"In Mexico, my headquarters was a converted cow stable right next to the fields, it was symbolic of the way we were planning and working," Niederhauser says. "We had scientists from all over the world coming to Mexico to study. They would participate in a growing season. We'd plant, hoe, cultivate, spray and harvest together in the fields. For many scientists from some developing countries, this was a new experience. They learned to become production people who could talk with some authority to local farmers. There's a whole community of scientists who have memories of these days in Mexico."

Several international potato programs have sprung from Niederhauser's early days as, what the late George Harrar called, "the only international agricultural research center that walks around."

The Rockefeller Foundation's international potato program that Niederhauser carried out from 1947 to 1971, led to the creation of the International Potato Center (CIP) in 1971. The center was established in Lima, Peru, following Niederhauser's 1968 meeting with Peruvian President Belaunde Terry and his cabinet. In 1978, Niederhauser and several of his national program colleagues in Mexico and five Central American countries, designed a new strategy for international cooperation and development. A regional cooperative potato program (PRECODEPA) now involves 10 countries and the International Potato Center. Niederhauser served as the coordinator during the first two years of PRECODEPA, and still is an adviser to the program.

His work has taken him to all of the countries in Latin America, eight in Africa, 17 in Asia, 22 in Europe and to the Fiji Islands and Hawaii.

Last February at a meeting in Costa Rica, Niederhauser attended a ceremony recognizing the recent release of a new blight-resistant potato variety, Istaru. Since this new variety was derived from a cooperative research project with Mexico, the Costa Rican Minister of Agriculture acknowledged Niederhauser's lifetime contribution by referring to the new Istaru variety as one of the Niederhauser family.

> One of his greatest contributions is the large number of international scientists and leaders he has trained over the years.

"Then the present leader of the Mexican national agricultural program spoke," Niederhauser says with a smile. "He wanted to make a clarification. He said, yes, the variety was one of Niederhauser's family all right, but it was actually one of his granddaughters.

"He was pointing out that a lot has happened in the years since I left, and that they were proud of what they were accomplishing. I thought that was wonderful!"

"...A Unique Experience!"

PHOTO COURTESY OF JOHN NIEDERHAUSER

John Niederhauser and a fellow worker in a field of sugar beets on a collective farm northwest of Moscow during the summer of 1935.

After John Niederhauser graduated in 1933 from Palo Alto Union High School in California, he didn't have money to attend college right away, so he spent two years working part-time and taking courses at Deep Springs, Calif. In 1935 he received notice from Cornell University in Ithaca, N. Y., that he'd won a scholarship that would cover tuition and room and board.

"By that time, I'd saved a little money, so I decided to take my first trip to Europe before reporting to Cornell in the fall," Niederhauser says.

Always looking to save money, he found a steamship line that offered a round trip to Europe for $99. When Niederhauser inquired as to the ship's destination in Europe, he was told, "We go to London, Hamburg, Helsinki and Leningrad." He chose Leningrad because it was the farthest he could go for $99.

"When I arrived in Leningrad, I wandered around and found a place to stay," he says. He met a group of Russian students who were producing the Clifford Odets play, "Waiting for Lefty," in English as part of their cultural program. Niederhauser traveled with the group for about four weeks helping them with their English, and finally landed in Moscow.

On one of his first days there, while walking through Moscow's Park of Culture and Rest, he happened upon a wheat and corn exhibit the U.S. Department of Agriculture had sent as part of a scientific exchange.

"By then, I was devouring every sign I saw written in English. I was reading these signs and a gentleman asked 'Do you speak English?' We started talking and he invited me to visit him at his office the next day," Niederhauser says.

The kind gentleman turned out to be world-famous geneticist Nicolai Ivanovich Vavilov.

When Vavilov learned that young Niederhauser could drive a tractor, he quickly offered him a summer job on a farm in the Ukraine. The Soviet Union had just begun importing Ford tractors from the United States as part of their agricultural development—but few Soviets knew how to drive them.

When the summer was over, Niederhauser returned to Moscow and reported back to Vavilov. The geneticist had heard good things about Niederhauser's work.

"He asked me if I would like to go to school in the Soviet Union," Niederhauser says. "He talked me into cabling Cornell to see if they would postpone my scholarship for one year, and they agreed."

So Niederhauser spent his first year of college at the Timuriazev All-Union Agricultural Academy near Moscow, studying with students from all over the Soviet Union. The second summer, he worked on a collective farm between Moscow and Leningrad.

Though he was offered the chance to continue studying in the Soviet Union, Cornell refused to hold his scholarship another year, and he went home.

The strict study habits he learned in the Soviet Union served him well at Cornell. In the Soviet Union he had attended classes eight hours a day, six days a week and studied in between. At Cornell, he says, he felt as if he were turned loose, with time to spare.

Niederhauser graduated from Cornell in 1939 with the highest academic average ever recorded to that time in its College of Agriculture. He went on to receive a doctorate in plant pathology from Cornell in 1943, served as a plant pathologist with the USDA for a year and was appointed an assistant professor of plant pathology at Cornell in 1945.

Looking back at his experience in the Soviet Union, Niederhauser says, "At the time, I thought what I was doing was something everyone did. Five years later, I was able to realize 'John, that was a unique experience!'"

—Jan McCoy

The following are excerpts from the remarks made by John Niederhauser upon receiving the World Food Prize, Oct. 17, 1990, at the Smithsonian Institution in Washington, D.C.:

I am deeply honored to be the 1990 laureate of the World Food Prize. It is with genuine feeling of both pride and humility that I accept this distinguished award. My feeling of pride is based on the knowledge that this award recognizes the contributions made by my colleagues and friends all over the world, working together for so many years. And I am proud to accept this award in their name.

... And I wish to call your attention at this time to one very special person who has been a constant source of support and encouragement during my career. Not only has she traveled with me all over the world and shared the satisfaction of cooperating with our colleagues in so many countries, but she has created the home and family that have made my life so wonderful. Those of you who know her are aware of how vital she has been to whatever might have been accomplished. I would like to introduce this person who shares with me the honor of the 1990 World Food Prize, my wife, Ann Niederhauser.

During the past 30 years, total potato production in the developing countries of the world has tripled. This is due to a 50 percent rise in the acreage planted, and most important, to a doubling of productivity, of the tons produced per hectare. Today the rate of increase for potato production in the Third World is greater than for any other food crop.

The success story is the result of an international cooperative effort involving the potato farmers, scientists, and decision makers in national programs all over the world. All of them can take justifiable pride in these dramatic contributions that the potato is making to the world food supply.

At this time I wish to call attention to the key role played by the Mexican national potato program, which not only was responsible for a sixfold increase in potato production in Mexico from 1950 to 1980, but played a vital role as an operating and training base in the development of national potato programs throughout the Third World.

... Despite these successes, during the past decade there has been a tendency for potato production to level off in many developing countries. One valid reason for this slower rate of increase is that these countries have little or no more irrigated land. And if the potatoes are to be grown, they must be grown under rainfall. And the potato varieties in most of these countries are susceptible to the most important potato disease in the world—late blight. So, if grown under rainfall, they must be sprayed with chemical fungicides to protect the foliage and the tubers. Too often, in Third World countries, these fungicides are either too expensive for the local farmer, or are unavailable. Thus, any further expansion in potato production is limited by this blight-susceptibility of the potato cultivars commonly grown by local farmers.

During the past 40 years, the national potato program in Mexico has developed about 25 potato varieties that have high levels of a durable resistance to late blight. Some of these new selections have been grown successfully without chemical protection for 20 years by subsistence farmers in the mountains of Central Mexico. Resistant Mexican potato selections have also been grown for a number of years in other Third World countries, such as the Philippines, Nepal, Costa Rica, and Guatemala. Though these selections have made a substantial contribution to the food supply in these countries, they still have an enormous unexploited potential for food production in other countries of the developing world.

The World Food Prize

John S. Niederhauser
1990 laureate

Established: 1986 by Norman Borlaug, 1970 Nobel Peace Prize winner

Prize: $200,000

Previous winners: M.S. Swaminathan, former secretary of agriculture for India and architect of India's "green revolution" (1987); Robert Chandler Jr., founding director of the International Rice Research Institute in the Philippines (1988); Vergese Kurien, chairman of India's National Dairy Development Board and founder of a milk distribution system in India (1989).

Sponsor: John Ruan Foundation, Des Moines, Iowa. Previous sponsor: General Foods Fund, Inc.

Administrator: Iowa State University in Ames, Iowa. Previous administrator: Winrock International Institute for Agricultural Development in Morrilton, Ark.

Number of 1990 nominees: About 250

To help realize this potential, in August 1990 a new international cooperative project was launched by the Mexican government, with the collaboration of scientists from Poland, Netherlands, Canada, United States, Mexico, and the International Potato Center. This project will foster the international testing, distribution, and multiplication of blight-resistant potato varieties throughout the world, and make these promising materials available to the small subsistence farmers in any country.

PHOTO COURTESY OF JOHN NIEDERHAUSER

John and Ann Niederhauser in Lima, Peru, in 1958.

This new project, called PICTIPAPA, represents a new strategy in international cooperation, with a Third World country, Mexico, providing its national potato program as the operating base for this worldwide collaboration.

The Mexican blight-resistant potato varieties represent the most promising plant materials for expanding world food production, since the short-strawed, rust-resistant wheats and the "miracle rice" varieties launched the Green Revolution a few decades ago. The Mexican blight-resistant potato varieties could launch a new Green Revolution, which might be called a truly green revolution, since it would be done with fewer chemicals, rather than more.

... It is obvious that merely having enough food produced is not automatically the final solution to hunger. There are other vital problems that result in food shortages and hunger. But the fact that we do have an adequate supply of food, does give us some time to confront these problems. And hopefully we shall have enough time to solve them. Certainly there is no time for complacency.

Two of these basic restraints that must be solved as we proceed with our efforts to provide the world's population with an adequate, nutritious diet are population stabilization and food distribution.

... In 1970, Dr. Norman Borlaug was awarded the Nobel Peace Prize for his leadership role in the Green Revolution. In his acceptance speech, in reply to some overly optimistic comments that the problem of world hunger was solved, he stated, "If fully implemented, the Green Revolution can provide sufficient food for sustenance during the next three decades; but the frightening power of human reproduction must also be curbed. Otherwise the success of the Green Revolution will be ephemeral only."

We are now entering the third decade following the prophetic statement. Today the world population is more than 5 billion. By the end of this century it will exceed 6 billion, and hopefully will be stabilizing by the year 2100, probably at 12 billion. Also, it is important to realize that about 90 percent of this population of 12 billion in 2100 will reside in what are now called developing countries of the world.

Do our leaders have the information, planning skills, and determination to implement and enforce the policies and measures needed to reach population stabilization by the year 2100? During the next century, can we feed this growing population while establishing a sustainable agriculture that will preserve the quality of our environment? Will population stabilization be at a level consistent with what can be fed? Positive answers to these questions are urgently needed, because the world will not wait.

According to the United Nations' Food and Agricultural Organization estimates, about 20 percent of the population in developing countries is suffering from hunger. Yet the FAO also affirms that there is plenty of food produced in the world to feed everyone, and with some to spare. What is wrong?

The problem is one of distribution. It is beyond the scope of this brief talk to analyze the complex reasons why there is hunger in a country that can produce an abundance of food for its people. The causes may be economic, political, or social. But whatever factors that contribute to poverty in any sector of a society, are basic causes of hunger. This is equally true for any country of the world, developed or developing.

How are we going to attain world population stabilization during the next century, and produce adequate food for this population? How are we going to assure that food is available to all people? To reach these goals will require a coordinated international effort by dedicated leaders and their constituencies, who understand the critical relationship between population stabilization and food distribution in the conquest of hunger.

Are we equal to this challenge? As an agriculturist who has worked in the fields of farmers in many countries for over 50 years, I do believe that we have soils, water resources, climates, and technology to feed the world as it approaches population stabilization near the end of the next century. However, do we have the understanding, the dedication, and sense of urgency to cooperate in such a global program to feed more people, and to feed people more.

We are living now in one of the most exciting and critical periods in the history of mankind. As we approach the biologic limits for what this planet can support, we are also more aware that we are living in one world. And as citizens of one world, we must all work together to have this world without hunger, while conserving our environment and energy resources.

I ask again. Are we equal to this challenge?