Obituary

Norman Ernest Borlaug (1914–2009)
Nobel Prize Laureate and Honorary Member of the Japanese Society of Breeding

There are many scientists around the world who have been inspired and influenced by Dr. Borlaug. I am one of them. I was a first-year university student in October 1970 when it was announced that an agricultural scientist had been selected for the Nobel Peace Prize. I was fascinated to learn that an agricultural science could contribute to world peace at a level that was recognized by the Nobel Prize, which is the most prestigious prize in the world. This revelation set the direction for my future career. Later, during 2002–2008, I worked for The International Maize and Wheat Improvement Center (known as CIMMYT by its Spanish acronym) as Director General, and Dr. Borlaug was my Senior Advisor. This gave me an invaluable opportunity to develop a deep understanding of his philosophy and style of work.

In 1970, Dr. Borlaug was awarded the Nobel Peace Prize for his groundbreaking work in wheat improvement research initiated as part of the US-Mexico bilateral program in 1944 and continuing after CIMMYT was founded in 1966. His name became synonymous with the Green Revolution—a term coined on 8 March 1968 by William S. Gaud, the then administrator of the U.S. Agency for International Development, to refer to Borlaug’s impact on the developing world, by the spectacular increases in cereal crop yields that were achieved in developing countries during the 1960s.

Japanese scientists feel especially close to Dr. Borlaug because he used a Japanese wheat variety, Norin 10, as a source of dwarfness for the development of the high yielding wheat varieties that triggered the Green Revolution. During 1952 and 1953, Dr. Borlaug and colleagues made a concerted but unsuccessful effort to find suitable sources of shorter and stronger stemmed varieties, searching the entire world wheat collection of the U.S. Department of Agriculture. In late 1952, Dr. Borlaug learned of Dr. Orville Vogel’s preliminary successes at Washington State University in incorporating the dwarfing genes of the Japanese variety Norin 10 into his best winter wheat varieties. Dr. Borlaug wrote to Dr. Vogel and requested some of his seed samples, which he kindly sent.

Japanese wheat breeder Mr. Gonjiro Inazuka was largely responsible for developing the dwarf wheat variety, including one line that became Norin 10, while he was Chief of the Wheat Breeding Program at Iwate Prefectural Agricultural Experimental Station in Morioka from 1930 to 1935. The dwarfing genes (later known as \( Rht \) alleles) from the cross Norin 10 × Brevor, with the main effects of reducing plant height, increased the number of grains produced, and promoted more efficient use of water and fertilizer. Norin 10 was one of several dwarf Japanese wheat varieties brought to the United States by S.C. Salmon, an U.S. Department of Agriculture agricultural advisor assigned to Japan during the post-World War II U.S. period. A physiologically determinable effect of these \( Rht \) alleles was an increase in harvest index (HI). The yield potential of their new high yielding semidwarf-bred lines was twice that of the best “tall” wheat varieties available until then in Mexico. These long-term efforts of using the semidwarf gene in a locally adopted background finally produced the desired result, culminating in the release in Mexico of the first semidwarf varieties in 1962. These varieties fulfilled the promise Dr. Borlaug and his colleagues had seen in them: They stood up well under fertilization and yielded nearly twice as much as the old tall varieties.

Today, wheat varieties developed from the semidwarf varieties originally developed by Dr. Borlaug and his scientific team are grown on 80 million ha around the world. They have contributed more than 100 million tons in additional wheat production and a brought about a 40% decline in the real price of wheat.

When he was awarded the Nobel Peace Prize in Oslo in 1970, the Speaker of the Norwegian Parliament noted that he had been selected, not so much for his research achievements, as great as they were, but because of his unerring efforts to get these innovations into use.

In accepting the Peace Prize, Dr. Borlaug commented “that the responsibilities of the prize were far greater than the honor itself.” Indeed they were. He continued to be a man of action. For the next nearly four decades, he worked...
tirelessly as an advocate for smallholder farmers, agricultural science and technology, and foreign international assistance. Over the years, he spoke to more than 250,000 university and high school students, delivered addresses at 450 conferences and symposiums to more than 200,000 professionals, consulted with policy makers in 60 countries, and gave more than 500 press interviews.

In 1986, he was also made President of the Sasakawa Africa Association, and leader, along with former U.S. President Jimmy Carter, of the Sasakawa-Global 2000 agricultural programme in sub-Saharan Africa, which has worked with several million farmers in 14 countries of sub-Saharan Africa to increase food production. The last occasion I met with Dr. Borlaug was in November 2008 when the Sasakawa Africa Association had its annual board meeting in Dallas. He came to the Board meeting from a local hospital where he had been treated for cancer, and after the Board meeting he was taken back to the hospital. He still showed his tireless commitment in spite of his serious condition.

Dr. Borlaug came to Japan and gave a special lecture on the Green Revolution at the occasion of the 30th Anniversary of Japanese Society of Breeding in 1981. Many young scientists and students who were fortunate enough to listen to the lecture and interact with him were impressed and inspired by Dr. Borlaug. He influenced many young scientists, and they now constitute core members of our society and are key contributors to plant breeding efforts in Japan. We were deeply impressed by Dr. Borlaug for his attitude and philosophy towards farmers, who are the ultimate beneficiaries of agricultural research. This has been a constant source of our inspiration for the value of breeding research.

In 2006 Dr. Borlaug visited Japan. He had not been feeling well since the beginning of the year, but he wanted to travel to Japan accompanied by Mr. Chris Dowswell, Special Assistant, and myself. Chris and I knew that this would be his last long trip overseas considering his deteriorating health. He visited the Vice Minister of Agriculture, Forestry,
and Fisheries to express his appreciation of the contribution of Norin 10 and gave a special lecture at Tokyo University of Agriculture and The University of Tsukuba. I was always so impressed by his attitude towards students and young scientists at the Universities. He woke up early to practice his lecture before breakfast and he gave an enthusiastic speech with his full strength, just like he gave for his Nobel Prize acceptance speech, calling for continued efforts to fight hunger. Nobody in the audience noticed that this 92-year-old man was already suffering from a serious disease.

In 2008 the world had to face a global food crisis; food prices of major commodities soared by 2 to 3 times. This was exactly of what Dr. Borlaug was afraid. In his Nobel lecture on December 11th, 1970, Dr. Borlaug warned political, social, and religious leaders that a Green Revolution was still wanting in many parts of the world, and that it had only “bought breathing space” in which to deal with the global “population monster” and the subsequent environmental and social ills that rampant population growth in the world’s poorest countries was causing. Productivity increases of major food commodities, such as wheat, maize, and rice, have stagnated during the last two decades and food demand increase has surpassed the slow productivity increase. The global food crisis pushed up the number of the poor above 1,000 million from 800 million in 2006.

Dr. Borlaug inspired generations of scientists, policy makers, civil-society agents, and countless others to take action to seek solutions to end hunger and poverty. We remain committed to realizing his dream of the application of agricultural science for food security and a peaceful world. We agricultural scientists serve for the farmers in action.

Masaru Iwanaga
National Institute of Crop Science, Director General (July 2002 to March 2008, Director General of CIMMYT)

I and my wife had the honor of having Dr. Borlaug at our house for a tea break on the way to University of Tsukuba in May 2006 (introduced by M. Iwanaga).