

**Dr. Norman Borlaug and the Green Revolution:
At the Nexus of Reducing Hunger and Preserving Nature**

by

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At Dr. Borlaug's 95th birthday party – which I attended at his home in Texas around this time last year – he looked back on his life and career and shared several memories with the many family, friends, and guests who had gathered to celebrate with him.

Many of those friends and guests were, of course, from the field of agriculture, and many of the tributes that people offered to Dr. Borlaug referenced his work that improved crop yields and saved lives in the face of starvation.

When Norm passed away in September, the memorials and condolences that poured in from around the world lionized him as “the Father of the Green Revolution,” a ferocious champion of the poor and hungry, the leading agricultural figure certainly of our time – perhaps in all history – and the man who saved more lives than anyone else who ever lived. All of these are true and accurate ways to depict Norm's work and honor his memory.

However, today I am reminded of one of the stories that Norm himself told at that birthday party a year ago. It was about his first job after graduating from university – which was not in agriculture or food production or hunger alleviation. It was as a member of the U.S. Forestry Service. Norm remarked how unusual this job was as an introduction to the profession of agricultural science, telling us all, “They let me into USDA through the back door.”

Even after his breakthrough work in wheat breeding, and building partnerships with esteemed leaders like Dr. Swaminathan, and changing agricultural policies around the world, and establishing international agricultural research as we know it today – Norm, in many ways, still thought of himself as a forester.

Over the years that I knew and worked with Norm, I was able to hear several of his stories. Many of you here also know what a storyteller Norm was – with a sharp memory for details and an energetic intelligence that stayed with him well into his 90s.

One of the stories that he recounted to me with amazing clarity – this was not long before he died – was about the Dust Bowl that swept the United States in the 1930s, during the Great Depression and while he was a student at the University of Minnesota. He talked about drought and crop failures and windstorms that conspired to pull soil off farmers' fields. He described how families would shove rolled-up rugs and curtains against their doors and windows to keep the gritty brown and black dirt from filling the inside of their homes. Most strikingly, he told me that a whole cloud of good, fertile soil from the middle of the United States blew all the way to the Atlantic Ocean and covered Washington, D.C., in darkness and dust. “That got the politicians' attention,” Norm said.

Telling these stories at age 95, Norm's voice overcame its age and the weakness of his illness as he still – 70 years later – mourned the loss of the soil and the havoc that the Dust Bowl wreaked, not only for farmers but for the natural-resource systems of North America.

This wasn't just a memory for Norm. As a student, he worked in planting trees and carrying out other erosion-control strategies as part of the U.S. government's response to this huge disaster. It was work that built on his love of nature, and also his education – at the time, Norm was majoring in forestry. After graduating, he pursued several jobs with the U.S. Forestry Service, preserving forest ecosystems and protecting trees and woods across the United States.

It was this deep interest in forests that led Norm to his great achievements. Several of you know Norm's story about the night that changed his life – the lecture at the University

of Minnesota he attended, where Professor Elvin Stakman spoke about the threat of the rust fungus and its potential to wipe out wheat yields and trigger mass hunger and starvation.

The reason Norm attended that lecture was not his interest in wheat. In fact, Norm was not only not interested in wheat – he actively resisted his professors who tried to teach him about any food crops. What brought Norm to Stakman’s lecture was his concern that certain rust fungi would affect the pine trees he had so strongly admired in his time with the Forestry Service in Idaho.

But what Stakman said that night stayed with Norm his entire life – “Biological science, crop disease, soil infertility, human population, world hunger – all are interwoven.”

This was the idea that motivated Norm’s research and work with farmers in Mexico. This was the message he brought to politicians and scientists in India and Pakistan and China. This was the basis of his Nobel Prize acceptance speech in 1970. This was the argument he used to inspire world leaders and everyday citizens – specifically young people – in calling attention to poor yields and hunger and instability throughout the world, but particularly in Africa.

It was Norm’s ardent wish to protect the land and plants and natural systems that he so loved that drew him to study pathology and embark on his career in agriculture. And, though he likely would not have used this exact word at the time, it was biodiversity that made his achievements possible.

In Mexico, his work to improve wheat yields drew heavily on diverse wheat varieties there – both the local wheat strains used by Mexican farmers and foreign cultivars with their distinct traits. And the “shuttle breeding” program he pioneered brought him into contact with different areas of Mexico, with different soils and different microbes and different climates and different ecologies. All of this rich biological and environmental diversity made the first turns at the heart of the Green Revolution.

The Green Revolution, in turn, offered opportunity to preserve this biodiversity. When Norm’s research began in 1943, the only tools at his disposal were some basic farm supplies and the wheat being grown on and around his test fields. By the late 1950s, Norm’s program had gathered 50,000 crop varieties at what would become CIMMYT. IRRI, in the Philippines, was of course built and structured along these same lines, including gathering and preserving diverse rice varieties. Valuing and conserving the richness of biodiversity resulted wherever the Green Revolution brought vigorous and successful agricultural research. Dr. Swaminathan’s inspiring career and the outstanding work of his colleagues here at MSSRF is one of the most evident examples of that.

Throughout his life and until the end, Norm continued to be concerned with preserving land and conserving nature’s richness. In fact, he was just as adamant on this subject as he was known to be on the injustice and misery and cruelty of hunger in the world. When done sustainably, Norm commended efforts such as the development of agriculture in marginal areas like Brazil’s Cerrado, which he was so pleased the 2006 World Food Prize honored; or no-till methods; or improved seed varieties – including biotechnology – for their promise to intensify production of food while simultaneously allowing forests and savannahs and wetlands and other delicate ecosystems to go unharmed.

Norm used to talk with great pride that the improved varieties and agricultural technologies that he and his colleagues around the world developed boosted global cereal

production from 650 million tons in 1950 to 1.9 billion in 2000 – an increase of over 300 percent. In the same timeframe, land in agricultural cultivation only increased 10 percent.

Grain yields grew, and starvation, for billions of people, was avoided, because crop biodiversity was put to good use. As a result, 1.1 billion hectares of land did *not* have to be put into cultivation – 1.1 billion hectares that would have been converted to farms and fields in order to achieve the levels of production of the year 2000 through using the level of technology of 1950. “What would have happened to wildlife habitat, to our forests?” Norm would ask when he talked about this achievement. “What would have been the effect on erosion? Efficiency in agriculture saves natural lands and habitat for wildlife.” Higher yields alone did not impress Norm as much as higher yields on less land, using less water, with less of an impact on the surrounding ecosystem, and using diverse plants and trees and livestock and other organisms to strengthen and replenish the natural resource base.

Norm was, as you all know, a practical man. He had no time for ideologies – he craved results. He once told me what motivated him to innovate in those early days in Mexico – he needed to see results, and quickly. “I was afraid they’d fire me – I’d lose my job if I didn’t have something to show for it,” he said. The results he is most famous for, of course, are the billions of lives that were lived, and not lost to hunger, because of his work. But Norm would have been the first to also emphasize the hectares of land untouched, the forests and wild areas preserved, the animal and plant species that were saved – all important results of the Green Revolution.

For Norm, fighting hunger and preserving natural resources were part of the same battle: to work with nature, which he deeply loved and respected, to make sure the planet could support its inhabitants today and into the future. He often speculated that advances in agricultural technology would save as many trees as his own work had saved lives. At the 2005 World Food Prize “Borlaug Dialogue” symposium – one of the last formal addresses he made – he said, “I’m still afraid of the population monster.” But he also talked about the tools that would make it possible to overcome this monster – in particular, the biodiversity that is essential to making agricultural research thrive. “The underpinnings,” he called it. “It has to be the best available variety, or the best breed – the best gene if it’s going to have any significance.”

The best way for this to happen, in his view, was through reaching out to, training, and working with farmers, especially smaller farmers. He wrote in the *Wall Street Journal* last July: “Given the right tools, farmers have shown an uncanny ability to feed themselves and others, and to ignite the economic engine that can reverse the cycle of chronic poverty.” Much recent global attention has been given to the unique role of farmers – especially poorer smallholders – in producing food and preserving ecological resources, and this is the topic that will be at the center of the Borlaug Dialogue symposium to be held October 13 – 15 in Des Moines as part of the 2010 World Food Prize events.

So it’s therefore very fitting that this conference is being organized and held in Norm’s memory by his great friend and respected collaborator, Dr. M.S. Swaminathan. Norm would have been greatly heartened and inspired to know that each of you shares his passion for this critical work, that each of you is committed to moving this critical work forward. On his behalf, thank you so much for all that you are doing.