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Borlaug 101

The single-greatest challenge in all human history is this: can our species nutritiously and sustainably feed the 9 plus billion people who will be on our planet by the year 2046. A challenge exacerbated by increased climate volatility, terrorism, conflict, refugee migrations and increasing instances of pandemic diseases.

How I ended up dealing with this issue is a story of taking the wrong road to find the right road. As a city kid who was born in the Bronx and grew up in Dubuque, Iowa, where I attended an obscure Catholic liberal arts college named Loras. I had absolutely no interest in agriculture or farming or any of these issues. Indeed, when I passed the Foreign Service exam to become an American Diplomat in the mid-1960s, as I drove to Washington, D.C, visions of diplomatic sugarplums danced in my head. I dreamed of attending diplomatic soirees in chandeliered ballrooms in London or Paris or Vienna, discussing the nuances of international politics while sipping aperitifs.

I was, therefore, stunned when in 1967 the State Department informed me that since I was male, single, under the age of 26, and had never served in the military, thus was eligible for the draft, that I was being assigned not to the salons of Europe, but to Vietnam in the middle of the War. And it was not to the Embassy in Saigon or a regional capital or even a provincial town; but rather I was deployed with a military assistance command advisory team in a remote district in the Mekong Delta.

But, it was in the eight villages that I dealt with as a district senior advisor that I would learn the lesson of my life; a lesson which would completely re-shape the direction of my career. It is a lesson which holds such enormous promise for meeting that single-greatest challenge of helping build global food security and countering terrorism in the 21<sup>st</sup> century.

Now, to understand what I experienced in Southeast Asia, it is important to know the context of the late 1960s in terms of global agriculture. At that time, India and Pakistan faced imminent

mass starvation, but those countries were saved by a little-known plant scientist from Iowa named Norman Borlaug. Working for several decades in remote parts of Mexico with the poorest farmers, Borlaug had developed “miracle wheat” varieties, which could triple the yield and resist disease. At the urging of the United Nations, he had taken his new seeds to India and Pakistan and convinced the leadership of both countries to completely revise their approach to agriculture and adopt his formula, which also included fertilizer and irrigation. Borlaug’s approach paid off dramatically as both countries went from likely wide-spread famine, starvation and millions of deaths, to self-sufficiency and even exports in just a few years. Borlaug was proclaimed the Father of the Green Revolution and “the man who saved more lives than any other person who has ever lived.”

Back in Vietnam in 1968, the Green Revolution in rice was beginning, at the same time as Borlaug’s wheat was arriving in India. The miracle rice, developed by another great American agricultural scientist named Hank Beachell, was known as IR-8. It was being brought to the eight villages in my district by American agricultural advisors endeavoring to convince Vietnamese farmers to try it. It was seen as part of the war effort aimed at winning the hearts and minds of the peasant farmers.

Now, by sheer chance, not through any coordinated plan, just by coincidence, at that same time, a separate USAID program was underway to upgrade the old French colonial farm-to-market road that ran through all eight of my villages. When the new IR-8 rice arrived, the road had been completed through just four of the villages. As, I drove through the district, I observed what would be my great lesson. I saw that it was only in the villages where the roads had been repaired that farmers used the new IR-8 rice. There were no prohibitions against it in the other four villages, but the pattern was clear. And on those four villages with the upgraded roads, where farmers did adopt the IR-8 rice, the impact and change was immediate and dramatic. Almost overnight, life improved because farmers now could grow two crops a year instead of one, each with triple the yield in terms of grain produced. It still left time for a third crop of vegetables or melons. Farmers now had surplus income which meant that their houses were better built, their children better clothed, and nutrition enhanced. In addition, children stayed in school longer and girls stayed in school longer because they could now travel from hamlet to

hamlet along the improved road by little motorcycle taxis. And child mortality went down because the road allowed moms with sick kids to more easily get them out to medical help.

Most surprisingly, the new IR-8 rice had a dramatic impact on military security. In the four villages where it was being used, the combination of the road upgrade and the use of miracle rice so improved livelihoods that young men no longer found reasons to listen to the enemy propaganda and go off to join the guerillas. The insurgency evaporated.

What we had not been able to accomplish with bombs and boots on the ground, we now were able to achieve through the combination of agricultural technology and improved rural roads. However, when you came to the end of the improved road and went through the other four villages, life was unchanged from even one hundred years earlier. Houses were ramshackle, people were dressed in threadbare garments, children were undernourished and not in school, child mortality remained high, and the Viet Cong security threat was unchanged. I was fascinated by what I saw as the combined impact of the new miracle rice and the upgraded road, but I should not have been surprised. Because it was that same combination of farm-to-market roads and improved agricultural research and technology that transformed America, particularly the Middle West where I grew up and I dare say virtually all of the country, including here in Utah.

Infrastructure and agricultural innovation – that combination was the basis for the creation of the American land-grant college system in 1862 of which Utah State is a part. It is the lesson that almost all Americans have forgotten, including on many of the campuses of land-grant schools.

I was so fascinated by this transformative process of new roads and new rice that I wrote to the State Department to say that: I did not want to be assigned in Western Europe; and that I wanted to stay in Vietnam. Now normally when there is such clear evidence of mental instability, employees overseas are brought home immediately. However, the State Department was so desperate for officers to serve in Vietnam that they readily approved my request and I spent a total of six years in the country during the war.

Fast forward to 1990 when I was a senior State Department official still dealing with Vietnam and Cambodia in just four years. There were still 25,000 Khmer Rouge in control of most of the Cambodian countryside. Pol Pot and the Khmer Rouge, whose draconian total restructuring of Khmer society had taken the lives of approximately 2 million of the 7 million Cambodian population. As part of an international effort to help rebuild Cambodia, I had \$11 million of U.S. taxpayer money available. I told our aid officers to go into Thailand and rent all of the road grading equipment they could find and bring it to Cambodia and start repairing the roads that led into those Khmer Rouge areas.

At the same time, we would bring new agricultural know-how, including even more powerful rice seeds to the farmers long cut off from the government. I like to compare that approach to the process used to fight cancer. The agricultural technology is the chemotherapy and the roads are the blood vessels which deliver it to the Khmer Rouge tumor.

Over the next nine years, we built highways and supported an encouraged the Cambodian government to demine roads and upgrade them all over the country, spreading our medicine of agricultural development, education, and human rights into every Khmer Rouge stronghold. In March 1999, as I prepared to conclude my tenure as U.S. Ambassador to Cambodia, I received a phone call from the Prime Minister informing me that the last Khmer Rouge had just surrendered. We had, using the Borlaug formula of roads and rice, completely eradicated the single-worst genocidal, mass-murdering terrorist organization of the second-half of the 20<sup>th</sup> century.

As I retired from my diplomatic career and returned to Iowa to assume leadership of the World Food Prize, it was with considerable satisfaction but also trepidation for I was finally going to meet Norman Borlaug face-to-face. Fearing that he'd consider me an effete, fancy pants diplomat who grew up in the city, at our first meeting I hastened to tell him my story about being a foot soldier in the Green Revolution, about being in the villages of the Mekong Delta and of seeing firsthand the impact of miracle rice and roads. Borlaug slammed his fist on the table and should, "ROADS!" I thought I was about to be fired before I was hired. Borlaug said, however, that I was absolutely right, that roads were essential to uplifting people of out of poverty, hunger,

and malnutrition. Borlaug famously said, “If you want to feed Africa, build roads.” This would be the bond between us for the next decade as I endeavored to fulfill his vision of making the World Food Prize he created be seen as the “Nobel Prize for food and agriculture.”

For the last sixteen years, I have sought to promote Borlaug’s formula through our World Food Prize programs. **CUT 1** *The \$250,000 annual prize that we present each October in the magnificent Iowa State Capitol in ceremony that Borlaug himself said rivals those in Oslo and Stockholm at which he received his Nobel Peace Prize. The 45 Laureates we have honored over the last 30 years represent the all-star team that has led the single-greatest period of food production in all human history. At the same time, we hold our Borlaug Dialogue international symposium which draws 1,200 participants from 50 to 60 countries each year. Speakers at World Food Prize events in Iowa have included Vice President Xi Jinping of China, former UN Secretary General Kofi Annan, former Prime Minister Tony Blair, former president Joyce Banda of Malawi, business leaders such as Indra Nooyi as well as smallholder farmers and pastoralists from Africa, Asia and Latin America.*

*Bill Gates launched his African agricultural mission at the World Food Prize having done so because his staff told him that they had met a more diverse array of people at the World Food Prize than at any other conference they attended anywhere in the world. Included in the audience are 200 high school students and an equal number of their teachers from across the U.S. and from China and Africa, who are participating in our Global Youth Institute.*

In 2008, in a meeting at the State Department, I recounted my story about Borlaug roads and rice to Secretary of Defense Robert Gates, who interjected to say that every one of his U.S. military commanders in Afghanistan told him the same thing: “Where the road ends, the insurgency begins.”

In 2013, I had the enormous privilege of being invited to address United Nations World Food Day Observance in New York. In my remarks I told the story about the power of rural roads and agricultural technology.

I urged those officials and representatives to take the United Nations world hunger map and put it flat on the wall with the areas of hunger and malnutrition shaded. And then on top of that map place the world conflict map marking where terrorism, insurgencies, and internal conflict take place. You would see that these areas are largely coterminous. And then, if you were to superimpose upon those two maps an overlay of the world highway and rural road system, you would see that where the road ends, poverty, hunger, malnutrition, conflict, terrorism and human rights abuses all begin.

Perhaps the best example of this phenomenon is China, which over the last 35 years has raised half of its population above the poverty line. It did so in part by building and upgrading its rural farm to market roads. Southeast Asia, which was beset with war and conflict when I arrived 40 years ago, now has 95% road penetration, and is at peace. But Africa, with a significant share of the 900 million chronically food insecure people in the world, and another one billion who will be on that continent by mid-century, has only 45% rural road penetration.

So, with only 30 years until we will reach the figure of 9 billion people on earth, the lesson is clear: that the road to enhanced nutrition, decreased poverty, and peace, the road to overcoming the greatest challenge in human history, is paved. And Norman Borlaug is the inspiration for this endeavor.

## **CUT 2**

*In addition to the power of road and rice, the other significant lesson that I have learned over my career is the role that agriculture and food and confronting hunger can play in bringing people together across very broad chasms that divide them by ethnicity, nationality, religion, race or political and diplomatic differences. I have seen that, for example, in 2012 when our World Food Prize laureate was an Israeli-Jewish pioneer in micro-irrigation, Dr. Daniel Hillel, who had been nominated by three Muslim scientists from Arab countries. The Secretary General of the UN, Ban Ki-moon, came to help present the award. In the audience were Princess Haya bint al Hussein, the UN Messenger of Peace, Arab sheikhs, and an Israeli diplomat, all standing and cheering for this Laureate who had worked in Palestinian villages and Jordanian projects.*

Dr. Borlaug, who passed away in 2009, continues to be revered around the world. In 2014, on the occasion of the 100<sup>th</sup> anniversary of his birth, his statue was unveiled in the U.S. Capitol standing near Rosa Parks in Statuary Hall. Statues of Borlaug were also erected by farmers in Mexico and scientists in India. His last words, “Take it to the farmer,” were the theme for the National Agricultural Fair in Uganda. Most amazingly, in July 2014, I received an email message inviting me to take part in a ceremony commemorating the centennial of his birth that was being organized by the Agricultural Biotechnology Research Institute of Iran.

### **CUT 3**

*Since no other American diplomat or senior U.S. government official had ever been invited to speak at a government conference in Iran, I accepted but with great uncertainty about how I would be received. So, on August 26, as I stood before 400 Iranian scientists led by the minister of agriculture and a Mullah representing the Grand Ayatollah, it was with considerable trepidation. I told them of the heritage of Dr. Borlaug’s home state of Iowa, where, in 1959, at the most dangerous moment in all human history, when Soviet and American nuclear weapons, were posed to be fired at each other, Premier Nikita Khrushchev visited the Roswell Garst Farm where they talked about the high-quality of Iowa corn. This, in term, led to several decades of agricultural exchanges. None of which had anything to do with decreasing the capability of nuclear weapons but which had everything to do with lessening tension and building some modicum of understanding and thus easing tensions and making nuclear talks possible. Then I told them of being with Borlaug in Oslo on the 100<sup>th</sup> anniversary of the Nobel Peace Prize and of seeing another Laureate – Elie Wiesel, the Holocaust survivor – tell a Christian congregation how he had learned that people of different backgrounds who could come together and stand together and sing together and cheer together for the same accomplishment of achievement could live in peace together. And then I told the audience of Dr. Borlaug’s secret dream about biotechnology. That Borlaug who had fought rust disease in wheat all of his life envisioned that one day scientists using biotechnology would be able to take the trait within the rice plant that prevents it from ever developing rust disease, and using the tools of biotechnology transplant it into wheat, thus forever eradicating the scourge of rust disease from the face of the earth.*

*Then I said that there is an opportunity for you Iranian scientists, who believe so strongly in biotechnology to work closely with American scientists to fulfill Borlaug's vision. To that end I invited them to send their top specialist to Des Moines to attend the World Food Prize Borlaug symposium to begin this process – which they did. I concluded by urging them to imagine the day when Iranian scientists and American scientists would walk in together to receive Borlaug's World Food Prize for fulfilling Borlaug's dreams. As the audience filled with leaders and scientists of both countries were standing together and cheering together for this great common achievement, leaving unspoken but clearly understood, and living in peace together. When I finished, I received a standing ovation led by the Minister and the Mullah.*

Today we face the great challenges of confronting terrorism in the world from ISIS to Boko Haram and what I consider the greatest challenge in human history – sustainably and nutritiously feeding the 9 billion people who will be on our planet in 2046, the same year that Utah will celebrate the 100<sup>th</sup> anniversary of the Mormon Trek. These challenges must be met in the face of climate change and diseases such as Zika.

In confronting these struggles, the two-most significant resources America has are: first, Dr. Norman E. Borlaug, that person who in terms of life achievements is the single-greatest graduate of any land-grant institution, who is the greatest agricultural scientist America has ever produced and who is revered around the world, whose inspiration is needed more now than ever; and second, the land-grant university research system and the formula upon it was founded, and which Norman Borlaug carried forward and that I observed in Vietnam and Cambodia – the transformative power of agricultural technology and upgraded rural infrastructure. And yet...and yet, funding for agricultural research in America is going down and there are almost no courses at any land-grant university across America that teaches this powerful lesson; that teaches about the critical necessity of increased agricultural research and building and paving roads. To inspire the next generation – those students who must confront this greatest challenge – these two resources should be combined so that there would be such a course on the campus of every land-grant, and it should have the same title. Borlaug 101.