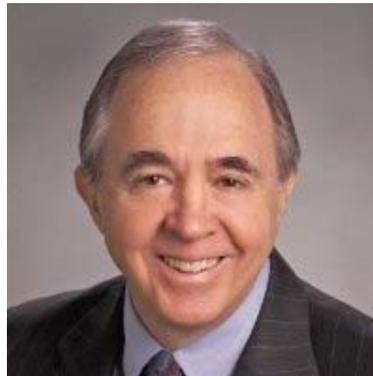


Commentary**Commentary****GLOBAL FOOD SECURITY IN PERSPECTIVE:
HOW DO WE MEET THE CHALLENGES OF A HOTTER,
DRIER, THIRSTIER AND MORE CROWDED PLANET?****A World Food Prize Lecture**

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Commentary

Thank you Shane [Cox] for your generous words, and for the invitation to join you for this special occasion in recognition of the partnership between *Simpson College* and the *World Food Prize*. It is particularly inspiring to be at Simpson, especially in view of your dedication to excellence and your progressive engagement in global affairs.

One need look no further than the opportunity you gave to a young student, *Dr. George Washington Carver*, and to your significant influence on this great man of science, to understand what your core values are all about. Gandhi's advice has not been lost on Simpson: "The best way to find yourself is to lose yourself in the service of others."

Let me also take this moment to acknowledge one of Simpson's esteemed graduates, *John R. Norris*, who earlier served as Chief of Staff to Governor Vilsack and later to Secretary Vilsack. A small world story directly related to my topic today – John currently is serving with distinction as FAS Minister-Counselor to the US Mission to the UN Hunger Agencies in Rome, a post I once was privileged to hold.

THE WORLD FOOD PRIZE AND IOWA'S HUNGER CHAMPIONS

Sometime we do not appreciate those things that are closest to home, but you should all understand that the *World Food Prize*, awarded annually, is indeed the *Nobel Peace Prize for Food and Agriculture*. As envisioned by *Dr. Norman Borlaug* it is to honor those who have made significant and measurable contributions to improving the world's food supply.

And the symposium that takes place during World Food Prize week, known as the *Borlaug Dialogue*, is – I like to say - the Super Bowl of policy forums on global food security. In its 28 years it has become our most important and valuable policy forum devoted to finding answers for a planet that is getting hotter, drier, thirstier, and more crowded. The Dialogue is quite simply the finest and most respected forum of its kind anywhere in the world. And its preeminence is not just from the world-class visionary leaders it attracts, but also from the solutions that emerge about our planet's most vexing problems.

And when we review our own nation's greatest champions of global food and nutrition security, Iowa undoubtedly has had an extraordinarily rich array of hunger legends. Of course, *Dr. Carver*, and his monumental achievements in transforming agriculture through plant breeding. But also *Herbert Hoover* who was in fact America's first great humanitarian to alleviate global hunger; his leadership in delivering food during and following WWI saved millions of desperate people from certain death. Eastern Europe today abounds with monuments to this great man; it is regrettable that our own country has not so recognized his uncommon contributions.

And the visionary Secretary of Agriculture, *Henry A. Wallace*, not only gave us so many contributions in plant genetics, soil conservation and farm economics, but he also was an early pioneer in nutrition programs to protect the largely forgotten urban poor.

Commentary

We should also note his father, Secretary of Agriculture, **Henry C. Wallace**, who worked tirelessly for our nation's farmers in the critical year after WWI. And, as mentioned earlier, **Norman Borlaug** who needs no introduction – the Nobel Laureate who “saved more lives than anyone in human history.” As his partner, **Dr. M.S. Swaminathan**, the “Indian Father of the Green Revolution” puts it, “Norman Borlaug was the living embodiment of the human quest for a hunger free world.”

And then let's not forget Iowa's distinguished opinion leaders today, those who are respected widely for their commitment to a more well nourished world – names like **Branstad, Vilsack, Harkin, Grassley, Ruan, Quinn, Newlin**, and so many others.

Finally, I would like to acknowledge your academic neighbor up the road in Ames. It is my privilege to serve as a Fellow at Iowa State's internationally-renowned **Seed Science Center**, under the able leadership of **Dr. Manjit Misra**.

WHY SHOULD WE CARE ABOUT HUNGER?

As we explore the condition of domestic and global hunger we also should examine why we care about this question. When we do, we come to understand that hunger affects each of us directly and substantially, whatever our faith, our politics, our economic circumstance, or our station in life.

Most of us believe that hunger is a profound **moral issue**, and further that there is no higher **commandment** in any major faith than responding to hunger and poverty.

Moreover, it is a critical **domestic economic issue** – the Center for American Progress recently calculated that hunger will cost US citizens \$167 billion annually, measured in malnutrition terms, hospitalizations, lost job opportunities, diminished outcomes in education, absenteeism, suicides, depression, and costs to charities. And for the business community hunger is a serious issue, negatively impacting bottom lines, the broader business climate, and our trading markets.

Beyond those reasons, hunger is a critical issue of **national security** and global political stability; the distinguished USDA Under Secretary, **Dr. Catherine Woteki**, perhaps put it best: “I think we're at a daunting recognition in this country of the fact that food and the related water issues are likely to be as big a national security issue in our future as our concerns over the last 50 years on nuclear proliferation and terrorism.”

I would add that no **definition of national security** is complete unless it embraces child nutrition, education, and environmental protection. The man often called America's greatest soldier never lost perspective about this paramount issue, even after he led the liberation of Europe: “Every gun that is made, every warship launched, every rocket fired signifies, in the final sense, a theft from those who hunger and are not fed, those who are cold and are not clothed... The peace we seek, founded upon decent trust and cooperative effort among nations, can be fortified, not by weapons of war but by wheat.” “*The Chance for Peace*”, **President Dwight D. Eisenhower**, 16 April 1953.

Commentary

WHO ARE THE HUNGRY?

To appreciate the challenge we have before us, it is useful to have a snapshot of just where we stand on hunger – both locally and nationally (from the Food Research & Action Center – FRAC) and globally (from United Nations sources):

Iowa, with a population of 3.1 million:

- 115,000 children living in poverty (16%)
- 55,000 households experiencing hunger
- 420,000 Iowans participate in Supplemental Nutrition Assistance Program (SNAP)

US, with a population of 310 million:

- 49 million Americans live in food insecure households (15%)
- 16 million of those food insecure Americans are children (nearly one million chronically hungry)
- 46 million on SNAP in recent month (only 8% were cash welfare recipients)

Global hunger: with a planet of 7 billion:

- Child dies of hunger ever 6 seconds
- That's around 25,000 people who die each day
- In fact, hunger causes the deaths of more people than AIDS, Malaria, TB combined
- More hungry people than the combined populations of US, Canada and EU
- Around 25,000 people die each day of hunger
- Nearly 1 billion will go to bed hungry tonight (1/7 of the world)
- Worldwide 1 in every 3 children is malnourished
- 180 million children stunted, irreversibly – will never have a normal life, and are at dramatically increased risk from infectious disease
- 19 million children are severely wasted – low weight for height
- Diarrheal deaths kill 1.5 million children each year (5,600 dirty water deaths daily)

OUR GLOBAL FOOD & NUTRITION CHALLENGE

“In the next 40 years we must produce as much food as we have in the last 8,000 years”, according to former World Food Program Executive Director Josette Sheeran. And, at the same time, World Wildlife Fund’s Jason Clay warns us that “Food production is the biggest threat to the planet today, whether to habitat, to biodiversity, to deforestation, to water take, to water effluence, to chemical use, to greenhouse gases”. “...and yet there is nothing more critical to our daily survival. The challenge is to reduce the negatives while maintaining and growing the benefits.” This advice from Jack Bobo, Senior Advisor for Biotechnology at US State Department.

Commentary

GLOBAL FOOTPRINT OF AGRICULTURE

Agriculture has an imposing global footprint. In fact, the Director of the Institute for the Environment at the University of Minnesota, Jonathan Foley, recipient of the prestigious Heinz Award, calls agriculture “the most powerful force on this planet since the ice age.”

Agriculture’s global footprint indeed is sobering:

- 30% of all Greenhouse Gases
- 40% of all global land use
- 60 times larger land area than all of world’s cities
- 70% of all fresh water
- 80% of Deforestation, Habitat & Biodiversity Loss

And even with these imposing numbers, the Gates Foundations’ Josh Lozman reminds us that “agriculture is greatest lever to reduce global poverty.” The challenge now – as FAO advises us – is for agriculture is to produce 70% more food by 2050, with less land, less water, less fertilizer, and fewer pesticides.

GLOBAL STRESS POINTS – ASTEROIDS

As we survey those “stress points” that most endanger our planet, leading the list must be global population, climate change, and water scarcity. Bipartisan Policy Center co-chair, and former Secretary of Agriculture, Dan Glickman calls them “asteroids”, or those things coming at us that could wipe us off the face of the planet.

Global population

No discussion about food and nutrition security is complete without sharing some perspective about the *demand pressures* on global food availability. Principal among these demands are our burgeoning global population, increasing worldwide affluence, heightened appetite for animal-sourced protein (especially in East Asia), and the race to meet the rising demand for plant-based biofuels.

The policy issues surrounding “population” can be particularly sensitive, especially as they may relate to concerns of conscience or religious ethics. My analysis does not go there; it does not need to go there. To deal effectively with the “population problem” in the context of food security we can stay within the bandwidth of agricultural development, nutrition, and education.

Just to recall where we stand today, let’s glimpse a snapshot of some well-worn numbers and concepts about population. In just over one century our planet has gone from 1.6 billion to more than 7 billion people, and will approach 9-10 billion by 2050. While we have already reached “peak child”, the coming population surge is due to better health and greater affluence, resulting in longer lives; all of this adds up to at least a 70% increase in global food production required by 2050 – in significant part

Commentary

because, according to the UN, about 3 billion people will add animal protein to their diets.

Of the more concerning population flashpoints, each week 1.2 million people pour into our world's cities. Put another way, the planet will add the equivalent of two more Chinas by 2050. And, for one particularly striking example of our daunting challenge, from the Population Reference Bureau, Ethiopia has grown 800% in just three generations – and its population is projected to double in another generation.

Climate change and consequences

It seems quite remarkable – and deeply concerning – that today even in the face of withering evidence about the severe impacts of climate change some policy leaders in the US and elsewhere continue to be in denial or deeply skeptical. Public attitudes are followed by conforming public policies, including the resources to support those policies. To the extent that seriously accepted science about climate change is challenged, the needed resources will not follow. In the case of climate change the consequences of such a policy scenario would be disastrous – especially if it short circuits the substantial benefits that come from investment in agricultural science.

Why is it so critically important that we make accurate assessments about the impacts of climate change? Because – confirming the recent findings of the Intergovernmental Panel on Climate Change (IPCC) - all of the world-class scientists who have studied this issue agree on **three fundamental points about climate change**: 1) it is real, 2) it is here, and 3) its consequences are and will continue to be increasingly devastating. What are those consequences:

- Higher Temperatures and extreme weather patterns – droughts and floods
- Rising Sea Levels with Flooded Cities & Cropland Loss
- Acidification of Oceans
- Lower Crop Yields & Food Price Volatility
- Damage to Agricultural Ecosystems and Extinction of Animal & Plant Species
- Loss of Access to Safe Drinking Water
- Rise in Plant Diseases & Pests
- Increase in Infectious Diseases of Humans & Food Producing Animals
- Worsening of Poverty & Increasing Refugee Crises
- Accelerating Violence from Water & Food Scarcity
- Severe economic disruption
- Inability of Industry to Source Product

In his forward to a recent UN report, Under-Secretary General for Environment Achim Steiner wrote that the “analysis reveals a worrisome worsening trend. Continued emissions of greenhouse gases will lead to an even warmer climate and exacerbate the devastating effect of climate change.”

Commentary

We must have a rigorous response to these consequences of climate change – on both policy and resources. And, these efforts must address strategies to *adapt* to climate change (e.g., no-till farming, biochar, reforestation, nitrogen use efficiency) as well as to *mitigate* its impact (e.g., prominently through biotechnology – including drought tolerance, disease resistance, nutrition enhancement, and pest resistance). This response must come from the national governments, the UN, development partners, foundations, the research community – from all of our institutions who are prepared and committed to deal with what is arguably the most important issue of our time.

Water scarcity

The impact of climate change on global water scarcity is profound; let's recall some of the most concerning aspects. NASA advises us that only about 2.5% of the Earth's water is fresh water (most of that locked away in glaciers), and that agriculture uses about 70% of available fresh water.

On top of that 12 to 15 of the world's largest rivers (including the Colorado, the Indus, the Yellow) often do not reach the sea. Moreover, the Aral Sea in Central Asia, formerly one of the four largest lakes in the world, is now only about 10% of its original size.

Complicating our increasing scarcity of water is our burgeoning urban population, expected to grow from the current 50%, to nearly 70% of total global population by 2050. Accompanying this dramatic demographic shift will be the sharply increasing political power in developing world urban centers. These political leaders will be demanding more and more of available fresh water for their constituents – both for drinking and to respond to the 2 billion people who today lack access to sanitation. So, the ultimate dilemma: if farmers cannot get water how will they produce our planet's food?

BEST POLICY SOLUTIONS

In our quest for a world free from hunger and malnutrition we must look to our best answers. What I suggest here is not intended to be exhaustive, but rather those avenues that offer the most effective solutions. Let me add that for any of these solutions to be successful there must be collaboration among all of our engaged institutions, including public-private partnerships – so well exemplified by the World Food Prize Borlaug Dialogue.

Promote good governance

The quality and policies of governments lie at the heart of global food security, and most of the root causes of hunger can be traced back to a nation's governance. Much of our policy conversations focus on contributory work of the UN, the World Bank, and other international institutions. But the reality is that citizens are principally reliant on their own national governments. The words of the great Nobel Laureate Dr. Armatya Sen speak volumes about the importance of responsive governments: “No famine has ever taken place in the history of the world in a functioning democracy.”

Commentary

So we must *encourage sound policies by the governments* of nations – well-supported nutrition policies, smart environmental policies, enlightened trade policies, land reforms that empower women, and respect for the rule of law. As one observer put it: “The root cause of hunger isn’t a scarcity of food or land; it’s a scarcity of democracy.” That is why it is so encouraging that the visionary leadership of the Presidents of Ghana and Brazil was recognized recently with their being awarded the World Food Prize. Their transformational example can serve as a model for nations around the world to improve the lives of their people.

Support agricultural research & biotechnology

Of all policy interventions to effectively combat food and nutrition insecurity, *agricultural research* is among the most tangible, most effective, and most powerful weapons we have – whether combatting climate change, improving seeds, increasing yield, enhancing nutrition, making water safer to drink, reducing post-harvest loss, or eradicating diseases of humans and food producing animals. Worth noting here is the impressive progress on Smallpox, Rinderpest, and Guinea Worm Disease.

And, to illustrate, let me cite an example – close to home - of agricultural research at its most impressive – the *Global Food Security Consortium*. GFSC is a worldwide initiative centered at Iowa State University, and includes research partners from other universities and research centers, the UN, USDA, agricultural companies, and NGOs. *GFSC* is an open network of experts devoted to the goal of global food and nutrition security.

Within agricultural research, let me also underline the central importance of *biotechnology* in effectively dealing with these intractable global challenges. Despite the rapid adoption of genetically modified (GM) crops by farmers in many countries, controversies about this technology continue. Uncertainty about GM crop impacts is one reason for widespread public suspicion – even though there is no evidence of harm to human health or the environment. The most important point is that our policies on these issues always must be grounded in science.

The University of Goettingen has recently concluded a meta-analysis of the agronomic and economic impacts of GM crops to consolidate the evidence. The *analysis covers 147 original studies* that were carried out internationally over the last 20 years. On average, GM technology adoption has *reduced chemical pesticide use by 37%, increased crop yields by 22%, and increased farmer profits by 68%*. The meta-analysis reveals compelling evidence of GM crop benefits. Such evidence may help to gradually increase public trust in this much-needed technology. The results have now been published in PLOS ONE.

Prioritize early child nutrition – “1,000 days”

Our country’s support of international agricultural and economic development in many respects represents the very best of who we are as a people. It speaks to our understanding that we live in an interdependent world where global stability is a

Commentary

paramount goal. It also reflects our compassion as members of a larger society. Historically, our foreign aid has focused on many worthy initiatives - capacity building, technical assistance, infrastructure, and so on.

Regrettably, we have not given sufficient focus to the most critical issue among these objectives – *early child nutrition*. We spend millions on these important development initiatives, but fail to understand that if a nation’s children grow up malnourished and stunted, then all of the other development objectives are severely compromised. It is the *linchpin* for everything else we try to achieve in international development policy, and supports all of the *UN Millennium Development Goals*. World Food Prize Laureate Catherine Bertini reminds us that “in no country is child nutrition a high enough priority – including our own.”

The so-called *1,000 Days Initiative* is the direct recognition that the most critical time in a child’s mental and physical development is from conception through the first two years of life – in other words 1,000 days. The data is now conclusive that if children are denied animal sourced protein and micronutrients during this crucial period they will never have a normal life - the stunting that results is *irreversible*.

On the positive side, the British medical journal *Lancet* reports that better nutrition during the 1,000-day window can boost a child’s IQ, improve her chances of earning an education, and increase her lifetime earnings by up to 46 %. It is most encouraging that early child nutrition is now getting increased attention in international development agendas.

Invest in women and girls

Just a word about the role of women in agriculture. One of the greatest challenges for our next generation is closing this “gender gap.” The *core of this problem* is that women are denied access to education, extension services, bank credit, land ownership, livestock, seeds, and other productive resources. Eliminating these economic, legal and social barriers is an absolutely crucial piece of our strategy for a world free from hunger. For the 1.1 billion women who are farmers, the UN Food and Agriculture Organization (FAO) estimates that this achievement alone would lift 100-150 million people out of hunger.

Although global forums abound with lip service about the *need to empower women*, the reality is that our international institutions – and member governments – are far behind the curve on this noble goal. That about 50% of the farmers of the world are women, and that they are allowed less than 5% of technical assistance to agriculture, should be unacceptable to every opinion leader in both government and civil society.

In far too many places women have all of the responsibility for everything important to family and children, including the producing of food, while men nearly exclusively control the economic levers of government policy, land tenure, educational opportunities, and financial resources. *Empowerment of women*, particularly including their education when young, is at the heart of the matter on global food

Commentary

security. Women are the key to our goals on child nutrition, as well as on agricultural productivity.

Reduce postharvest loss & food waste

Postharvest loss is another critical issue that must get renewed attention and support. The main concern here is that 95% of our research funding on perishables goes to food production, and less than 5% is devoted to postharvest loss. Why is this out of balance? Because globally we lose 50% or more of fruits and vegetables after they are harvested. Moreover, the UN Environment Program informs us that “every year, consumers in rich countries waste almost as much food as the entire net food production of sub-Saharan Africa.” Imagine the pressure we could take off of the food security equation if we could save what is already being produced. This could be a game changer.

Improve agricultural productivity and trade

Improving Agricultural Productivity is also one of our best answers. Former Under Secretary of USDA, Dr. JB Penn, has calculated that just one century ago an American farmer fed about 9 people (i.e., his family), whereas today one farmer feeds 144 people (i.e., her community). So, we should always remember with special appreciation that farmers really do feed the world!

Liberalization of agricultural trade is another essential component of our most important policy solutions for a world free of global food and nutrition insecurity. US agricultural exports, on an annual basis, today are about \$145 billion. Darci Vetter, Chief US Ag Trade Negotiator, summed it up nicely in her recent remarks at a forum sponsored by Center for Strategic and International Studies: “Trade is essential if we want to reach that overall definition of food security...good trade policy is good food security policy.” She added: “The purpose of trade is to move goods that are in surplus to areas where they are in deficit...that is what we have to do in an era where we have this growing population by 2050 and where we have different capacities for production of different kinds of agricultural products.”

LESSONS WE HAVE LEARNED FROM NORMAN BORLAUG

Since this is the centennial year of Norman Borlaug’s birth, it seems especially appropriate to remember the enduring legacy he left for us. Recently, Dr. Ruth Oniang’o, Chair of the Sasakawa Africa Association, invited me to characterize my view of the lessons that Borlaug gave us. Here was my response:

- No nation is healthier than its ***children*** or more prosperous than its ***farmers*** (*with a nod to the words of President Truman*)
- The work of agriculture always must be ***grounded in science*** and a search for the best answers – no matter how unpopular they may be
- On issues of global sustainability, we must ***stand up to naysayers*** whose “world view” is colliding with scientific evidence
- Institutions have an obligation to ***educate the public*** – and not to inflame their unfounded fears about the frontiers of food and agricultural science

Commentary

- To get the necessary resources, we must give science a “*human face*” – these issues always are about the wellbeing of people

To best capture Borlaug, however, is perhaps to do so in his own words: “The first essential component of social justice is adequate food for all mankind.”

AGRICULTURAL SCIENCE MUST HAVE A HUMAN FACE

Please let me close with what is perhaps my most important point. With respect to the “human face of science”, too often we do not seem to grasp that we must tell the story of the extraordinary contributions of science with more sensitivity. While it is expected that scientists would talk with each other in their own jargon, at some point the *message about the ultimate beneficiary* of that science – the farmer, the patient, the customer, the diner, the student, the taxpayer – *must be clearly communicated* to the policymakers and other stakeholders responsible for insuring those resources. It is critical that we explain effectively the larger benefits of agricultural science, to insure political will which in turn gives us increasing public support.

To cite a few examples: *Climate change* is not just about Polar Bears on ice floes and rising sea levels, but about human suffering and starvation. *Food price volatility* is not just about speculation in commodities markets, but about a mother’s desperate efforts to afford a micronutrient rich diet for her children. *Codex* – the internationally recognized standard setter for food safety - is not just about MRLs and risk analysis, but about whether farmers can export their cassava and whether village families will be blessed with safer food. “*Golden Rice*” is not just about a new genetic trait, but about hundreds of thousands of children spared from the agony of Vitamin A deficiency. To gain the resources needed for science to do its job, we must talk with people who influence public opinion in their own language. Agricultural science always must have a human face.

Thank you, and God bless you.
