

A 21st Century Green Revolution

Our Team

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An International Science Agenda for The United States and The World

Senator Lugar and The Lugar Center (TLC) have a long history in working on global food security policy and related science issues. Going forward, our work focuses on building support and momentum for US leadership of a 21st Century Green Revolution with a defined list of priorities reflecting the current and anticipated state of global agriculture. To date, prioritizing science and scientific collaboration has been a weak component of existing global food security programs. With the start of a new administration and new Congress, and the commitment to take up a number of key legislative policy vehicles, we believe there are both challenges and opportunities that necessitate renewed advocacy of a global science agenda that benefits all farmers and consumers. We look forward to building a coalition of like-minded organizations committed to ending global hunger through science.

The Science Challenge

The first Green Revolution (1950-1970), led by the work of Norm Borlaug is credited with saving millions of lives with its concentration on raising crop productivity through scientific advances around improved inputs and farming techniques. The present-day global food and agriculture system will continue to be under enormous pressures that can only be ameliorated by greater investments in science. To feed a world population of nearly 10 billion by 2050 will require not just greater productivity, but smarter productivity that recognizes the environmental challenges of climate change, stresses on water and soil resources, the demands of a more urbanized global population and changing preferences for more protein-rich diets.

While not all areas of the world benefited equally from the first Green Revolution, it formed the basis for international scientific collaboration around a common agenda with benefits that lasted decades. Investments in agricultural research and development have been shown to pack a powerful punch for development. Studies have demonstrated a rate of return of nearly 10 percent with these types of investments. No other investments in any other topic area to date have been able to demonstrate these rates of return. A 2009 Senate Foreign Relations Committee report on 10 countries with varying levels of food insecurity found that those having a reasonably-resourced agriculture university have greater food security and less hunger.

In recent decades, public funding of agriculture sciences has stalled, and in some instances, declined. Despite recent US leadership on global agriculture that has motivated commitments from other international donors, public investments in international agricultural science and technology have lagged far behind. Even more distressing is the lack of commitment to international university collaborations that had been a hallmark of US programs in past decades. African universities are poorly resourced in both human and institutional capacity. According to Agriculture Science and Technology Indicators (ASTI), about half of the countries in Sub-Saharan Africa have had annual negative growth rates in the levels of public R&D devoted to agriculture. A 2014 ASTI report cited an inability to replace researchers, many US-trained, who will soon retire, as well as low salaries and donor dependency, as factors contributing to the decline in university and research capacity. Often, students come to the United States for advanced degrees in agriculture but then return to schools that are unable to support their research or train their own graduate students.

There are many benefits to having strong agriculture universities in developing countries. They set the stage for greater investments in local and orphan crops. The Ethiopian staple crop Tef, for example, may not be of much interest to researchers in the American Midwest, but its value in East Africa is well understood. Local botanical resources are important sources of food and pharmaceutical products that not only hold the potential of

providing global benefits but also would receive greater attention from local scientists. University partnerships provide frameworks and working relationships to respond to plant and animal disease outbreaks that could threaten staple crops around the world. These benefits will not be realized without proper investments and stronger collaborations.

A 21st Century Green Revolution should focus on the following components:

1. **Widen productivity gains** of not just global staple crops, but of indigenous and orphan crops upon which millions rely for basic nutrition and income.
2. **Build resilience to climate change** for farmers of all sizes. Looming over all our hopes for eliminating hunger is the threat of climate change because it has the potential to alter the basic assumptions upon which both global and regional agriculture function.
3. **Increase access to science**, extension services and technologies so that farmers can make informed choices for what best suits their purposes, with a focus on smallholders, the majority of whom are women.
4. **Advance health and nutrition** of crops, animals, and people. Science has already shown us the benefits of bio-fortified foods. It can also do the same for plant pests and disease, animal health, and sanitary and phytosanitary (SPS) issues.
5. **Strengthen foreign universities working on agriculture.** Increase the human and institutional capacity of universities in food insecure regions so they can partner globally in sharing knowledge with a focus on science related to local crops, the veterinary sciences and health sciences and the local conditions that affect them.

A 21st Century Green Revolution will have the greatest impact if it is characterized by inclusivity for all farmers, but with a special focus on smallholders and women who often get left behind. It should remain unbiased with regard to types of farming

approaches. The often rancorous debate between genetic engineering and what some call non-GMO is unproductive and may soon be outdated as new gene editing processes come online.

Why TLC is Well Positioned on Science

The TLC approach to food security has always advocated for the elevation of science. As the former Chairman of both the Senate Agriculture, Nutrition, and Forestry Committee and the Senate Foreign Relations Committee, Senator Lugar holds political and policy credibility in calling for greater and more focused investments in international agricultural science agenda. TLC resources (GE FAQs and Resources for Researchers) have focused on science and climate change issues, biodiversity, genetic engineering, and orphan crops. Lugar is one of the few Republicans to take a public stand on the need to address climate change particularly as it applies to agriculture.

In 2009, Lugar authored the Global Food Security Act and commissioned a related staff study on the causes and consequences of food insecurity. That work, among others, informed the creation of President Obama's Feed the Future Initiative. At the 2014 Feed the Future Global Forum, Senator Lugar called for Congress to authorize global food security legislation, which was subsequently passed and signed into law in 2016. The law represents a commitment between the legislative and executive branches of the US government for US leadership in global food security policy.

Opportunities of a Science Agenda

A Green Revolution for the 21st century will have enormous benefits for American agriculture, universities and the US economy. Even with President Trump's advocacy of an America First approach, the new administration has not been more receptive to calls for a science agenda. Science research benefits American farmers in ways that increase productivity, conserve resources, and protect the environment. Increases in environmentally friendly agricultural productivity and growing economies in the developing world enable US farmers and agricultural product companies to

export more. And collaboration among scientists prevents the outbreak and spread of plant and animal disease that can decimate crops, livestock and undermine whole economies. It will help us achieve a more peaceful and prosperous world in which no one goes to bed hungry.

About The Lugar Center. The Lugar Center mission is to identify solutions to global problems that will define the 21st century. The Center seeks to educate and motivate the public, policymakers, and future leaders on critical issues such as global food security, controlling weapons of mass destruction, foreign aid effectiveness, and bipartisan governance.

The Center works to keep global food security at the forefront of public policy debates and to educate government leaders, the foreign policy community, and the public on the need for U.S. leadership. TLC seeks to foster a better understanding of the overall food security and global agriculture challenge and to encourage a more productive and bipartisan debate on its related issues. TLC puts special emphasis on the role of science and evidence-based approaches that will alleviate global poverty and hunger and counter skepticism around the issues of science-driven solutions and climate change. It is informed by a commitment to foreign assistance effectiveness principles that can help to overcome political and budgetary resistance to foreign assistance that supports agricultural development and global food security.