



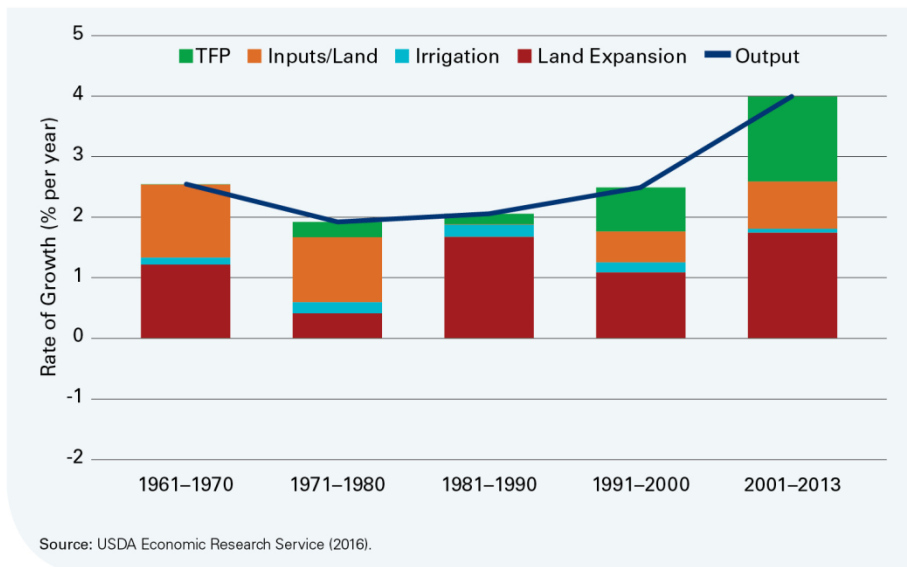
Feeding a Growing World

March 16, 2017

Testimony by Dr. Jay Akridge, Dean of Purdue University Agriculture, at the House Agriculture Subcommittee on Biotechnology, Horticulture and Research

According to the U.S. Census Bureau, the United States gains one new person every 16 seconds; the world gains a new person about every half a second⁴. At present rates, the global population will reach 9.6 billion by 2050, and experts believe that agricultural productivity must increase 25 - 100% from current levels to feed a global population of that magnitude⁵. The challenge here is more than producing calories, it is about providing proper nutrition for a growing population⁶. And, this challenge is more than a food security issue, it is a national security issue as food insecurity and political instability are tightly linked⁷. This task is also made more challenging by a variety of factors: limited land and water resources, increasingly variable weather, natural a variety of factors (pests and weeds resistant to insecticides and herbicides, for example), societal attitudes toward science and technology, and barriers to adoption of improved farming practices globally.^{8,9}

Figure 3 – Sources of Growth in Agricultural Output in Low Income Countries
Source: 2016 Global Agricultural Productivity Report®, Global Harvest Initiative

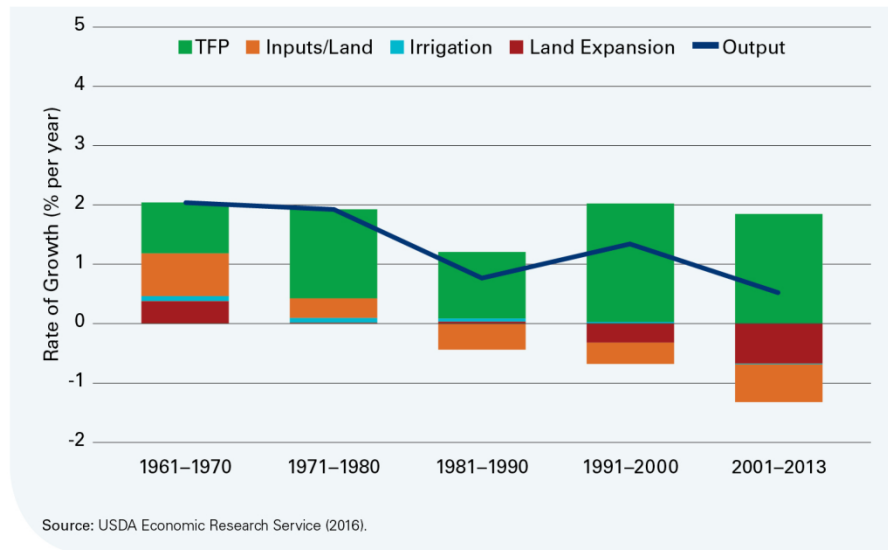


The Global Harvest Initiative (GHI) has worked to quantify the challenge of feeding a growing world and measuring the current status of our ability to meet that challenge. The charts above and below are from the GHI's 2016 Global Agricultural Productivity Report and demonstrate the profound difference that Total Factor Productivity (TFP) has made in the developed world over the past 50 years. TFP is the ratio of agricultural outputs (gross crop and livestock output) to inputs (land, labor, fertilizer, machinery and livestock). When TFP

rises, more output can be produced from a fixed amount of inputs. TFP growth can result from increased effectiveness of inputs, more precise use of inputs, or adoption of improved production practices.¹⁰

Figure 2 – Sources of Growth in Agricultural Output in High Income Countries

Source: 2016 Global Agricultural Productivity Report®, Global Harvest Initiative



GHI reports that TFP must grow by 1.75% annually for the world to double agricultural output through productivity gains by 2050. Investment in agricultural research will be a fundamental determinant of whether or not this level of productivity growth is achieved.

According to the GHI's 2016 Global Agricultural Productivity Report, "Agriculture research and development (R&D) and extension programs are essential public goods and the principal drivers of TFP. Along with private sector and collaborative research, public R&D in agriculture plays an essential role in fostering agricultural innovation systems." The report goes on to state that publicly funded agricultural research generates technologies and innovation that enhance farmer productivity and competitiveness, reduce waste in the food value chain, and ultimately benefit consumers through lower prices and improved access to safe and nutritious food.

⁴ <https://www.census.gov/popclock/>

⁵ Hunter, M.C, R.G. Smith, M.E. Schipanski, L.W. Atwood, D.A. Mortenson. "Agriculture in 2050: Recalibrating Targets for Sustainable Intensification." *BioScience*, February 22, 2017.

⁶ Jones, A.D. and G. Ejeta. "A New Global Agenda for Nutrition and Health: The Importance of Agriculture and Food Systems". *Bulletin of the World Health Organization*. 2015-94:228-229.

⁷ Ejeta, G. "Revitalizing Agricultural Research for Global Food Security". *Food Security*, Volume 1, No. 4 (2009).

⁸ Glickman, D. "A Food and Agricultural Research Agenda to Deal with the Asteroids of the Future". 2014 Charles Valentine Riley Memorial Lecture, June 4, 2014

⁹ Baldos, U.L.C and T.W. Hertel. "Global Food Security in 2050: The Role of Agricultural Productivity and Climate Change." *Agricultural and Resource Economics*. 58:2014.

¹⁰ 2016 GAP Report: [http://www.globalharvestinitiative.org/GAP/2016 GAP Report.pdf](http://www.globalharvestinitiative.org/GAP/2016%20GAP%20Report.pdf)