

**ABSTRACT: Ewing Marion Kauffman Foundation White Paper - AgTech: Challenges and Opportunities for Sustainable Growth, April, 2014**

<http://www.kauffman.org/newsroom/2014/04/agriculture-tech-advances-opportunities-for-entrepreneurs>

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**Summary:** This paper, produced by Suren Dutia on behalf of the Kauffman Foundation, provides an overview of an emerging economic sector focused on *sustainable agricultural technology*, or “AgTech.” This sector is seen as increasingly important as the world’s population is projected to grow to 9B people and total demand for food is expected to increase 70 percent by 2050. Combined with the growing demand for biofuels and meat for consumption due to increasing prosperity (which places large demands on crops and water), the key question is: how are we going to feed everybody in a way that sustains the planet? According to the author, the answer is AgTech, which has the potential to completely reshape global agriculture by dramatically increasing productivity while reducing the environmental and social costs of current agricultural production practices. These twin challenges of productivity and sustainability translate into countless opportunities for visionary entrepreneurs to innovate across the complete value chain, from inputs and agricultural production to transport, processing, distribution, storage and waste disposal. The author identifies five major areas in which public and private sector efforts can help drive forward the development of AgTech.

**Educate and promote the need and opportunity for AgTech:** In order to understand the need for innovation, investment and public policy direction supporting AgTech, people must first understand the major challenges of meeting the rising global demand for agricultural products while staying within “planetary boundaries.”<sup>1</sup> Six of the 10 boundaries are especially relevant to global agriculture: climate change (agriculture contributes 13.5 percent of global GHG emissions), biodiversity loss, nitrogen cycle, phosphorus cycle, global freshwater use (agricultural production accounts for roughly 92 percent of total human water usage), and global land use (agricultural cropland is 11.7 percent of total global land cover).

**Increase the capital flow to AgTech:** Agricultural is one of the world’s largest economic sectors, with global net farm income of approximately \$120B and farm assets of \$2T. Yet there has been relatively little investment in AgTech compared with other industries like clean energy. Venture capital firms compiling portfolios of new AgTech companies are seeing startups seeking more funding than is currently available, and other investor groups thus far have not entered the field in significant numbers. Given the size of the potential market and the vital societal need for agricultural innovation, the author expects that investors will soon realize the opportunity of AgTech and invest substantially in this emerging field.

**Develop human capital to meet the needs of tomorrow:** The solutions that may be available to address the expected food and water shortages will likely require expertise in the development and application of technology. This expertise currently is not broadly available within the agricultural community and needs to be developed through the whole continuum of our existing learning institutions, including high school, trade schools, community colleges and other higher education institutions.

**Transition to new technology around the theme of “green and lean” efficiency:** We must shift from the scale-driven efficiency that was part of the “Green Revolution” of the last century to a lean and sustainable efficiency that Johan Rockstrom terms the “Evergreen Revolution.” After sixty years of chemical control, farming is now entering an era of responsible, transparent and ecological control, driven in part by consumer demand. AgTech is at the cusp of a new revolution in which innovations in seeds, nutrition, protection, and agronomics are merging. Experts have pointed to similarities with the information technology (IT) field, in which leading players have embraced convergence and interdependence in Internet search, cloud storage, smartphones, tablets, and PC’s and still carve out their own space to

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<sup>1</sup> A landmark 2009 study in the journal *Nature* first proposed the concept of planetary boundaries, or geophysical thresholds that, if crossed, could be dangerous to humanity.

effectively compete. AgTech must go through a similar revolution wherein the players will unite to implement state-of-the-art developments leading to integrated agricultural productivity.

**Regional AgTech entrepreneur support systems to accelerate innovation:** The author believes that the American heartland (12 total states) provides an ideal example of a region poised to make great strides forward in developing an entrepreneurial sector for AgTech. The heartland has some of the world's best growing conditions and natural resources, and currently produces 27.2 percent of the world's corn, 29.8 percent of its soybeans, 6.7 percent of its beef, and 6.9 percent of its pork, making this region an epicenter of agricultural activity. The Potsdam Institute for Climate Impact Research identified the U.S. heartland and central Europe as the two most fertile areas in the world based upon climate, soil and water constraints. The heartland also houses some of the world's largest and most progressive agricultural processing companies, has highly developed transportation networks, and world class research capabilities through its land grant universities. Taken together, these resources indicate a regional competitive advantage in AgTech, similar to what the Silicon Valley cluster has provided for the IT industry. For these reasons, the author believes a concerted effort to develop a regional AgTech entrepreneurial support system will result in immense benefits for the region itself and set an example for other agricultural communities across the world.