

RISKY BUSINESS

What You Need To Know About...

Advancing Technologies on the Farm

In 1900, 41 percent of the labor force worked on farms. Today, that number is less than two percent.¹ As the labor force shrinks, the demand for farming continues to grow. Only through the use of emerging technologies can farmers overcome these modern-day challenges to keep up with demand.

HOW FARMING CAN BE IMPROVED:



1/3 of all food produced is lost or wasted every year, losing \$940 billion for the global economy.²

Why?

20th century techniques in:



Planting



Harvesting



Water Use



Trucking

Increased loss of crops from:



Weather

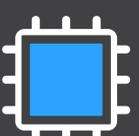


Pests



Consumer Demand

PROGRESS OF NEW TECHNOLOGY TRENDS:



The farming sector is transforming as a major focus of significant **innovation**. Technology is finding its way into agriculture for more output from less acreage.

How are new technologies advancing agribusiness?

EQUIPMENT:



Bigger, better tractors.

GPS accuracy within one inch will reduce fuel use up to **40 percent**.³

AutoSteer will allow for **autonomous tractors**. Currently sold by four major manufacturers.

Software to increase productivity.



The software market for farm management will increase **14 percent** by 2022.¹



More telemetric, precision mapping and variable rate technology for planting will remove uncertainties that lead to lost crops.

Robotics for speed and precision.⁴



Increase in revenue up to **\$74.1 billion** by 2024.



Solution to **labor** shortage and higher minimum wages.



Up to **90 percent less** pesticide, herbicide and fertilizer use.



Faster weeding, seeding, spraying and harvesting for less spoilage.

AUTOMATION:

Data-driven farming.

Crop sensors to measure sunlight, soil moisture, nitrogen levels and pest pressures.

Tractors connected to an online mapping system.

Through sensor technology, engine replacement parts are automatically ordered via an Internet protocol address.

BIOTECH CROPS:

More food at a lower cost.

Genetic engineering can modify a plant's photosynthesis process **up to 20 percent**.⁵

Biotech crops need less plowing, less fertilizer and less labor.



1994 Over 20 years, biotech crops decreased pesticide use by **583 million kgs**.⁶ 2014

CULTURED OR CLEAN MEATS:

Huge savings in resources.

Raising Cattle

Producing the meat for one 1/4 pound burger requires

74.5 sq. ft. of land

52.8 gallons of water

1,086 btu of heat

6.7 pounds of grain

Plant-Based Meats⁷

Cultured meat can use:

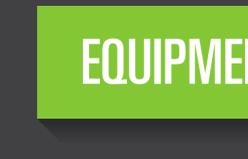
99% less land

96% less water

96% less greenhouse gases

With these new technologies, we may be able to soon increase crop yields by **50 percent per acre**.

EQUIPMENT BREAKDOWN PERSPECTIVE:



As electronic components are increasingly embedded into modern-day equipment, the risk of electrical breakdown continues to rise.

Business interruption and equipment replacement costs may increase significantly as robotics and automation replace manual tasks.

By 2020, **75 million** agricultural IOT devices will be used to aggregate historical crop yields, climate data and more.⁸



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References

- ¹ The Economist <https://www.economist.com/node/21698612/help/accessibilitypolicy>
- ² Forbes <https://www.forbes.com/sites/timparapani/2017/03/23/how-big-data-and-tech-will-improve-agriculture-from-farm-to-table/#4179aac59891>
- ³ John Deere https://www.deere.com/common/docs/products/equipment/agricultural_management_solutions/guidance_systems/brochure/en_GB_yy1114823_e.pdf
- ⁴ Tractica <https://www.tractica.com/newsroom/press-releases/agricultural-robot-revenue-to-reach-74-1-billion-worldwide-by-2024/>
- ⁵ University of Illinois study <https://will.illinois.edu/news/story/study-enhanced-photosynthesis-increases-yield-up-to-20-percent>
- ⁶ ISAAA <http://www.isaaa.org/resources/publications/pocketk/16/>
- ⁷ The Daily Mail <http://www.dailymail.co.uk/sciencetech/article-5682128/Tyson-Foods-backs-Israeli-startup-grow-meat-lab.html>
- ⁸ IBM <https://www.ibm.com/blogs/watson/2016/12/five-ways-agriculture-benefit-artificial-intelligence/>