

TECHNOLOGY

AI in Agriculture: Is the Grass Greener?

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AI offers the tools to boost farm yield and quality and truly transform agriculture.

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Artificial intelligence has offered countless tools for industries around the world to use, including agriculture. In this scenario, there are important questions farm managers need to grapple with: *Which AI tools are best to use? How do I use them? Is AI a worthwhile investment?*

Should I make the move now or wait for a better time after I've seen evidences of successful AI models? Is the grass really greener in the world of AI?

Land of promise

According to a **Markets and Markets Report (2019)**, the agricultural AI market is presently valued at around \$519 million and is projected to grow to \$2.6 billion by 2025. This is a very impressive growth forecast for any industry by any standard. There are several successful cases that demonstrate the value of AI in farming and agriculture. For example, Nature Sweet when growing their tomatoes **uses AI for pest control and disease study**. Their AI architecture and cameras monitor plants 24/7 and provide instant feedback (McFarland, 2017). An **AI app called Climate Basic** identifies the optimal location to plant corn based on temperature, erosion, precipitation and soil quality in order to optimize yield (Rao, 2017).

There is an abundance of AI tools in the market. Table 1 shows examples of companies with products catering to farming and agriculture.

Table 1. Examples of farming activities and AI companies

Farming Activities	Examples of AI Companies
Weed control	Blue River Technology
Harvesting and packaging	Harvest CROO Robotics
Diagnosing pests and soil defects	PEAT
Soil analysis	Trace Genomics
Crop health monitoring	SkySquirrel Technologies
Lettuce thinning	Blue River Technology
Self-driving tractors	Autonomous Tractor Corp
Weather, pests and disease prediction	aWhere

It is evident that farm managers have a wide assortment of tools at their disposal to boost farming and agricultural intelligence.

The cognitive farm

Advances in AI and related technologies lead to smart farms or farming models with high cognitive ability. This terrain is now characterized by enhancements such as:

Extensive data capture and analysis – farms now have the ability to set up, track and analyze a multitude of data points thereby helping farmers make better decisions. This boosts information accuracy and aids in decision making. For example, a farm manager can use a drone to scan a large track of land and identify the exact location of plant disease or pest infestation in real time.

Automation and robotics - in order to speed up manual work or manage manpower shortages, robots are used in farm activities such as fruit picking and lettuce thinning among many others. This can lead to productivity gains with indefatigability, minimization of errors, and consistency of work quality.

Predictive analytics – AI tools have been created to predict changes in weather patterns, pest infestation or soil erosion in order to improve planning and farm management. These tools help farmers take a glimpse of the future and assist them in making informed decisions.

Similar to other industries, farms face constraints relating to the use of AI such as investment costs, compatibility with current tech infrastructure, skills and resource availability, privacy, security, and possible regulatory issues.

Despite these potential constraints, the stage is set for cognitive farms, precision farming, and agricultural intelligence. **Farmers are now super-empowered to find the right crop, for the right place and at the right time** (Bagchi, 2018).

The digital farmer

The AI revolution is transforming farming and agriculture and provides multiple pathways for abundant harvests in all corners of the world. With such transformation, digital farms require digital farmers. Amidst these dramatic technological changes, farmers need to manage their farms in new ways. Drawing upon traditional farming proverbs, viable strategies may be found:

“If you are going to go where corn grows, take a cutting tool with you.” Farm managers need to use the right tools at their disposal. They need to quickly immerse themselves on the technologies available and need to be able to sensibly assess its benefits to the farm. Extensive technological knowledge is not necessary, but an understanding of the basic principles and its operational implications is important. Through AI, farmer managers can have a deeper and better understanding of their farms. This heightened cognitive ability brings a new meaning to the saying – “fields have eyes and woods have ears.”

“When planning for a year, plant corn. When planning for a decade, plant trees. When planning for life, train and educate people.” The changing technological environment requires changes in the kind of talent needed in the farm organization as well as refinements in the organizational structure. Apart from the typical farming roles, employees with technological skills need to be hired. The entire organization have to be trained and educated to stay abreast with the AI economy.

“All the fruit is not found in just one field.” There is value in taking a step out of the farm’s comfort zone and explore new collaborative opportunities. Farm managers should partner with tech firms to obtain unique, innovative and cutting edge technologies that would not only boost productivity but will also help them obtain a distinct competitive advantage. Strategic partnerships with firms with inimitable technologies can give farm managers an upper hand.

“If the collective farm is wealthy, the farmer is happy.” Cost advantages and profit gains can be obtained from economies of scale. Farm managers will benefit by finding strengths with numbers. AI tech tools can be expensive and untenable for some farms, collaborating with other farmers, cooperatives, suppliers, government, universities and even the local community can help drive down investment costs.

“Work improves the harvest better than the field itself.” In farming, just like in any other enterprise, diligence and conscientious planning contributes to success. Farm managers need to plan and prioritize their digital agenda. Optimizing farm operations and yield requires thoughtful assessment and strategic planning. It requires, a thorough review of what needs to be resolved first as well as a clear plan for implementation.

Into the land of plenty

AI offers the tools to boost farm yield and quality and truly transform agriculture. Enhancement in farm production on a large scale can positively impact GDP's of countries, improve food security, and even positively impact environment.

Consequently, increases in production can lead to exciting and positive changes in the future. It is estimated that **the global food and agribusiness industry is worth about \$5 trillion** and continues to grow (Goedde et al, 2015). In the US alone, **there are over 2 million farms averaging 443 acres and leading to agricultural exports amounting to about \$137 billion** (Statistica.com, 2019).

Productivity gains can reshape the very nature of farming and agriculture and improve global food supply. For example, **climate factors affect yield fluctuations of crops such as maize, rice, soy and spring wheat by as much as 20-49%** (Phys.org, 2019). AI tools such as predictive analytics on weather patterns can help minimize crop losses around the world. Data analytics and robotics can boost overall production in every farm.

With regard to the question - Is the grass really greener in a world of AI? While challenges exist, the evidence supporting it's case is very compelling. The future of farming and agriculture is in the hands of farm owners and managers worldwide. In a cognitive farm with a digital farm manager, a likely response to the question is - How green do you want it to be?

► References



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