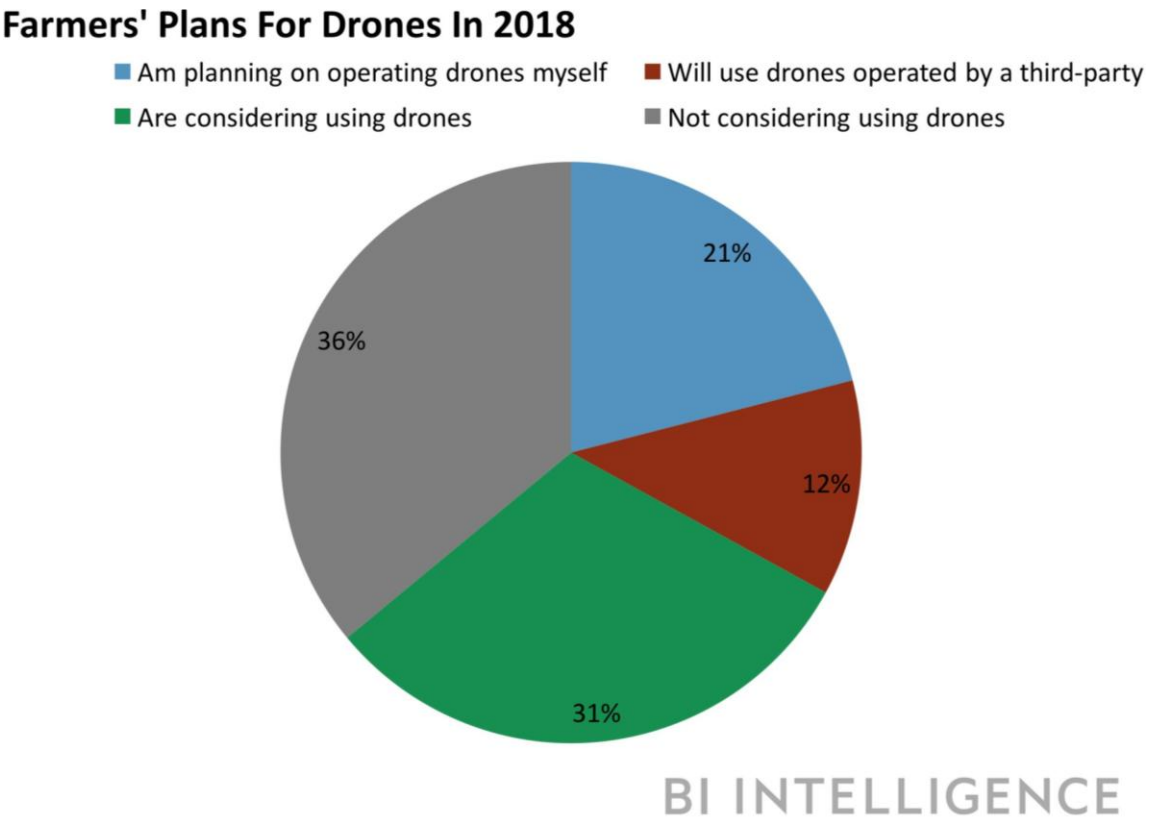
DRONE INDUSTRY SNAPSHOT: AGRICULTURE

The UN projects that the world's population will swell from 7.3 billion today to 9.7 billion by 2050, which will help global agricultural production rise 69% between 2010 and 2050, according to an Australian Journal of Agricultural and Resource Economics study. Farmers and agriculture companies will need to boost production to keep up, which they're increasingly turning to drones to do, as the unmanned aircraft promise to save time, money, and other resources.

Twenty-one percent of farmers in the US plan to use drones in 2018, according to an April 2017 survey of 1,094 farmers conducted by FarmPulse. Meanwhile, 12% will hire a third-party firm to operate drones for them, and another 31% said they were considering the use of unmanned aircraft. Most of the farmers and agriculture companies using unmanned aircraft today are large, well-capitalized, primarily big-ag-owned farms that manage thousands of acres of land, largely because the return on investment is far higher than it is for farmers that manage only a handful of acres. Farmers and agriculture companies are primarily using unmanned aircraft for surveying, mapping, and managing the acres of land that they operate.



Source: Agweb, n=1,092, 2017

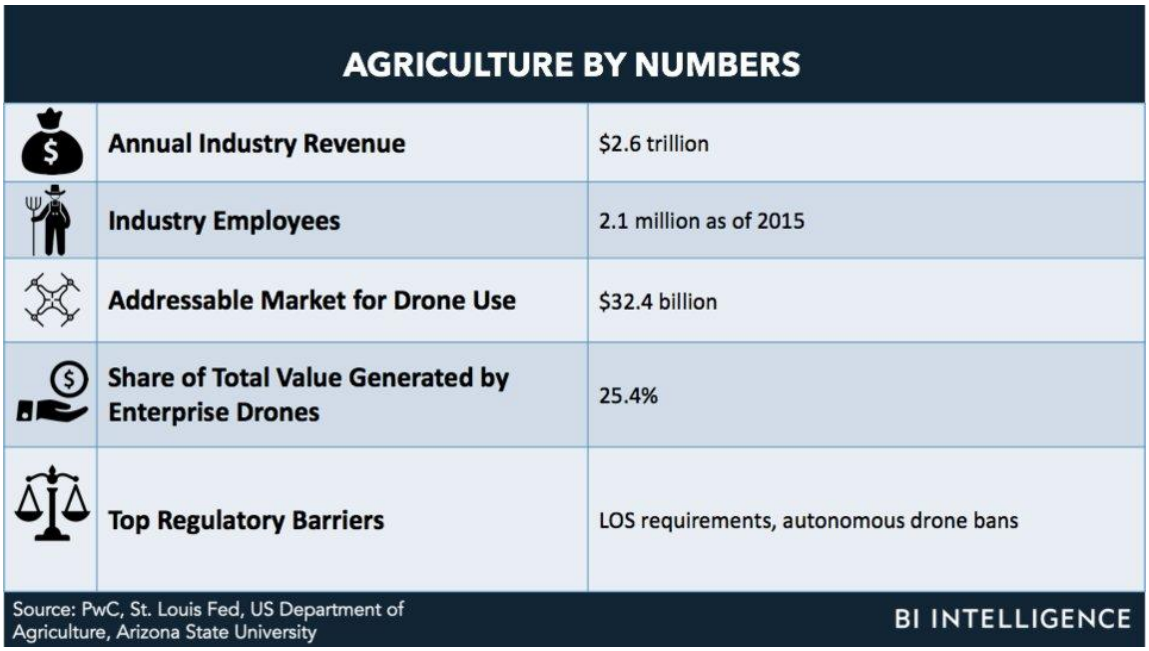
Top Use Cases

Mapping and crop monitoring. Most enterprise drones are equipped with high-definition and thermal imaging cameras that can be used to very accurately capture the light and heat that crops generate through photosynthesis. By capturing this data via drone and cross-analyzing it with the normalized difference vegetation index (NDVI), farmers and agricultural companies can understand plant health and measure how far along in their growth periods the crops are. For dead or poisoned crops, this gives farmers the opportunity to either replace them entirely or spray them with substances designed to cure their diseases.

Irrigation management. When equipped with a thermal imaging camera, unmanned aircraft can identify areas where water is pooling or where there's a lack of moisture. From there, farmers can move their watering equipment out to the location to give in-need crops water to try and save them, ultimately saving farmers time and money that would be used to replace these potentially spoiled crops. The Food and Agriculture Organization of the United Nations estimates that $1 trillion in crops is wasted or lost every year, costs that can at least be partially recouped via drone use. In the coming years, technological advancements could enable high-payload drones to identify crops that are dehydrated and spray small amounts of water on them, giving farm employees time to get more water before it's too late.

Fertilization, soil, and seed management. Most crops need to be sprayed with at least a half dozen different types of fertilizer, often on a monthly or weekly basis. Drones can scan the ground and maintain a precise distance away from the field in order to spray the right amount of fertilizer, and ensure that its coverage is even across a large area of crops. DroneFly estimates that drones can spray fertilizer 40 to 60 times faster than doing so by hand. In addition, drones with thermal cameras can collect soil data before seeds are planted, which can be analyzed to ensure more accurate planting. Moreover, while not yet used broadly across the industry, a handful of startups have been able to develop planting systems that, when equipped onto unmanned aircraft, can drastically boost the number of seeds that eventually sprout. BioCarbon Engineering, a California-based agtech startup, was able to achieve a 75% uptake rate of the tree seedlings planted during a recent test run, and expects that it can eventually reach an 85% uptick over traditional planting tactics.

Livestock monitoring. Chicken, cows, and other livestock are often given the freedom to roam over an area of a farm spanning several dozen acres, and in some cases, several square miles, making keeping track of them challenging. Thermal imagers can detect the heat that livestock emit to track them over these long distances, allowing farmers to determine if there are any missing, injured, or preparing to give birth to new animals.



What Comes Next

Gartner expects the market for drone use in agriculture will be constrained by price and regulatory limitations through 2020, accounting for only 7% of the total growth in the global commercial drone industry. In the years after, however, looser regulations and lower prices will drive small, individual farmers to integrate drones into their operations, pushing the agricultural drone market to become the largest of any industry. PwC pegs the total global addressable market for agricultural drone use at a whopping $32.4 billion, second only to infrastructure applications.

Drones will allow the agriculture industry to become incredibly data-driven in the years ahead. The aircraft will collect millions of data points annually for individual farmers that can be analyzed and leveraged to gain the insights necessary to boost crop yields and cut down production inefficiencies. Additionally, Astro Teller, head of Alphabet's X moonshot arm, recently told MIT Tech Review that he foresees AI algorithms being able to analyze the data agricultural drones collect to determine when to harvest, water, or replant crops in the not-too-distant future.

On the regulatory front, the Federal Aviation Administration's line-of-sight requirement could be relaxed in the coming years, enabling farmers and agriculture companies to fly drones over dozens of acres of land without needing to constantly move their positions and ensure they can still see their aircraft. If this occurs, it's not unreasonable to imagine a future where swarms of drones fly over farm fields at very low altitudes, spraying water, fertilizer, planting seeds, or identifying crops in need of hydration.

Download the charts and data in Excel »

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