Precision Agriculture and Irrigation

Precision agriculture is the marriage of advanced agronomics with big data and predictive analytics. Under pressure to produce more with fewer resources, today's farmers are harnessing sensor technologies, GIS data, and expert decision-support algorithms in order to increase yields and lower costs. Sometimes called connected agriculture because of the major role played by always-connected IoT devices, precision agriculture has spawned an entire ecosystem of innovative solutions -- from veteran companies seeking to tap into new opportunities, and from exciting new start-ups.

According to market research firm Markets and Markets, the connected agriculture market will grow from $1.34 billion in 2016 to $3.06 billion by 2021. That forecast represents a remarkable Compound Annual Growth Rate (CAGR) of 17.9%. North America will continue to be the largest market, but APAC is also witnessing significant growth.

5 Technology Trends Driving Precision Agriculture

Although precision agriculture makes use of a wide array of technologies, there are five technology trends that stand out as growth drivers:

• Global Positioning Systems (GPS) are not new, but they are becoming more accurate all the time. GPS was one of the earliest technologies to be embraced by farmers, who use it to map fields in great detail and then manage crop inputs very precisely based on highly localized parameters. Using GPS information together with computer-based soil maps, for example, seeding, fertilization or pesticide rates can be adjusted in real-time as the tractor navigates through the field.

• IoT: It would be hard to imagine precision agriculture without the recent advances in IoT sensors and other devices that can communicate autonomously with each other and with central databases. Constant streams of highly granular, real-time data about soil conditions, temperature, sunlight, humidity and so on are the foundation of agricultural smart management systems.

• Predictive analytics: All the data generated by IoT and other sensors is well and good, but what makes it actionable is predictive analytics. Powerful algorithms process the big data into predictive models that are, in turn, the backbone of automated, rule-based expert systems. Aside from the data generated by any given farm, predictive analytics can also tap into regional, national and even global databases in order to further refine their models.

• Drones: More and more farmers today are using camera-equipped drones to visualize the state of their fields and crops. Drones can fly cheaply at low altitudes to get highly detailed images of a large area in a short period of time. The drones can be equipped with multispectral cameras that capture images from both the infrared and visual spectrums. This combined image can detect unhealthy plants, for example, in a way that would not be possible with the naked eye.

• Robotics: It might sound like science fiction, but there are those who believe that robots are the future of precision farming. A notable example is the MARS (Mobile Agricultural Robot Swarms) project. Planting or other agricultural operations are carried out autonomously by swarms of small, lightweight, energy-efficient robots that are coordinated and controlled by a single logistics unit. The entire system is cloud-based and managed by remote via a tablet-based app.
The Role of Precision Irrigation

In the United States agriculture accounts for 80% of water usage, competing with industry and with households for usage of this precious resource. With the pressures of growing populations and increasing water shortages, there is increasing awareness that water resources have to be stewarded more carefully. One of the responses has been to raise the price of water to levels that are closer to the actual cost of extracting, cleaning and distributing the water. It is not surprising, therefore, that farmers today are highly motivated to use as little irrigation water as possible. One way to conserve is through the “hardware”, i.e., to migrate to more efficient irrigation methods, such as drip or spray irrigation. These methods reduce unnecessary surface water runoff as well as loss of water through evaporation. In order to make irrigation even more precise, farmers are adopting centralized command and control solutions that analyze crop, soil and weather data in order to optimize when and how much any given field should be irrigated.

Mottech is Proud to be Part of the Precision Agriculture Revolution

Motorola’s IRRInet irrigation control platform is at the forefront of precision agriculture, helping farmers around the globe increase their crop yields. Irrinet optimizes irrigation and fertilization with a unique, automatic quantity calculation system that controls and monitors thousands of field elements. IRRInet shuts down the water supply automatically in case of water leakage and alerts the relevant personnel. The IRRInet connected field elements communicate autonomously with each other and with a remote command and control center powered by the proprietary ICC PRO software.

IRRInet can now also be operated by a dedicated mobile app and is fully integrated with Google Maps, for a highly visual and interactive user interface.

Contact us to learn more about how Mottech can help you take control over your irrigation and fertilization processes.