https://www.agupdate.com/theprairiestar/news/crop/farm-tech-uses-smart-farm-tools-of-present-future/article_57ee2508-9da6-11ec-af09-d31336b6b28e.html

TOP STORY

Farm Tech uses smart farm tools of present, future

Sue Roesler
Mar 11, 2022

Doug Weist, owner of Farm Tech, LLC, based in Choteau, Mont., demonstrates a sprayer with Topcon CropSpecs inst mounted precision ag laser technology for remote sensing. Photo courtesy of Topcon Marketing.

Sue Roesler

CHOTEAU, Mont. – As Montana farmers go out to prepare their fields for spring seeding, could precision ag tools help with critical farm decisions that could save money on high input costs or grow more bushels on the same amount of inputs?

Doug Weist, farmer and owner of Farm Tech, LLC, a precision ag hardware and service business based in Choteau, talked about what is new and coming in precision ag and how farmers can get a start using it at Montana's Next Gen Conference.

"Precision ag is doing the right thing in the right place at the right time in the right amount, and maximizing margin does not necessarily mean growing the most bushels for yield," Weist said.

Weist, 41, grew up on the family farm in north central Montana and studied molecular plant biology at Montana State University (MSU). While attending MSU, Weist worked at WestBred as a technician. After graduating, he took a position at CHS in precision ag in 2004, where he worked for five years leading the precision ag program.

Afterward, Weist had an opportunity to work for an American farm management company.

"I worked in Ukraine for four months in 2009, came back, and started Farm Tech," said Weist, who has been practicing precision ag for the last 20 years.

With planting, there's quite a bit of technology available for farmers to use, including variable rate, section control, auto depth, auto raise and scales – just to name a few.

"In Montana, not many farmers are using variable rate yet, but many have the capability on their equipment and are not taking advantage of it," he said.

How do we use precision ag tools to plant and spray?

"Moving forward from the seeder, we can add auto steer to the tractor, which can add up to 15 percent savings in overlap," he said. "You can variable rate each tank of nutrients and seed based on a map, and different sections can be turned on and off as the seeder crosses places that have already been applied."

Farmers can put auto depth on any implement, including seeders, to deal with varying conditions and the implement will adjust itself according to changing field conditions.

In addition, there are tech tools to track the tractor's fuel usage, engine load, temperatures and keep track of servicing intervals.

"Corn planters have a lot more technology than a broad acre air seeder, and the ultimate one is reporting that seeding information directly to the Farm Service Agency (FSA) right from the field. We can do most of what the planters can do, including auto reporting," Weist explained.

After the crop is in the ground, what precision ag tools are available to assist farmers during the growing season?

"Farmers can run individual nozzle control and have turn compensation technologies. For better coverage, you have boom height control and drift control, which are pretty popular," he said.

It doesn't take a lot of technology to properly time your nutrients, Weist pointed out.

Some of the low-tech tools that are available to farmers during the growing season include paying attention to weather events by "looking out your window," always scouting, and always walking your fields.

"Farmers know their fields better than anybody. They are going to know a problem before even technology, so just be out there and be with it at the very least," he said.

More advanced digital tools like satellite imagery and lasers can help with crop scouting.

"The most user-friendly digital tools are lasers (called CropSpecs) mounted on the application equipment that are always on, constantly scanning to identify crop health problems and create a nice map of the field when completed," Weist said.

With harvest, there are a few tools that have been available for quite a while: autosteer, yield mapping, grain carts to weigh the crop, task sharing with high quality yield maps and auto yield reporting to crop insurance.

“Yield mapping has been around for decades, and most combines have that now,” he said. “Weighing is hit or miss, depending on whether or not guys have grain carts in the fields, but load cells and autolog can be added to any grain cart to make capturing all the weights effortless.”

In addition, multiple combines can now share yield data in real time between machines.

“Yield maps are more high quality today mainly because of good algorithms and sectional control on the mapping,” Weist said. “Auto yield reporting straight from the field directly to crop insurance – that is brand new and coming on pretty strong.”

One of the big changes in how farmers use tech tools is zoning – breaking the field up into zones.

“Today, we are starting to understand that field variability on a different level. We are using non-invasive type sensors, looking at independent soil physical characteristics that are not affected by management or seasonal changes coupled with soil sampling data,” he said. “Those long-term soil-type characteristics are really what we are after in that soil now, and we couple that with soil sampling data to generate a high resolution map of any nutrient we sample for.”

Weist pointed to a traditional zone map with soil test results that was used in the past, broken up into 11 management zones. On the right, there were several nutrients and soil characteristics listed, such as phosphate, pH, potassium, organic matter and micronutrients, and farmers could see it varied dramatically.

People are also reading...

1 **Legal rulings show challenges for livestock industry**

2 **Crop progress, condition in Wisconsin**

3 **A new way to hay**

4 **Father-son duo best in tractor show**

“We would then use that information to create a prescription map with nutrients by zone, but it was divided by those lines we established,” he said.

Currently, FarmTech is using a high-definition ‘Soil Optix’ scanner for zone mapping and they typically do one scan every 10 years, with soil sampling done every five crop cycles.

“It is non-invasive and measures gamma radiation. Every element decays differently and this sensor can pick that up. It is independent of management practices and what we get is a map of every nutrient sampled,” he said.

Weist pointed to a 2020 yield map and compared it to data generated from the Soil Optix sensor. Much of the color change was due to elevation – the lower yields were often on hilltops with less available nutrients to grow a healthy crop.

Within the same map, the colors ranged from areas of red – weak-yielding production areas – to areas of green, which indicated good yielding production areas.

“The pH level can be seen throughout the map, and it is not straight, chopped lines. It is more like a grid sample, but a higher resolution with less physical soil sampling,” Weist said.

Higher organic matter is seen in the higher producing green areas.

“A potassium map looks a lot different than your phosphorus map and there could be problems growing a crop in those areas. So, we would load the map into your air seeder, and it could handle those bins independently at the same time,” he said.

While many farmers apply all their fertilizer up front, Farm Tech often recommends a split N approach.

During application with the sprayer, the farmer would likely apply more N or whatever nutrient was lacking to the red areas and less in the green areas. With that, a farmer could save money on fertilizer, applying only what was needed for more efficiency and better production.

Remote sensing is a diagnostic tool for in-season assessment of crop health and for identifying variability and has become almost “free.”

“Farmers still have to make the decision from the information. This has been a problem in the industry since I studied this in college. There is not a magic AI button that would make the decision for the farmer,” Weist said. “It is technology that is coming, but it is still a downfall to remote sensing.”

With remote sensing, it is looking at data about the growing plant and how it is responding to applications up to a specific point in the growing season.

“We aren’t looking at a true color photo. We are using different wavelengths of light like infrared red and red edge and we are doing it from various platforms,” he explained.

Technology with a satellite has changed dramatically, and basically, satellites cover the earth every 2-5 days with different satellite platforms.

“They are not super high resolution, but they are very good for Montana’s agriculture,” Weist said. “When we get into row crops and specialty crops, we need higher resolution technology.”

Because Montana farms are large-scale agriculture with not that much cloud cover, satellite technology works well.

“Unmanned aerial vehicles or drones have not helped large scale agriculture,” he said.

Weist says terrestrial drones can provide huge benefits with seeding, weeding and spraying, and those types of drones are the wave of the future.

“Certain sensor platforms are interesting. Hyperspectral can look at all the wavelengths and thermal is great for crop canopy,” he said.

Rather than UAVs, Farm Tech has been selling CropSpecs, cab-mounted precision ag laser technology, for remote sensing. There are a couple of different companies producing different versions of them.

“This technology hasn’t caught on like I expected it would nearly a decade ago. CropSpec is a cab-mounted laser, with one on each side of the cab of the tractor or sprayer or other implement. The lasers are essentially scanning the crop, doing a crop health assessment,” he said.

Weist pointed to a tractor and sprayers that had CropSpecs mounted on them and were working on fields in Montana. Some options allow farmers to apply variable rate fertilizer on-the-go in real time, which saves money on precise applications.

“The fertilizer rate was higher where the crop was not progressing well, and farmers could back off in areas that had a good, healthy crop growing,” he said. “At the very least, you get a nice image of crop health that you can go back and use. It is very cool and useful technology.”

With satellites, many companies offer a free service with cloud capabilities, which are a good option for Montana growers.

More advanced services cost a few dollars more per acre, and producers could try it out on a small acreage.

Soil sensors are another good option for collecting data about the soil, but the price is high.

Real-time soil sensors are placed in the soil and compile and communicate data back wirelessly to a phone or computer.

“The sensors that are highly advanced can calculate nutrient levels, soil moisture levels, temperature and humidity and determine irrigation scheduling,” Weist said. “This is going to be groundbreaking once the price comes down.”

By Sue Roesler

Reporter