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## Seminar offers look at farming's future

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The task at hand for agriculture producers is a tall one.

With nearly a billion people across the globe already struggling with hunger and a world population that's predicted to add 2.5 billion more people by mid-century, farmers will be expected to produce as much food during the next 50 years as has been produced since the beginning of human civilization in order to meet the growth in demand, according to some experts.

And farmers will have to do so as land and water are becoming more scarce.

With the cards seemingly stacked against farmers and the billions of people who depend on them for food, Raj Khosla, professor and extension specialist at Colorado State University, as well as other experts, believes technology will be the savior of agriculture — and consequently the planet.

Khosla has made his life's ambition technological advancement in farming — specifically “precision agriculture,” which involves the use of advanced positioning technologies, like GPS, to tailor inputs, such as fertilizer and water, to specific and variable needs within a field to greatly increase yields while also protecting the environment.

Khosla is the president of the International Society of Precision Agriculture and has also helped CSU offer the only four-year degree in the U.S. in Applied Information Technology in Agriculture.

Most recently, Khosla helped efforts in CSU inking a deal with Trimble — a California-based technology company that applies positioning systems, lasers and optics, to make various operations, including agriculture, more productive.

As part of the collaboration, Trimble has outfitted machinery with positioning technologies used for precision agriculture at CSU's Agricultural Research, Development and Education Center (ARDEC), and is using ARDEC as a comprehensive training center for dealers of its agricultural products, training that's later passed on to farmers purchasing the technologies.

In its third week at ARDEC, Trimble officials were educating machinery dealers Tuesday on how to use the company's Greenseeker product — a system that identifies crop variations in real time so farmers can put precisely the right amount of nutrients on each square foot of their crop while driving through the field.

“Before this kind of technology, farmers used ... and some still use ... yield maps and soil samples as a way of determining how much nutrients and fertilizer needed to be applied,” said Wade Stewart, the training manager for the Trimble Agricultural Division who is leading Trimble's education efforts at ARDEC. “That information might be anywhere from six months to a year out of date by the time the farmer is out in his field spraying.

“And its application-control feature makes it so that the farmer doesn't have to keep adjusting the flow as he's driving.”

The Greenseeker, which operates off of sensory output from bands of light pointed at the crop, can be used for in-season nitrogen management, variable-rate fungicide and desiccant, as well as crop-condition mapping and pre-plant variable rate fertility, Stewart said.

He explained that the Greenseeker, like much of the newer precision agriculture technology, stems from advancements off GPS-based machinery-guidance systems that became popular in farming during the last few years.

"Ten years ago, automatically steering a tractor was an amazing thing," Stewart said. "Just five years ago, farmers were amazed that these kinds of technologies worked. Now farmers are telling us they can't live without them."

Stewart explained that Greenseeker technology has been around the past five years, but it is just now starting to see more demand in the market.

Khosla noted that Purdue University's Center for Food and Agricultural Business report for 2009 said 73 percent of farmers surveyed that year were using an auto-guidance system in their machinery — technology that allows farmers to work more areas with less fatigue, cover more acreage in less time and "make new laborers drive like 30-year veterans," he said.

However, only 2.5 percent were using Greenseeker technology, he added.

Khosla said Purdue did not release a report in 2010 and he hadn't seen the updated numbers in its 2011 analysis, which was released this summer.

At the ARDEC facility, Stewart and other Trimble trainers will move on to other technologies in upcoming weeks, including training on water-management products. As Stewart explained, their product and others like it use GPS, which takes into account the Earth's curvature, and lasers to create perfectly level fields that ensure proper slopes and prevent certain sections of crops from being starved of water or overwatered.

Trimble offers variable-rate technologies aimed at improving all aspects of farming, from planting to harvesting, just as many manufacturers do today, Stewart noted.

While many of the nonguidance GPS systems in agriculture still aren't heavily used, some local ag producers have been using technological advancements for years.

About 12 years ago, Fagerberg Farms in Weld County first implemented a drip-irrigation system and in 2001 began using GPS in its fields, technology that workers at the farm have updated constantly since then.

"At that time, all of it was pretty new technology," said Rod Weimer, manager at the farm.

He said he can now operate the irrigation system from anywhere in the world with his smartphone.

Weimer, who noted that CSU and Fagerberg Farms have worked together over the years to implement new technologies, said since the farm's drip-irrigation system has been installed, the farm uses anywhere from 30 to 50 percent less water, depending on the crop, and yields have improved by 20 to 40 percent.

It did come at a cost, Weimer admitted.

He said the farm — about 1,700 acres of onions, pinto beans, corn and wheat — spent about \$3,000 per acre to get the drip-irrigation system up and running.

"It was kind of like buying the farm all over again," Weimer said.

But it's an investment that Khosla is hoping farmers everywhere will make.

Khosla noted that corn production where human population is growing rapidly — places in Asia and Africa — is only 1 ton per hectare, while production in the U.S., where technology has improved practices, is 10 times that. And now is the time to start investing in advanced agriculture methods, with commodity prices at record levels and the technology becoming less and less expensive, he added.

"We must start growing more with less water, less nutrients.

"How else will we do it?"

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