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Chapter 6- A View from Agricultural Producers

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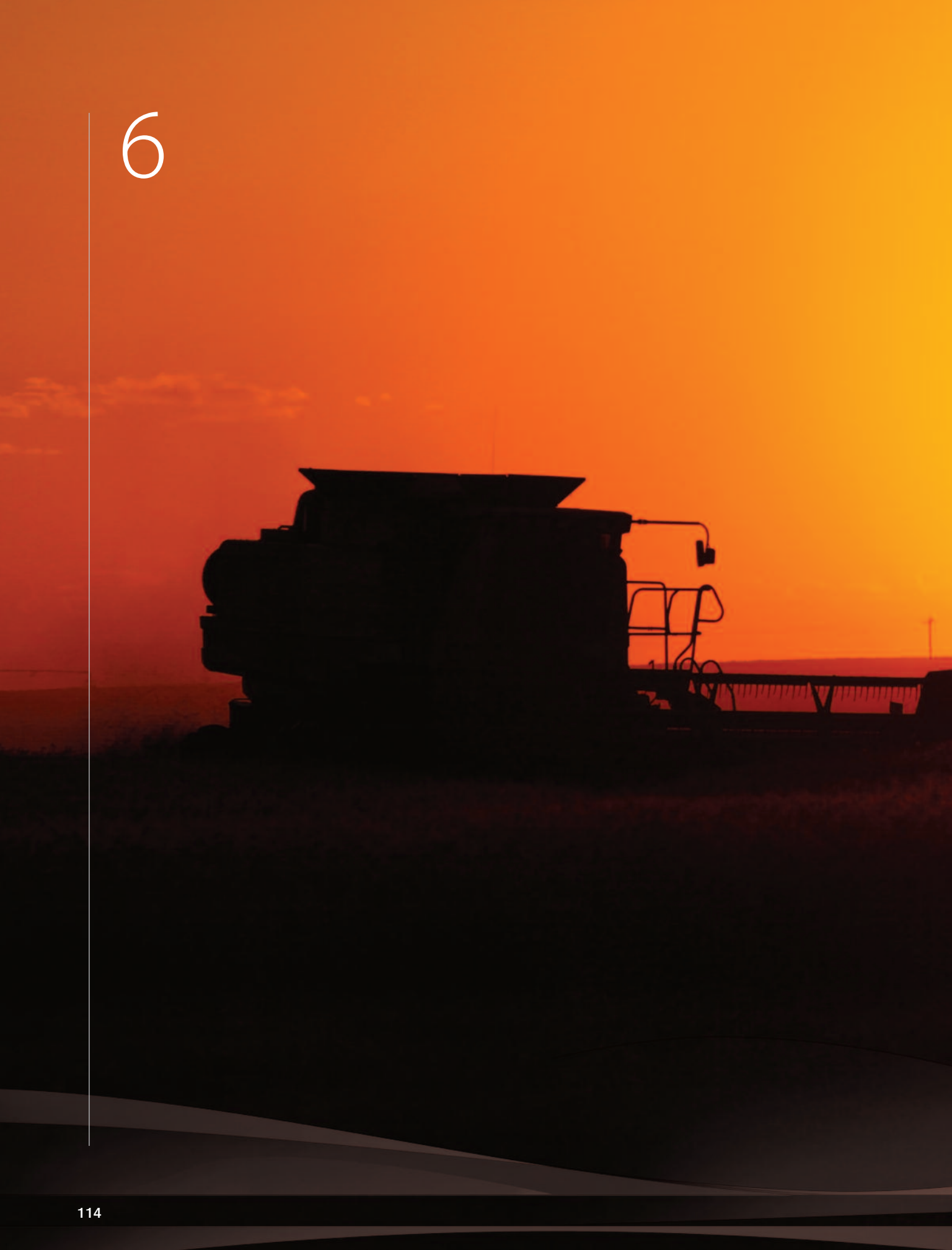
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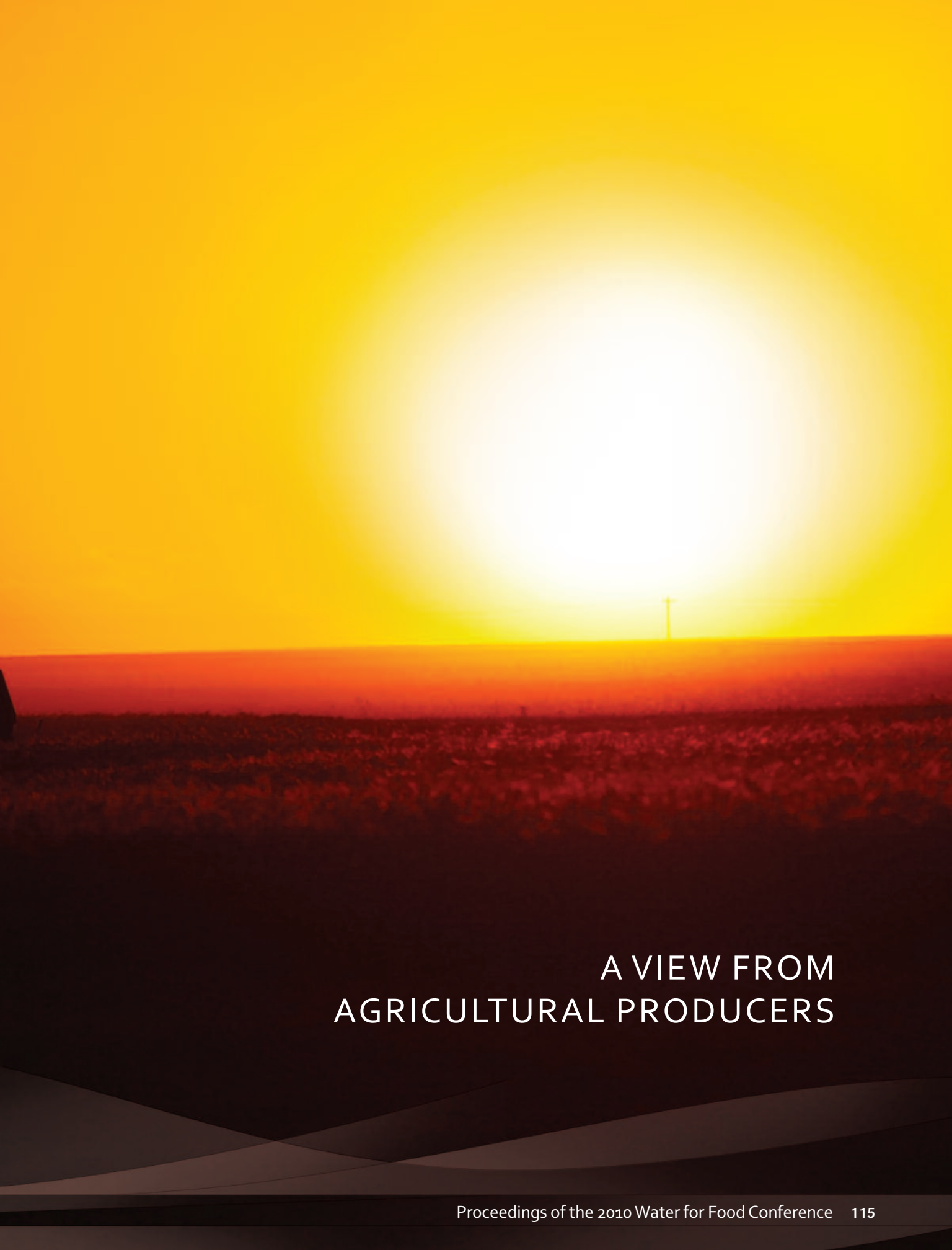
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6





A VIEW FROM AGRICULTURAL PRODUCERS

A View from Agricultural Producers

Panel

Martin Pasman
Producer, Argentina

Keith Olsen
Producer and President, Nebraska Farm Bureau

Roric R. Paulman
Producer, Paulman Farms, Nebraska

Aaron Madison
Producer, Madison Farms, Oregon

Mark Gustafson, Moderator
Coordinator, Nebraska Rural Initiative

The panel provided the viewpoints of large-scale agricultural producers, whose operations range from a 20,000-hectare operation in Brazil to irrigated and rainfed farms in Nebraska and Oregon. The panelists provided brief overviews of their farming operations and then responded to audience questions.



From left: Mark Gustafson, Martin Pasman, Roric R. Paulman, Keith Olsen and Aaron Madison

Rainfed and Irrigated Production in Argentina

Martin Pasman, Producer, Argentina

Martin Pasman, an Argentine agronomist with a master's degree in business administration, began his career as a consultant to farmers and has experience in Argentina, Uruguay, Paraguay and Brazil, where he was instrumental in helping to develop 80,000 hectares in the western part of the Cerrado area. His farming experience stems from his family's farms, located in five areas of Argentina. Most are rainfed, but one area receives less than 500 millimeters of rain annually. Pasman also runs an irrigation business serving 80 percent of the Argentine market, giving him vast experience in developing irrigated land.

Argentina is the second-largest South American country after Brazil and is one-third the size of the U.S. One-third of Argentina receives more than 800 millimeters of rain and depends upon rainfed agriculture, while the majority receives less than 800 millimeters. Argentina cultivates 30 million hectares per year, of which 2.2 million are irrigated. Total production output is 90 million metric tons, and about 70 percent of farmers in Argentina practice no-till agriculture.

Pasman's family came to Argentina from the U.S. around 1825, when it was primarily cattle country. His family brought the first Aberdeen Angus bull to Argentina and also helped develop agriculture. In the 1970s, the family farmed 6,000 hectares, of which only 500 were used for crops, yielding 3.5 tons of corn per hectare and 1.5 tons of wheat per hectare. They plowed the land and used few herbicides and no fertilizers. The majority of the land was used to raise 3,000 head of cattle, which were finished in natural pastures.



Martin Pasman

Today, the family's farm operation has expanded to 20,000 hectares, 15,000 of them used for agriculture. In the low-productivity land, they also manage 9,000 head of cattle in cow-calf operations, finishing the animals in American-style feedlots. In rainfed fields, the Pasmans produce 8 tons of corn per hectare and 3 tons of wheat; under irrigation, they get 12 tons of corn and 6 tons of wheat. The most important crop, however, is soybeans. They also grow potatoes, corn and sunflower seeds for Monsanto Company. The farm uses 42 pivots to irrigate 4,000 hectares, and about 80 percent of the farm is double-cropped: wheat plus soybeans, seed corn plus soybeans, potato plus corn. Argentina uses a huge amount of herbicides and genetically modified crops, Pasman said, adding that his farm was one of the first to produce Roundup Ready® soybean seeds in 1994.

A View from Agricultural Producers

"The cornerstone of our production technology is no-till," Pasman said, a technique used on the entire farm except the potato fields, which follow a rotation of one year of potatoes followed by three years of no-till. A corn crop follows the potato harvest in the same year.

No-till improves water infiltration and water retention and reduces evaporation because the previous crops' residue minimizes runoff and allows the soil to retain more water. No-till also reduces erosion risk and increases organic matter, improving oxidation and carbon circulation in the soil. It improves soil fertility, increases productivity and sustainability, and allows farming in difficult soils, particularly shallow soils of 3 inches.

No-till uses less than half the water and less labor compared to conventional tillage, reducing production costs by 30 percent, Pasman concluded. "It is very important, the mix of no tillage with center pivot (irrigation) against traditional management."

No-till Rainfed Farming in Nebraska

Keith Olsen, Producer; Nebraska Farm Bureau

Keith Olsen's family arrived in southwest Nebraska in 1923 when his grandfather, thinking he could raise corn in western Nebraska, moved west after going broke farming about 60 miles southeast of Lincoln, Neb. It turned out the land in western Nebraska was too dry for corn, so Olsen's grandfather grew wheat until the Dust Bowl of the 1930s. The family farm survived by following University of Nebraska soil conservation advice to plant wheat every other year, letting the ground lie idle for a year to regain moisture. In 1970, Olsen returned home from college to continue the family's traditional fallow-wheat rotation. "Little did I know how things would change," Olsen said.

By the late 1970s, the Olsens had started using fertilizer because university tests showed the investment paid off. In 1980, the family started experimenting with eco-fallow farming. The following year, Olsen started planting milo into



Keith Olsen

wheat stubble with some success. When corn hybrids for dryland conditions were introduced, Olsen began planting corn, though delayed by a then-government policy that didn't allow farms to change crops unless farmers were willing to operate outside the farm program. "The farm program delayed how quick I converted to a no-till operation," Olsen said. "But we got into no-till long before GMOs (genetically modified crops) were there."



No-till soybean field

Today, Olsen's middle son works his own operation on the farm as well. The farm receives about 19 inches of rain, but neither Olsen nor his son irrigates. Practices have changed considerably since Olsen returned to the farm. Then, farmers harvested wheat close to the ground, leaving little stubble and a windrow of straw. The next year they worked the ground bare. Rain or wind caused tremendous soil erosion. "These were two issues I wanted to change on my farm," Olsen said. "… We had to look at a different way of doing things."

He now practices no-till farming. The benefits are obvious. After a 6-inch rain, a tilled field leaves much standing water, while water quickly soaks into no-till soil, retaining moisture. Tracks between rows also conserve moisture, providing ground cover to slow wheat growth.

To prevent crop failures from droughts, such as those that occurred from 1999 to 2006, Olsen is trying new soil management techniques. He's practicing wheat stubble management using a stripper head, a British invention that leaves straw in the field, providing ground cover for corn. Olsen uses winter wheat planted in the fall as straw for the following crop season. Another technique includes skip-row planting. Neighbors who till their ground suffer tremendous wind erosion, altering the quality of the wheat they grow, he said.

On trips to Russia and Turkey, Olsen observed farmers plowing their fields. Could they be using no-till farming? he asked. He'd like them to try. "Just because it works in southwest Nebraska on my farm doesn't mean it'll work in some other place, even in Nebraska, let alone other places in the world," Olsen said. "But I think there are opportunities to try these things."

A View from Agricultural Producers

Consumptive Water Use on a Nebraska Irrigated Farm

Roric R. Paulman, Paulman Farms

Roric R. Paulman, a self-described early adopter of technology, is a third-generation farmer who returned to the farm in 1985 to help his father during U.S. agriculture's financial crisis. The Paulmans had cattle and hogs and irrigated land. (At the time, land cost $300 an acre, plus another $300 to drill a well and put up a pivot.) Six months later his father passed away. "At that time I had to decide: Am I going to take advantage of an opportunity, make this a lifestyle again, or am I going to turn tail and run?" He and his wife, a teacher, quit their jobs in Omaha, Neb., and returned to farm, teach and raise four children in western Nebraska.



Roric R. Paulman

Paulman has a keen perspective on the business of farming. In the beginning, Paulman had to rent back the family's land from the Farm Credit Bureau. He gathered a team of people with money and an interest in agriculture, and over the years, opportunities arose to develop land and drill wells. Today, Paulman operates 5,600 irrigated acres with 45 high-capacity wells and 1,500 dryland acres.

Paulman's farm has changed considerably. He was part of the Roundup Ready® revolution and adopted other new technologies and techniques to maintain ground cover. Twenty years ago, two pounds of Atrazine and some 2,4-D raised a good corn crop. Today, a quart or less of Roundup® or just three-eighths of an ounce of IMPACT® herbicide on 43,560 square feet does a great job. As his operation progressed, he brought experts to the farm, including agronomists. "I worked closely with anybody I could find because I didn't have the background," Paulman said, or the father figure to counsel him.

Over the years, Paulman experimented with a variety of techniques, including grid sampling and site-specific soil analysis. Paulman's land ranges from the challenging sandy soil near Valentine, Neb., to highly productive sandy loams. He also handles the business end, purchasing his inputs, marketing his crops, originating his sales and maintaining his storage. His wife implemented an enterprise-analysis system that he still uses today.

Paulman has become extensively involved in water use issues and is developing a model for measuring consumptive use. Although he's tried the recommended conservation efforts, he wanted to understand the effects. "We don't talk about consumption, and what we've tried to do on the farm is identify what that consumption is," he said.

Paulman rotates up to 11 different crops with some corn and soybeans, but primarily dry beans and popcorn. He also manages consumptive water use. His farms are in three local Natural Resources Districts, two of which are under close scrutiny for supplemental irrigation. The third is developing an integrated management plan.

Farmers also face load control. Public utilities cannot provide unlimited power anymore due to higher electricity costs and growing infrastructure stress. Because energy supplies and fuel costs on diesel wells restrict the amount of water that can be pumped, Paulman worked with the public utility to develop a remote management system that allows him to turn power on and off during peak evapotranspiration. To determine when to power off, he's established his own weather stations and evapotranspiration processes to monitor and drive water use.

It takes 27 to 29 inches of water to bring corn crops to full production. Paulman's farm receives 18 inches of rainfall annually, but only up to 9 inches falls during the growing season, requiring 21 inches of supplemental water to produce a crop. Good management retains some soil moisture, but producers also must use less water. "After four years of being heavily involved with the water process, I don't think we talk enough about consumptive use," Paulman concluded. "Three hundred bushels of corn [per acre] is great, but in that same respect, I'm going to be asked in my area to reduce my consumption. So can I grow a crop to full capability?"

Farming in an Oregon Critical Groundwater Area

Aaron Madison, Madison Farms

Aaron Madison's great-grandfather started the farm in 1914 when he moved to northeastern Oregon from Iowa to take advantage of a Bureau of Reclamation irrigation project. Settling outside the reclamation project's boundary, he was unable to use the water on his 500 acres, which receives just 7 inches of rain a year. He settled on raising sheep and forage crops. In the mid-1900s, his son began growing more wheat using irrigation and dryland wheat-fallow rotations and switched to raising cattle.



Aaron Madison

Production practices have changed dramatically over the years. Irrigation, for example, began as flood irrigation. It progressed through hand lines and wheel lines and is now predominately center pivot irrigation. The Madisons' farm has grown to 17,500 acres, with 7,200 irrigated

A View from Agricultural Producers

acres. About 1,850 acres are dryland wheat with fallow rotation, and the rest is native rangeland. The family also raises a variety of crops to take advantage of the available water.

Because the farm is located in a designated critical groundwater area, it runs on 27 percent of the water typically allocated for irrigated crops. In the 1970s, the state of Oregon had revoked water rights to the aquifer because it had been over-appropriated and was declining. But the Madison farm is located 12 miles south of the Columbia River, a large river with flows of about 250,000 cubic feet per second in summer to a high of 500,000 cubic feet per second in the winter. For about 20 years, the family has added Class A biosolids to the rangeland to retain water and improve nutritive value, which has improved grazing productivity without irrigation – in some areas by more than 300 percent.

In the 1920s, 60 percent of the farm's production was used to feed the horses that powered the equipment. In contrast, 7 percent of the 2007 canola crop produced enough oil to run the operation's equipment, illustrating the changes in technological efficiency over the years. Even as recently as the early 1990s, the Madisons used three combines to harvest the wheat and corn crops, a task accomplished by just one combine today.

Madison credits diversity in crops and water sources for allowing the farm to maintain profitability with such limited rainfall. Most of the farm's water comes from the Columbia River. Because summer withdrawals are not permitted in order to protect salmon runs, the Madisons take advantage of Oregon's Aquifer Storage and Recovery program, which allows them to take Columbia River water during the spring and fall and store it in the depleted aquifer until needed. "Variation and a variety of cropping and water sources and other enterprises have enabled us to maintain productivity," Madison concluded.



Soybeans

Questions and Answers

Moderator Mark Gustafson: ***What technologies or management systems have been important over the years for water use efficiency?***

For Martin Pasman, no-till farming, made possible by Roundup Ready® soybeans, was an important change, along with irrigation. Regulatory changes also have played a role. Argentina's heavy import taxes for equipment and inputs restricted the use of cutting-edge technology. After removing the taxes in 1990, Argentina's production has increased output from about 30 million tons to 90 million tons today.

Roric R. Paulman's first corn yield in 1985 averaged 153 bushels per acre. It required irrigation, seven hired men, 11 tractors and a harvest that took seven combines and two or three weeks. Today, using tools such as genetically modified crops (GMOs), chemigation, improved equipment and many others, Paulman can plant 60 acres of corn in an hour using an 80-foot planter, spray 150 acres in an hour and harvest using a single combine. But finding people with the knowledge needed to run the equipment is challenging, Paulman said.

Keith Olsen credits new crop technology, particularly GMOs, but said, "We've got a tremendous challenge, I think, down the road as we get concerned about crops becoming Roundup Ready® resistant." Reliable equipment has greatly reduced hours spent repairing machinery and has increased his farm's efficiency.

Means to move water efficiently also have advanced, Aaron Madison said. For example, rather than running full irrigation, variable-frequency drive systems allow irrigation to run at 40 percent, which saves electricity. One of the Madison farm's biggest costs is electricity to carry water from the Columbia River. He also agreed with Paulman about the importance of education. "A lot of this equipment is getting a lot more technologically advanced," Madison said. "And the operators do need a more firm grasp of some of these systems, such as GPS guidance and variable-rate application."

Moderator Gustafson: ***What advances do you foresee to keep your farm sustainable as climate change threatens?***

Madison reiterated the benefits of Oregon's Aquifer Storage and Recovery program. He's also interested in variable-rate water application technology that would allow fine-tuning irrigation to the specific water needs of different soil types within an irrigated circle.

Olsen said farmers have to understand that droughts occur, and no-till farming can minimize the impact of dry spells. He's confident that farming can adapt to changes, with continued improvements in practices and technology and flexibility in operations.

Paulman said a broader understanding of water supply is needed, from precipitation to surface water and storage capabilities in the Ogallala Aquifer. "I think that what we do in the next three or four years will determine what 10 years from now I'll be capable of raising – or what my consumptive-use coefficient will be,"

A View from Agricultural Producers

Paulman said. "I think that we'll have the opportunity to make that better, and we'll all get better together."

Pasman is preparing his farm for Argentina's 100-year rain cycle. He trusts the companies to develop seeds to better withstand drought, but he also is improving the farm through better no-till and irrigation practices.

Madison added that Oregon producers struggle with "rate and duty" water rights, which don't incentivize farmers to use water efficiently because of restrictions about where and how much water can be applied. The ability to spread allocated water over more acres would encourage greater efficiency. In addition, permission to pump Columbia River water is triggered by calendar dates, which doesn't allow for annual environmental fluctuations. A more adaptive policy would be beneficial, he said.

Audience question: ***Can Madison provide more information about the farm's groundwater recharge projects?***

The recharge project applies surface water from a creek running through the property to a land area that allows it to filter into the groundwater system, where it is collected and injected into a confined basalt aquifer, about 500 feet deep. Farmers are allowed to take out 98 percent of the water when needed. As expected, slight rises in the water table have resulted, and the aquifer should slowly be recharging.

Audience question: ***As large-scale U.S. producers, what do you think is transferable to small-land farmers in Africa? Can the Water for Food Institute, which is addressing large-scale U.S. needs, also handle thinking about African farmers?***

Olsen has traveled to southeast Asia, Russia and Turkey, which have some similarities to western Nebraska. He believes some of the technology he uses can be transferred there but also would like to try some of those countries' most sophisticated equipment in Nebraska. He relayed stories about a Vietnamese farmer and agricultural students in Japan to illustrate that although farming is different elsewhere, similarities – and opportunities to learn from each other – also exist. "It makes no different what size of a farm it is," Olsen said. "A small farm can be just as successful as a large farm. … I do believe that we can share with one another, and we can share what we're doing."

Pasman said transferring basic agronomic practices, such as row distance and density, would be helpful. In addition, he believes no-till farming would be extremely helpful for Africa, aided by Roundup Ready® seeds. The same technology for a large farm can be beneficial to very small farms. The difficulty is that yields for no-till crops are low for the first year or two, and new, cheaper irrigation systems for small farms also are needed.

Audience question: ***What does Pasman believe is the role of government policy, especially trade policy, for the agricultural sector's success?***

Free trade results in development around the world, Pasman said. Production increased after Argentina allowed free trade for important

technology. Argentina still has a 35 percent duty-export tax for soybeans, a policy Pasman said he opposes. In addition, universities and governments must invest in development and extension services that help farmers.

Audience question: ***What are Paulman's incentives to grow a variety of crops? To what degree is sustainability involved in choices?***

Many components play a role, Paulman said, but he manages for a five-year water supply, both rainfed and supplemental. High water-use crops, such as alfalfa and sugar beets, hit his upper water capacity quickly. He also strip tills and manages for off-season water loss using a stripper header. "I'm keeping that water on my ground and I'm actually inhibiting return flows to the river, but I'm penalized for that because I pump that during the season," Paulman said. Ultimately, he's trying to achieve sustainability in a five-year rotation while balancing input costs and gross revenue.

Olsen said he was concerned that too few young people are studying agronomy. Farming has changed dramatically over the past 40 years thanks to university researchers, many of whom are retiring. "I'm really concerned where we're going to get the next generation of scientists that's going to be there to advise us farmers on how to raise our crops, how to use our water," Olsen said.

Technology is getting sophisticated, and it's difficult to find people capable of running the equipment, doing the research and talking to farmers about producing the world's food.

Moderator Gustafson: ***What do the panelists need from U.S. and Argentine universities to stay competitive and sustainable?***

Pasman said in Argentina, getting research to the farmers is a problem. Transferring technology and exchanging information between countries and between universities is necessary to advance. It's also important to help farmers in countries that don't have the technology by developing low-level technology.

Paulman said he agreed, adding that producers' abilities and ingenuity are also underused. Much time is spent thinking at high levels, while the farmer is left waiting to see what happens. It's hard to understand the multiple layers, such as trade, affecting farming on a global scale.

Madison expressed concern that university research is languishing in the laboratory without a mechanism for applying it in the real world. "How can we incentivize the transfer of that information into an application, into something that's going to make changes at the production level or at the research level or in the private sector or in the public sector?"

Olsen said he was concerned that too many government regulations will hurt agriculture's future. For example, could the government take away Monsanto's new Roundup Ready® seeds or other new technologies? Or could regulations, such as the Clean Water Act or Clean Air Act, change farmers' practices? As president of the Nebraska Farm Bureau, Olsen works with farmers to oppose harmful regulations. "The whole issue of regulations, I think, is one we have to take very seriously as we look at the future of agriculture," Olsen concluded.