

AMOUR AT A MALL

TWO IOWANS TIE THE KNOT WHERE THEY MET A YEAR AGO — ON A SHOPPING TRIP. **METRO & IOWA, 3A**

The Des Moines Register

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IOWA FARM FAMILIES CONFRONT A NATION IN TRANSITION



Jayden Dammann waits for a tractor ride while his father, Justin, visits with others on the family farm in rural Page County in July. Justin says he feels confident about the management of the family farm one day passing on to Jayden.

CHRISTOPHER GANNON/REGISTER PHOTOS

ROOTS AT RISK

EVEN A SOLID, CENTURY-OLD OPERATION FACES CHALLENGES, UNCERTAINTY

By Sharyn Jackson | sjackson@dmreg.com

On the lawn of a ranch house abutting rolling acres of emerald pasture, a red-haired girl, almost 7, leads a calf in circles with the help of her family.

It's early July, and Jillian Dammann is getting ready to show her bottle calf, Olaf, at the Page County Fair. Her parents, Justin and Jennifer, are teaching her how to lead him, and her little brother, Jayden, is helping.

Named after a character in Disney's "Frozen," this calf from the Dammanns' livestock breeding operation lost its source of sustenance when its mother died. So Jillian helps rear it, feeding Olaf milk from a bottle that's bigger than the pink cowboy boots she wears, here in the southwest Iowa county where Jessie Field Shambaugh founded 4-H clubs more than a century ago.

Jillian is currently one of two possible heirs to a business that's been in her family for five previous generations. Her training with Olaf is more than an extracurricular activity; it's an investment in the legacy of this family and the future of this farm, this county and this country.

For the family to continue its legacy, it will need to navigate the subtle but sweeping forces of change that are transforming America and its place in the world.

See **DAMMANN'S**, Page 8A

FIVE-PART SERIES

The Register examines how the demographic, technological and economic changes that are transforming America are playing out in the lives of four Iowa farm families.

DIGITAL EXPERIENCE

This project includes an innovative 3-D experience and a 2-D option. Learn more at DesMoinesRegister.com/HarvestofChange.



Justin Dammann cuts hay in a field on the family's Page County farm in July.

INSIDE

» **The Dammanns:** The roots of this family farm extend six generations.

» **The other farms:** One is owned by an immigrant just starting out. One is converting to organic. Another raises chemical-free produce and livestock.

» **Oculus Rift:** Learn about the virtual reality headset that allows touring the Dammann farm in an immersive, 3-D experience that's a journalism first.

Bradshaw expects greater use of cameras

But outfitting all officers and storing video is expensive.

By Regina Zilbermints
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Outgoing Des Moines Police Chief Judy Bradshaw expects to see the department's officers equipped with body cameras and other improvements in law enforcement technology, a development she believes will be both a benefit for police and a challenge.

The cameras, which are being worn by increasing numbers of law enforcement officers nationwide, have drawn praise from the public who say the body cameras hold officers accountable. Leaders in law enforcement say the cameras help officials when they handle complaints.

Bradshaw and other local officials said they would like to have the cameras.

But equipping Iowa's largest police department with the devices requires a large and ongoing financial investment during a time of tight budgets. Increased use of the cameras also requires discussions about how video would be stored and when the cameras would be activated.

"The issue with cameras isn't whether or not you support them, for any chief of police or sheriff, it's really the budget and the cost," Bradshaw told

See **POLICE**, Page 13A

VIDEO ONLINE

See this story at DesMoinesRegister.com to hear Des Moines Police Chief Judy Bradshaw talk about several subjects, including moving up the ranks of the department.

Many laid off still jobless

More than 20 percent of Americans laid off in the past five years are still unemployed, a survey released today says, underscoring that despite a recent sharp drop in long-term unemployment, many people out of work at least six months are still struggling.

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High 72° Low 53°

Sunny.
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HUGE FORCES TRANSFORM U.S.

By Sharyn Jackson
sjackson@dmreg.com

The Dammann family in southwest Iowa, like millions of others across the country, finds itself navigating a changing America while remaining rooted in what came before. Consider some of the forces at work:

» **America is aging.** By 2060, those 65 and over are projected for the first time to outnumber those under 18, raising deep questions about the size of the labor force and how families will care for their elders. Meanwhile, school districts will merge and be hard-pressed to maintain services to younger generations that are a smaller slice of the overall population.

Two members of the four farm families highlighted in this project represent opposite ends of the age shift, and show how it has changed childhood in rural America.

Don Wimmer, who turned 88 this summer, came of age in southwest Iowa at a time when children attended the local schoolhouse, multiple businesses catered to his town's population, and a future on the family farm seemed bright for him and his peers.

Jillian Dammann turned 7 this summer in a county that, in terms of population, is in the top quarter of the oldest in America.

She attends private school because her parents don't know whether the public school will still be around by the time she graduates.

» **The country is en route to becoming majority nonwhite.** Whites made up 85 percent of Americans in 1960 but are projected to drop to 42 percent in 2060. The change is driven by immigration, higher fertility rates among new arrivals and their children, and more marriages between people of different racial and ethnic groups.

The increase in racial and ethnic diversity has come more slowly to Iowa, which was 89 percent white as of the 2010 census. But the foreign-born population has risen exponentially in counties with meat-packing plants, which have increasingly relied on immigrant labor.

Crawford County, for instance, home to several meat-processing operations, is now more than a quarter Hispanic. In the Denison school district last year, Crawford County's largest, more than half the students had limited English proficiency.

» **Local businesses are more connected to the global economy.** Aided by the technological advances of the digital age, globalization of industry in a hyperconnected world reduces the clout of owners and workers in charting their own destinies, while influencing how even the most isolated farmers run their operations.

100 PHOTOS
Iowa farming since 1930 at **DesMoinesRegister.com/HarvestofChange1**.

One example of how far-flung events affect Iowa farmers: Conversations about establishing a kosher beef trade between Iowa and Israel stopped earlier this summer when turmoil between Israel and Hamas in Gaza flared up, said Bill Northey, Iowa's agriculture secretary.

» **The specter of climate change threatens an altered environment.** Recent droughts and floods offer vivid reminders that the environment appears increasingly fragile.

In Iowa, flooding in 2008 submerged 1,300 blocks in Cedar Rapids, Iowa's second-largest city, damaged 22 major buildings on the University of Iowa campus and caused up to \$3 billion in losses to agriculture, including crops and equipment.

Weather records have piled up almost yearly since: Flooding returned to much of the state in 2010, and to the Missouri River basin, on the state's western edge, in 2011. Nature seesawed the other way in 2012, when drought parched Iowa and the Midwest. In 2013, Iowa saw its wettest spring, and this year, 24 of Iowa's 99 counties became presidentially declared disaster areas after heavy rain, wind, hail and tornadoes in June and July.

Those extremes could signal climate change or merely weather volatility. But they combine with fundamental demographic and economic shifts to heighten unease about the future.



CHRISTOPHER GANNON/THE REGISTER

With help from her dad, Justin Dammann, and brother, Jayden, Jillian Dammann leads Olaf, her bottle calf, as Justin's wife, Jennifer, looks on at the family's farm near Essex in rural Page County. Iowa farm families like this one are grappling with immense societal changes that will put a new face on the nation over the next century.

DAMMANN'S

Continued from Page 1A

Two massive demographic shifts head the list: Americans are rapidly graying, and the nation is becoming more racially and ethnically diverse.

"Either one of these by itself would be the defining demographic drama of its era," said Paul Taylor, a Pew Research Center fellow and author of "The Next America: Boomers, Millennials and the Looming Generational Showdown."

"The fact that they're happening together could be a recipe for stresses in social cohesion."

Then layer in other dramatic shifts, including the increasing impact of the global economy, rapid technological advances and concerns about the climate's health. They combine to leave many Americans with an unsettled sense of the future.

In Iowa, these profound changes are perhaps best seen through the eyes of the people who for centuries have fed America and the world.

The Iowa farm family, with its deep community roots, extended family ties and a large dose of savvy born from living close to the soil, finds itself at the epicenter of a new cultural and economic landscape.

In rural America, the aging of the population and ever-bigger farms enabled by technological advances are already depopulating the countryside.

"It is almost inevitable that there are going to be less farm families farming in the state of Iowa, which in turn means less schools, less churches, less communities. And it just kind of snowballs," said Justin Dammann, Jillian's father. "I think as we go forward, the big question mark is: How

is it going to look?"

He fears Iowa will one day resemble parts of Nebraska and other rural states that have seen small family operations swallowed up by corporate farming and consolidation, leaving vast stretches of land with few towns in between. That future would see fewer families finding it viable to stay in farming, fewer shoppers in fewer stores on Main Street, fewer schools and fewer opportunities in the community for his kids.

As they circle the yard, little Jayden hangs on to the end of Olaf's rope, followed by Justin. Jillian tugs the rope where it's closest to the calf's face, and Mom, Jennifer, holds its tail.

The Dammanns have thrown all hands into a vast and uncertain future, as the family has for generations.

If ever a family was equipped to face uncertainty, it would be the Dammanns. Their farm has survived waves of tumult since its 1901 founding by a German immigrant.

The operation outlasted the Great Depression of the 1930s, a destructive tornado in 1964, the farm crisis of the 1980s, consolidations that squeezed the family out of the swine and poultry industries, drought in recent years, and the latest challenge, corn prices less than half of what they were a year ago.

Outside the boundaries of the family's acres, one-room schoolhouses have shuttered, and districts merged. Towns disappeared from the map. Young people moved away, as the old folks got older.

The passing years also brought times of promise, fostered in part by this family's commitment to preserving the land for subsequent generations, as well as its adaptability to a changing industry.

Technology has transformed the barn of yesteryear, once filled with hand imple-

ments. Now sleek, computer-guided machines work the land with pinpoint accuracy.

Pressure to keep up with competition led this farm to grow from a 160-acre plot to 7,100 acres of cropland and pasture that's spread among nine counties in two states, Iowa and Missouri.

Four generations are rooted here, including Arnold Dammann, 79, whose grandfather founded the farm and whose father imparted to him the frugality of Depression-era life; Arnold's son Danny, who entered the business just as the 1980s farm crisis took hold, shaking his confidence that he could continue doing what he loved; Arnold's grandson and Danny's son, Justin, 34, who as manager of the farm is at the core of today's operation; and, representing the fourth generation, Justin's son, Jayden. He's just 4, but with his bins of toy tractors and drawers of iconic green John Deere T-shirts, he's viewed as the best prospect to take over one day.

Jillian isn't sure she wants to farm, but by proximity alone, she's learning the basics. The culture in which her family is raising her, on an Iowa farm rich with history, teaches her how to care for animals and how to nurture the Earth and its creatures.

Jillian struggles as she tries to lead Olaf, who pulls her away from her intended destination.

She begs her parents to turn back. But Justin won't let her give up.

"Tough times," says her father, "make people stronger."

"No, they don't!" Jillian protests.

Her father laughs. His family's history is rooted in struggle, though they now live in plenty.

"Yeah, they do," he says knowingly. "Wanna do another round?"

VIDEO
Spend time with the Dammanns as they talk about their legacy.

14 PHOTOS
Historical photos of the Dammann farm.

15 PHOTOS
Explore the farm with the family's next generation. **DesMoinesRegister.com/HarvestofChange1**

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CHRISTOPHER GANNON/REGISTER PHOTOS
Fog blankets a valley at sunrise as seen from the Dammann family’s farm in Page County in July. In all, the Dammanns’ 7,100-acre operation is spread over nine counties in two states.



Jordan Dammann, the farm’s master mechanic, sweeps out his shop. His work on machinery saves the operation \$100 an hour in service costs in town.



Jayden Dammann entices calves with a handful of grass plucked nearby. His parents are teaching him and his sister, Jillian, how to raise calves.

A JOURNALISM FIRST: VIRTUAL REALITY

By Anthony DeBarros | adebarros@gannett.com

In a first-of-its-kind explanatory journalism project, The Des Moines Register and Gannett Digital have partnered to tell the story of an Iowa farm family using emerging virtual reality technology and 360-degree video. The experience — part of the Register’s Harvest of Change series, about how sweeping demographic and economic changes in America are affecting Iowa farm families — takes viewers on a virtual tour of the Dammann family farm in southwest Iowa, to a central “shop” location that includes the original 1888 farmhouse and the nerve center of the family’s corn, soybean and calving operation. It’s best viewed with an Oculus Rift, a virtual reality headset that gives viewers what its manufacturer, Oculus VR of California, calls a sense of “presence.” Facebook recently acquired Oculus for more than \$2 billion in cash and stock, placing it at the head of the nascent VR industry.

In our project, viewers can take an immersive, self-guided tour of the farm, rendered in 3-D using the Unity video game engine. Along the way are a dozen 360-degree video segments in which the family and others in agriculture discuss their work and issues they face with technology, genetically modified crops, shifting culture and the future of farming in a time of rapid change. Total Cinema 360, a New York City film company, shot the videos using cameras that record images and sound in all directions at once. When watched via the Oculus Rift, the video appears to surround the viewer. Turn your head (or move your mouse) in any direction to see what’s happening around you. So far, about 125,000 of the first two Oculus Rift development kits have been sold, according to a company spokesman. The early buyers are largely developers and hard-core game enthusiasts. If you own one, you can download our Oculus version of the VR farm experience. For

BEHIND THE SCENES

Watch a video of the Gannett digital and Register crews at work with the 360-degree video equipment, a helicopter flyover and more. Go to this story at **DesMoinesRegister.com/HarvestofChange**.

everyone else, we’ve built two-dimensional versions. You can download applications for PC and Mac (requiring a speedy computer and graphics card), or you can watch a “light” version in a Web browser after downloading a Unity 3-D plug-in. To build the experience itself, the Gannett Digital team started with photos and video taken at the Dammann farm by the Register. Then, we used the Unity game engine to render the farm’s terrain, buildings and flora. Aerial imagery was used to accurately place and size objects. Everything in the environment was built to scale, and several objects, such as buildings, incorporate actual textures from photographs. On a visit to the farm in July, the team and a two-man crew from Total Cinema 360 shot the video segments and recorded audio, including natural sound from the farm that’s heard in the experience.

Anthony DeBarros is director of interactive applications for Gannett Digital

DESMOINESREGISTER.COM/HARVESTOFCHANGE

EXPERIENCE THE DAMMANN FARM

This series includes a unique virtual rendering of the Dammann farm you can experience in several ways. If you own an Oculus Rift DK2 — a virtual reality headset — you can download an immersive three-dimensional walk-through of the farm that includes a dozen 360-degree videos of farm life. For everyone, a 2-D version of the complete experience is available as a PC or Mac download, but you’ll need a speedy computer. Finally, a “light” version can be viewed in Web browsers. Visit our series page at **DesMoinesRegister.com/HarvestofChange** for all options.



THE FARM

What will you find in the Register’s virtual farm experience? Explore a dozen 360-degree video segments about life on and off the farm. For example, in this segment, take a ride with Justin Dammann as he checks the cattle herd at dawn, and hear from patriarch Arnold Dammann about how their family farm competes with corporate farms.

OTHER FEATURES ONLINE

- SPECIAL DIGITAL REPORT:** In addition to the virtual reality experience with this project, the Register has produced a rich multimedia story, including photos, videos and interactive databases.
- VIDEO OVERVIEW:** See an introduction to changes sweeping America and the four farm families featured in this project.
- MEET THE FAMILIES:** Learn more about the families and their farms, including video documentaries on each farm, to be released this week.
- TALK ABOUT IT:** Share your thoughts on this project and the virtual reality experience on Twitter with **#VirtualFarm**.

ABOUT THE AUTHORS



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HARVEST OF CHANGE

- Today** Overview
- Tuesday** Aging
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PUMPKIN IS SERVED

An ode to REAL pumpkin, plus recipes, in IOWA LIFE

The Des Moines Register

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Domestic abuser trackers pushed

Monitoring program would protect victims of violence, advocate says

By Kathy A. Boltan
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An Iowa woman's push for a state law that would require electronic monitoring of people

accused of domestic abuse is getting attention from state policymakers.
Gov. Terry Branstad, at a recent candidate forum, said the idea makes sense.

"One of the big tragedies that we've had occur is when someone who has a no-contact order violates it and murders their estranged spouse or partner," Branstad said. "This would be a

way to make sure you knew where they were and that they were not violating the no-contact order."
Domestic violence in the United States has been in the

spotlight since the release of a video that showed pro football player Ray Rice slugging his then-fiancee. The incident has prompted calls for the NFL to take a firmer stance against domestic violence. It also has

See GPS, Page 13A

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IOWA FARM FAMILIES CONFRONT A NATION IN TRANSITION



These are some of the Union County friends who frequently assemble for morning coffee talk outside Frank's Service in Arispe. From left are Marvin Ringberg, Mike Fry, Don Wilson, Frank Eighme, Randy Needham and Jim Bradley. The weathered station is one of the few remaining businesses in the southwest Iowa town.

CHRISTOPHER GANNON/THE REGISTER

TOWNS GRAY, SHRINK

AS THE POPULATION AGES AND YOUNG PEOPLE GO TO WHERE THE JOBS ARE, MANY FARM COMMUNITIES WITHER

FIVE-PART SERIES

The Register examines how the demographic, technological and economic changes that are transforming America are playing out in the lives of four Iowa farm families.

DIGITAL EXPERIENCE

This project includes an innovative 3-D experience and a 2-D option. Learn more at DesMoinesRegister.com/HarvestofChange.

By Sharyn Jackson | sjackson@dmreg.com

On U.S. Highway 169 in Arispe, a southwest Iowa town of 100 people, a gas station is one of the last holdouts of convenience in a place where a grocery store, bank, coal yard and tavern have all been shuttered.

The auto shop is so remote and weathered that a passer-by might think it's one of the vacant relics found across Iowa in towns whose boom years have long passed. But Frank's Service is still very much in use.

Every morning, in hourly shifts starting at 6 a.m., a handful of old-timers gathers at the shop for coffee, doughnuts and chatter. If Frank Eighme, the shop's 78-year-old namesake, isn't doing oil changes or fixing flats, he joins the group, sitting outside the garage in low-to-the-ground, gray plastic chairs built for children.

A Frank's regular bought the chairs many years ago from Arispe's schoolhouse, right before it was torn down. The school closed in 1994.

The scene reflects a rapidly aging America, one of the fundamental demographic, technological and economic changes that are sweeping the nation — and brew-

INSIDE PAGES 8A-10A

» **Solutions:** How can shrinking towns be revived? Experts have some ideas.

» **Families:** Farm families, like others in the nation, now include more nontraditional households.

» **Technology:** High-tech gear has brought precision and savings to farming, but not without societal costs.

See AGING, Page 11A



Christie to speak at Branstad bash

Chris Christie, the outspoken governor of New Jersey and one of the GOP's most formidable potential presidential candidates for 2016, is scheduled to speak at Gov. Terry Branstad's birthday bash next month. It will be Christie's second trip to the presidential testing grounds of Iowa in three months. **Metro & Iowa, Page 3A**



Legal pot could net Iowa \$24M

If Iowa legalized marijuana, the state would likely gain more than \$24 million in new annual tax revenues, a national report predicted Monday. The estimate is based on Iowa's sales-tax rate and on how many adults say in surveys that they regularly use pot. **Metro & Iowa, Page 3A**

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CHRISTOPHER GANNON/THE REGISTER

Frank Eighme, 78, repairs a tire in his service station in Arispe. He has worked in service stations in town for 56 years. "You gotta have a reason to get out of bed in the morning," he says of his passion for the work. Other businesses in town, however, haven't survived. A grocery store, bank, coal yard and tavern have all been shut down.

AGING

Continued from Page 1A

ing anxiety about the future.

Like many rural towns across Iowa and nationwide, Arispe has experienced a population shuffle that has seen the number of young people decline as remaining residents grow older.

In the 30 years ending in 2010, the national median age rose by more than seven years, to 37.2. Iowa aged even more, rising to 38.1. By 2040, Woods & Poole Economics projects that people age 65 and older will constitute at least 20 percent of residents in 83 out of Iowa's 99 counties.

Meanwhile, the proportion of the population under 18 is shrinking, declining from 28 percent of Americans in 1980 to 24 percent in 2010. A dip to 23 percent is expected by the next census.

What once was a triangular spread of population nationwide — lots of kids at the bottom, fewer middle-age people, a narrow tip of elders at the top — now looks more like a rectangle. Each day from now until 2030, 10,000 baby boomers will turn 65, according to the Pew Research Center.

"This kind of extensive aging is brought about by the very big baby boom cohort waiting at the top of the age structure, and it's very hard to fill in the bottom," said William H. Frey, a demographer and senior fellow at the Brookings Institution.

This new shape of the population will challenge society in supporting its oldest and youngest members.

The number of working-age people compared with the young and elderly — known as the "dependency ratio" — will rise sharply, according to the Pew Research Center. That means the cost per worker to support those dependents is going up.

Communities that target more funds toward social programs for a growing number of seniors may face cutting services and educational opportunities for youth.

Nation's rural areas see bigger age shift

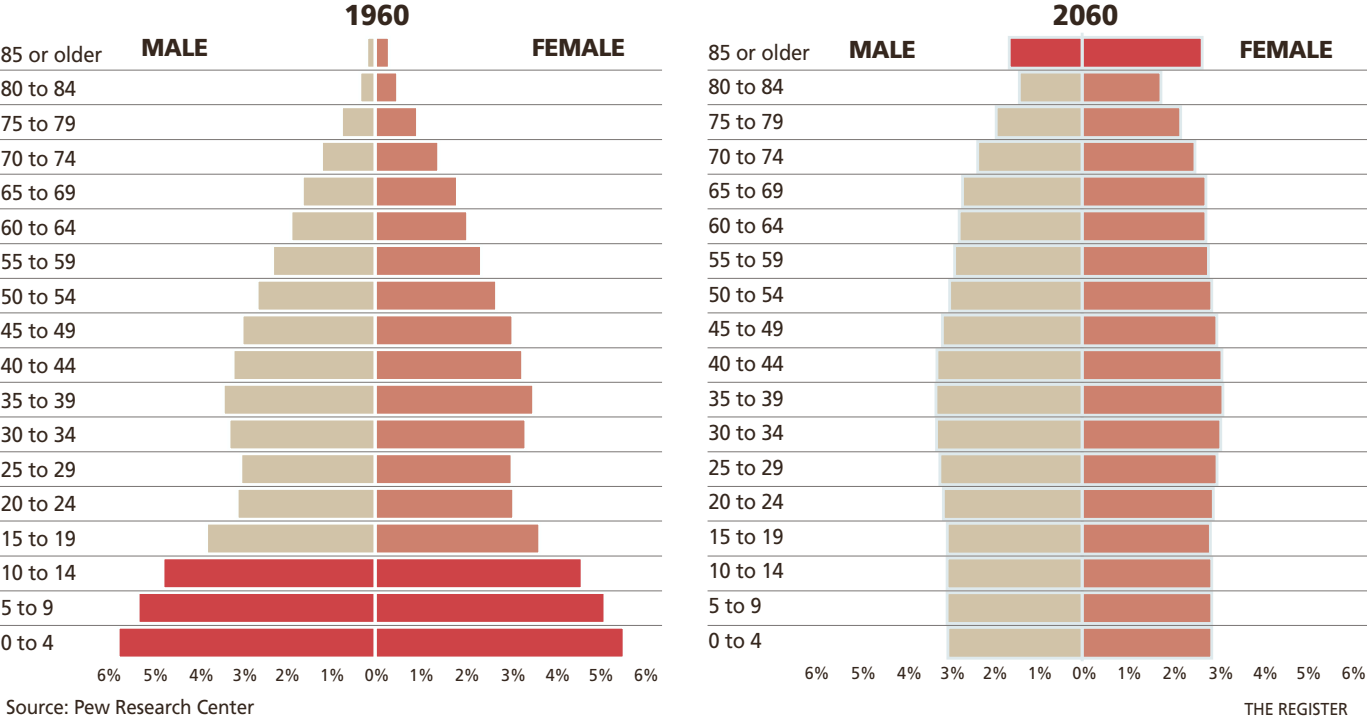
In rural areas, the shape shift is more pronounced, driven by a cycle of shrinking opportunities. Technological advances mean fewer workers are required to operate most farms, and the high cost of land and equipment makes it harder for young farmers to get started. With fewer jobs available, young people migrate to cities for work.

Then, with fewer young families on the farms or in nearby small towns, longtime businesses close, whittling remaining jobs. Schools close or consolidate with those in other towns. Families have to drive farther just to buy groceries.

AGE DISTRIBUTION IS SHIFTING – AND SHRINKING

In 1960, U.S. population was spread out in a pyramid: lots of children on the bottom, fewer middle-age people at the center and a small number of elders at the tip. By 2060, population will be spread like a rectangle, with almost as many people over 85 as under 5.

KEY: ■ Baby boomers (born 1946-1964)



"In rural areas that don't have real vibrant economies that attract young people, when you lose those young children, you don't get them back," Frey said.

The impact of an aging population with fewer kids can be felt in increased need for medical care and long trips to get it. For decades, the Dammann family in southwest Iowa has had to make 80-mile drives to Omaha for more advanced care than the local medical center in Clarinda can provide.

And it can be seen in tiny graduating classes and eventual school closures.

Though Iowa's school enrollment grew from 1991 to 2011, it ranked 37th in the nation for its increase. Roughly 10 to 15 school districts in the state have closed each decade since 1970. Already since 2010, 21 districts have closed, leaving 338.

Influenced by a steady decline in school-age children in the area, Justin and Jennifer Dammann decided to send their 7-year-old daughter, Jillian, to private school rather than public school in their hometown of Essex.

Since the 2002-03 school year, the Essex district has seen a 21.5 percent drop in enrollment, to 219 students. Neighboring districts also saw sharp declines. In 10 years, South Page lost half its students, dwindling to 158.

"One of our decisions why to go that way was because we felt that by the time our kids graduated, the Essex school may not be there," Justin said.

Essex Superintendent Paul

Croghan said the solution for budget-strapped rural school districts is to share teachers, video-conference with classrooms outside the building and use online courses.

"We would love to be there face to face, but is that always feasible?" Croghan said. "No."

Farm crisis accelerated urbanization trend

More than 60 percent of Iowa municipalities have lost population since 2010, and cities with fewer than 500 residents lost 3 percent of their populations combined, according to an Iowa State University analysis of census data.

Meanwhile, 44 percent of statewide growth from 2010 to 2013 occurred in Iowa's 10 largest cities. The urbanization trend can be traced back to the Great Depression, and it accelerated when another depression hit agriculture in the 1980s.

Many family farms were wiped out during the 1980s farm crisis. Those that endured got bigger, while smaller farms found it harder to compete. And lots of people who lived through those years became disenchanted with the struggle.

"I had to make a choice between keeping my family fed and maintaining a tradition," said Bill Schreck, who left his family's longtime Carroll County operation 12 years ago after decades of working a second job to make ends meet.

Schreck had once hoped his

children would continue the family legacy in farming, but after making it through many lean years, "I encouraged them to look at other avenues."

For the towns hit hardest by the graying of their population and flight of their youth, simply imagining a community's future can be hard, if not heartbreaking.

Nancy Jarred, 74, is the mayor of Tingley, a town eight miles south of Arispe, in Ringgold County. As of the 2010 census, nearly one in three of Tingley's 184 residents was 65 or older, up from 2000, when it was about one in four.

Jarred worries that her town won't be around in 15 years. "The businesses that we have are having a rough go of it," she said. "We may lose our post office. Our store is struggling. Our cafe is struggling."

The lack of young people has her fearing the worst, she said. "Our community is going to die out if we don't get more people."

Liesl Eathington, an economist at Iowa State University's Community Indicators Program, suggests the trend of rural population decline in Iowa and nationally is not necessarily a bad thing.

"The natural tendency is for people to think of their community the way it was when they were growing up, so a lot of times people's standard for what is correct is in the past," Eathington said.

"Urbanization is a very natural tendency," she said. "People need assurance that just because their community is changing, doesn't mean it's disappearing."

13 PHOTOS, PLUS VIDEO

Gathering at Frank's Service. DesMoinesRegister.com/HarvestofChange2

INTERACTIVE

Explore how rural and urban populations have shifted in an interactive map. DesMoinesRegister.com/HarvestofChange2

SEARCH

Explore a database showing the makeup of Iowa counties by race, family structure and other demographics. DesMoinesRegister.com/HarvestofChange2

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CHRISTOPHER GANNON/THE REGISTER
Farming has become easier for Danny Dammann as he's gotten older. Above, he runs a sprayer across a Montgomery County soybean field in July.

TECHNOLOGY:
THE OMINOUS EDGE

By Sharyn Jackson
sjackson@dmreg.com

At 57, Danny Dammann is becoming more conscious of his health. The lifelong farmer in southwest Iowa sticks mostly to operating the sprayer these days, avoiding more strenuous jobs. But farming has also become easier as he's gotten older, making it more likely he can stay in the profession longer than his forebears did. A Global Positioning System device guides the sprayer through the field, making his work go faster. Pressurized combine cabs keep corn dirt out of the air that drivers breathe, so they're less prone to respiratory illnesses like emphysema, from which Danny's father, Arnold, suffers. Technology has transformed farming as it has other industries around the globe. Machines can now work a farm with precision accuracy — and require fewer operators. Small farms often can't afford new technology and struggle to compete with the efficiency of larger farms and their arsenal of big equipment. While job loss from technology causes concern in many industries, in farming it contributes to the disappearance of family farms, to the emptying of whole towns, to a loss of generations. In Iowa, farms that are owned and managed by families have declined 23 percent since 1982. At the same time, the average age of farmers in the United States in 2012 ticked up to 58.3 from 55.3 ten years earlier, part of a steady 30-year increase, according to the USDA's agriculture census. With farmers better equipped to work more efficiently, average U.S. farm size also is growing, up 3.8 percent to 434 acres from 2007 to 2012. "And there doesn't appear to be anything on the horizon that would stop or turn around that trend toward adoption of larger machines, larger technology," said Dave Miller, a farmer and director of research for the Iowa Farm Bureau. Technology enables more efficient, cost-effective production, but the impact of technology on rural communities "creates issues," Miller said. "We see a number of Iowa counties continue to lose population, which puts pressure on school districts, puts pressure on community resources, narrows the taxpayer burden," Miller said. "That's probably one of the big dramatic shifts that's going on and continues to go on."

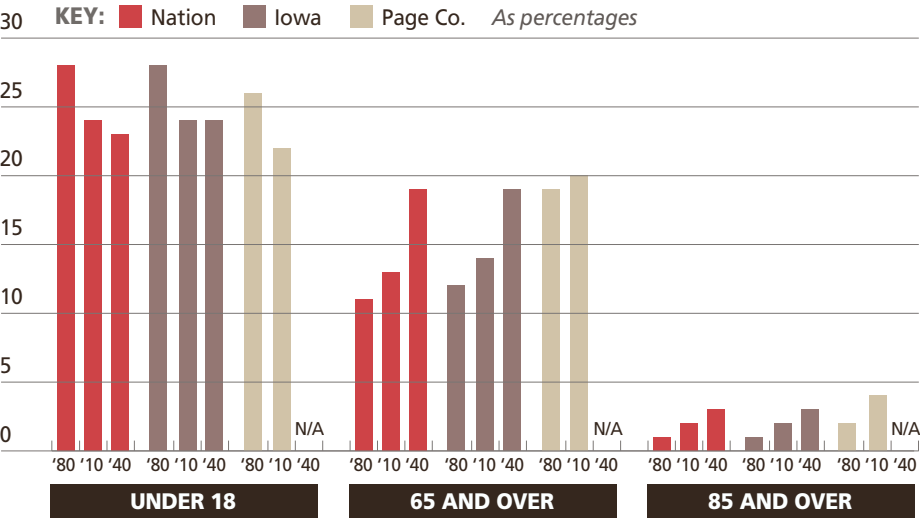
SEARCH
Explore a database showing the makeup of Iowa counties by race, family structure and other demographics. **Des Moines Register.com/HarvestofChange2**

Danny Dammann said the family was lucky to have his sons, Justin and Jordan, join the operation. "I remember when I was getting Justin started," he said. "There's a lot of kids his age that did not stick on the farm." When those kids' parents eventually retire, if their heirs don't take over the land, Danny said, "there's going to be a dead spot in there." Though technology facilitates longer careers, it also brings a new health challenge for farmers. Justin, 34, said he has to watch his weight for the first time in his life. "We physically work less," he said. "It's the challenge of all of us in our culture to stay physically active. It used to be nature; we worked manually all day. Now, we have technology working for us." Although farm operation differs today, the essential character of many farm families remains the same, said Bill Northey, Iowa's secretary of agriculture. Family farms are more technologically advanced, bigger, and staffed by fewer, older people, he said, but families "still have that attachment to their farm, to their landlords, to their neighbors." But the Dammanns worry that with their children's age group smaller than the last, and with advances in farming requiring less labor going forward, the effects on their area will be severe. "I think what is most intriguing with the power of technology and the equipment that is available today," Justin said, "is how are these Iowa rural communities going to look 10, 15, 20 years from now?"

AMERICA IS AGING

In U.S. pie, youth piece shrinks, elderly piece grows

The share of population made up by youth is shrinking, while the share of older people is rising in the U.S., Iowa and Page County — a continuation of a long-term demographic shift that is projected to become even more dramatic by 2040.

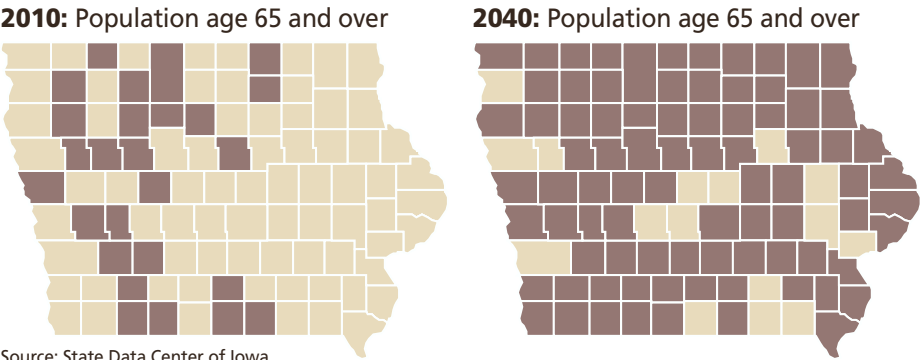


Source: U.S. Census, 1980-2010, and future estimates from Woods and Poole Economics, 2011-2040.

Wave of gray to spread across Iowa

Residents 65 and over accounted for at least 20 percent of the population of 26 Iowa counties in 2010. In 2040, they will account for at least 20 percent of the population in 83 of Iowa's 99 counties.

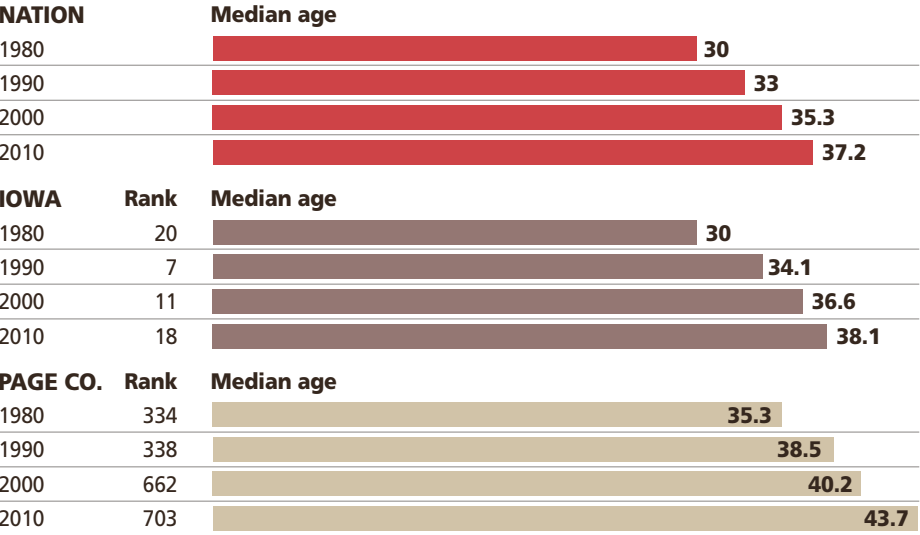
KEY: Less than 20 percent 20 percent or more



Source: State Data Center of Iowa

Median age rises

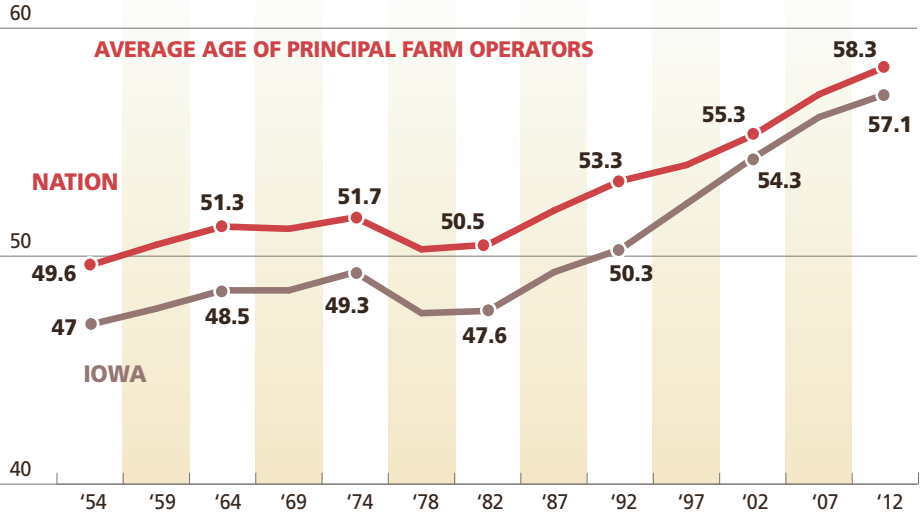
From 1980 to 2010, median age rose at the nation, state and county levels. Page County is in the top 25 percent of oldest counties in the U.S. Its rank among oldest counties has slid since 1980, showing how the rest of the nation is catching up to its high median age.



Source: U.S. Census, 1980-2010

Median age of farmers ticks up

From 2007 to 2012, median age of U.S. farmers rose more than a year to 58.3.



Note: Beginning in 1997, the National Agricultural Statistics Service (NASS) administered the Census of Agriculture, which was previously conducted by the U.S. Census Bureau. NASS altered the census methodology to adjust figures to capture nonrespondents, so figures prior to 1997 may not be entirely representative.

Source: U.S. Department of Agriculture, Census of Agriculture

THE REGISTER

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EXPERIENCE THE DAMMANN FARM

This series includes a unique virtual rendering of the Dammann farm you can experience in several ways. If you own an Oculus Rift DK2 — a virtual reality headset — you can download an immersive, three-dimensional walk-through of the farm that includes a dozen 360-degree videos of farm life. For everyone, a 2-D version of the complete experience is available as a PC or Mac download, but you'll need a speedy computer. Finally, a "light" version can be viewed in Web browsers. Visit our series page for all options.



ENJOY THE RIDE

Go for a ride with Justin Dammann and his son, Jayden, on a self-driving, GPS-guided Case tractor. The Dammanns use the high-tech tractor to plant, fertilize and harvest crops with precision, saving countless hours and cutting waste.

OTHER FEATURES ONLINE

- SPECIAL DIGITAL PRESENTATION:** In addition to the virtual reality experience with this project, the Register has produced a rich multimedia story, including photos, videos, interactive databases and graphics.
- VIDEO OVERVIEW:** See an introduction to our examination of the broad changes transforming America and to the four farm families featured in this project.
- MEET THE FAMILIES:** Learn more about the four families and their farms, including video documentaries on each farm to be released this week.
- TALK ABOUT IT:** Share your thoughts on Twitter at **#VirtualFarm**.

ABOUT THE AUTHORS



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HARVEST OF CHANGE

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MOMENTUM MAN

Growing buzz around UI's C.J. Beathard becoming hard to ignore. *SPORTS*

The Des Moines Register



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IOWA FARM FAMILIES CONFRONT A NATION IN TRANSITION



CHRISTOPHER GANNON/THE REGISTER

Phrakhounmany "Air" Philavanh leads cattle on his farm near Milo. Philavanh, who played on his grandparents' rice farm in Laos, made a longtime dream of his come true in 2010 when he bought a few acres to farm.

AG'S NEW FACES

MANY IMMIGRANTS SEE FARMING AS A SPECIAL WAY TO SOLIDIFY TIES WITH THEIR NEW HOME

FIVE-PART SERIES

The Register examines how the demographic, technological and economic changes that are transforming America are playing out in the lives of four Iowa farm families.

By Sharyn Jackson | sjackson@dmreg.com

Watching John Wayne movies as a child, Phrakhounmany Philavanh dreamed that one day he could be like the characters the Westerns legend portrayed.

"The fact is: John Wayne? Cowboy," said Philavanh, who came to Iowa — Wayne's home state — as a refugee from Laos in 1984. He goes by the single name Air, his childhood nickname.

"Over there, I didn't have time to be a cowboy," said Air, 50, whose family was broken up by a communist takeover and lived for years in refugee camps in Southeast Asia before being invited to resettle in Des Moines.

In 2010, after decades of working a mix of jobs, Air bought an 11-acre plot of his own south of Des Moines, where he's raising 10 calves.

"Over here," he said, "it's the right time."

Philavanh is part of an extended wave of immigration that, along with more intermarriage and higher fertility rates among immigrants and their descendants, is dramatically changing the racial and ethnic makeup of America. Non-Hispanic whites, which made up 76 percent of the population as recently as 1990, are estimated to lose their majority in 2043, according to U.S. Census projections.

This shift coincides with an aging population and rapid technological and economic changes, giving many Americans an unsettled sense of the future.

America's changing complexion — and the anxieties it stirs — has come more slowly to rural Iowa, but can be seen today on farms run by immigrants and in meatpacking towns where compa-

See IMMIGRATION, Page 14A

INSIDE PAGES 12A-13A

» 'Most happy': His small farming operation is a dream come true for Phrakhounmany Philavanh.

» Familiar foods: "Incubator farms" around the country are helping refugee families earn money and enjoy their native crops.

DIGITAL EXPERIENCE

This project includes an innovative 3-D experience and a 2-D option. Learn more at DesMoinesRegister.com/HarvestofChange.

INFRASTRUCTURE

Aging gas pipes pose explosion danger

But Iowa has relatively few miles of bare metal pipes, which are prone to corrosion and rupture as they age.

By Daniel P. Finney and Jeffrey C. Kummer dafinney@dmreg.com

Natural gas pipeline incidents have been relatively sparse in Iowa over the past decade despite dozens of deaths, hundreds injured and \$2 billion in property damage nationwide.

Iowa has seen 25 reportable gas pipeline incidents causing more than \$6.3 million in property damage since 2004. There were seven injuries and no fatalities in that span.

Only one Iowa incident involved a corroded pipeline. Nearly all the incidents were caused by lines being severed in construction or traffic incidents or weather.

Of the 17,814 miles of natural gas pipeline in Iowa, just 179.4 miles are made of bare metals, which are prone to corrosion and failure as they age.

Natural gas pipeline breaks and leaks can be disastrous, and despite years of warnings from federal and state regulators, some utilities across the nation have hundreds or even thousands of miles of old, vulnerable pipes, according to a USA TODAY Network investigation.

The most destructive blasts have killed at least 135 people, injured 600 and caused \$2 billion in damages since 2004, despite recommendations from federal safety regulators and acci-

See PIPE, Page 22A

USA TODAY

About every other day over the past decade, a gas leak in the United States has destroyed property, hurt someone or killed someone, a USA TODAY Network investigation finds. A review of federal data shows there are tens of thousands of miles of cast-iron and bare-steel gas mains lurking beneath American cities and towns. The industry has replaced thousands of miles of pipe, but a daunting amount remains. It can cost \$1 million per mile, or more, to replace aging pipe, costs typically passed to customers. Story, Page 1B

METRO & IOWA, PAGE 3A

New ash borer plan might spare trees



BUGWOOD.ORG

West Des Moines' initial plan to combat the emerald ash borer called for removing all 1,100 of the city's ash trees over several years, regardless of their location or condition. But now, city officials say new data about an alternative treatment method will allow them to keep some trees. A product called TREE-age, an insecticide that's injected into the trunks of trees, has been used effectively in many other cities, West Des Moines' urban forestry supervisor says.

High 72° Low 56°
Mostly cloudy.
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CHRISTOPHER GANNON/THE REGISTER
Bhutanese refugee Tika Bhandari, with her daughter, Sophiya, 4, and father, Narad Bastola, sells her farm produce during the Global Greens Farmers Market at Lutheran Services in Iowa in late August. The Des Moines market, launched in June, features fruits and vegetables grown by displaced farmers who have resettled in Iowa.

IMMIGRATION

Continued from Page 1A

nies have sought labor from immigrant communities.

Though Hispanics accounted for just 5.5 percent of Iowa's population in 2010, Woods and Poole Economics projects the percentage will rise to 12 percent by 2040. Nationally, Hispanics are expected to make up 27 percent of the population by 2040 and Asians 8 percent.

By 2050, the Pew Research Center projects, nearly one in five Americans will be foreign-born.

Yet in a nation where 99 percent of Americans trace their presence to immigration, 15 percent of adults say immigration is the country's top problem, according to an average of July through September Gallup polls. That's the highest level of concern about immigration since 2006.

And by a 2-to-1 margin, Americans think immigration should be decreased, a July Gallup poll found.

Immigration has occupied a constant and contentious presence in national headlines since spring, when tens of thousands of unaccompanied minors, mostly from Central America, attempted to cross the southern border.

Air, who is an American citizen, says he has not encountered negativity from other Iowans, including his farm neighbors.

"I look different to them, but they're happy," he said. "They kind of want to help me out."

Immigrants head to where the jobs are

Many immigrants, like other Americans, go to where the jobs are, which is primarily in the nation's metro areas.

Polk County, home to Des Moines and Iowa's most populous county, has the state's single largest Hispanic population, at 34,887 people in 2012.

In Iowa, one job magnet has been meatpacking plants. Eight counties in 2012 were at least 10 percent Hispanic, and the highest percentages of Latinos were in counties that are home to packers: Crawford (26.6), Buena Vista (24.5), Marshall (18.5), Muscatine (16.5) and Louisa (16.4).

"We certainly have some tough jobs in agriculture, and some of the folks that run those operations, whether it's a dairy farm or detasseling corn or working in a meat plant, have struggled to find the help that they need," said Bill Northey, Iowa's secretary of agriculture. "Some of those jobs have transitioned to immigrants."

As Air's story shows, the nation's changing complexion has come even to farm ownership and management, where whites have long predominated.

For many immigrants, farming is a special way of putting

down roots after leaving behind difficulty and strife to start a new, better life in the United States.

"It has been the story of Iowa, immigrants coming and farming, and he's in that tradition," said Matt Russell, a Lacona farmer who mentors Air through Practical Farmers of Iowa. "Getting into agriculture and owning a farm, that has historically been a great wealth-building opportunity for immigrants."

Among 2.1 million principal farm operators in 2012, almost 8 percent were minorities, according to the U.S. Department of Agriculture's Census of Agriculture.

That's an increase of 12 percent over the previous five years. Farms operated by Hispanics, which made up the largest minority group, saw a 21 percent increase.

Iowa governor says no to kids at border

Air came to Iowa under a now-legendary initiative begun years earlier by former Gov. Robert Ray to welcome war-displaced refugees from Laos and Vietnam. Between 1980 and 1990, Iowa's Laotian community multiplied, from 162 to 3,241.

"Iowans stood up and did their part, town by town, church by church," said David Oman, who served as Ray's press secretary. "They felt as good about it as did the refugees who received a second chance at life."

Today, Iowa's officials aren't welcoming all new immigrants. A plan by the federal Office of Refugee Resettlement to house 48 Central American juveniles at a shelter in Clarinda fell apart earlier this summer, and Gov. Terry Branstad has been outspoken in his opposition to bringing such children to the state.

"We are deeply empathetic for the unaccompanied alien children who are coming to the United States for a better life," wrote Branstad, a Republican, in a July letter to the White House. "However, the lack of a secure border and sound immigration policy is sending a signal of false hope to the unaccompanied alien children."

Oman said the difference between Ray's efforts to resettle southeast Asian refugees and today's controversy has to do with transparency.

"People weren't coming into the state under the cloak of darkness," Oman said.

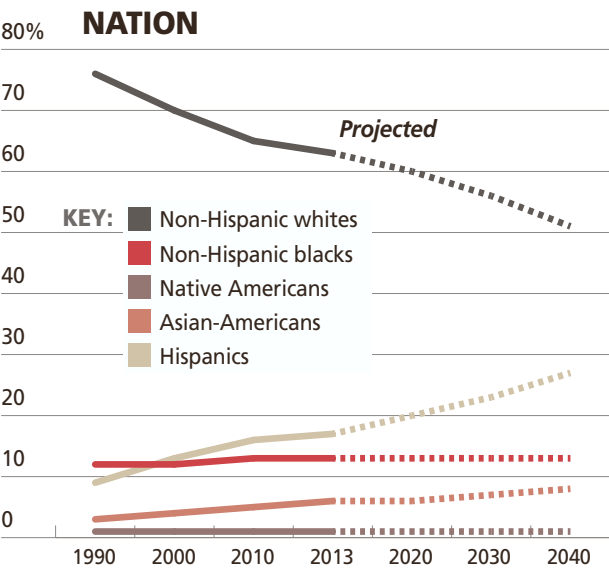
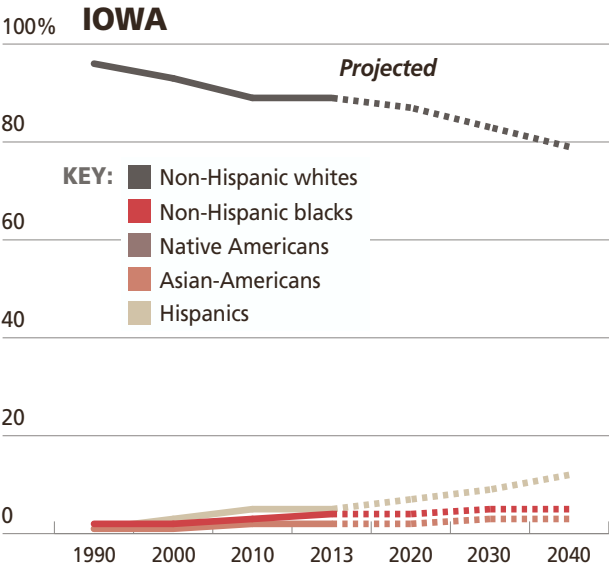
Concerns include jobs, respect for law

In Republican U.S. Rep. Steve King, Iowa has one of Congress' most outspoken critics of unauthorized immigration. Last year, he gained national attention when he said that for every child of undocumented parents "who's a valedictorian, there's another 100 out there who weigh 130

AMERICA IS BECOMING MAJORITY NONWHITE

America's complexion is changing

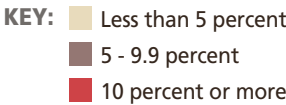
Along with a major shift in the country's age comes a massive shift in its complexion. The white population in the U.S. and Iowa is projected to decline over the next several decades, while the population of Hispanics is rising at a faster rate than that of any other minority group. By 2050, America will be majority nonwhite.



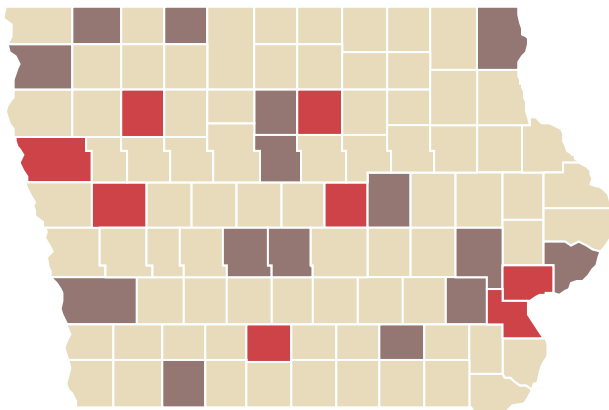
Source: Woods and Poole Economics, 1990-2040 (not available before 1990).

Packing jobs, cities attract Latinos

Eight Iowa counties had a Latino population of 10 percent or more in 2012. Several of the counties with the largest Latino populations are home to meatpacking plants, which have increasingly relied on immigrant labor. Other high percentages of Latinos were in large metropolitan areas.



Latinos as a percentage of total population, 2012



Source: State Data Center of Iowa

THE REGISTER

pounds and they've got calves the size of cantaloupes because they're hauling 75 pounds of marijuana across the desert."

Mark Grey, a sociologist and the director of the New Iowans Program at the University of Northern Iowa, who works with communities to integrate immigrants, said most of the concerns he hears from American-born Iowans have to do with the availability of jobs, respect for the law and fears about language barriers.

"An honest assessment says there are costs" for a community to welcome immigrants, Grey said, such as providing interpretation services, training law enforcement and health providers how to engage with them, and teaching kids English in schools.

But newcomers also contribute to the local economy, take jobs that have gone unfilled, pay income and property taxes, and buy gas and other goods, he said.

The longer an immigrant spends in a new country, especially a high-income country such as the United States, the more he or she gives back to the community, whether by donating money to charity or volunteering time for an organization, a June Gallup poll found.

"Communities realize it's difficult, but at the end of the day, they are all happy they worked through it," said Grey, who cited success in training employees in

the police force in the meatpacking town of Storm Lake and in the suburban West Des Moines school district to work better with immigrants.

"This transition can be difficult, but it's not insurmountable."

Immigration keeps Iowa from shrinking

Immigration has kept Iowa's population relatively steady, said Gary Krob, coordinator of the Iowa State Data Center.

"We have a small number of people who move out of the state, but such a large international migration that comes in, that's one of the main components that helps us," Krob said.

For Air, buying his farm was a chance to become the cowboy he'd admired in John Wayne while connecting with a love for the land he developed while helping out on his grandparents' farm when he was a child.

His enthusiasm resonates beyond his own community. Bill and Sue Sudbrock have land in nearby Lacona where Air sometimes helps out to learn farm practices. They say Air has revived their own love for farming.

"It's joy for him," Sue Sudbrock said. "He sees everything, and he tells you about everything. And his enthusiasm is contagious."

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Phrakhounmany Philavanh eats dinner most evenings with his cattle and his dog, Milo, saying it is simply a way he likes to spend time between chores on his farm.

‘IT’S THE BEST TIME OF DAY’

By Sharyn Jackson
sjackson@dmreg.com

Phrakhounmany “Air” Philavanh never eats dinner alone. Each night after he gets home from work, he prepares a meal for calves while his own food warms up in the kitchen on his 11-acre Milo farm. It’s the start to a daily ritual that this Laotian farmer, who came as a refugee to Iowa in 1984, says makes him happiest and helps him keep a closer eye on the well-being of his livestock. After dumping three buckets of grain and seed into three troughs, Air rings his version of a dinner bell to entice his 10 calves from the field. “Hey-oh!” he yells, while banging on the empty buckets. “Come on, guys!” Once the animals are munching, Air gets his frozen pizza out

of the microwave and joins the cattle on a bench facing their pen. Milo, his polar bear of a Great Pyrenees, lounges at his feet, occasionally getting a bite. “It’s the best time of day,” Air said. “Most happy. They enjoy the food. I enjoy my meal. That’s all we need for farm. For farm like me.” Air had saved until he could afford his own slice of Iowa’s fertile land and found a foreclosed property in 2010 about 30 miles south of Des Moines, paying off the mortgage in three months. Now, he’s in his second season of running a feeder cattle operation, fattening calves before auctioning them off in the fall. He hopes to expand soon to raise poultry. Air got his nickname from his parents. In Laotian, it means “last child.” They called him that even after having another son. His love of farming took root in his childhood. He had played

on his grandparents’ rice farm and watched the water buffalo work as natural tractors. He also learned how to care for animals from his father, an Army doctor who raised ducks, turkeys and chickens at their home. When Laos went under communist rule in 1975, Air’s father was imprisoned in an army camp as a POW, where he made prosthetics for wounded soldiers until he died in 1984. The rest of the family fled to Thailand in 1980, where they stayed for four years until they were invited to settle in Des Moines. Air was the last of eight siblings to make it to the U.S., his childhood nickname of “last child” finally realized. A divorced father of one, Air toiled for 16 years as a loan payoff clerk at Citigroup, using his vacation days each year to make weeklong visits to the Iowa State

Fair, where he learned animal husbandry from 4-H kids. In his first year of raising cattle, he didn’t get a good return on his investment, so this year, he watches the cattle more closely to make sure they are in good health and gaining weight. Hence, the standing dinner date. He hopes soon to begin raising Muscovy ducks, a delicacy among Laotians. Also a novice drummer, he wants to erect a stage on his land, where Laotian musicians can play and members of the community can gather for duck and drinks. His bigger plans are to start what he calls an “international farmers market” on the farm, and provide other foods requested by his friends, immigrants from Asia and Africa. “If I can make it happen, Laotian people come out so they can enjoy and see new idea about farm,” he said. “They can see and taste why farm in America.”

MEET AIR
See photos and video of Air at work on his farm and learn more about the passion that inspires his endeavor.
DesMoinesRegister.com/HarvestofChange3



CHRISTOPHER GANNON/REGISTER PHOTOS
Phrakhounmany “Air” Philavanh saved up until he could afford his own farmland. He found a foreclosed property in 2010 about 30 miles south of Des Moines. Now, he’s in his second season of running a feeder cattle operation.



Philavanh hopes to expand his operation soon, adding poultry. The lumber he’s carrying will be used in the construction of duck houses. Laotians consider Muscovy duck a delicacy, so that’s the breed he’ll raise.

Philavanh is also a novice drummer and wants to put up a stage on his land, where Laotian musicians can play and members of the community can gather. His plans don’t stop there: He wants to start an “international farmers market” on the farm and provide other foods requested by his friends.



harvest of CHANGE

NATIVE CROPS FEED THE SPIRIT



CHRISTOPHER GANNON/REGISTER PHOTOS

Burundian immigrant Beuline Bucumi assembles her produce as her granddaughter, Sadia, 1, rests in a sling on her back at the Global Greens Farmers Market at Lutheran Services in Iowa in late August. Some unusual offerings can be spotted among classic American vegetables at the Des Moines market, like lavender-tinted radishes and African eggplant.

By Sharyn Jackson
sjackson@dmreg.com

Amaranth is the scourge of many an urban gardener and crop farmer: Varieties like pigweed and the so-called “superweed,” Palmer amaranth, are pulled or sprayed to prevent them from choking more desired produce and grain.

Pacifique Simon, 22, says people who discard the weed are crazy. In Burundi, where he was born, the greens make for a nutritious meal.

Simon, who came to Des Moines as a refugee six years ago with his family, likes to saute the amaranth greens — first boiled, then chopped — with some oil and onion.

In a cooking demonstration at the Global Greens Farmers Market, a Saturday produce sale for refugee farmers, Simon added ground peanuts and chopped tomatoes to the now-wilted amaranth, called lenga lenga in his Kinyarwanda language.

“I feel so good” to prepare the Burundian recipe, he said. “It reminds me of home.”

Lutheran Services in Iowa has provided resettlement services to refugees for decades, and one of its newest initiatives is to offer small farm plots for 150 of its clients. Refugees from Myanmar (Burma), Bhutan, Rwanda and Burundi — mostly people who were subsistence farmers in their native countries — get up to a quarter-acre on which to learn the ways of Iowa soil and climate. Plots are in community gardens around the city and on four acres in West Des Moines.

The program is one of dozens



Tanzanian immigrant Evelyn Barampanze awaits customers at the Global Greens Farmers Market. Lutheran Services in Iowa offers small farm plots for 150 of its clients.

11 PHOTOS

Take a look at the Global Greens Farmers Market in Des Moines.

DesMoinesRegister.com/HarvestofChange3

around the country that offer refugee families “incubator farms” to get started growing plants in the United States. In addition to providing income through direct sales, these plots also feed refugees’ families with foods native to their home countries.

The idea for the program in Des Moines grew when a group of refugees drove with agency staffers to Washington, D.C., for a conference and saw, for the first time, the vast agricultural opportunities outside the city.

“It’s fun being able to respond to something that people are so passionate about and interested in doing and know how to do so well,” said Nicholas Wuertz, Lutheran Services in Iowa’s director of refugee community services. “As people integrate into a community, it’s good to do something familiar that reminds them of their homeland, and gets them out of their apartments, too.”

For the first time this summer, eight farmers are offering their

bounties at Global Greens, a market that runs Saturdays from 10:30 a.m. to 2 p.m. through early October in the parking lot at Lutheran Services, 3125 Cottage Grove Ave.

Some unusual offerings can be spotted among classic American vegetables, like lavender-tinted radishes the size of potatoes, pumpkin vines and African eggplant — bitter little orbs with a green pepper’s sheen.

“It’s diversifying what is available in Iowa,” said Zachary Couture, Lutheran Services’ farm associate. “If chefs could catch on to this, a lot of these things could be gourmet specialty items.”

Immigrant and refugee farmers can also find resources through the Beginning Farmer Center at Iowa State University and through Practical Farmers of Iowa, both of which match participants with established mentors. Practical Farmers also offers its Savings Incentive Program, a two-year course that teaches be-

ginning farmers about finances and matches their own reserves up to \$100 a month.

Ten percent of students in Practical Farmers’ savings program are immigrants and refugees, said Sally Worley, operations director.

“There is a huge learning curve, there is a financial curve and there are quite a few barriers for them,” Worley said. “The first time LSI had their market, they had no prices. The farmers wanted to negotiate or barter, and we had to explain ‘Iowa nice’ to them, and that they had to have prices.”

In addition to providing the plots, Global Greens teaches its farmers about seed-saving, soil science, record-keeping and marketing.

Program participant Tika Bhandari, 32, said one of the biggest adjustments to farming in Iowa is the short growing season compared with that in her native Bhutan, where her father had a ginger farm and export business. Her family was forced to leave the farm and flee to a camp in Nepal because of an ethnic conflict that left them stateless for 18 years. Bhandari and her father, Narad Bastola, hope to start growing the root again next year.

Bastola doesn’t speak English, but Bhandari says returning to farming has given her father a way to communicate with the other refugees in the program who share the experience of having to flee the land that once provided them sustenance.

“He cannot talk with anyone else, but now when he goes to farm, he can talk with these people,” she said, gesturing to the other sellers at the market. “There is no language, but they can understand.”

DESMOINESREGISTER.COM/HARVESTOFCHANGE

EXPERIENCE THE DAMMANN FARM

This series includes a unique virtual rendering of the Dammann farm you can experience in several ways. If you own an Oculus Rift DK2 — a virtual reality headset — you can download an immersive, three-dimensional walk-through of the farm that includes a dozen 360-degree videos of farm life. For everyone, a 2-D version of the complete experience is available as a PC or Mac download, but you’ll need a speedy computer. Finally, a “light” version can be viewed in Web browsers. Visit our series page at **DesMoinesRegister.com/HarvestofChange** for all options.



REGISTER EXCLUSIVE

Iowa curbs Tesla test drives

DOT cuts short W.D.M. demonstrations, asserting they’re illegal since electric car company fails to meet state laws

By Joel Aschbrenner
jaschbrenn@dmreg.com

Tesla Motors is the hottest name in the growing electric car market. But don’t plan on taking the Model S for a test

drive in Iowa anytime soon.

Iowa joined a growing list of states tussling with Tesla Motors’ business model when it told the company to cut short three days of test drives earlier this month in West Des Moines.

The Iowa Department of Transportation said the test drives were illegal for two reasons: Tesla isn’t licensed as an auto dealer in Iowa and state law prohibits carmakers from selling directly to the public.

Founded by billionaire inventor Elon Musk, Tesla Motors produces what is widely considered the premier electric car because of its battery life and horsepower.

But Tesla doesn’t sell

through traditional franchise dealerships. Customers can buy the Model S online or at one of a handful of Tesla stores around the country.

See TESLA, Page 13A

harvest of CHANGE

IOWA FARM FAMILIES CONFRONT A NATION IN TRANSITION



Danny Dammann unloads a trailer of food-grade white corn at Minsa Corp. in Red Oak in July. After it’s milled, the corn is shipped to restaurants and wholesalers across the country and around the world.

CHRISTOPHER GANNON/THE REGISTER

SELLING TO THE WORLD

INCREASED EXPORTS COULD BOOST PROFITS BUT PUT FARMERS AT MERCY OF WORLD EVENTS, SHIFTING GLOBAL TASTES

By Sharyn Jackson | sjackson@dmreg.com

Twenty-six tons of toothlike white corn kernels rush out of an open doorway on the bottom of a metal bin that’s planted on a slice of rolling farmland in Page County, southwest Iowa.

The flying grains get sucked into a cylindrical red auger, which pulls them against gravity into a semitrailer’s open cargo hold, depositing them onto a growing mound that will be driven to a Mexican-owned plant 20 miles away. It is only the beginning of their journey.

This grain, grown on the Dammann family’s farm, will be weighed and tested, cleaned and milled, packaged and shipped to restaurants and wholesalers across the United States and internationally. Cooks or assembly lines will hydrate the now-powdered kernels with water and bake them to become tortilla chips and wraps enjoyed by millions.

What starts on a farm in Iowa ends up on plates around the world. Like many other industries today, farming links the local and the global.

Increased globalization joins broad demographic and technological changes in reshaping — and unsettling — America. Easier movement of goods, services and

See GLOBAL, Page 11A

INSIDE PAGES 9A-10A

- » **Bigger farms:** Not sustainable, or key to feeding the world?
- » **Smaller options:** Direct-to-consumer sales of organic produce, grown locally, are rising.

FIVE-PART SERIES

The Register examines how the demographic, technological and economic changes that are transforming America are playing out in the lives of four Iowa farm families.

DIGITAL EXPERIENCE

This project includes an innovative 3-D experience and a 2-D option. Learn more at **DesMoinesRegister.com/HarvestofChange**.

Early voting starts today in Iowa

One benefit: Campaigns will start leaving you alone if you vote early.

By Jennifer Jacobs
jejacobs@dmreg.com

For Iowans weary of being hassled about voting by well-meaning but overeager political campaigns, there’s a remedy. Early voting starts today.

“I always tell my friends who complain to me about all the phone calls and mail and door knocks that there’s a sure-fire way to get no mail and no phone calls, and that’s to vote as soon as possible,” said longtime Democratic operative Grant Woodard, the campaign manager for Jack Hatch’s gubernatorial bid. “You will be taken off every list.”

The political operatives’ strategy is this: Use the 40 days before the election to lasso as many votes as possible, instead of waiting to whip up voting during the 14 hours polls are open on Election Day.

It’s a strategy that can shift outcomes of Iowa races — and affect the passage or failure of legislation concerning same-sex marriage, abortion, tax cuts or tax increases.

Iowa Republicans have accelerated their early voting ef-

See VOTING, Page 7A



Templeton Rye faces lawsuit

A lawsuit filed in Illinois alleges Iowa whiskey company Templeton Rye broke consumer protection laws and misled drinkers with tales of its origins. The class-action suit comes after revelations in August that the whiskey is made using the stock recipe of an Indiana distillery instead of a Prohibition-era recipe.

Metro & Iowa, Page 3A

harvest of CHANGE

GLOBAL

Continued from Page 1A

workers across borders has improved the quality of life for people around the globe, experts say, but also has put the jobs of American workers in competition with lower-paid, increasingly well-educated workers overseas.

“All this is making us, to some degree, hypercompetitive,” said Ernie Goss, an economist at Creighton University. “Unless you’re cloistered, businesses are going to be facing this.”

Global connectivity, with the help of technology, has transformed how and when companies do business, said Elliott Smith, executive director of the Iowa Business Council.

“Having a presence electronically seems to be the ticket to competition in many instances,” Smith said. “Whereas it was downtime when the sun was down, now the sun is up somewhere.”

In farming, many experts view increased exports as a golden opportunity to increase income for American producers and a critical piece in feeding the world’s growing population.

Net U.S. farm income stood at \$92 billion in 2012, according to the U.S. Department of Agriculture’s Census of Agriculture. Income per farm varies widely, largely based on size. The average was \$43,750 in 2012, up 29 percent from 2007.

“Exports truly are the future of profitability for farmers,” said Julius Schaaf, past president of the U.S. Grains Council and a farmer in Fremont County, Ia. “We’re just about filled for domestic demand, so the real opportunities are outside our borders.”

But increased reliance on exports adds another layer of uncertainty and vulnerability to farming. Larger forces of policy, world events and weather synchronize before one little white tooth of a corn kernel becomes someone’s dinner. It may be a drought in Brazil, turmoil in Ukraine or European bans on genetically engineered crops.

Decisions shaping farmers’ destinies often take place far from the farm or dining room, in houses of parliament and company boardrooms, sometimes affected by attitudes farmers and researchers view as not based on science.

“The world is bigger than where we’re at,” said Bill Northey, Iowa’s secretary of agriculture. “Political reasons or scientific reasons might not have to do with me, but might have to do with my prices.”

Farmers learned that lesson during the farm crisis of the 1980s, caused in part by a U.S. embargo on grain exports to the Soviet Union, ordered in retaliation for that country’s invasion of Afghanistan.

The sudden decrease in demand for grain, combined with skyrocketing interest rates and plummeting land values, sent American agriculture into a depression whose recovery required two decades.

Consumer attitudes alter farm decisions

These days, add a new complication: More consumers at home and abroad are basing their food-buying decisions in part on how their food is grown.

Farmers markets, where consumers can interact directly with the growers of their food, have risen steadily in the United States from 1994 to 2014, almost quintupling to 8,268, according to the Agriculture Department.

Some consumers want meat to come from livestock raised in a way they view as humane, are skeptical that crops grown with genetically engineered seed are safe to eat, and believe the planet would be better off if everyone could buy food produced close to home rather than shipped from ever-bigger farms anywhere in the world.

An example of how attitudes abroad may over time affect how farms operate in Iowa: European resistance to American farmers’ embrace of genetically engineered crops.

Genetically modified seeds contain DNA that’s been modified to express a trait such as resistance to a pest, an environmental condition or a chemical. Such seeds are planted in 27 countries and on 79 percent of the world’s soybean acres and 70 percent of



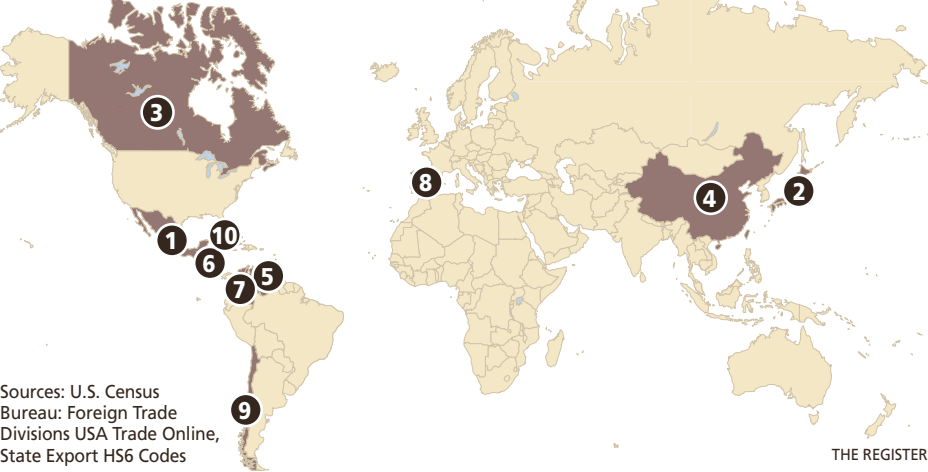
A forklift operator works inside the warehouse at Minsa Corp. in Red Oak. The company, which also has mills in Texas, aims to reach more European markets and the growing U.S. market for food not derived from genetically modified organisms.

Global attitudes affect Iowa corn exports

Iowa sends corn, its second-largest export, to 52 nations. Asian and South American countries with a growing middle class are rising in the ranks of corn importers. But European restrictions on genetically modified foods are keeping Iowa corn out of most countries on that continent.

Rank 2013	Country	2013 value	Rank 2003	Percentage change from 2003
1	Mexico	372,275,491	1	119%
2	Japan	61,992,813	5	2,307%
3	Canada	51,739,172	2	94%
4	China	32,164,748		
5	Venezuela	29,093,495		
6	Honduras	17,109,404		
7	Colombia	12,347,283		
8	Spain	8,878,076		
9	Chile	7,849,555	4	153%
10	Cuba	7,074,021		

Rank 2013	Country	Rank 2013	Country	Rank 2013	Country
11	Panama	25	Portugal	39	Brazil
12	Jamaica	26	Romania	40	Costa Rica
13	Peru	27	Sweden	41	Trinidad and Tobago
14	France	28	El Salvador	42	Greece
15	Argentina	29	Ecuador	43	Hong Kong
16	Austria	30	Taiwan	44	Israel
17	South Africa	31	Hungary	45	Lithuania
18	Nicaragua	32	Thailand	46	Turkey
19	Saudi Arabia	33	Netherlands	47	Dominican Republic
20	Belize	34	Germany	48	Philippines
21	Russia	35	New Zealand	49	Curacao
22	Italy	36	Sudan	50	Barbados
23	Guatemala	37	Belgium	51	United Arab Emirates
24	Korea, South	38	Ukraine	52	United Kingdom



Sources: U.S. Census Bureau; Foreign Trade Divisions USA Trade Online, State Export HS6 Codes

THE REGISTER

PHOTOS

The Dammanns deliver their grain to a processing plant. DesMoinesRegister.com/HarvestofChange4

INTER-ACTIVE:

Browse the countries to which Iowa sends most of its agricultural products. DesMoinesRegister.com/HarvestofChange4

its cotton, according to the International Service for the Acquisition of Agri-biotech Applications, a group that promotes the use of such crops.

Seed giants like DuPont Pioneer and Monsanto promote the higher yields from their GM crops as linchpins in efforts to feed a hungry world.

After swine, corn is Iowa’s second-largest agricultural export, and 95 percent of the corn growing in Iowa this year comes from genetically modified seeds.

Ruth MacDonald, a food science expert and professor at Iowa State University, stands by the safety of GM foods.

“There has never been a documented incident of any health consequence associated with consuming foods or food ingredients that are derived from genetically modified technologies, and there’s a wide body of research that shows that they are not different nutritionally or functionally different from conventionally developed foods,” she said.

But European countries have largely rejected GM products.

In 2013, only Spain among European countries made the list of the top 10 importers of Iowa corn, at No. 8. In the past decade, Japan, now at No. 2, experienced a

more than 2,000 percent increase. Mexico remained at No. 1 and China, with its growing middle class, moved up the list from No. 33 to No. 4.

Schaaf, the past president of the U.S. Grains Council, is the president of MAIZALL, an alliance between Argentina, Brazil and U.S. corn growers that works to influence global trade issues. The group recently visited policymakers in the European Union in hopes of putting a face on the growers of GM corn.

“What we’re trying to do is keep those markets open, and make sure we get our fair share of the growing pie,” Schaaf said.

Some farmers adapt to shifting attitudes

But rather than try to change European policy, some American farmers are adapting to it.

The Mexican-based processing company where the Dammanns sent their corn will accept only non-GM corn this fall from the southwest Iowa growers it works with, said Scott Roberts, national procurement manager for Minsa Corp.

The company, with mills in Texas and Red Oak, Ia., aims to reach more European markets

and the growing U.S. market for food not derived from genetically modified organisms.

“The demand seems to be there,” Roberts said. “The non-GMO, I think, is going to meet the sort of market out there that can’t afford organic, but yet they still want to be able to see it on a label or know that it’s non-GMO. We’re just trying to get ahead of the market.”

Minsa’s directive for the coming crop this fall led the Dammanns to plant 2,400 of their 4,200 tillable acres in non-GM food-grade corn. (They still grow GM corn for ethanol, and their soybeans are also genetically modified.)

Growing non-GM corn after years of planting genetically modified strains is a challenge, especially the more finicky white corn, the Dammanns say. The yield is slightly lower, and they have to use a different cocktail of herbicide than usual, since non-GM corn isn’t resistant to Roundup, the chemical used by conventional farmers to eradicate weeds.

Justin Dammann said it is not up to him to decide what people should eat, but the other way around.

“Food is very similar to fashion,” he said. “It goes in cycles.”

He doesn’t care whether demand for non-GM food is founded in science or politics, or is just a fad.

“What was in yesterday is out, but we’ve got to keep up with all that, because we’re raising what people want to buy and eat,” he said.

Consumers forecast to hold more sway

Matt Russell, a chemical-free farmer in Lacona who sells directly to shoppers at the Downtown Farmers’ Market in Des Moines, believes consumers will play larger parts in determining what farms grow.

Russell is coordinator of Buy Fresh, Buy Local, a project of Drake University’s Agricultural Law Center that encourages Iowa consumers to choose farm-fresh foods at farmers markets or at the farms themselves.

Consumers’ desire to know where their food comes from and a growing distrust of industrial agriculture will affect how large-scale farms will operate going forward, said Russell, who grows produce, free-range chicken and grass-fed beef on 110 acres.

The impact is already seen in the movement within the U.S. to label GM food, he said.

In January, for example, General Mills announced it would not use genetically modified ingredients in its original Cheerios brand.

“We now have an engaged public that is reconnecting and thinking about food, and so that opens up a whole political process and a market process that makes industrial agriculture more responsive,” Russell said.

“It’s not replacing industrial agriculture with our farm. It’s making big agriculture think differently, making them more accountable, making them more responsive to the environmental questions.”

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CHRISTOPHER GANNON/THE REGISTER
Joined by his dog, Blaze, Justin Dammann scans the landscape on a July morning while checking on one of his cattle herds on some of the family's Page County farmland.

UNDER PRESSURE, FARMS EXPAND

By Sharyn Jackson
sjackson@dmreg.com

Hand in glove with the globalization of farming comes pressure to operate ever-bigger farms. Family farms, even those as large as the 7,100-acre Dammann operation in southwest Iowa, struggle to compete against the efficiency of even larger farms.

Critics see large-scale farms — with their use of expensive machinery, chemical fertilizers, genetically engineered seed, dependence on fossil fuels and shipment of products worldwide — as an unsustainable system that at times enriches distant corporate directors at the expense of families and local communities.

Many agricultural experts see the high output per acre of big farms as critical to meeting the world's food needs.

An estimated 9.6 billion people are expected to inhabit the planet by 2050. Ken Quinn, World Food Prize president and former U.S. ambassador to Cambodia, calls feeding this growing population “the greatest challenge in human history.”

He believes farmers and scientists in America's heartland will answer this challenge, just as when food prize founder Norman Borlaug developed a strain of wheat that ended starvation for millions of people and won the Nobel Peace Prize in 1970.

Through the work of agricultural researchers at Iowa State University, developments in biotechnology and machinery, and the increasing efficiency of farmers here, “Iowa,” Quinn said, “has become the epicenter of the greatest period of food production and hunger reduction in all human history.”

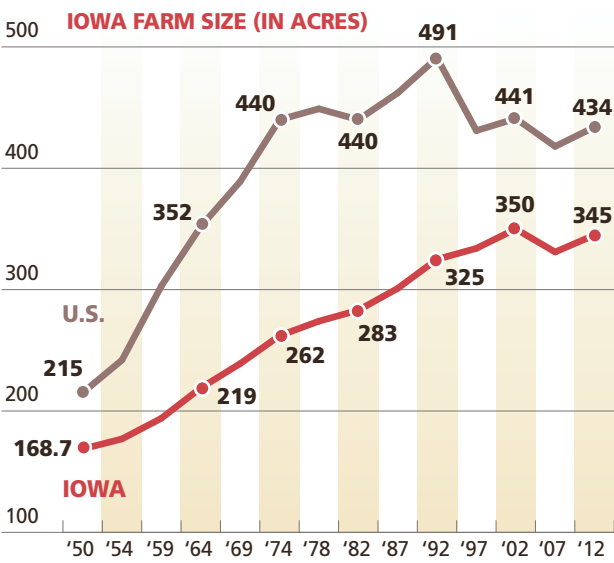
The Dammanns, like many other farmers, view the notion of caring for the land and passing on that legacy as their faith-inspired calling.

They have repeatedly increased their farm's size, from 160 acres to today's equivalent of 11 square miles of owned and rented land. It's a matter of increased efficiency — and survival, they believe.

“What size or scale does our family farm have to be so that we don't lose the grain part of our operation someday, like we did with the poultry and the hogs?” Justin Dammann said. “My fear is some-

Farms are getting bigger

Farm size in Iowa and the U.S. has grown since the 1950s.



Note: Beginning in 1997, the National Agricultural Statistics Service (NASS) administered the Census of Agriculture, which was previously conducted by the U.S. Census Bureau. NASS altered the census methodology to adjust figures to capture nonrespondents, so figures prior to 1997 may not be entirely representative.

Source: U.S. Department of Agriculture, Census of Agriculture.

THE REGISTER

LARGEST FARMS RAKE IN SUBSIDIES

A frequent criticism of the largest U.S. farms is that they receive the bulk of government subsidies.

Subsidy programs include a guarantee of a minimum price for a crop, which kicks in when market prices fall below a certain threshold, and protection for farmers from weather disasters.

Iowa, with its large concentration of corn and soybean operations, received more commodity subsidies from 1995 through 2012 than any other state, according to the Environmental Working Group, which maintains a database of farm subsidies. In 2012, 9 percent of all commodity payments went to Iowa farms.

Ten percent of subsidized farms, typically the largest and most profitable, received 75 percent of all farm payments between 1995 and 2012, the Environmental Working Group has found.

Principals in the Dammann farm have received \$682,000 in the 10 years from 2003 to 2012, including conservation and disaster payments.

The 10 percent of Iowa farms that received the most in subsidies from 1995 to 2012 took in an average of \$34,475 a year.

The Dammanns have a complicated relationship to subsidies. Justin Dammann notes that subsidies bring in less than 3 percent of their gross income, and he'd prefer that it was even less.

“We'd rather farm and stand alone,” Justin said. “But with the price structure the way it is, with market volatilities and catastrophic events, there's a need for a safety net.”

day if we aren't efficient and sustainable, we may not be raising corn for ourselves but for Cargill” — the world's largest grain exporter.

Farm size in the U.S. ticked up 3.8 percent from 2007 to 2012, to 434 acres. Smaller farms far outnumber the biggest operations, but produce much less.

In 2012, 75 percent of farms in the U.S. had sales of less than \$50,000. But combined, they produced only 3 percent of the value of all agricultural products sold. The 4 percent of all farms with gross sales over \$1 million, including the Dammann farm, produced 66 percent of agricultural products sold.

Even as the Dammanns expand their acreage (they own 1,690 acres and lease the balance), they worry that consolidation will continue on a larger scale, with giant corporations taking over smaller operations that can no longer compete. The Dammanns saw it years before with poultry and swine, which became no longer financially viable for them to continue, and they worry the same thing will happen one day with grain.

The fear that corporate agriculture will squeeze out family farms is real, said Matt Russell, who coordinates the State Food Policy Project at Drake University's Agricultural Law Center.

“Farms are getting bigger, (and there are) lots more opportunities for employees rather than farmers,” he said. “That's being driven by the corporatization of agribusiness that's using their market power to limit the opportunities for those farms.”

Arnold Dammann, the eldest living member of the seven-generation Dammann farm, said seeing the farm raise grain for a corporation is his biggest fear. His pride in the farm comes from being self-sufficient and the sole profiteer.

“The best we can produce (is) when we are self-employed,” he said. “You benefit from what you do.”

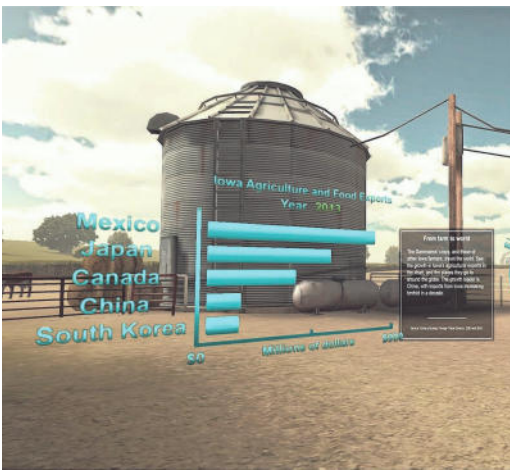
Justin Dammann said that fear is what drives him to keep expanding the operation. He and his wife, Jennifer, just purchased another 131 acres, though he says that land isn't necessary to provide for his family.

“I think we can't get comfortable,” he said, “because it seems to me the trend is that people that get comfortable are the ones that get consumed.”

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GLOBAL MARKET

The corn and soybeans produced by the Dammanns are part of growing agriculture exports from Iowa to the world, with China a fast-growing customer. Explore a data visualization in 3-D.

OTHER FEATURES ONLINE

SPECIAL DIGITAL REPORT:

In addition to the virtual reality experience with this project, the Register has produced a rich multimedia story, including photos, videos and interactive databases.

VIDEO OVERVIEW:

See an introduction to changes sweeping America and the four farm families featured in this project.

MEET THE FAMILIES:

Learn more about the families and their farms, including video documentaries on each farm, to be released this week.

TALK ABOUT IT:

Share your thoughts on this project and the virtual reality experience on Twitter with [#VirtualFarm](https://twitter.com/VirtualFarm).

ABOUT THE AUTHORS



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HARVEST OF CHANGE

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LOCAL FOODS: ‘THE REAL DEAL’

By Sharyn Jackson
sjackson@dmreg.com

A tomato isn't just a tomato to Denny Wimmer — or his customers.

The organic farmer regularly fields questions at the Valley Junction Farmers Market in West Des Moines about how his tomatoes were grown. In the ground or hydroponically? In a greenhouse or under a high tunnel?

"They're the real deal," he tells a customer. "Grown outside in southwest Iowa."

Wimmer might find the interrogation extreme, especially compared with what he hears from the customer base at markets in rural areas, who he says trust his farm more. But he agrees there's a difference between "supermarket tomato" and his product.

"They're juicier and they're more flavorful," he said of his offerings. "They taste like tomato."

At the same time that U.S. farmers have increased exports in a global market, America's local food movement is expanding the amount of produce grown and sold close to home. Fresh fruits and vegetables sold directly to consumers were a \$1.3 billion industry in 2012, up 8 percent since 2007, according to the U.S. Department of Agriculture's Census of Agriculture.

Wimmer, 58, sells his produce to restaurants; at three farmers markets; through community-supported agriculture (CSA) arrangements, in which consumers buy shares in the farm's harvest; and to the nearest supermarket, a Hy-Vee 13 miles away in Creston.

"It's like getting it out of your backyard," said Mark Hoffman, the Creston Hy-Vee's produce manager.

Wimmer is in his second full summer of converting his 76-acre ancestral farm from conventional row crops to organic produce. He applies a fertilizing



Denny Wimmer sells a head of napa cabbage to Kathy Anderson of Martinsdale at the Valley Junction Farmers Market in July. Wimmer sells at three markets each week. He also does business with restaurants and a grocery store near his operation.

"tea" that he brews from compost, but the only other enhancements are sunlight and rain.

In 20 rows, a biodegradable plastic shield suppresses weeds, but on most of the land, invasive plants tower over the vegetables Wimmer harvests with nothing but physical labor and a steak knife. He rinses the dirt off them in an old car wash he bought and converted into a wash house and refrigerator.

Wimmer studied agronomy at Iowa State University and went on to own a lawn care business in Chicago, where he lived for nearly 30 years. When he returned to Iowa to take over the farm from his father, who at the time was in

MEET THE WIMMERS
Spend time with organic farmer Denny Wimmer on the land his father once tilled.
DesMoinesRegister.com/HarvestofChange4

his mid-80s, he decided to make a change.

"In Chicago, I used weed control all the time, and I just think I had enough exposure to chemicals for my life," he said.

Going organic also made sense for Wimmer financially. While expenses are higher on an organic farm than on the average U.S. farm, so are profits. For a small farm like Wimmer's, the higher profit allows him to provide for him and his wife, Patty; his parents, Don and Darlene; and his father-in-law, Don, who all live on the property.

Farming this way also has improved his diet. Rather than stop to take lunch breaks, he eats what

he grows in the field. And because of the labor, he has dropped some 25 pounds since winter. But besides the weight-loss program, he says he treasures the experience of providing fresh food that people want to eat.

"It's nice to be able to grow vegetables that go directly to the consumer, instead of just a commodity," Wimmer said. "It's nice when people speak to you directly that they've eaten your products and they love them, and they can't wait to get more of them."

Just as he was being grilled by a customer about those tomatoes, another walked by his stand at the market and vouched for them. Wimmer made the sale.



Denny Wimmer carries a bin of freshly harvested zucchini on his organic farm in Arispe in July. The farm has been in his family since 1919. Wimmer left his sales career in Chicago three years ago to return and launch an organic operation on the 76 acres.



It's time to give the onions a scrubbing. Wimmer washes his vegetables in what once was a car wash in Arispe.



Wimmer prints a newsletter from his office at the farm. He offers a 20-week Community Supported Agriculture program and publishes the newsletter with each week's CSA delivery.

DISC GOLF

TODAY IN IOWA LIFE: MATURE TREES, SCENIC VISTAS
DRAW GOLFERS TO IOWA'S 150-PLUS COURSES

The Des Moines Register

FRIDAY, SEPTEMBER 26, 2014 | THE NEWS IOWA DEPENDS UPON | DESMOINESREGISTER.COM | METRO EDITION

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IOWA FARM FAMILIES CONFRONT A NATION IN TRANSITION



CHRISTOPHER GANNON/THE REGISTER

Justin Dammann walks a newly built terrace on his Page County farmland. The Dammanns continue to invest in terracing of fields to stop runoff and reduce erosion. A cover crop planted after the terracing was completed was beginning to emerge.

NATURE REBELS

SPECTER OF CLIMATE CHANGE POSES NEW THREATS TO FARMING,
ALREADY UNDER PRESSURE TO LESSEN ITS ENVIRONMENTAL IMPACT

By Donnelle Eller | deller@dmreg.com

Late July was a critical time in the growing season, when the lush, tasseled corn on Justin Dammann's family farm filled with sweet, juicy kernels.

The tall, dark-green stands were a stark contrast to those of two years ago, when drought gripped the hilly region and state. Inch by inch, the heat drained the Dammanns' crops. In a few fields, cornstalks were so weak, they tumbled.

"Two years ago, we had the worst crop of my life, and probably my dad's. And this year will probably be our best ever," said Justin Dammann, 34.

Even with recent extremes, Dammann doesn't put much stock in the concept of climate change — that humans are creating heat-trapping gases that are pushing the Earth's temperature higher.

For Dammann, it's just the weather, bringing cycles that farmers across Iowa and the world have worked in, around and with for generations. It's like the "the grain markets or the stock market. It's unpredictable. And it's out of our hands," Dammann said.

But scientists say climate change is causing more intense and frequent flooding, droughts, hurricanes and tornadoes. They predict it will change the way Iowa's farmers grow corn and soybeans and raise livestock — increasing the pests, weeds and diseases that farmers battle to bring food to the table and triggering decreased yields or even the economic shock of crop failures.

The potential of wrenching climate change adds to broad demographic, technological and economic changes that give many Americans an unsettled sense of the future.

Scientists have predicted a wide range of impacts from climate change, including shrinking glaciers and rising sea levels. In the Midwest, forecasts in-

INSIDE PAGES 7A-8A

- » **Extremes:** Adapting to weather volatility.
- » **Weeds:** Costly pests — but not to everyone.
- » **Responses:** New crops?
- » **Solutions:** Action plans on climate change.

FIVE-PART SERIES

The Register examines how the demographic, technological and economic changes that are transforming America are playing out in the lives of four Iowa farm families.

DIGITAL EXPERIENCE

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See CLIMATE, Page 9A

Audit: Pay given, but no proof of work

State officials now aim to see if any of \$114,000 paid to workers after jobs cut can be reclaimed

By Jason Clayworth
jclayworth@dmreg.com

State officials are reviewing how and whether Iowa can reclaim any of the nearly \$114,000 paid to six Iowa secretary of state employees after their jobs had been eliminated.

The call Thursday for a so-called "claw-back" came with the release of an audit showing Iowa Secretary of State Matt Schultz allowed the workers to continue to collect state checks in 2012 after he had eliminated their positions.

Schultz has previously said that some of the workers provided consultation and had called in daily. But his office has yet to show documentation that the employees provided a

service.

Thursday's audit concluded there was no way to determine if the employees had performed any work because of a lack of documentation. It concluded that it was Schultz's responsibility to ensure all payments made by his office are in the interest of the public.

The information has left some elected officials to launch reviews about whether they

See AUDIT, Page 18A

Exodus of city officials creates plight in Pierson

PIERSON, Ia. — The harsh truth about small-town politics is that it can be a pain in the neck for the elected officials who can't help but stare their constituents — I mean, neighbors — in the eye as they travel up and down the few streets available to them.

Just ask Max Dunnington, who resigned this month after 19 years as mayor of Pierson, a map dot between Sioux City and Cherokee in northwest Iowa.

Dunnington, 57, was "tired of being everybody's daddy."

He does remain a partial parent since he also has been the local fire chief for 24 years.

The town of 366 re-elected Dunnington just last year — although by a mere six votes, 52 to 46.

He just got tired of it, Dunnington said when I caught him at home. Got burned out.

"If I dropped over dead it'd be the same effect," he shrugged.

See MUNSON, Page 10A



KYLE MUNSON'S IOWA
kmunson@dmreg.com



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Mostly sunny.
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CHRISTOPHER GANNON/THE REGISTER
Justin Dammann walks alongside a terrace between soybean fields on his Page County farmland. The Dammann family continues to invest in terracing of fields to stop runoff and reduce soil erosion. The terraces, plus buffer strips and other conservation practices, have cost the family an estimated \$1 million over four decades, Dammann says.

CLIMATE

Continued from Page 1A

clude increased deaths from heat waves and greater vulnerability to diseases carried by insects and rodents.

As for agriculture, experts foresee higher food prices for consumers in the U.S. and around the world. Even with improved farming technology and practices, climate change will increase tensions about food and the potential for global price shocks, scientists say.

Despite Dammann’s doubt about the concept of climate change, he and other farmers acknowledge that weather trends are becoming more extreme, and they’re trying to mitigate the impact.

“I don’t want to paint a picture that Mother Nature is out of control and we’re not doing anything about it,” said Dammann, who estimates his family has invested \$1 million over four decades in terraces, buffer strips and other conservation practices. “We still feel very strongly, from a conservation standpoint, that we can do our part to help minimize the damage.”

Pressure heightens over environment

Farmers are facing growing pressure — from government regulators, consumers and big-box retailers — to reduce the industry’s impact on the environment.

The federal government is pushing Iowa and 11 other Midwestern states to reduce the fertilizers flowing from farm fields and contributing to the dead zone in the Gulf of Mexico.

And global corporations like Wal-Mart and McDonald’s are demanding that suppliers like Cargill, PepsiCo, Kellogg and Tyson reduce their environmental impact, by means such as cutting greenhouse gas emissions or reducing water use.

The companies seek to protect themselves from future price shocks and ensure their long-term viability, said John Lawrence, an associate dean in Iowa State University’s College of Agriculture. Such actions enable companies to tell consumers: “We’re not just after the bottom line here,” Lawrence said. “We’re going to do business in a sustainable manner.”

A short ride from Justin and Jennifer Dammann’s home near Red Oak is a 160-acre farm the young couple bought.

Climbing up one side of the field are terraces the Dammanns have just built. The terraces will slow rainwater — and better retain the precious soil and nutrients (nitrogen and phosphorus) that can get carried away in runoff. The water flows into a nearby creek and eventually into the Mississippi River basin, which feeds into the Gulf of Mexico.

In the Gulf, nutrients from Midwest farms, golf courses, sewage plants and lawns feed al-

Conservation spending up, acres down

Spending on conservation in Iowa has climbed about 60 percent over a decade and about 50 percent across the U.S., state and federal data show. The totals include building wetlands, grassed waterways, terraces and manure management systems, as well as keeping grazing land out of crop production. At the same time, the number of Iowa acres in conservation has fallen about 18 percent, outpacing the national decline at 2 percent.

	Total Iowa spending	Total Iowa acres
2004	\$227,316,176	2,245,498
2005	\$265,273,122	2,804,624
2006	\$269,572,214	2,147,499
2007	\$289,121,987	2,093,012
2008	\$301,475,555	2,056,027
2009	\$319,527,241	1,811,352
2010	\$353,348,186	2,505,168
2011	\$330,860,003	2,128,068
2012	\$337,169,144	2,097,087
2013	\$361,994,391	1,842,976
	SPENDING ▲ 59.2%	ACRES ▼ -17.9%

Protected acres down, rents up

Environmentally sensitive acres that are protected through the Conservation Reserve Program have fallen about 20 percent in both Iowa and the U.S., while the rents paid out have climbed about 12 percent in Iowa. They’re flat nationally. Environmentalists blame high corn and soybean prices for putting fragile lands back into production. Corn prices have tumbled about 60 percent since peaking in 2012.

	Acres/Iowa	Rents/Iowa
2004	1,894,501	\$191,778,874
2005	1,917,479	\$195,971,139
2006	1,958,883	\$199,959,182
2007	1,970,486	\$206,349,887
2008	1,809,633	\$209,194,241
2009	1,703,941	\$200,689,691
2010	1,637,130	\$197,389,377
2011	1,662,373	\$196,571,581
2012	1,644,429	\$212,942,767
2013	1,525,012	\$216,365,109
2014	n/a	\$214,402,615
	ACRES ▼ -19.5%	SPENDING ▲ 11.8%

Sources: The National Resources Conservation Service, Iowa Department of Natural Resources, the Iowa Department of Agriculture, U.S. Department of Agriculture Farm Service Agency

THE REGISTER

gae that decompose, consuming oxygen in a process that chokes fish, shrimp and other aquatic life. The hypoxia area, or dead zone, is about the size of Connecticut.

Sprouting between the Dammanns’ terraces is a cover crop mix of sweet peas, oats and brassicas, planted to help protect and rebuild the soil. This fall, Dammann will graze some of his 1,500 cows and calves on the field, their manure naturally feeding the organic matter in the soil.

Improving the soil’s health is important for yields, but a richer soil also helps better absorb water during the deluges — or hold it during drought — that climate change is predicted to bring.

“If we get 3 inches of rain and only 1 inch stays on the farm and the rest of it runs off, we lost an opportunity,” Dammann said. “We feel that’s very important to hold those 2 inches here, and allow our crop to use it throughout the season.”

Iowa efforts grow, but pace is criticized

Across Iowa, farmers are increasing their efforts to build greater conservation into their operations.

A national report in June that criticized the amount of water and chemicals used to produce U.S. corn acknowledges the gains: “The efficiency of fertilizer use has improved overall, with the amount of corn produced per ton of nitrogen increasing by more than 50 percent, and corn

produced per ton of phosphate increasing by 168 percent between 1968 and 2010.”

But the report from Ceres, a nonprofit group of investors, businesses and others pushing for more sustainable business practices, also estimates that “\$420 million in inefficiently applied fertilizer washed off corn acres into the Mississippi River and eventually the Gulf of Mexico” in 2013.

Iowa farmers’ conservation efforts are voluntary. Environmental advocates decry the pace as too slow and seek regulation.

Dammann believes that some environmental groups want “us to manage Mother Nature at any expense.”

“We invest and we reinvest in the best tools possible,” he said, incorporating GPS systems, precision applicators and historical data to place the least amount of fertilizer and chemicals for maximum effect.

“I always ask those people who complain about what we’re doing: ‘Well, how much money are you spending to make this system better?’” he said.

“The soil is our livelihood, and we’re passionate about it,” he said. “So we take it personally when some special-interest group points a finger and says we’re not doing it right.”

Cost an obstacle in conservation push

A lot is riding on Iowa farmers’ response to climate change, experts say.

“If we’re going to maintain Iowa’s ability to produce crops, we’re going to have to get very serious about improving our soil ... and protecting it from the extreme variations in the climate,” said Jerry Hatfield, a collaborating professor at Iowa State University and director of the National Laboratory for Agriculture and the Environment.

The state estimates the cost to implement the conservation infrastructure needed to fully address water quality concerns could run up to \$1.2 billion annually over 50 years.

Conservation can sometimes reduce production costs. For example, use of no-till — planting without breaking up the soil by plowing or other cultivation — reduces fuel and equipment use. But building terraces and grass waterways can be costly, and the payoff in reduced erosion, better retention of expensive fertilizers, improved soil health and higher yields can take years.

Funding, whether from farmers or public dollars, is one of the biggest factors limiting adoption of conservation practices, said Roger Wolfe, an environmental program leader at the Iowa Soybean Association.

Conservation spending has increased in Iowa, up nearly 60 percent from 2004 to \$362 million last year. And U.S. spending has climbed about 50 percent in the same period, to \$4.2 billion last year. Those amounts don’t fully encompass farmer spending.

Despite the increase, the Iowa Farm Bureau Federation says farmers involved in watershed improvements sought about \$100 million more in state and federal funding than was available last year. And future availability of government funding is expected to decline because of federal budget cuts.

The soybean association, along with the Iowa Pork Producers and Iowa Corn Growers associations, announced a new alliance last month whose goal is to accelerate the pace and scale of water-quality improvement. The group will look to farmers, agriculture and food corporations, private foundations and government programs for funding.

Dammann said his family would invest about \$50,000 altogether in his most recent terracing project. An additional \$10,000 will come from government cost-sharing. Dammann said he waited seven years for a chance at the federal assistance.

The cost isn’t easy for farmers to handle, especially in years like this one, when the price of corn and soybeans may drop below the cost of production. The Dammanns’ investment in conservation measures is possible because they own the farm and look at payoff for the cost over generations, he said.

“We’re not perfect. There are farms we farm that need improvements. It’s an ongoing process,” Dammann said.

But “we do try to do it right. It’s our moral obligation and our livelihood. ... We hope these farms are in our family forever.”

VIDEO

Learn more about the terraces the Dammanns have installed on their farm to reduce soil erosion at [DesMoinesRegister.com/HarvestofChange5](#).

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ADAPTING TO WEATHER’S TOLL

By Donnelle Eller
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Climate change is already taking a toll on U.S. agriculture — an industry that produces \$330 billion in commodities annually, according to this year’s National Climate Assessment report.

In the Midwest, extreme rain events increased 37 percent over five decades, the report said.

And rising temperatures — especially overnight during critical pollination periods, when soybean pods and corn kernels are filling out — can “greatly reduce yields and increase the risk of total crop failure,” the report said.

“These effects have already begun to occur,” according to the report, in

which Iowa State University professors Jerry Hatfield and Eugene Takle played leading roles. “High nighttime temperatures affected corn yields in 2010 and 2012 across the Corn Belt.”

“With the number of nights with hot temperatures projected to increase as much as 30 percent, yield reductions will become more prevalent,” the report said.

Iowa’s climate is changing, too, the scientists said. Spring rainfall in the state climbed 22 percent from 1970 to 2010, said Takle, director of Iowa State University’s climate science program. “What used to be a 1-in-20-year event is now a 1-in-4 event.”

That pattern has cut the number of days farmers can be in the field during the critical spring planting season by 3.5 days. Meanwhile, Iowa has had 13 percent less winter rainfall.

Farmers — and the industry — are adapting, Takle, Hatfield and others said.

Many farmers don’t embrace the terms global warming or climate change. But “I do think that many are beginning to appreciate increased volatility in the weather, relative to what they’re accustomed to,” said John Lawrence, an associate dean in Iowa State’s College of Agriculture.

Farmers are adding tiles that can help soil drain better. They’re investing in irrigation systems. They’re buying bigger, faster planters to compensate for shorter planting seasons. Companies are designing seeds that are resistant to more severe droughts and developing chemicals that are more effective against insects and weeds.

Farmers also looking for “geo-

graphically diverse” farmland, hoping to avoid damage to all of their acres from hail and other catastrophic storms. And they’re investing in grain bin drying systems and are buying more crop insurance.

But those steps won’t be enough to fully blunt agricultural losses, the climate assessment report warned.

Hatfield said Iowa and U.S. farmers will need to combine precision farming, more conservation practices and more diverse crop rotations to help mitigate weed and insect pressures while maintaining yield — and profits.

“We’re on the cusp of an agricultural revolution,” he said. “It’s about getting farmers to ask different questions ... to get them to think about changes, maybe different metrics other than yield.”

WEEDS: TERMINATE OR TOLERATE?

By Sharyn Jackson
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Justin Dammann walks through a cornfield with his son, Jayden, for a lesson on weeds.

The corn is higher than Justin’s head. To Jayden, who recently turned 4, the stalks must look as tall as the decades-old pin oak tree that towers above the Dammanns’ century farmhouse.

Among the pristine rows of corn, Justin spots an invader.

“There’s a weed,” he says. “We don’t like weeds, do we?”

Jayden knows weeds “do something” to the corn, but he’s not sure what. His father explains that they “take the water” from the crop.

Jayden has the solution. “Either spray them or pull them,” he says, repeating a mantra his father has often uttered.

Justin may be simplifying things for Jayden, but “spray them or pull them” is what most farmers do to combat irksome weeds. A few, though, take a “live and let live” approach.

Most farmers believe they’re good stewards of the land. But their varied approaches to the age-old dilemma of weed control show how different their paths can be in carrying out that belief.

Justin’s father, Danny, does most of the spraying on the family’s 4,200 tillable acres. He uses a computerized guide preset with GPS coordinates that steers the sprayer and highlights on an iPad-like screen the areas that have been covered. The technology prevents the chemicals from overlapping, reduces waste and protects the fields from over-spraying.

“It just takes the guesswork out of it,” Danny says.

The technology not only saves money on wasted chemicals but also has tripled the speed at which Danny can spray. During planting, his busiest time, he can cover 500 to 600 acres in a day.

Not all farmers deploy such a large-scale assault.

Denny Wimmer, who raises organic produce in Arispe, keeps some weeds suppressed with a biodegradable plastic shield that runs along the ground where his tomatoes grow. But that plastic covers only 20 rows on his 76 acres.

Elsewhere, he and other workers pull weeds manually.

Wimmer routinely used chemicals in his earlier career as owner of a lawn care business, but he embraced the idea of ending that exposure when he took over the farm from his father two years ago.

It’s not that he doesn’t fantasize about an easier way to attack weeds.

“When I see a weed sometimes, I go, ‘Gosh, I should just blast these once with Roundup and then start over,’” he says. “But I don’t.”

Weeds aren’t an enemy to all farmers.

On Matt Russell and Patrick Standley’s 110-acre Lacona farm, weeds tower over onions, ring around bunches of chard and basil, and make rolling hills of pasture look furry and alive when a breeze rustles through.

“We think of weeds as part of our farm,” Russell says.

Russell grew up on a conventional farm 100 miles west of his land, where his parents sprayed Round-



CHRISTOPHER GANNON/REGISTER PHOTOS
Justin Dammann discards a massive weed after uprooting it along the side of one of his soybean fields in Page County. Dammann believes in pulling or spraying the weeds on his farm.



Chemical-free farmer Matt Russell harvests onions at his Lacona operation in preparation for a trip to the Downtown Farmers’ Market in Des Moines in July. “We think of weeds as part of our farm,” he says.

up on corn and soybeans. He said his parents bought into a “culture of clean fields” propagated by businesses selling herbicide.

“If your business model is to eradicate weeds, then it’s in your interest to make sure farmers have a very hostile attitude toward weeds,” he says.

Russell described his farm as “a little oasis of chemical-free” land that allows weeds — and the in-

sects drawn to them that he says are “complementary” — to thrive alongside more desirable produce. One benefit of tall weeds, he explained, is that they shade the ground, keeping in moisture. The weeds he does pull, he leaves on the ground, eventually to go back into the soil as nutrients.

“It’s a balance,” he says. “Part of the excitement of being a farmer is living in that tension.”

DESMOINESREGISTER.COM/HARVESTOFCHANGE

EXPERIENCE THE DAMMANN FARM

This series includes a unique virtual rendering of the Dammann farm you can experience in several ways. If you own an Oculus Rift DK2 — a virtual reality headset — you can download an immersive three-dimensional walk-through of the farm that includes a dozen 360-degree videos of farm life. For everyone, a 2-D version of the complete experience is available as a PC or Mac download, but you’ll need a speedy computer. Finally, a “light” version can be viewed in Web browsers. Visit our series page at **DesMoinesRegister.com/HarvestofChange** for all options.



TOUR THE DAMMANN HOME

Go inside the Dammann home and learn more about the homestead that has supported eight generations. Plus, see history unveiled with historical pictures compared with the current setting.

OTHER FEATURES

SPECIAL DIGITAL REPORT: In addition to the virtual reality experience with this project, the Register has produced a rich multimedia story, including photos, videos and interactive databases.

TALK ABOUT IT: Share your thoughts on this project and the virtual reality experience on Twitter with **#VirtualFarm**.

ABOUT THE AUTHORS



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HARVEST OF CHANGE

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Climate change

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Wimmer Farms employees Annie Konkler, left, and Taylor Mayne harvest green beans in Arispe in July. Denny Wimmer believes farmers in Iowa need to think more about climate change and its impact on not only how they farm, but also what they grow.

NEW CROPS, NEW STRATEGIES

By Donnelle Eller
deller@dmreg.com

Denny Wimmer, a fruit-and-vegetable grower in south-central Iowa, thinks a lot about farming, conservation and the environment. Wimmer grows clover and alfalfa as a cover crop between rows of aronia berry bushes. And he uses compost — and compost tea — to reduce the amount of nutrients needed to raise his cherry tomatoes, green beans, squash, zucchini, peppers and onions. He and his wife, Patty, also have built terraces, with some government assistance, to slow water that can flow from the farm and take soil and nutrients with it. The North Fork of the Grand River starts on the farm, and they want to protect it. “You wouldn’t know it to look at it — it’s just a tiny creek — but that’s what it says on the map,” said Wimmer, who studied agronomy and ran a lawn care business before starting work three years ago to become a certified organic vegetable grower. Wimmer believes farmers in



Denny Wimmer looks over fields with his dad, Don, who was born on the farm in 1926 and worked conventional crops and livestock there until his retirement.

Iowa need to think more about climate change and its impact on what they grow and how they farm. For example, a perennial crop like aronia berries, a fruit rich in antioxidants that’s growing in popularity, might become more attractive than corn and soybeans, which must be planted annually and require intense fertilizers and chemicals to grow. Already, farmers in drought-stricken California are shifting from water-needy crops like cotton to less thirsty almond trees. Climate scientists forecast California and other Western states will become even drier, and shifts

in crop choices will accelerate. Wimmer, 58, sees the extremes in Iowa as well. “The weather is more severe — drought, rain, hail — than I remember growing up,” he said, an observation his father, Don, 88, also makes. “The climate is changing.” He’s doubtful, though, that the majority of Iowa farmers will embrace conservation practices that can help mitigate the impact. When he was a crop specialist with an Iowa farmer-owned cooperative, advising farmers on cover crops, “the main concern was with increasing yields. The conservation part of it was secondary,” Wimmer said. “They were making money. Corn prices were high,” he said. “It’s hard to change to a new concept when they’re doing well with the old concept.” Wimmer sees growing interest from agriculture groups in addressing conservation, but he believes the government probably will need to push farmers for broad adoption. “There are people out there who want to make it happen,” he said. “I wish it would, but it doesn’t seem to be working yet.”

PHOTOS

See Denny Wimmer’s organic farm and greenhouses. [DesMoinesRegister.com/HarvestofChange5](#)

COMPOST TEA

Learn about Wimmer’s natural fertilizer. [DesMoinesRegister.com/HarvestofChange5](#)

OPTIONS FOR ACTION STIR DEBATE

By Donnelle Eller
deller@dmreg.com

What are possible solutions to the environmental and climate change challenges facing Iowa and U.S. farmers? The answers, of course, depend on whom you ask. Here’s a look at some options being discussed, and thoughts on whether they could work:

GOVERNMENT REGULATIONS

Proposal: Government should force farmers to put in buffer strips, use cover crops or take other steps to reduce nutrient runoff, environmentalists say.

Background: Congress exempted farmers from regulations that other groups like city sewage systems, industry and water agencies must follow. Iowa’s environmental department regulates large livestock operations, but environmentalists say enforcement is too weak to prevent manure runoff and spills. Environmentalists, hunters and

other groups won a long-fought battle in the 2014 farm bill to tie compliance with conservation practices to farmers’ eligibility to receive crop insurance payments. They also won regional protections of native grasslands, a program called Sodsaver. But conservation spending will be trimmed back — \$4 billion over 10 years, which will climb to \$6.1 billion when broader federal spending limits kick in.

Pro: Bill Stowe, CEO of the Des Moines Water Works, said other states push farmers to do more. “I see Wisconsin and Minnesota and Illinois saying, ‘You take federal money, you take state money, you’d better have buffer zones, you’d better not be planting right up to the waterway, you’d better have a cover crop before you receive money from us.’”

“That kind of tie-in is important,” he said, adding that his drinking water utility is likely at some point to challenge whether drainage districts could be forced to meet pollution regulations. If that’s successful, regulation could filter back to farmers.

Con: Regulations will not make Iowa’s water cleaner, farm leaders say. The solutions to reducing nutri-

ents that enter waterways from farm fields are complex, differing from farm to farm, they say. And weather significantly impacts nutrients in the water. A recent U.S. Environmental Protection Agency inspector general’s report acknowledged quality gains can lag several years behind improvements. “It’s not like flipping a switch,” said Roger Wolfe, an environmental program leader at the Iowa Soybean Association.

SHARING COSTS

Proposal: The Iowa League of Cities is exploring the idea of cities chipping in to help farmers step up work to curb nutrient pollution.

Background: State officials say it could cost up to \$1.2 billion annually over 50 years to add all the conservation practices needed to cut nutrient pollution leaving farms — from building wetlands to filter strips to grass waterways to bioreactors (essentially trenches with carbon sources like wood chips that help break down nitrates).

Pro: The League of Cities’ rationale is that by investing in rural solutions

to nutrient pollution, cities could avoid making larger investments in building infrastructure downstream in urban areas.

Con: Stowe called proposals for urban residents to help pay to curb farm runoff “paying the polluter” and doubts that Iowa city utilities have enough customers to address the financial challenges in the countryside. Stowe and some environmental groups say farmers and agricultural corporations are passing their costs along to water consumers in cities like Des Moines. The capital’s water utility spent \$1 million last year treating water to remove nitrates harmful to babies.

Another idea: Groups like the Iowa Policy Project have proposed providing consistent funding for environmental improvements through tapping some of the \$100 million that could be raised by the Natural Resources and Outdoor Recreation Fund, an initiative that 63 percent of Iowa voters approved in 2010. However, the fund has no money. Stocking the fund requires legislative approval of a penny sales tax, which has not won support.