

By Rita Erhel



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Promoting agriculture and food systems that build healthy land, people, communities, and quality of life for present and future generations.



Windmills' Time Past?

Forests of white turbines with blades longer than train cars are sprouting up in the nation's windiest states, from California to Minnesota, creating a grid of alternative power contingent on a never-ending supply of wind. It's considered New Age, akin to ethanol and biodiesel fuel, solar and nuclear energy. But harnessing the wind is nearly as old as technology itself.

The first windmills—essentially turbines without electricity—were used in Persia at 500 to 900 A.D. for pumping water or milling grain and resembled a large merry-go-round with boat sails. Another vertical-axis windmill dates back to 1219 A.D. in China.

The first windmills to appear in Europe were of the horizontal-axis configuration around 1270 A.D. The forerunner of today's windmill design, these too had cloth sails. Around 1390, the Dutch refined the design into a tower mill. Improvements were made steadily during the next 500 years until the windmill sails had all the major features recognized today as being crucial to performance. From then on, they were used extensively, from water-pumping and grain-milling to processing of timber, spices, paints, tobacco, and other commodities, and their popularity didn't wane until the invention of steam engines at the end of the 18th Century.

Then, in 1854—130 years after the first U.S. windmill was erected in Jamestown, Virginia—the first of the modern design, the Halladay windmill, made its appearance in the American Midwest, upon which settlers depended on for water, both for home use and with livestock. The first windmills of this kind had four paddle-like wooden blades; subsequent designs thinned the blades and added a tail to orient the contraption into the wind. The steel



blades came onto the scene in 1870.

Windmills quickly became an iconic part of rural American culture. More than 6 million small-output wind machines—those designed for home use—were installed between 1850 and 1970.

Today, these steel-bladed windmills are largely considered of a prior time, before electricity, a leftover of the pioneer days. They serve to remind of what life was like pre-light bulb, pre-automobile, pre-hydrant.

There once was a windmill on every homestead, but as farms disappeared and pasture was turned into cropland, windmills have been plucked out of the landscape one at a time until now, they are an uncommon sight. And, even more unlikely, is a windmill with the rotor on top of the tower, or all the

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blades. A working windmill is a rare find.

These small-output windmills atop their cage-like towers—versus the sleek tri-blade design of the massive turbines of today’s wind farms or the smaller versions for off-the-grid homes—have been relegated in many people’s minds to personal antique collections or heritage museums. A windmill still standing in a pasture may conjure thoughts of nostalgia, but without a real purpose—or is there?

In pastures without access to surface water, such as stock ponds or creeks, producers must develop another way to water their livestock. Rather than digging and installing water lines for stock tanks, alternative energy can provide water at a relatively low cost. Producers with a working windmill have an easy choice, but producers starting from scratch often lean toward solar power.

The NRCS recently hosted a webinar re-introducing windmill usage to producers. Here’s a comparison of windmills and solar systems side by side, in terms of water-pumping:

- ◆ **Solar systems** – costs an average \$4,930 equipment and installation, produces an average 3,120 gallons per

day if at least eight hours of sun per day.

- ◆ **Modern windmills** – costs an average \$6,700 equipment and installation, produces an average 4,320 gallons per day if at least 15 mile-per-hour winds.

Some producers may be tempted to go with the less expensive option between the two, said Craig Runyan, the water resources specialist who presented for the NRCS, but it’s important to note that solar systems can only work during the day and windmills can work night and day, so the higher cost of installing windmills translates into double the results of solar. For areas with plenty of windy days, such as South Dakota and Nebraska, windmills make more sense than solar systems. For areas with lower annual rainfall, and therefore more sunny days, solar systems are more comparable.

In addition, solar panels are easily damaged compared to windmills, and the pumps used with solar systems are more easily damaged by low water quality caused by suspended solids. Pumps used with windmills are not as temperamental.

“Solar panels also seem to be easy

targets for vandals,” Runyan said. “People like to shoot at them.”

The best of the two options would be a system that combines solar and wind power, so that either can be the back-up to the other on calm days or cloudy days, but as of yet, the technology for this isn’t available yet.

The major requirement for a future or present windmill site is one with a good well. The well is small-diameter hole drilled from the surface into the aquifer. Generally, wells are considered abandoned if not in use for three consecutive years, so a new well should be drilled. Any reputable well driller will know both regulations and best practices to drilling a well. One of the primary requirements is to separate the well area from land-use risks, such as livestock pens and septic tanks.

“If the well driller knows what he’s doing, there is no reason that well shouldn’t be there indefinitely,” Runyan said.

Rita Brhel is an NSAS Board member and the NSAS newsletter editor. She and her husband, with their three children, live on a small sheep and poultry farm near Fairfield, Nebraska. Rita writes freelance for various farm publications.

Drought Resiliency Grant Applications Due Oct. 15

The NRCS has announced the availability of up to \$5 million in grants to evaluate and demonstrate agricultural practices that help farmers and ranchers adapt to drought.

NRCS is taking applications for Conservation Innovation Grants (CIG) to help producers build resiliency into their production systems so they can adapt to climatic extremes, such as the historic drought impacting the nation.

Grant applications are due October 15, 2012. Funds will be awarded through a competitive grants process for projects lasting for one to three years. Private individuals, Tribes, local and state govern-

ments, and non-governmental organizations can apply. Apply electronically at www.grants.gov or call (703) 235-8065 for an application.

NRCS is especially interested in projects that demonstrate:

- Cropping or grazing systems that increase drought resiliency through soil health;
- Increases in available soil water-holding capacity through reduced tillage, cover crops, and organic amendments;
- Coordination with NRCS Plant Material Centers in using drought-resistant plants and practices;
- Recommendations for nutrient management following an extended drought;
- Analysis on a regional basis of how agricultural and conservation systems fared during drought conditions;
- Improvements in water use efficiency;
- Agricultural approaches that flourished in low-precipitation areas;
- Traditional production practices that have proven effective in dealing with drought;
- Alternative feeding systems for confined animal operations that incorporate novel drought-tolerant feedstocks;
- Alternative housing or cooling systems for improved energy efficiency in confined animal operations; and
- Technologies that reduce water use in confined animal operations.

The **NSAS Newsletter** is a bimonthly publication of the [Nebraska Sustainable Agriculture Society](http://www.nebraskaagriculture.org) (NSAS), a private non-profit organization. Our mission is to promote agriculture and food systems that build healthy land, people, communities, and quality of life for present and future generations. The purpose of this newsletter is to inform our readers on sustainable agricultural issues, resources, and activities. This newsletter is a NSAS [membership benefit](http://www.nebraskaagriculture.org/membership-benefit).

NSAS Staff

William Powers, Ceresco
Executive Director
402.525.7794
healthyfarms@gmail.com

Jill Wubben, Hartington
Membership Coordinator
jillw@hartel.net

Newsletter services provided by Rita Brhel, rita.brhel@gmail.com

Ali Clark, Omaha
Urban Agriculture Intern
a.clark0425@gmail.com

Sandy Patton, Brunswick
Farm2School Coordinator
sandyp@conpoint.com

Western Sustainable Ag Conference on December 1

A broad range of topics will be discussed at the Sixth Annual Western Sustainable Ag Crops and Livestock Conference on December 1, in Ogallala, including growing crops in high tunnels, mobile meat processing, and using the same field for both crops and grazing.

“Integrating Crop and Livestock Enterprises: Strengthen Your Operation and Reduce Risks” is the theme of the conference, which will take place at the Quality Inn, 201 Chuckwagon Road, from 8:45 a.m.-3:45 p.m.

The conference will kick off with a keynote presentation by Ken Miller who, with his wife Bonnie, own and operate a 2,000-acre ranch in Morton County, North

Dakota. They have utilized an intensive rotational grazing system for more than 20 years. At the present time the Millers are switching to a custom grazing operation with an intensive rotational system on irrigated pastures. They have been no-tilling for the past seven years and have been growing cover crops since 2006 for grazing. Ken also works full time for the Burleigh County Soil Conservation District. His duties are working with producers on grazing systems, no-till and cover crops, and as a research soil scientist with U.S. Department of Agriculture Agricultural Research Service. Ken will speak about integrating grazing into crop production, especially no-till crops.

There are opportunities to participate, including being a sponsor and having an exhibit booth. For information, visit <http://nebusag.org/conference.shtm> or contact William Powers from NSAS at healthyfarms@gmail.com or 402-525-7794.

The conference is a collaboration between UNL Extension, OCIA #2, and the Nebraska Sustainable Agriculture Society

Registration deadline is November 30. Contact UNL Extension Educator Karen DeBoer at P.O. Box 356, 920 Jackson St., Sidney, NE 69162; [308-254-4455](tel:308-254-4455) or [866-865-1703](tel:866-865-1703); or kdeboer1@unl.edu. To download a brochure and registration form, go to <http://www.ckb.unl.edu>.

About NSAS

NSAS is a non-profit, grass-roots membership organization. Initiated more than 30 years ago by farmer members, NSAS has grown into a dynamic organization with members from all across Nebraska. We welcome farmers and non-farmers alike... everyone eats!

Our mission: To promote agriculture and food systems that build healthy land, people, communities and quality of life, for present and future generations.

Our vision and work: We recognize that there is a strong relationship between a healthy local agriculture and a strong local food system. That relationship requires that much of the food consumed is grown and processed locally. This adds quality and security as well as social and ecological responsibility to the community diet. It is this understanding that motivates NSAS's work to strengthen and enhance these systems together. Our work is across Nebraska in all communities and settings to expand this system for the benefit of local agriculture and local residents.

NSAS is active in collaborative projects that support rural communities and the environment. These projects offer mentoring opportunities for beginning and experienced farmers, and

opportunities for on-farm research, demonstration, and education. We offer opportunities for non-farmers to participate in a food system and network with sustainable Nebraska farmers, attend workshops and link with all our projects! Each year, NSAS sponsors a Healthy Farms Conference, workshops, farm tours, and field days. NSAS is a member of the Midwest Sustainable Agriculture Working Group.

NSAS is not just for farmers. Our diverse membership includes rural and urban consumers, market gardeners, educators, and of course farmers raising a fantastic array of goods. We welcome anyone who is concerned about family farming, environmental quality, and good, healthy food. We depend on the support of all that are concerned with renewing and enlivening a sustainable food system and sustainable farming in Nebraska!

- **Healthy land...** NSAS promotes farming practices which decrease soil erosion, increase soil fertility, reduce the need for off-farm inputs, protect natural resources and encourage a diverse landscape. NSAS offers a variety of workshops, tours, and projects which demonstrate environmentally and economically sound farming practices.
- **Healthy people...** NSAS works with growers to increase the availability of fresh produce, quality

grain products, and farm-fresh beef, pork, poultry, eggs, and other animal products. We link concerned consumers with growers who market these foods. NSAS advocates farming practices which benefit the environment and human health.

- **Healthy communities...** NSAS programs are built on community networks of farmers, ranchers, businesses, technical assistance providers, and consumers. NSAS provides these networks with organizing support, information and education, and opportunities to exchange ideas and experience with other networks across the state.
- **Quality of life....** NSAS works to strengthen the economic and social base of family farms and rural communities by increasing the use of on-farm resources. NSAS recognizes the importance of increasing family farm profitability and strengthening local businesses while brightening the environment.
- **For present and future generations...** NSAS programs focus on the entire family, including opportunities for rural women and children, along side similar opportunities for urban refugees and immigrants. NSAS has a history which continues today of projects providing outreach, education and support to all ages, genders and across cultures.

New Carbon Program for Dryland Corn

A new carbon credit program is now available to dryland corn producers in 12 Midwestern states, including South Dakota and Nebraska, beginning with the next planting.

The Climate Action Reserve, a Los Angeles-based carbon offset registry, recently announced the new program, the Nitrogen Management Project Protocol, which rewards producers who reduce their application of synthetic nitrogen fertilizer. Like other carbon credit programs, such as the Chicago Climate Exchange, this program generates carbon offsets that earn revenues through the carbon market and continuing to allow the producer to use the land for agricultural production.

The goal of the program is to reduce releases of nitrous oxide into the atmosphere, a significant byproduct of the application of nitrogen fertilizer. Even though nitrous oxide represents but a fraction of the major greenhouse gases contributing to global warming, it is much more ominous than the more prevalent carbon dioxide or methane. According to the U.S. Environmental Protection Agency, national greenhouse gas emissions per year total 84% carbon dioxide, 10% methane, and just 4% nitrous oxide. But each molecule of nitrous oxide is 310 times more potent at trapping heat in the atmosphere than the more prevalent carbon dioxide.

And the EPA reports that the two-thirds of nitrous oxide emissions in the U.S. comes from agricultural practices: 6% of the total nitrous oxide emissions from manure management and a whopping 68% from soil management. Other emission sources include 7% transportation, 7% stationary combustion sources like boilers and turbines, 8% industry and chemical combustion, and 4% other.

Widespread use of synthetic nitrogen is the surest way to higher yields, especially combined with intensive farming practices. In dryland, without the insurance provided by regular irrigation, excessive nitrogen application is more likely. A carbon credits program gives producers more of a reason to change their fertilizer application methods than simply “to benefit the environment,” by helping to financially offset the reduction in profits that they fear from lower yields.

But does reduced fertilizer use necessarily mean reduced yields?

In 2001, an Iowa State University study compared yields between corn with reduced rates of spring-applied nitrogen 50 pounds per acre below the recommended amount and corn with the recommended nitrogen application. All yields were reduced, but sometimes, it was only by one bushel per acre and sometimes by five bushels per acre. The largest deviation was 11 bushels per acre in one field. There was no strong correlation between the amount of fertilizer applied and the yield received, however, and the researchers determined that stressed plants use the applied nitrogen less efficiently, even at higher application rates, than do plants that are in the best of growing conditions.

Overall, yields in the trial from crops receiving reduced nitrogen were lower by an average of three bushels per acre. However, because the extra 50 pounds of nitrogen would have cost more than the extra three bushels per acre, the researchers determined that the lower amount of nitrogen applied was actually more profitable than applying the recommended amount of nitrogen.

Timing is probably the best determinant for nitrogen use efficiency. Too early or too late, and it'll be wasted and unavailable to the crop. A 2008 University of Missouri trial showed that the ideal timing of nitrogen fertilizer application is just before the crop's peak demand for the nutrient: For corn, this is when plants are knee- to thigh-high. Also, the source of nitrogen—whether synthetic fertilizers, nitrogen fixation from a soybean rotation, livestock manure, or others—doesn't matter nearly as much as the timing. University of Wisconsin research shows that timing depends on the soil type: Medium- and fine-textured, well-drained soils are best fertilized pre-planting; whereas medium- and fine-textured soils that poorly drain are better with side-dressed nitrogen, as are coarse-textured soils.

Basically, there is more to successful nitrogen management than simply applying the full recommendation of synthetic fertilizer. Reducing fertilizer applications below the recommended amounts may even be the most prudent course of action given high input costs.

Compiled by Rita Brhel

NSAS Board of Directors

Joe Mazour, Deweese

President

walnutcreekorganicranch@hotmail.com

Jim Peterson, Blair

Vice President

jimpeterson@huntel.net

Jo Lowe, Lincoln

Treasurer

jo.lowe@nebraska.gov

Jessica Jones, Tecumseh

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jjones12@unlnotes.unl.edu

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rk_bernt@yahoo.com

Rita Brhel, Fairfield

rita.brhel@gmail.com

Krista Dittman, Raymond

organicdairy@branchedoakfarm.com

Kevin Fulton, Litchfield

fultonfarms@hotmail.com

Martin Kleinschmit, Hartington

martink@hartel.net

Gary Lesoing, Auburn

glesoing2@unlnotes.unl.edu

Ben Schole, Hooper

blschole@yahoo.com

Scott Willet, David City

scott.willet@ne.usda.gov

Charles Wortmann, Lincoln

cwortman@unlnotes.unl.edu

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NSAS Programs

[Healthy Farms Conference](#), the annual meeting of the NSAS held in February in an Eastern or Central Nebraska community

[Western Nebraska Sustainable Agriculture Conference](#), a joint NSAS-University of Nebraska-Organic Crop Improvement Association event held annually in the Panhandle

[Farm Beginnings Nebraska](#), a joint NSAS-University of Nebraska 10-week course for beginning farmers and growers

Nebraska Beginning Farmer Mentorship Program, connecting beginning/transitioning farmers and growers with mentors knowledgeable in sustainable practices

[Market Nebraska](#), an online interactive map of Nebraska's local foods outlets

[NSAS Memorial Library](#), a collection of books on sustainable practices housed at Ceresco, many of them donated by the family of the late holistic grazing expert Terry Gompert

Farmer Support Group, an in-person discussion group for all farmers and growers that meets monthly at Ceresco

Western Nebraska Fruit and Vegetable Group, an in-person discussion group for growers in the Panhandle

Nebraska High Tunnel Project, workshops and a webinar educating growers on high tunnels

Farm2School Project, connecting local foods producers with interested school cafeterias

PASTURE MANAGEMENT TIP:

Dairy Cow, Ewe Needs Change in Fall

If you have noticed that the sun rises later each morning, you've probably also noticed that it sets earlier in the evening as well. One can only conclude that the days are getting shorter, which is sometimes taken for granted because it happens every year at this time.

One thing to remember is that decreasing day length also changes how your pasture plants are growing—fewer hours of sunlight means less time for the plants to photosynthesize and, as a result, they make less sugar. If the fall weather becomes cloudier as well, that will also reduce sugar production in the plant.

There are two types of animals that this will most likely affect: milking dairy cows and ewes that are getting ready for breeding.

In the case of milking cows, you may notice a slight drop in milk production or a change in grazing behavior, such as less

time spent grazing. It may make sense to try to include a source of sugar, such as molasses, in your grain mix or another way such as “limited” free-choice. This may help to maintain production between now and when pastures stop growing completely due to cold weather and frost.

For ewes that are moving into the breeding season, they need to be “flushed” with a higher energy diet prior to breeding to stimulate multiple ovulation. As with dairy cows, there may be a benefit to feeding a small amount of grain, or at least some higher energy forages, to try to make up the difference. In previous years, a few sheep farmers indicated that they have had many more ewes with singles when it has been a cloudy and wet season.

If you are unsure whether or not to increase the energy, take a pasture sample and send it in for analysis. The results will tell you the energy level of your pastures.

Value-Added Grant Applications Due Oct. 15

The USDA Rural Development has announced an availability of funds for the Value Added Producer Grant (VAPG) program. The application deadline is October 15. In this program, agricultural producers or producer groups may apply for either a feasibility study grant (max \$100,000) or a working capital grant (\$300,000 max).

There is a matching funds requirement of at least \$1 for every \$1 in grant funds (matching funds plus grant funds must equal proposed total project costs).

Grants will be awarded competitively for either planning or working capital pro-

jects directly related to the processing and/or marketing of value-added products. Generating new products, creating and expanding marketing opportunities, and increasing producer income are the end goals. Applications that support aspects of regional strategic planning, cooperative development, sustainable farming, and local and regional food systems are encouraged. Proposals must demonstrate economic viability and sustainability in order to compete for funding.

For additional information and application procedures, call (402) 437-5551.

SARE Grant Applications Due Nov. 29

The North Central Region-Sustainable Agriculture Research and Education (NCR-SARE) program is now calling for proposals for its Farmer-Rancher Grant.

Proposals should show how farmers and ranchers plan to use their own innovative ideas to explore sustainable agriculture options and how they will share project results. Sustainable agriculture is good for the environment, profitable, and socially responsible.

Projects should emphasize research or education/demonstration. There are three types of competitive grants: individual (\$7,500 max), partner for two farmers/

ranchers from separate operations working together (\$15,000 max), and group for three or more farmers/ranchers from separate operations working together (\$22,500 max). NCR-SARE expects to fund about 45 projects in the 12-state region, which includes Nebraska. A total of approximately \$400,000 is available for this program. Grant recipients have 25 months to complete their projects.

More information can be found at www.northcentralsare.org/Grants/Types-of-Grants/Farmer-Rancher-Grant-Program. Proposals are due November 29 at 4:30 p.m. Central time zone.



OCIA News

Organic Crop Improvement Association
Nebraska Chapter #1

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Randy Fendrich, Linwood

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Joe Roberts, Axtell

Staff

Kim Mosel
PROGRAM ADMINISTRATOR
86536 State Spur 45A
Page, NE 68766
402-620-2701
ociane1@yahoo.com

NEWSLETTER CONTACT:
Liz Sarno, Concord
UNL Extension Educator &
Organic Project Coordinator
402-309-0944
www.esamo2@unl.edu

OCIA Research & Education, Inc.

Angela Tunink
EXECUTIVE DIRECTOR
1340 N. Cotner Blvd.
Lincoln, NE 68505
402-477-2323, Ext. 320
atunink@ocia.org
www.ocia.org/RE

COW PIE-LOGY 101:

You Can Learn A Lot About Your Cows from Their Manure

You might say you can learn a lot from a cow pie. In fact, many beef producers observe cow pies to determine when to start supplemental feeding or when to rotate the cattle to a different pasture. The shape, size, color, and texture can tell a story about the cow's diet quality. By observing the cow pie, one can get an indication of the quality of the animal's diet. This is not a science but rather an art that can be used as an indicator.

Figure 1 is a cow pie from a pregnant cow eating hay that tested 14.8% protein, 28.2% fiber, and 57.3% TDN, or energy. This hay met the cow's requirements for protein (7.8%) and TDN (53.2%). This cow pie was flat, round, and dark in color. The fiber content in the hay was low (28.2%); therefore, the hay was easily digested.

The cow pie in *Figure 2* shows a remarkably different shape. It was not flat and round, but rather the cow pie is hard, stacked, and showed grooves or waves. When this cow pie landed on the ground, it stacked one on top of the other. This cow was eating hay that tested 5.1%

protein, 31.5% fiber, and 53.7% TDN. A cow pie with this shape usually is a sign of high fiber and low digestibility.

In this example, the protein content was very low (5.1%). Because of the low protein in the diet, the digestibility of the protein and other nutrients is often seriously decreased. A supply of protein above the minimum promotes healthy microorganisms in the rumen to aid the digestion process.

The cow pie in *Figure 3* was from a cow eating hay with more fiber (32.8%), as compared to the *Figure 2* cow pie, but it also had more protein (8.8%). Because the protein requirement was being met, more of the hay was digested and the shape of the cow pie was different. The TDN level was only 46.3%. If this cow continued to eat this hay without additional supplement, body condition would diminish. By observing cow pies, a change in diet quality can be observed before a decrease in body condition occurs.

The science of forage testing is the key to proper supplementation. A forage test provides the nutrient contents of hay. Knowing the nutrient composition of hay allows for the comparison between hay nutrients and the nutrient requirements of the cattle being fed. If the animals' needs are greater than what's provided in the hay, a least-cost feed supplement can be devel-



Figure 1



Figure 3



Figure 2



OCIA News

Organic Crop Improvement Association
Nebraska Chapter #1

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ing generally involves grouping animals based on their nutritional requirements, forage testing, and identifying the costs of feed grains. To minimize feed costs, cattle with different nutritional requirements should be grouped separately and supplemented accordingly.

Comingling cattle with different requirements (for example, non-lactating cows in the same field as lactating cows) can cause either overfeeding and waste of costly supplements or underfeeding and poor cattle performance.

Knowing the nutrient composition of the forage allows feeding lower quality hay to cattle with lower nutrient requirements and feeding higher quality hay to cattle with greater requirements. If the nutrients in the hay are less than the requirements of the cattle being fed, a least-cost supplement can be formulated based on local grain prices and alternative feed sources.

Remember, the "art" of cow pie-ology may indicate a supplement is needed, but it is the "science" of forage testing that indicates which and how much supplement is needed.

Source: Dr. Tom Troxel, professor at the University of Arkansas's Division of Agriculture



By Rita Erhel

A Look at the Urban Ag Movement

In Nebraska, where even in the heart of Lincoln or Grand Island or North Platte, anyone is within only a few minutes' drive from open pastures and crop fields, it is difficult to not feel a connection to agriculture.

But this connection that Nebraskans often take for granted is just as foreign as the star-filled night skies and evenings sparkling with fireflies are to residents of the major U.S. cities, such as Los Angeles and Chicago, perhaps even in intercity Omaha.

In these cities, a person can spend her entire life surrounded by concrete and people and traffic and skyscrapers, and know America's Heartland only by pictures. Children grow up thinking that grocery stores make the food they eat, and their parents may not give a second thought that their eggs have ever been anywhere other than the carton.

But some urban dwellers are giving a second thought. In fact, according to the USDA, 15% of the world's food is grown in urban areas. Most cities now allow a small flock of hens, if not the roosters, and perhaps even a milking goat or beehive or fish pool. Even apartment residents can grow vegetables in flowerpots, and community gardens invite both beginners and the experienced.

"Around the world, people are growing food in cities," said Steven Peck, founder of Green Roofs for Healthy Cities in Toronto, Ontario, Canada.

Back here, surrounded by agriculture, where home gardens are a summertime tradition that's always been a part of the rural and small town culture, the idea of city dwellers growing their own food tends to be viewed as simply a fad along the lines of "going green" and "natural living." But for these "urban farmers," the choice to get back to their agricultural roots is far from a flash-in-the-pan trend: It's a movement.

According to the Southside Community Land Trust in Providence, Rhode Island, the Urban Agriculture Movement is much more than the practice of growing food in the city: It's a way for people to reconnect with nature, the act of eating, and to their community. It's a way to experience what everyone in Nebraska experiences everyday as they make way for tractors on the highway or pick their own pumpkin at the U-pick patch.

Urban agriculture is how urban dwellers are finding meaning to their lives, more so than navigating rush hour. Urban agriculture is how urban dwellers are expanding their world beyond the small space behind their

duplexes—by increasing self-reliance, conserving financial resources, connecting to the environment, lowering their carbon footprint and personal food miles, offering an opportunity to improve health through better nutrition, and transforming rooftops and balconies into green spaces.

At its most basic, urban agriculture allows people to have control over the accessibility and security of at least part of their food supply.

Art Yuen, mother and wife in New York City, explains intercity food desserts, which like its rural counterpart, involves areas without access to fresh, healthy foods whether in grocery stores or farmers markets, but in an urban sense, it applies to several city blocks rather than hundreds of rural miles. Urban agriculture allows Yuen and many of her friends access to fresh vegetables that otherwise would take an expensive taxi, bus, or subway ride.

Holly Hirschberg, founder and director of The Dinner Garden in San Antonio, Texas, resolved to learn how to grow tomatoes, onions, and other vegetables as a way to reduce food costs after her husband lost his job during the recession. Her nonprofit organization now starts out beginning gardeners with the seeds and knowledge needed to grow their own food.

Urban agriculture also promotes fellowship. Despite the conveniences of a high-tech world, social media cannot fulfill a person's need for human connection and interaction. City dwellers yearn for the Norman Rockwell idea of neighbors sitting on their front porches, drinking lemonade, waving at passers-by. Growing and sharing local foods brings this nostalgic lifestyle to life.

For some urban dwellers, urban agriculture is as close as they can get to their childhood memories. They're farm kids, but due to the changing agricultural environment and unique challenges of beginning farmers, they have no choice but to live within city limits. Joshua Alder of San Antonio says it was only natural for him—whose parents raise beef cattle on their ranch in the Leon Valley—to put a vegetable garden, a small flock of chickens, and a beehive in his backyard. He says that he doesn't believe he's saving much money on eggs, because of the cost of chicken feed, but he feels that homegrown eggs are healthier and the lifestyle helps pass down his family's values to his children.

Because urban agriculture is challenged



by space restrictions, limiting their economies of scale, the gardeners and livestock owners who participate strive to be as sustainable as possible with their finances. This often means getting creative. For example, a quarter-acre garden in West Oakland, California, is able to make ends meet by recruiting elementary student volunteers and convincing vacant lot owners to waive their lease fees. Others pool resources and labor. Management techniques center on getting as much quality as quantity from as small of a space as possible with as little input as possible. Permaculture, composting, square-foot gardening, container gardening, yard sharing, and other alternative methods of growing food work well in urban agriculture, even if they're not so sustainable in larger operations. Special considerations for intercity gardens include rat and squirrel deterrents as well as thieves and vandals.

While most "urban farmers" are simply interested in growing their own food, some are capturing a bit of income through farmers markets or even selling eggs off their doorstep. The city of Detroit, Michigan, has found success from a major undertaking—converting backyards, schoolyards, and vacant lots into gardens whose produce is enjoyed by their caretakers but also sold to a local cooperative, Grown in Detroit, which sells from roadside stands and farmers market tables. Families in New York City are able to sell an average of \$3,000 worth of produce off of a garden just four-by-eight-foot. In Philadelphia, Pennsylvania, a nonprofit garden generated \$67,000 from a half-acre plot by producing high-value vegetables like lettuce, carrots, and radishes. In Milwaukee, Wisconsin, another nonprofit garden sells \$220,000 a year with just one acre packed with greenhouses, tilapia tanks, poultry, and goats by selling not only to individual consumers but also restaurants.

"Most farmers don't make much more than \$20,000 to \$25,000," said Nathan Watters of Minneapolis, Minnesota, who doesn't yet make what he would consider a livable wage from his urban farming projects—about \$15,000. "But we are still a sustainable hobby."

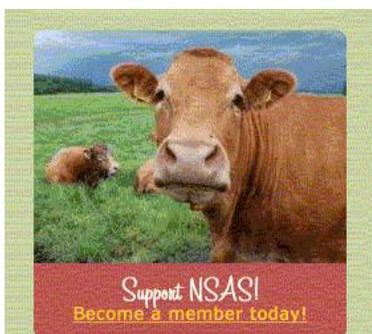
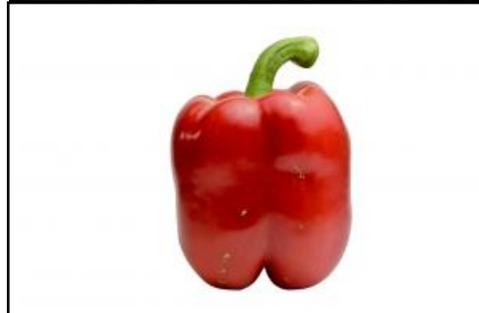
Watters' goal is to develop an urban farm model that can actually provide a livelihood, perhaps through a subscription farm.

On the other side of urban agriculture are the local governments that are passing ordinances to support and boost locally grown foods. In 2011, the City of San Francisco, California, signed a law allowing vacant lots to be used as garden spaces and for gardeners to sell their produce on-site direct. The City of Seattle, Washington, passed ordinances in 2010 allowing rooftop gardens and up to eight chickens, among others, to promote urban agriculture. And in the City of Atlanta, Georgia, the University of Georgia has teamed with the City and various nonprofits to train urban farmers and support their endeavors through soil testing, marketing, and business management training.

As with all movements, urban agriculture has the potential to dramatically and permanently shift urban landscapes from consumers dependent upon store-bought food to communities of local foodies.

Back in rural Nebraska, where farming means hundreds of acres and large equipment, urban agriculture may seem to be no more than an overly enthusiastic garden or beekeeping hobby, but for urban dwellers surrounded by concrete and traffic, growing food provides a connection to so much more.

Watters' farming partner Nathan Schrecengost, also of Minneapolis, said that urban agriculture has never been about money for him: "I'm not a money or finance person. I just want to grow food."



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By Rita Erhel

New Disease Threatening Walnut Trees

As much fear surrounds the Emerald Ash Borer and what it would mean for our predominant ash treescape should this slender, shiny green beetle make it to Nebraska in the coming years, there is as much threat to another native species—the Black Walnut—from a new bug only as big as fine pepper.

Black Walnuts' Value

The Black Walnut is a common species in pastures and some farm windbreaks. Nebraska is on the very western edge of the Black Walnut's native range, which spans much of the eastern United States. However, there are numerous planted Black Walnut trees throughout the state. While walnut trees can sometimes be viewed as a nuisance, as each tree drops hundreds of walnuts each fall onto the surrounding ground, many people value their unique qualities: Besides providing shade and attracting wildlife, the Black Walnut is known to be a generally hardy pick, being both drought- and disease-tolerant. Individual Black Walnut trees have been known to live for several hundred years. It is a species that would be missed.

In addition, the Black Walnut can be harvested as lumber and the nuts can be eaten. The Nebraska Department of Agriculture estimates there to be 1.5 million trees, the lumber of which is valued at \$40 to \$80 million. Approximately \$3.5 million in lumber is harvested each year. The wood is especially prized for use in furniture and guitars.

Many people plant groves of Black Walnut specifically to be harvested in 40 years to add to their retirement funds, referring to the Black Walnut as “the 401k on a stump,” said Bruce Moltzan, national program leader for forest pathology with the USDA's Forest Service.

Another \$1.2 million of the state's economy comes from the 70,000 pounds of walnuts produced each year, which is most widely used in the ice cream industry.

Danger to Black Walnuts

Unlike the Emerald Ash Borer, which is an invasive species native to China, Japan, and Korea, the Walnut Tree Beetle is native to the southwestern United States. Before 2010, the reddish-brown, 1.5 millimeter-size Walnut Tree Beetle was not considered a pest; however, its status has

changed with a recent association with the *Geosmithia* fungus, which can kill full-grown trees within three years of the first signs of infection. Dennis Fulbright, a plant pathologist at Michigan State University, believes the spread of the fungus, which naturally prefers warmer temperatures, may be due to climate change.

“It's a hard time for hardwoods,” agreed Steve Seybold, a chemical ecologist and forest entomologist with the USDA Forest Service's Pacific Southwest Research Station in Davis, California. “This is behaving like an invasive pathogen that has run amuck.”

While all walnut species including English Walnut and Butternut are able to contract the fungal Thousand Cankers Disease, the Black Walnut is the most susceptible. Pecan, hickories, and other tree nuts outside of the walnut family are resistant.

The Walnut Tree Beetle feeds on walnut wood under the bark, creating small cankers ranging in size from only a few millimeters to three centimeters in diameter. Without the fungus, these dead areas would not significantly damage the tree. However, as a carrier, the insect introduces the fungus to the tree, which then causes bigger and deeper cankers and eventually death of the tree by obstructing the uptake of nutrients through the tree's phloem tissues, which is where the cankers are located.

Trees may be infected for many years without visible symptoms, which include yellowing leaves that wilt and turn brown and dying branches, starting at the tops of the trees; in all, it may take more than a decade to kill a tree, but for the majority of those years, there are no symptoms. There are no effective chemical controls, and ultimately, all infected trees die.

In fact, the entire population of Black Walnut has been killed in Colorado Springs, Colorado, said Ned Tisserat, the Extension plant pathologist with Colorado State University who first identified the responsible fungus and gave the disease its name. Other cities whose Black Walnut populations have been eliminated since the disease's discovery in 2008 include Boulder, Colorado; Portland, Oregon; Prosser, Washington; and four counties in California.

“It is really, really a scary disease,” Tisserat said.

Confirmed cases of Thousand Cankers Disease—which was first recorded in New Mexico in 2001, with the beetle-disease complex not noticed until 2008 in California—are found throughout the western United States, including Washington, Oregon, California, Idaho, Utah, Nevada, Colorado, Arizona, and New Mexico, as well as now Tennessee, Pennsylvania, Illinois, and Virginia in the eastern United States.

Protecting Black Walnuts

Nebraska has joined Kansas, Oklahoma, Missouri, Arkansas, West Virginia, Indiana, Wisconsin, Michigan, and Minnesota in putting regulations in place to protect walnut trees. The Nebraska Department of Agriculture has issued restrictions on movement of walnut wood originating outside of the state into or through Nebraska as a way to help prevent the spread of Thousand Cankers Disease into the state's walnut population—both wild and planted. Diseased wood is highly infectious. Literally, thousands of the Walnut Twig Beetle can be found in even small logs.

“Thousand Cankers Disease has the potential to devastate Black Walnut just as Dutch Elm Disease nearly wiped out American Elm and Chestnut Blight eliminated American Chestnut,” said Whitney Cranshaw, an entomologist at Colorado State University. “All it would take is one careless individual moving a walnut log with the beetles, and we could have an outbreak that could quickly spiral out of control.”

Walnut logs, firewood, green lumber, woodchips, and nursery trees are all included in the quarantine. What are not included are nuts, processed lumber, and finished wood products without bark. The most likely pathway for movement is raw wood, such as firewood, and the natural spread of disease among wild populations, such as riparian areas where there is little to no monitoring.

Any signs of Thousand Cankers Disease should be reported to the State Forest Service in Nebraska. Basically, if a Black Walnut tree is dying back at the top, tree owners need to look for small pinprick holes in the bark. If these are found, and if peeling the bark away reveals tunnels in the wood, a call to a tree professional is in order. For more information, visit

www.thousandcankers.com.

By Rita Erhel

How to Improve On-Farm Bee Habitat

It's not only fruit and vegetable growers who are interested in creating on-farm habitats for pollinating and other beneficial insects. All types of agricultural producers, from small to large, from crops to livestock, are seeking ways to make their operations more bug-friendly.

Natural resource conservationists across the country are receiving more calls from producers, usually recipients of EQIP (Environmental Quality Incentive Program) dollars, seeking help in attracting bees to their farms, said Mace Vaughan, pollinator program director for the Xerces Society and a pollinator conservation specialist for the NRCS's West National Tech Support Center in Portland, Oregon.

Habitat Assessment

There are three areas of habitat needs for all animals. On-farm conservation requires the addition of a fourth.

"The first three [areas of habitat needs] deal with ecology of pollinators," Vaughan said. "The fourth is the only one that looks at specific farm practices and how that affects biodiversity."

Good habitats for pollinators include:

- ◆ **Nesting Sites** – Ground-nesting bees prefer areas of well-drained, bare sandy or sandy loam soil or ground with sparse vegetation. No-till cropping systems are particularly inviting. Wood- and cavity-nesting bees like brush piles, pithy shrubs like sumac, and native clump-forming grasses. These bees also readily occupy artificial nests, so this is an easy addition to improve on-farm habitat.
- ◆ **Foraging Habitat** – Bees prefer natural vegetation, and better ratings are given to farms consisting of at least a 45% cover of native plants such as pastures or a mix of native and naturalized, non-invasive plants such as alfalfa. Ideally, there would be at least five spring, summer, and fall flowering species in the mix. It's important to include the surrounding landscape, too, for at least a half mile in all directions from the site. Invasive flowering weeds and sod-forming grasses are not good foraging habitat for bees.
- ◆ **Other Landscape Features** – Bees do better in larger habitat areas, of at least five acres. Bees are also attracted to riparian buffers, windbreaks, fencer-



ows, and flowering cover crops.

- ◆ **Farm Management** – The top hazard on farms for bees is contact with pesticides, so the most ideal operations are organic or those that utilize Integrated Pest Management strategies. Conventional operations aren't ruled out if they reduce pesticide drift, and limit application to the night time hours and to plants outside the bloom period. Areas with minimal intrusion during the year, such as livestock pasture, are preferred by bees; where burning, mowing, or haying is done to more than half of the area discourages bee activity. Grazing plans that encourage wildlife abundance and diversity is optimal, as are fields where tilling is not used for weed control, such as no-till. However, tilled land can be considered as bee habitat if field borders are left intact.

Habitat Restoration

After assessment, the next step is changing the fauna on the farm to attract bees.

"What we're talking about is non-crop habitat," Vaughan said. "The amount of natural habitat on and around a farm has a direct influence on pollinator populations."

The primary way is to plant a conservation cover, also called a wildflower meadow. The biggest question is how to incorporate that into production agricultural systems.

"To be honest, the ecology community

has never interfaced with agriculture," said Eric Mader, assistant pollinator program director for the Xerces Society and an assistant entomology professor at the University of Minnesota in Minneapolis. "This is cutting-edge information."

There are a number of reasons why creating bee habitat is particularly challenging on the farm, including:

- ⇒ **Pesticides** – Bees, like all beneficial insects, are sensitive to pesticides. Any habitat on the farm must be protected from pesticides and pesticide drift.
- ⇒ **Accessibility** – At the same time, the habitat needs to be easily accessed by equipment for planting and maintenance.
- ⇒ **Sunlight** – A wildflower meadow is just that—a wildflower plot, and most wildflowers require full sun conditions.
- ⇒ **Slope** – Habitats are planted best on flat or gently sloping areas, rather than steep or highly erodible sites.
- ⇒ **Weeds** – Wildflowers have more difficulty establishing in areas with high weed pressure, although some weed types are more notorious than others.
- ⇒ **Site history** – Past plant cover, use of pre-emergent herbicides and other chemicals, and soil compaction can affect wildflower establishment. It's also important to know about poor drainage or flooding tendencies, which doesn't rule out bee habitat but may require a different mixture of plant species.
- ⇒ **Soil** – Plants need to be matched to appropriate planting conditions, including soil types.
- ⇒ **Irrigation** – Seeding wildflowers doesn't require irrigation, but establishing via plugs, pots, and bare root do.
- ⇒ **Special considerations** – While conservationists would rather create bee habitat as a wildflower meadow, there are other planting considerations if the area serves additional functions, such as runoff prevention, stream bank stabilization, wildlife habitat, or windbreaks.

Farmers and ranchers interested in increasing pollinators on their property, with or without EQIP dollars, should contact a local NRCS office.

Canola Threatening Brassica Seed Purity

Brassicas don't win a lot of popularity contests. Particularly, broccoli gets regular ribbing as a child-unfriendly vegetable. Perhaps if this news piece had something to do with apples or watermelon or potatoes—Lord knows people would freak out if their French fries were messed with—or even carrots, this would have become a national headliner.

Basically, there is a region in the state of Oregon, known as Willamette Valley—which is as recognizable in the vegetable world as Napa Valley is in the wine world—that is among the top five places in the world for growing and supplying specialty seed. This is the place where both large-scale growers and backyard gardeners get their seeds. And among these specialty seeds are brassicas, a family of vegetables that includes not only broccoli but also cauliflower, arugula, rutabaga, turnip, radish, kale, cabbage, and the like.

Canola is another brassica. I've never eaten canola—well, as a vegetable. I use canola oil. But, apparently, canola is not a nice brassica—or maybe it plays too nicely with others. Canola, according to Oregon State University research, very easily cross-pollinates with many other brassicas, especially turnips, broccoli raab, rutabaga, some kales, and possibly radish and broccoli. It loves to interbreed. In order to maintain seed purity of brassicas in Willamette Valley, the Oregon Department of Agriculture has maintained a canola exclusion zone in the Valley.

Until recently at least, when after a series of behind-closed-doors meetings

with farmers who want to grow the plant for biodiesel or cooking oil, it has issued a temporary rule to allow canola—including GMO varieties—to be grown in the Valley unchecked and with disregard to the previous isolation zone. The manner that the Department of Agriculture has done this allows them to skip the requirement of public commenting.

A representative of the Agriculture Department said that they were just trying to find a way for both sides to share the Valley, but it didn't take long before a lawsuit was filed and the courts blocked the planting of canola until an official ruling is made.

Sigh.

The most obvious observation of this whole mess is the gross error the state department made in changing planting zones of a previously banned crop without public announcement or transparency—that secret meetings, especially among lawmaking institutions, are in and of themselves not ethical. The second, perhaps less apparent, observation is that the state department didn't recognize that their handling of this Valley dispute affects a lot more people than the local producers bickering over geography—that their seemingly flippant decision affects growers worldwide.

You, as a consumer, may not think much about seed purity unless you're into organic gardening. You may not care that this radish is a different variety than this radish over here, as long as they're fresh and taste good. And biodiversity may seem like one of those nuances that only the tree

-hugging people or retired horticulturists really get into. After all, do we really need 50 different varieties of a vegetable?

But here's a more universal threat that comes with not respecting biodiversity and seed purity: What if we only have a couple different varieties of broccoli and all of the varieties have been tainted with a touch of canola, so essentially, we're all eating a broccoli-canola mix, and then some disease comes by that attacks canola and we have a worldwide shortage of broccoli. Now, you who don't care much for broccoli might not care, but broccoli is a wonderful cheap and nutritious veggie especially in the winter months.

Plus, any ruling like this will set the stage for future planting zone decisions. It reminds me of the whole deal with GMO sugar beets—you know, we eat these as sugar—being planted in areas of organic, non-GMO sugar beets. There's a legitimate concern, especially if you're a producer marketing non-GMO sugar beets, that the GMO would cross-pollinate with the non-GMO. And of course there's a legitimate concern if you're a consumer who prefers non-GMOs.

So, yeah, it's a much bigger issue than organic versus conventional producers, and much bigger than Willamette Valley. It's something that we should be following in the news, if only through the Internet grapevine and not in the national networks. And even if it is only broccoli.

Opinion piece by Rita Brhel