

Engineering Notes

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Agricultural Structures

Should You Be Your Own General Contractor?

David W. Kammel, Wisconsin Extension Engineer

In my position as an extension agricultural engineer and educator, I work with both builders and dairy farmers (owners) and have asked this question and tried to answer it from both perspectives. I have learned from both sides the risks and benefits of the decision. There is no pat answer for you as an owner. What I would like you to think about are the issues I am presenting in this article. Answering the questions may help you understand the risks and benefits of making the decision to be your own general contractor or hiring a professional to do the job.

A builder is not a dairy person, and may not have your dairy experience or know what you want. As the owner, you need to educate the builder in exactly what you need. That does not mean you have to be the general contractor to control the project. You as the owner have complete control over the general contractor.

A dairy person is not a builder, and may not have builder experience. Do you as a dairy person have the expertise to carry out the multitude of tasks required to move a project through

from start to finish? Can you order materials, schedule labor and subcontractors, resolve conflicts between subcontractors, and finish the job on time and on budget?

What are the attributes of a general contractor?

A general contractor (GC) considers the big picture and understands the building process from start to finish. The GC is detail-oriented and can decide if a specific change made now will significantly affect the quality of the job. A GC can think ahead of the current scheduled work toward the next day's, next week's or next month's schedule. The GC understands that a mistake in scheduling today's work can have a snowballing effect on the future schedule and cause significant delays in the project completion. The GC is thrifty—he needs to make a profit to stay in business. Redundancy and wasted material or labor can eat up profits quickly.

Some might even say that a GC is a “control freak” (in this case, it is probably a good thing). Someone has to be in control. Some owners might feel that they don't have control if they have a GC. I don't think this should be threatening to an owner. In fact I think this gives the owner more control over a project because the owner directs and controls the GC who in turn controls the project.

What are the responsibilities of the general contractor?

In the project management phase, the GC oversees the project design, resolves design conflicts, contracts with all the subcontractors, orders materials, and estimates the project cost. In the construction management phase, the GC schedules the subcontractors, resolves scheduling conflicts to keep the job on time, and inspects the work to make sure the next scheduled work can be done properly.

Another key issue that may affect the decision for an owner to be a GC is the size and scale of a project. For example, a 100-cow freestall barn may be considered a small project that could be done in a relatively short time. It is not a particularly large building, and is a simple structure with concrete floors and curbs, minimal utilities and equipment. The dairy owner may only need to work with a few contractors (excavator, building, concrete, plumbing, electrical), and may be able to coordinate all the contractors to get the job done on time and on budget.

In This Issue

<i>Should You Be Your Own General Contractor?</i>	1
<i>Bunker Silo Facer—Why Invest?</i>	2
<i>Making Educated Decisions to Keep Children Safe on Your Farm</i>	3
<i>Sustainable Agricultural Program Calls for Grant Proposals</i>	4
<i>Checking Frozen Septic Systems to Prevent Future Problems</i> ...	5
<i>Odor Issues with Onsite Sewage Treatment Systems</i>	6
<i>Daily Crop “ET” Info Available on the Internet</i>	7
<i>Computer Spreadsheet Available for Irrigation Scheduling</i>	8
<i>Resources</i>	9
<i>Calendar of Events</i>	10

A major project expansion such as a new 250-cow freestall barn, parlor, feed storage, and manure storage project has many more contractors, is more complex, and has a longer time frame. This kind of project can take a huge time commitment from the general contractor—time the dairy owner may not have, and may not understand the time commitment until it is too late into the project to turn it over to anyone else.

What I have learned from owners who did try to be the GC on a major project was that they sacrificed their family time, business time, and personal time to save on the project costs.

So how much can you save on a project?

That’s a hard number to nail down, but it is probably in the range of 10-20% of the project cost. That can be significant money on large projects, and saving money is one of the main reasons why an owner might consider being the general contractor. It might be the difference between keeping the project under or over budget. But are the cost savings worth it?

What are the benefits of owners being general contractors?

They can save money, and they are in complete control of the project.

What are the benefits of hiring a professional general contractor?

They have the knowledge and expertise in the construction business. They have experience. They have the time because that’s what they are paid to do. They have long standing relationships with subcontractors.

When can being your own general contractor work?

On small projects with a short time frame with minimal contractors, and when you have the time to spend acting as the general contractor to get the job done on time and on budget.

When should you hire a professional general contractor?

On large complex projects with a long time frame with a large number of contractors, and when you don’t have the time to spend acting as the general contractor because you are running a dairy business.

It may sound like I am discouraging any dairy owner from taking on the challenge of being a general contractor. That is not the case. I do believe that some owners might like the challenge, are fully capable of performing the GC function, and can learn on the job for a small construction project before they tackle bigger projects. For a large project, the decision to be a general contractor should not depend only on the fact that it can save you money. It should be a thoughtful decision discussed with your family and business partners to decide if the cost savings are worth the time and effort that will be required.

Bunker Silo Facer— Why Invest?

Brian J. Holmes, Wisconsin Extension Engineer

Bunker silo facers are a form of silage unloader which remove silage from the bunker leaving a smooth face with a relatively low exposure to oxygen. The facer is an alternative to the commonly used front-end loader. Even with good management, it is difficult to leave a relatively smooth face with a front-end loader. Too often, you end up with a rough face with deep fissures in the silage, leading to major dry matter losses (up to 10%) from exposure to air.

The difference in loss between that obtained by the front-end loader and the facer is influenced by many factors, including how the forage was ensiled, and how it is removed. An estimate of dry matter loss differences based on silage management is listed in Table 1. These estimates assume that the fewer the recommended practices for silage management are followed, the higher the dry matter loss differences become.

TABLE 1. Dry matter loss improvement by using a silage facer versus a front-end loader.

Dry Matter Loss Improvement (%)	Storage Management Characteristics
1	<ul style="list-style-type: none"> •Harvest forage in the 60-70% moisture range •Short chop length •Pack forage densely (> 16 lbs DM/cu ft) •Remove 12 inches per day from silo face •Good face management with front-end loader
3	<ul style="list-style-type: none"> •Harvest forage in the 55-65% moisture range •Long chop length •Pack forage to average density (14-15 lbs DM/cu ft) •Remove 6 inches per day from silo face •Moderate face management with front-end loader
5	<ul style="list-style-type: none"> •Harvest forage in the 50-60% moisture range •Long chop length •Pack forage to below average density (< 14 lbs DM/cu ft) •Remove less than 3 inches per day from silo face •Poor face management with front-end loader

So, can a producer justify the investment in a bunker silo facer? To answer this question, a spreadsheet has been developed to establish the break-even cost that one can use to compare to the actual cost of a facer. Table 2 shows results from the spreadsheet. A producer can afford to spend less than the break-even cost and maintain profitability. The break-even cost of the facer when converted to an annual cost equals the sum of improvement in dry matter loss value, additional labor, additional equipment, and additional fuel use costs. The labor, equipment, and fuel use could actually be savings if the facer operates at a faster rate than the front-end loader.

In Table 2, the front-end loader and facer are assumed to remove silage from the bunker at the same rate. There will be no additional cost or savings for labor, equipment or fuel use. A small facer may cost between \$3,500 and \$5,000. From Table 2, a producer with a small amount of forage using good manage-

TABLE 2. Break-even cost with no additional time required by the facer for forage removal compared to a front-end loader.

Increased DM Loss Using Front-end Loader (%)	Quantity Stored (T DM)	820	2050	4100	6150	8200
	No. of Cows with Heifers	100	250	500	750	1000
		----- Break-even Investment (\$) -----				
0.5		2,278	5,694	11,389	17,083	22,778
1		4,556	11,389	22,778	34,167	45,556
2		9,111	22,778	45,556	68,333	91,111
3		13,667	34,167	68,333	102,500	136,667
4		18,222	45,556	91,111	136,667	182,222
5		22,778	56,944	113,889	170,833	227,778

ment (1% DM loss difference) will break-even with the cost of a smaller facer. Larger producers or those using fewer good management practices will have significant profits by investing \$4,500 for a facer. For example, a producer with 2,050 T DM stored who improved dry matter loss by 3% would have a \$29,667 (\$34,167 – \$4,500) profit over a 10-year period, or about \$2,967/year.

Other Benefits

Benefits of a bunker facer that may be difficult to quantify monetarily include:

- Elimination of silage chunks which are difficult to meter into a feed mixer from a loader bucket and sometimes don't blend in the mixer
- Blending of the forage before placing into feed mixer
- Particle size is not reduced

To access the spreadsheet referenced above or a more extensive discussion of this subject, visit the Wisconsin Team Forage, Harvest and Storage web site at <http://www.uwex.edu/ces/crops/uwforage/storage.htm>

Safety and Health

Making Educated Decisions to Keep Children Safe on Your Farm

Mark Purschwitz, Wisconsin Farm Safety and Health Specialist

While a farm is a nice place to raise a family, it is also a hazardous workplace that can inflict serious or fatal injuries to them. Children living on the farm are at the highest risk, but it is not uncommon for visiting children to be injured or even killed. Every farm operator must make important decisions about child safety on the farm.

Children are usually injured while in one of three situations: (1) working; (2) not working but accompanying a parent or

older sibling in the workplace; or (3) not working and not being supervised or watched. Each of these situations requires thought and diligence by adults to prevent serious injury.

Children who are working must be given age-appropriate tasks. Each child is different, and parents must think carefully about what that child has been asked or told to do. Both the physical and mental aspects of a job must be considered. Can the child physically do the job? Will he or she be harmed by overexertion or heavy lifting? Are they required to climb dangerous heights or to be in a position where they could have a serious fall?

If operating a machine, can the child reach all the controls and have the strength to operate them smoothly and swiftly if necessary? More importantly, do they have the maturity to make critical decisions when things go wrong? Can they anticipate problems or potentially dangerous situations and take actions to avoid them? Do they understand the dangers of the machine and know not to work on a machine while it is running? Just because a child can reach the controls and handle a machine when things are going smoothly does not mean the child can handle malfunctions or emergencies well. Like any other operator or worker, children must receive training and supervision.

Caution must be exercised when taking children into the workplace, e.g. when accompanying a parent. Is the child in a safe place? Riding on the fender or in the cab of a tractor is not a safe place; children have fallen from both and been run over. Can the child be watched continuously? There have been tragedies involving parents who were trying to work while watching a toddler, suddenly realizing the toddler is nowhere in sight, and finding the toddler dead due to a farm hazard. Although finances and schedules may be a problem, often the wise thing to do is to get a babysitter or to use some sort of day care, to keep the child in a safe place. This also allows parents to concentrate on their work.

Babysitting or day care is also important when young children would otherwise be unsupervised around the farm. Creating safe play areas is also important. With all the tractors, trucks, and implements in motion on modern farms, curious

children might easily be run over before they are seen. Children need to be taught from an early age what areas of the farm are “off limits,” and that machines are dangerous and should be avoided. This issue is more important than ever, since an increasing number of spouses work off the farm.

In addition to making good decisions, parents must be sure hazards on the farm are controlled, both for the safety of children as well as for adults. Guards and shields must be in place on machines. Tractors should have ROPS (Roll-Over Protective Structures). Fences and barriers must be used to keep people out of dangerous areas, and chemicals kept in locked storage areas.

Information is available to help you make wise decisions about the children on your farm. Your county Extension agricultural, 4-H/Youth Development, or family living agent can help you think through decisions. Two excellent sources of information on this and other farm safety topics are the University of Minnesota’s farm safety clearinghouse web page at <http://safety.coafes.umn.edu/> and the University of Wisconsin Center for Agricultural Safety and Health page, <http://bse.wisc.edu/wiscash>. The University of Minnesota has developed the publication *Safe Play Areas* which can be purchased in quantity or downloaded for individual use, see <http://safety.coafes.umn.edu>. They both have links to other information sources. The National Children’s Center for Rural and Agricultural Health and Safety, located in Marshfield, has published the *North American Guidelines for Children’s Agricultural Tasks*, which breaks down various farm jobs into individual tasks to help you decide if there are parts of a job unsuited to a certain child. The web sites are <http://research.marshfieldclinic.org/children/> and <http://www.nagcat.org/>. In addition, the organization “Farm Safety 4 Just Kids” is dedicated to preventing serious and fatal injuries to children on farms, and has a wealth of materials.

It is important for farm families to make sure their priorities are in order. Spending time with children is important, but not in an environment where they can be seriously injured or killed. Having children develop a good work ethic is important, but not if they will be seriously injured or killed. Farming is not worth the death of a child.

Sustainable Agriculture

Sustainable Agricultural Program Calls for Grant Preproposals

Bill Wilcke, Minnesota Extension Engineer and NCR-SARE Regional Coordinator

Members of institutions and organizations from the North Central Region are invited to apply for 2004 Research and Education Grants through the North Central Region Sustainable Agriculture Research and Education (NCR-SARE) program. NCR-SARE estimates that about \$1.5 million will be available for 10 to 15 grants by the summer of 2004. Individual grants cannot exceed \$150,000. Grants can be one to three years in length and must address sustainable agricultural topics with in-depth research or education/demonstration projects.

Successful preproposals will address the long-term enhancement of agricultural profitability, environmental quality and societal well-being. NCR-SARE encourages projects that include holistic approaches, interdisciplinary team involvement, agricultural producer participation, significant outreach and measurable results. Projects should pertain to issues within the North Central Region.

The Call for Preproposals is currently accessible at the NCR-SARE office at 402-472-7081 or through its website at www.sare.org/ncrsare. Preproposals will be accepted in the NCR-SARE office in Lincoln, Nebraska until June 10, 2003, at 4:30 p.m. CDT. Successful preproposal authors will be invited to submit full proposals that will be due fall 2004.

The Research and Education Grant Program is one of four NCR-SARE grant programs. The Research and Education program provides funds to collaborative teams of scientists, farmers, educators, institutions and organizations to explore sustainable agriculture through research, education or demonstration. NCR-SARE is a competitive grants program, funded by the USDA, that strengthens rural communities, increases farmer/rancher profitability and improves environmental quality by supporting research and education. States included in the North Central Region are North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Michigan, Indiana and Ohio.

If you’d like to obtain a copy of the Call for Preproposals, contact the NCR-SARE office in Lincoln (402-472-7081, ncrsare@unl.edu, or www.sare.org/ncrsare). To discuss preproposal ideas, contact Bill Wilcke, NCR-SARE Regional Coordinator (612-625-8205 or wilck001@umn.edu).

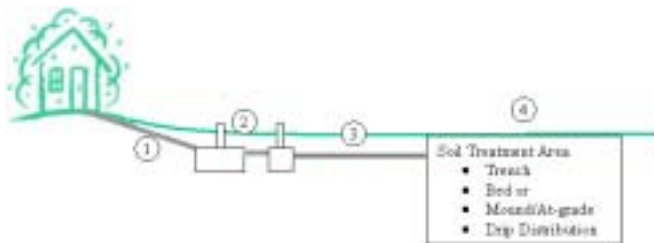
Water Quality

Checking Frozen Septic Systems to Prevent Future Problems

Sara Christopherson, Minnesota Extension Educator
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 Jim Anderson, Professor and Extension Soil Scientist,
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 Dave Gustafson, Minnesota Extension Educator

If an onsite septic system freezes during a cold winter, it is important to know why and where the system froze. This will help determine if repairs, corrections, or changes to the system are necessary to make sure it will operate properly in the future. The steps needed depend on the type of system and where the freezing occurred. If the freezing problem was simply because of cold temperatures and/or lack of snow cover to insulate the system, it may just need to be checked for problems and perhaps minor repairs or improvements made. However, some freezing problems are the result of problems with the design, installation, or use of the system that may require significant repairs or changes to solve the problem.

Other factors, such as excessively high or very low water use can also be a contributing factor to the freezing problem. For more information about why systems freeze and measures to prevent freezing, please see the fact sheet entitled *Freezing Problems with Onsite Sewage Treatment Systems*, found at <http://septic.coafes.umn.edu/Homeowner/>



There are four common locations where systems can freeze.

1. Pipe from house to tank
2. Septic tank and/or pump tank
3. Pipe to soil treatment area
4. Soil treatment area

It is important to determine where and why the system froze so corrective actions can be taken to avoid freezing in future winters. A licensed onsite sewage treatment professional should be able to determine where the system froze if it is not obvious. Homeowners should also know where each component of the system is located to aid in problem solving and proper maintenance. After a system has been frozen and thawed each component should be checked.

1. Pipe from house to tank

If the pipe between the house and septic tank froze, two issues need to be evaluated. First, make sure there are no leaking fixtures, such as toilets or faucets, or low wastewater generating devices, such as a high efficiency furnace discharging into the system. Secondly, make sure the entire pipe has sufficient slope without any sags to assure water is draining into the septic tank (minimum of 1" drop in eight feet and a maximum 2" in eight feet).

2. Septic tank and/or pump tank

When a septic tank freezes, the baffles need to be checked to verify that they are still in place and have not been damaged. The tank(s) should also be checked for cracks, although this occurs very rarely. Styrofoam which is designed to be buried can be placed over the tank to insulate it by removing the soil cover, placing 1-3 inches of Styrofoam, and replacing the soil cover. If the tank was pumped out because of a freezing problem and this pumping was not done through the manhole (>20 inches in diameter), then proper maintenance of the tank was not performed. In this case, the tank should be pumped on its normal 2-3 year interval from the last date of proper maintenance.

If there is a pump in the system, it should be inspected to make sure that the floats have not been damaged. The pump should be checked to assure it is pumping effluent and that it will turn off and on as necessary. It is important that the pump is accessible at all times. This may require the installation of a riser to bring the access to the surface. Because bringing the manhole to the surface will allow more heat loss from the tank, it is a good idea to add Styrofoam under the manhole cover or place insulation (loose material such as straw, hay or leaves) over the top of the cover each fall.

3. Pipe to soil treatment area

The pipe from the tank to the soil treatment area may have frozen for the same reasons as the pipe from the home (# 1). If so, the same remedies would apply. In addition, if there is a pump in the last tank, it is critical that when the pump shuts off, all the effluent drains back into the tank through a weep hole. A weep hole is typically a 1/4-inch hole in the lowest portion of the piping in the manhole. This weep hole will drain water even when the pump is on. Two common problems in pump tanks are check valves that do not allow effluent to drain back and pumping systems designed for drainback through the pump. A licensed onsite sewage treatment professional can determine if a check valve is in place or if the effluent is draining through the pump.

4. Soil treatment area

If the soil or mound was soggy or wet before the winter, the system needs a thorough evaluation by an onsite sewage treatment professional to determine why it is not operating properly. If sewage comes to the surface while frozen in the winter, this creates a health risk to people or animals that come in contact with it. *This problem is serious and must be*

corrected. If ignored after the freezing problem, sewage is likely to surface in this area in the future. The solution may be as simple as bringing in additional topsoil or a more extensive reworking of this part of the system. Checking the distribution system should also be done. In gravity situations drop or distribution boxes should be checked and in pressure applications the system should be verified.

If a drip distribution system froze, a licensed onsite sewage treatment professional trained to maintain the system should troubleshoot the system to determine if a problem exists. Common reasons for drip systems freezing include improper drainback and frozen air relief valves.

For More Information

Please see our website at: <http://septic.coafes.umn.edu/homeowner/index.html> for more information about proper operation of septic systems. You can also contact our staff by calling 800-322-8642.

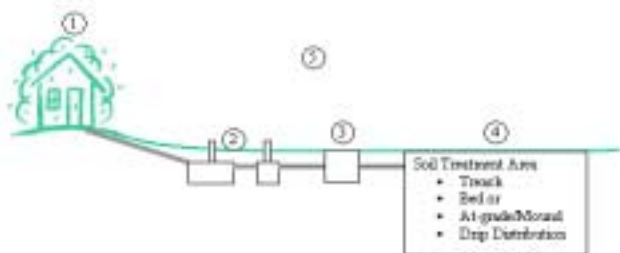
Odor Issues with Onsite Sewage Treatment Systems

Sara Christopherson, Minnesota Extension Educator
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Occasionally, homeowners complain about odors from their onsite sewage treatment system. Although most people understand that sewage has a particular odor, steps can be taken to limit these odors in the home and yard. Gases from an onsite system that can be a problem include hydrogen sulfide, carbon dioxide, and methane. Within a home these gases can be irritating, toxic and explosive. In a yard they are not typically found in high enough concentrations to be dangerous, but are still a nuisance.

There are several locations within an onsite system where odor can be an issue.

1. In the home
2. Near the septic tank
3. Near a pretreatment unit
4. Near the soil treatment area
5. In the yard



1. Odors in the Home

Septic odors inside the house are both annoying and can be a health problem. Odors in a home are typically an indication of a plumbing problem. A very common problem is the drying out of a trap in a basement floor drain allowing gases from the septic tank to vent back into the home. This can be corrected by making sure all floor drain traps are periodically filled with water. Also, the cleanout access plug inside a drain may be loose and could allow for sewer gas to escape. A plumber or ISTS professional who provides line cleaning could check this out and correct the problem.

A second common problem is the plumbing vent located on the roof, which allows the pressure in the drainpipes to equalize as wastewater flows through them. Without this vent, sinks, tubs, and toilets gurgle, traps dry out, and odors come into the home. These plumbing vents can freeze closed during prolonged cold periods or get clogged with leaves or other debris. A warm day or two will thaw out the frozen pipe, but leaves will need to be cleaned out. The pipe can also be unfrozen using a jetter or warm water, but always be sure to take special precautions when working on a slippery or steep roof.

A third common plumbing problem is an improperly sealed cover on an ejector sump pump basket in the basement. The cover should be checked, and a new seal applied to prevent leaks.

2. Odors near the septic tank

An occasional weak odor near the septic tank may be quite normal. But, if there is a particularly strong odor around the septic tank(s), the first step should be to make sure all manholes and risers are securely covered. Typically, a concrete lid covers the tank manhole, although other materials such as plastic and metal lids are used. The septic tank manhole can be covered with a maximum of 12-inches of soil or can come to the surface, while any manhole on a tank with a pump must come to surface to allow for repair or replacement of the pump. The newer plastic lids have a rubber seal which helps keep odors in the tank. They must also be properly secured in place with lag screws or other fasteners. If a concrete lid is leaking odors out of the manhole, weather stripping or other materials can be used to create a temporary seal that will contain odors but still allow for proper maintenance of the tank. This seal will need to be replaced after maintenance.

3. Odors near a pretreatment unit

There is a growing use of pretreatment units in onsite sewage treatment systems. The most common pretreatment devices are aerobic treatment units; constructed wetlands; and peat, recirculating, sand, and textile filters. If an odor is persistent around one of these pretreatment units, a licensed onsite professional trained to maintain the specific type of unit should be called.

4. Odors near the soil treatment area

If there are strong odors in the soil treatment area (around an in-ground drain field, bed or mound), it can indicate a problem with that part of the system. All inspection pipes should be checked to make sure the pipes are not broken and that they are covered. A visual inspection of the entire area should be performed to determine if there are any wet or spongy soil areas indicating that sewage is coming to the surface. If any of these conditions are found, humans and animals can come in contact with it. This is considered an “imminent health threat” and should be corrected immediately.

5. Odors in the Yard

If the yard in general smells of septic gas, it may be that the plumbing vent pipe (described in # 1 above) on your house or a neighbor’s house needs to be extended to diffuse the odors. Homes located in valleys, forested areas, or low areas may not have appropriate wind patterns to carry the odors away from the living areas and the yard. As the wind blows over the house, the air currents that are supposed to carry the gases up and away can instead carry the sewer gas down into the yard. Extending the vent pipe can help diffuse the odors carrying them away from the yard. Carbon filters can also be placed on the top of the vent to help control odor. The filters need to be changed regularly (every 1 to 5 years) to be effective. According to the Minnesota Plumbing Code, a device such as a filter is not allowed obstruct the flow of air, therefore the filter must be chosen in accordance with these regulations. Check with the local unit of government if clarification is needed.

For More Information

Please see our website at: <http://septic.coafes.umn.edu/homeowner/> for more information about proper operation of septic systems. We can be reached by calling 800-322-8642.

Water Management

Daily Crop “ET” Info Available on the Internet

Jerry Wright, Minnesota Extension Engineer

Minnesota and Wisconsin growers needing daily crop evapotranspiration (ET) for irrigation scheduling can access the internet to obtain daily ET potentials. The maps for Minnesota and Wisconsin potential crop ETs are available at: <http://www.soils.wisc.edu/wimnext/>

The Minnesota and Wisconsin ET daily statewide color-coded maps are available now and throughout the growing season. Each daily map gives a reasonable estimation of the potential (reference) ET across the region based on the real weather conditions for that day. Potential ET values are very similar to the actual daily crop ET of a full canopy crop.

Users can request that the daily values for a given field site be sent directly to them by e-mail each day.

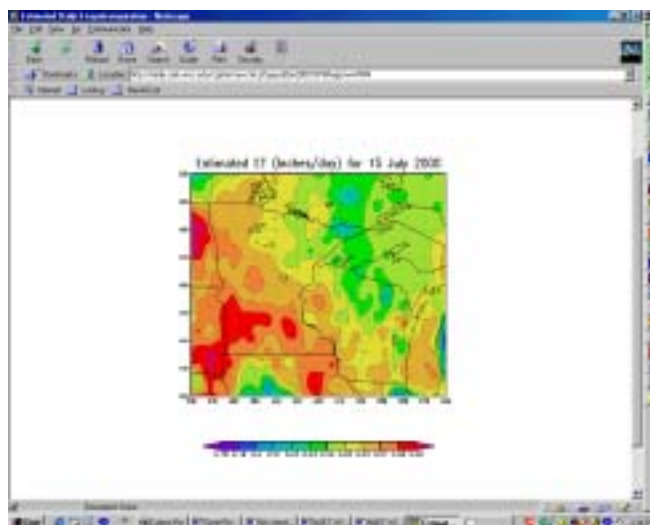
These reference ET daily contour maps are generated using data taken from numerous local airports automatic temperature recording stations across the state and solar radiation estimations, calculated from a GOES satellite that takes a picture about every 10 minutes. A comparison of values from the past few years with ET estimations from local weather stations at Staples and Morris, Minnesota, has found them to be very similar but with the web site values generally being around 10 percent greater in value.

The daily Wisconsin-Minnesota ET maps are created and managed by Bill Bland, University of Wisconsin Extension Soil Scientist. The daily ET value from the map must be multiplied by a crop coefficient (Kco) constant that may range from .25 to 1.0 and depends on the growth stage of the specific crop. Generally, for annual crops, the correction factor starts out around .25 and increases to 1.0 or greater as the plant nears full canopy and holds there until produce starts to mature. As a crop matures, the actual ET of some crop types decreases slightly each day as they come to maturity, hence the crop correction factor will go from 1.0 to as low as .40.

Keeping track of the crop’s daily ET use, along with regular in-field soil moisture checks, can go a long ways toward helping you to optimize the crop’s growth while reducing the potential for leaching of inputs like nitrogen into the groundwater.

These daily ET values best serve the user if recorded on a calendar log like an irrigation checkbook worksheet or computer spreadsheet for quick reference when making irrigation decisions. Consider assigning the updating task to one of the younger members of your family. Worksheets from the University of Minnesota Extension Service bulletin #1322, *Irrigation Scheduling: Checkbook Method*, can be printed off the web at

<http://www.extension.umn.edu/distribution/cropsystems/DC1322.html>



or may be purchased with a credit card by calling 800-876-8636 or 612-624-4900.

For more information on how to use daily crop ET information, contact Jerry Wright, Extension Engineer at the West Central Research and Outreach Center in Morris, MN 320-589-1711 or jwright@umn.edu, or you can contact your local Extension or SWCD office.

Computer Spreadsheet Available for Irrigation Scheduling

Jerry Wright, Minnesota Extension Engineer

A simple, user-friendly spreadsheet style computer program is now available to assist you in planning your next irrigation event and keeping a daily record of your precipitation and irrigations amounts and estimated daily soil water status throughout the growing season. The beta version of the software can be used to monitor daily soil water status for alfalfa, corn, soybeans, potatoes, dry beans, wheat and sugar beets.

The software creates a spreadsheet-like working file for each field that reflects the soil types and depth, available water holding capacity, crop type and emergence date.

The software generates a 30-day soil water depletion graph (Figure 1) for each field for any date, which is easily printed to take to the field or to file with other annual information pieces on performance and input records.

After an initial file setup and an in-field soil moisture estimation, the user needs to enter the daily maximum air temperature, rainfall amounts, and irrigation depths for each respective event. If the day's air temperature is not entered, a historical maximum temperature is already assigned based on the nearest historical weather site that is incorporated into the software. The software lists several regional weather stations around Minnesota and North Dakota.

Once the daily inputs are updated in the spreadsheet for the specific field, a new estimated soil water depletion status is calculated for each day (expressed in inches of water depleted and also percent deficit). This estimate should be cross-checked every five to ten days with an in-field soil water assessment. If differences are found, a correction can be made to the spreadsheet estimate.

The program is designed to run on IBM-compatible computers with Windows 3.1 or higher operating systems. The software requires 5 MB of memory and 5 MB of free hard drive space. The program works best on faster processors and operating systems.

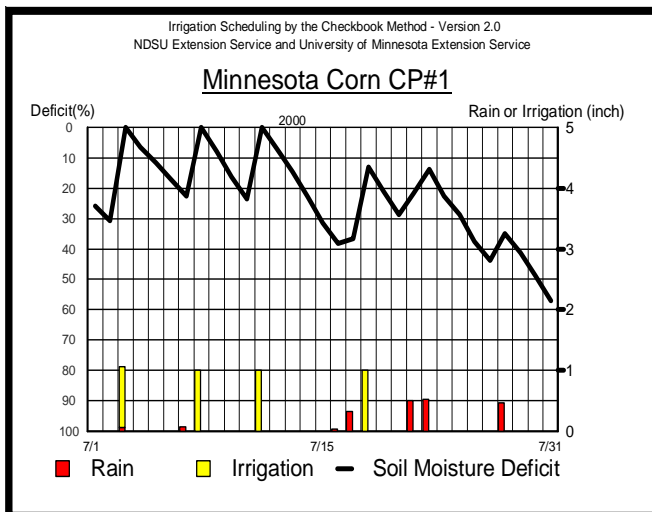
A copy of the software and operating manual can be obtained by sending a \$30 check made payable to *University of Minnesota* to:

West Central Research & Outreach Center
University of Minnesota
Attn: Jerry Wright, Extension Engineer
PO Box 471
Morris, MN 56267

Tom Scherer and Dean Steele, North Dakota State University Irrigation Engineers, and Jerry Wright, University of Minnesota Extension Engineer, developed the software program. The software was field tested with about a dozen farmers and crop consultants in Minnesota during the summer of 1999 and revised in 2000.

The software is based on the concepts used in the University of Minnesota Extension Service bulletin #1322, *Irrigation Scheduling: Checkbook Method*, which can be viewed at <http://www.extension.umn.edu/distribution/cropsystems/DC1322.html> or purchased with a credit card by calling 800-876-8636 or 612-624-4900.

For more information contact Jerry Wright, Extension Engineer at the West Central Research and Outreach Center in Morris, MN at 320-589-1711 or jwright@umn.edu.



Resources

Page 2: Bunker Silo Facer—Why Invest?

To access the spreadsheet referenced in this article or a more extensive discussion of this subject, visit the Wisconsin Team Forage, Harvest and Storage web site at:
<http://www.uwex.edu/ces/crops/uwforage/storage.htm>

Page 3: Making Educated Decisions to Keep Children Safe on Your Farm

University of Minnesota's farm safety clearinghouse web page:
<http://safety.coafes.umn.edu>

University of Wisconsin Center for Agricultural Safety and Health page: <http://bse.wisc.edu/wiscash>.

The National Children's Center for Rural and Agricultural Health and Safety: <http://research.marshfieldclinic.org/children/>

North American Guidelines for Children's Agricultural Tasks: <http://www.nagcat.org/>

Page 4: Sustainable Agricultural Program Calls for Grant Preproposals

To obtain a copy of the Call for Preproposals, contact the NCR-SARE office in Lincoln, Nebraska:
www.sare.org, ncrsare@unl.edu, or 402-472-7081

To discuss preproposal ideas, contact Bill Wilcke, NCR-SARE Regional Coordinator:
wilck001@umn.edu or 612-625-8205

Page 5: Checking Frozen Septic Systems to Prevent Future Problems

Page 6: Odor Issues with Onsite Sewage Treatment Systems

For information about proper operation of septic systems:
<http://septic.coafes.umn.edu/homeowner/index.html> or call 800-322-8642.

Page 7: Daily Crop "ET" Info Available on the Internet

The maps for Minnesota and Wisconsin potential crop ETs are available at: <http://www.soils.wisc.edu/wimnext/>

Worksheets from the University of Minnesota Extension Service bulletin #1322, *Irrigation Scheduling: Checkbook Method*, can be printed off the web at:

<http://www.extension.umn.edu/distribution/cropsystems/DC1322.html> or may be purchased by calling 800-876-8636 or 612-624-4900

For more information on how to use daily crop ET information contact Jerry Wright, Extension Engineer at the West Central Research and Outreach Center in Morris, MN 320-589-1711 or jwright@umn.edu, or you can contact your local Extension or SWCD office.

Page 8: Computer Spreadsheet Available for Irrigation Scheduling

A copy of the software and operating manual can be obtained by sending a \$30 check made payable to *University of Minnesota* to:

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Morris, MN 56267

Calendar of Events

May 28, 2003, **Reducing Impact on Lower Minnesota River Public Meeting**, Community Center, Redwood Falls, MN. See www.pca.state.mn.us/water/basins/mnriver/index.html, www.pca.state.mn.us/water/tmdl, or call Larry Gunderson at 651-297-3825.

June 5-7, 2003, **World Pork Expo**, Iowa State Fairgrounds, Des Moines, IA. See www.worldpork.org or call (847) 838-6772.

June 9-12, 2003, **Wisconsin State FFA Convention**, Alliant Energy Center, Madison, WI. See <http://www.wisconsinffa.org/>.

June 13-15, 2003, **Minnesota Inventors Congress**, Redwood Area Community Center and Fieldhouse, Redwood Falls, MN. See www.invent1.org or call 800-INVENT-1.

July 8-10, 2003, **4-State Dairy Nutrition and Management Conference**, La Crosse, WI. Contact Jim Linn, 612-624-6789

July 15-17, 2003, **Wisconsin Farm Technology Days**, The Clinton Farm, Waupaca County, WI. See <http://www.wifarmtechnologydays.com/>.

July 27-30, 2003, **ASAE Annual International Meeting**, Riviera Hotel and Convention Center, Las Vegas, Nevada. See <http://www.asae.org/meetings/index.html>.

July 31-August 10, 2003, **Wisconsin State Fair**, State Fair Park, West Allis, WI. See <http://wistatefair.com/static/Sf2002/web/index.htm>.

August 3-5, 2003, **Minnesota Rural Summit**, Minnesota State University, Mankato, MN. Contact Jane Leonard at jleonard@minnesotaruralpartners.org or 651-645-9403, or see www.minnesotaruralpartners.org.

August 5-7, 2003, **Farmfest '03**, Gilfillan Estate, Redwood County, MN. See www.farmshows.com/farmfest/index.shtm.

August 21-30, 2003, **Minnesota State Fair**, St. Paul, MN. See <http://www.mnstatefair.org/> or call 651-642-2200.

August 27, 2003, **Horticulture Day**, North Central Research & Outreach Center, Grand Rapids, MN. See <http://ncroc.coafes.umn.edu> or call 218-327-4490.

August 28, 2003, **Beef/Forage Field Day**, North Central Research & Outreach Center, Grand Rapids, MN. See <http://ncroc.coafes.umn.edu> or call 218-327-4490.

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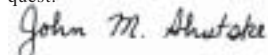
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University of Minnesota Newsletter Team: John M. Shutske, Deb Hansen, and Christy McKibben. This publication is available in alternative formats upon request.



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