Biological Systems Engineering

Engineering Update Summer 2009

Engineering Update: ASABE Blue Ribbon Winner!

In this issue…

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Engineering Update

VirginiaTech Invent the Future

Biological Systems Engineering
June 2009

To: Extension Unit Directors, Extension District Directors, Extension Program Leaders, and ANR Agents

Dear Co-Workers: Engineering Update is a joint effort of Biological Systems Engineering and other interested parties. Subject matter areas include timely information on water quality, natural resource management, TMDL, air emissions, animal waste management, machinery management, precision farming, application technology, farm safety, energy, engineering education, and technology. Please use this information in your on-going Extension programs and circulate to all Extension staff and interested parties. Engineering Update is electronically accessible at: (http://www.ext.vt.edu/vce/anr/bse/index.html).

Reducing Spray Drift

One of the biggest concerns of herbicide applications in the spring of the year is off-target drift. Managing spray applications to minimize drift is something that should take top priority in the total herbicide management scheme. Drift reduces product efficacy, damages crops that are economically or aesthetically important, hurts wildlife, and contaminates water supplies. Herbicide drift can also deposit illegal residues on eatable crops, especially organic grown crops or processed crops that are checked for contaminants.

Two Types of Drift:

1. **Vapor drift** - which is related to the product formulation, temperature, relative humidity and is not a function of the application method or equipment, and
2. **Particle drift** – which is a function of the application method and equipment. The key factors associated with particle drift are:
   a. Droplet size
   b. The equipment and operation technique
   c. Wind speed and direction and climatic conditions

The simplified difference between vapor drift and particle drift is that with vapor drift, the application reaches its target and then moves off target some time after application. In the case of particle drift, the portion that moves off-target does not reach its target.

Particle Drift

Particle drift occurs with all pesticide applications, regardless of the product or formulation, and is directly associated with droplet size in combination with boom height and wind speeds. Injury symptoms from drift will depend on the product used, environmental conditions, and sensitivity of plants in the path of air flow.

Low concentrations of glyphosate may or may not show injury symptoms while low concentrations of 2,4-D or dicamba may show major symptoms on sensitive plants. Controlling droplet size by choosing the proper nozzles and operating the equipment at the proper pressures will minimize drift problems more than anything else within the operator's control.

For burndown and early season applications, selecting nozzles that produce medium to course size droplets (220-400 microns) will provide good herbicide coverage. Operating the sprayer at 30 to 40 psi will usually provide the maximum droplets in this range.

Obviously the pressure range will also depend on the nozzle type. Some wide-angle nozzles with pre-orifice or air-assist design will allow pressures to be greater than other nozzle design, while extended range flat-fan nozzles can be operated at lower pressures.

A consortium of 38 agricultural chemical companies reported that the average loss of active ingredient was approximately 0.5% with a 10 mph cross wind. However, it should be noted that winds and gusts of wind can often surpass 10 mph.

The most common ways to reduce herbicide drift onto susceptible crops or sensitive areas are:

1. Use the lower end of the pressure recommended range for that particular nozzle to produce course droplets
2. Lower the boom height – but, ensure that the spray pattern is maintained
3. Instead of increasing pressure to provide higher outputs, increase the nozzle size to increase the spray volume/acre while keeping within the recommended pressure.
4. Spray when the wind speeds are less than 10 MPH.
5. Spray when the wind direction is away from sensitive areas
6. In case of volatile herbicides like growth regulators, do not spray when there is no wind; this may suggest that an inversion is present.
7. Use a drift control agent if possible

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Reducing Spray Drift (cont')

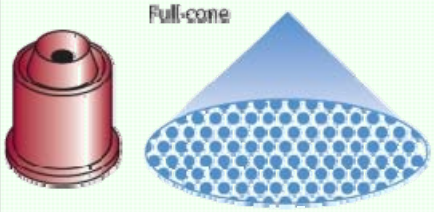
(Continued from page 2)

Vapor Drift

Vapor drift is much harder to control than particle drift. Vapor drift is a function of the herbicide formulation and ambient temperature. Researchers investigated drift using a closed system. They observed some indication of how temperature can affect volatility of dicamba. As temperature increased from 59 to 86° F, visual symptoms on soybean increased from almost 0% to 40%.

The most common vapor drift of 2,4-D comes from ester formulations, but can also be seen from other herbicides like Command. Ester formulations of herbicides volatilize at temperatures of 70 °F or greater, and if calm conditions exist creating an inversion layer, these herbicides can drift for more than one mile.

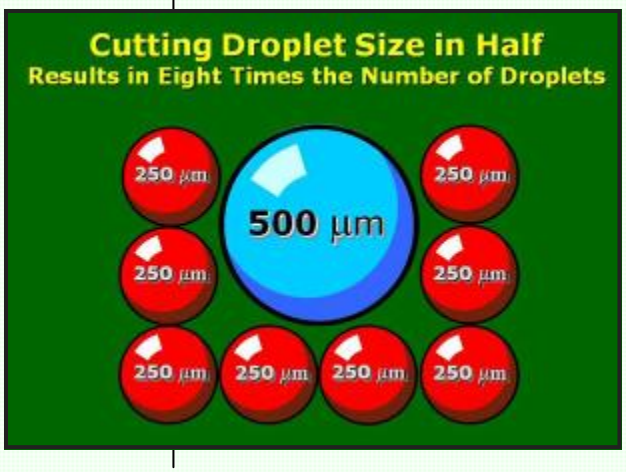
When volatile herbicides are applied in the spring, soil surface temperatures can be 10-15°F hotter than the air temperature, especially in mid-afternoon, increasing the possibility of volatilization. Weather data indicates that inversion layers occur an average of 20 times per month during the periods of April through July but those strong enough to cause long distance herbicide drift occur. Long distance movement usually occurs at night as the air temperature cools and there is light air movement. When such days occur, being aware of a volatile herbicide's ability to vaporize can help the applicator manage a potential drift problem by either not spraying until conditions improve or by choosing a formulation of the product that is less subject to volatilization.



Volatile herbicides are not unique to long distance movement. Any herbicide that is part of a spray droplet of 100 microns or less, which can be produced when spray pressures are increased over normal recommended ranges for that particular nozzle, can become an aerosol particle that is suspended in the air and will likewise move long distances with high winds or by a temperature inversion layer. On a calm day with low relative humidity a droplet of 100 microns or less will evaporate in less than 6 seconds and the herbicide molecules will suspend in the air similar to smoke. For example, at 90°F and 36% RH, a 50 micron droplet will travel only about 3 inches from the nozzle and evaporate in less than 2 seconds.

These suspended molecules can then move horizontally for very long distances before being deposited on off-target areas. Once the dry molecules are rehydrated by wet leaves, they can then be absorbed by leaf tissue. If the herbicide residue is from an herbicide that has enough activity, it can cause injure symptoms to sensitive crops. These are usually herbicides like growth regulators (ester or amine), bleachers like Command, or contact herbicides like paraquat. Other herbicide chemistries may or may not show symptoms.

See new VCE publications: "*Nozzle: Selection and Sizing*" found at: http://www.ext.vt.edu/pubs/rowcrop/442-032/442-032.html



www.agdrift.com/PDF_FILES/Ground.pdf

Spray Nozzles Wear Out

The most critical part of the sprayer often gets the least tender love and care. Fact is, the spray nozzles are quite fragile and tiny distortions to the openings of the nozzle can cause distorted spray patterns and product deposition.

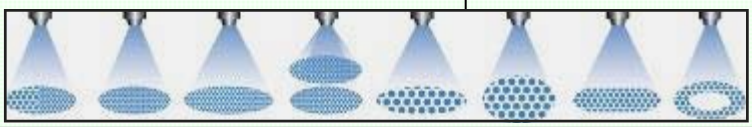
The major problem though with spray nozzles is orifice wear. This was especially true when most of the spray nozzles were made of brass. The soft brass nozzles were really a problem when the spray formulation was some type of dry material. Those nozzles did not last long. The stainless steel nozzles being made now are far superior. Still, there can be questionable nozzles that produce variations in the spray volumes and the spray patterns. These variations may cause either poor performance on the bugs or phytotoxicity to the crop being treated.

The best thing to do is use your small measuring cup and a stop watch to measure the flow from each spray nozzle. If the flow rate is not consistent with others on the sprayer, it should be replaced. These few minutes checking the flow rate will insure even spraying and optimum performance.

When a spray nozzle is clogged, please don't use your pocket knife or a piece of small wire to clean. You may get the nozzle cleaned, but you may also damage the most critical part of the nozzle, the opening. Use a soft brush and gently clean . An old toothbrush will do just fine.

Take care of spray nozzles. Keep them clean and properly adjusted so the spray goes where it is intended and at the rate intended for optimum performance

(Adapted by Grisso)



Build A Sprayer Emergency Kit

Equip field sprayers with emergency kits for handling leaks and/or spills.

A kit includes extra hoses, hose clamps, a set of protective clothing, electrician's tape, duct tape, washer-head screws and caulking compound.

Put a plastic tarp in the kit. If the sprayer forms a leak, you can spread the tarp underneath the sprayer and use dirt to build a berm at the edges so there's a pocket or depression in the middle to catch fluid. This may serve to contain the spray and eliminate the problem with soil contamination until you have time to stop the leak and get it repaired.

Critical replacement parts, absorbent materials, plastic bags and a shovel can round out an emergency kit. For information on preventing and managing pesticides spills, download *Handling Pesticides Properly* (see below).

http://agbiopubs.sdstate.edu/articles/ExEx8109.pdf

Proper tractor setup can increase fuel efficiency

Power, power, and more power are what farmers have always wanted from their tractors. Recently, the price of diesel fuel has changed that mantra to power, more power, and fuel efficiency. Passenger cars achieve greater fuel efficiency by becoming lighter and smaller, but that is not an option for farm tractors. Modern tractors need to pull and haul increasingly bigger and heavier loads; however, it is still possible to get the most from every gallon of diesel fuel.

Farmers cannot afford to just put it in gear and shove the throttle forward, anymore. Producers need to tailor their machines for better fuel efficiency with proper ballast weights, correct tire pressures, smart transmissions and new technology.

Ballast:

Farmers sometimes put weights on the tractor for the biggest job they will do and then never change the weights again. When farmers switch to a field operation that requires less weight, such as spraying, disking or field cultivating, they end up with more weight on the front of the tractor than they need. A 50-50 split between the front and rear axle under load is ideal. Weight increases the rolling resistance and it takes more

fuel just to move that weight.

More weight on the front of the tractor than needed creates more rolling resistance and can create power hop issues. Power hop is an imbalance between the front and rear axle. Taking weight off the front axle can solve this problem.

For example, a large tractor can be used to run a big disk or deep ripper as well as being used for planting or spraying. Take weight off the tractor when the load is lighter.

Ballast for the application. The trick is to get as much useful work from that gallon of fuel as possible. That means maximizing the power

transfer from the tractor to the ground. The tractor should be a certain weight relative to its horsepower to enable the tractor to transmit that power to ground.

Weight needs to be placed on the front and rear axles in the right ratio to get the best performance out of the tractor.

Tire pressure

The optimum setup for fuel efficiency also includes tire pressure. Air pressure inside the tire is pretty much the actual ground pressure. With optimum setup, producers can minimize slip, and slip is where they can be wasting fuel or wasting horsepower. One of the primary areas where you gain efficiencies is through minimizing wheel slip.

Select tractor tire pressure for the most demanding conditions. Tires on large four-wheel tractors can use very low tire pressures, between 6 to 10 psi. Be sensitive to temperature changes. As weather cools in the fall and winter, the ambient air temperature

(Continued on page 6)

Increase fuel efficiency

(Continued from page 5)

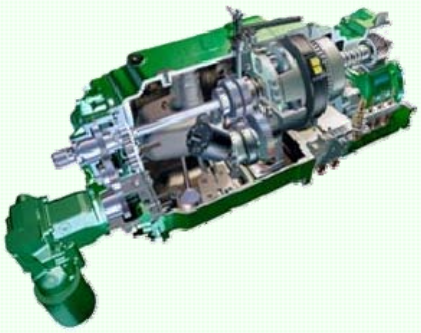
drops and so will the air pressure. When producers run at these low tire pressures, that can be significant.

Check tire pressure in the morning, the coolest part of the day. That will be the lowest ambient air pressure and the lowest tire pressure. At the very least, check tire pressures weekly. Depending on the condition of the tractor tire and the price of fuel, potential savings can be significant. Rees said producers can see a 10 percent savings if they reduce rolling resistance and minimize slip with proper tire setup.

Adjust ballast properly, split front to rear, choose the right tire for the application, set tire pressure accordingly and get the optimum performance from your tractor and the most from your fuel.

Gear up and throttle down

Everyone knows to run at a lower RPM at a higher gear if you want to save fuel, but the ability to do it quickly and accurately is the trick. New transmissions on modern tractors make it much easier to gear up and throttle back.



The Continuously Variable Transmission (CVT) with power shift and the Infinitely Variable Transmission (IVT) with auto mode.

How often do you check to see if you are matching the right gear to the right engine speed as field conditions change or load on the engine changes? New "smart" transmissions make that connection several hundred times a second.

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Evaluations done at the Nebraska Tractor Test Laboratory showed an 8 percent savings in gallons per hour at 75 percent of the max pull when comparing the IVT in auto mode versus manual mode.

GPS technology

New technology includes Global Positioning Satellites (GPS) used in precision farming. GPS technology can have a big impact on input costs such as fertilizer, but it can also save fuel in many cases. Farmers could save 15 to 20 cents an acre in fuel costs by using GPS technology.

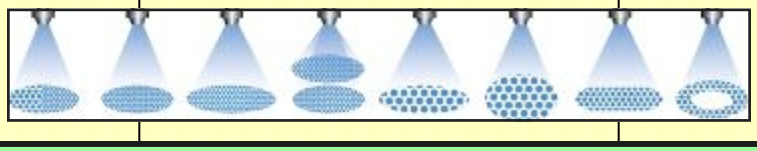
Part of this savings comes by reducing overlap and thus reducing the number of trips across the field. A study found that GPS technology could reduce overlap by 5 to 10 percent. The other part of the equation comes in that a person can drive a little faster. There are some savings associated by getting the job done quicker.

(R Grisso)

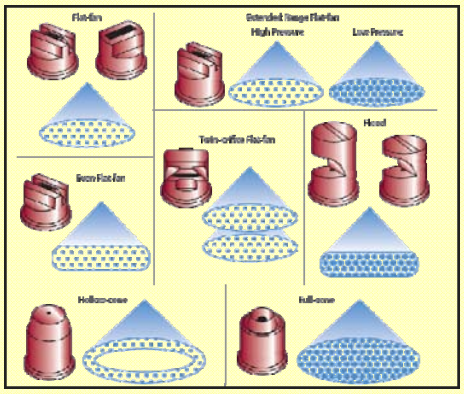
NEW BSE Extension Factsheet

A new extension factsheet entitled "***Nozzle: Selection and Sizing.***" VCE Publication Number 442-032 was posted in March 2009. This fact sheet covers nozzle description, recommended use for common nozzle types, and orifice sizing for agricultural and turf sprayers. Proper selection of a nozzle type and size is essential for correct and accurate pesticide application. The nozzle is a major factor in determining the amount of spray applied to an area, uniformity of application, coverage obtained on the target surface, and amount of potential drift.

In spraying systems, nozzles break the liquid into droplets and form the spray pattern. Nozzles determine the application volume at a given operating pressure, travel speed, and spacing. Selecting nozzles that produce the largest droplet size, while providing adequate coverage at the intended application rate and pressure, can minimize drift.



It is important to select a nozzle that develops the desired spray pattern and spray volume. The nozzle's intended use—whether for broadcast application of herbicides or insecticide spraying on row crops—determines the type



of nozzle needed. Examine current and future application requirements and be prepared to have several sets of nozzles for a variety of application needs. In general, do not select a nozzle that requires a nozzle screen less than 50 mesh. Nozzles requiring 80–100 mesh screens clog too easily. *(by Grisso)*

Drive to Survive

10th Annual National Work Zone Awareness Week

The Federal Highway Administration (FHWA) recently celebrated the 10th Annual Work Zone Awareness Week (April 6-10, 2009). This year's theme was Drive to Survive -- Our Future is Riding On It! Your safety and the safety of roadway workers are at stake. In 2007, the most recent year for which data is available, over 800 people were killed in work zone crashes. That's about 2% of all the fatal collisions in 2007.

To bring this safety message to your audiences, the FHWA has prepared a number of materials, which are available on the Web site workzonesafety.org. Print materials, videos and links are provided to the kick-off media event, to informational resources from the FHWA clearinghouse, and to many state observances.

Materials from the FHWA are primarily for driver awareness and information. For worker protection information, visit the Highway Work Zone Safety topic page (www.cdc.gov/niosh/topics/highwayworkzones/) produced by the National Institute of Occupational Safety and Health.

On that page, you will find publications such as the Work Zone Protection Toolbox and Building Safer Highway Work Zones: Measures to Prevent Worker Injuries from Vehicles and Equipment.

(Adapted by Grisso)

www.workzonesafety.org/news_events/awareness_week/2009

Safe Trucking for Agriculture

The American Trucking Associations' Agricultural and Food Transporters Conference (AFTC) recently released the "***Manager's Guide to Safe Trucking During Agricultural Planting and Harvest Season***."

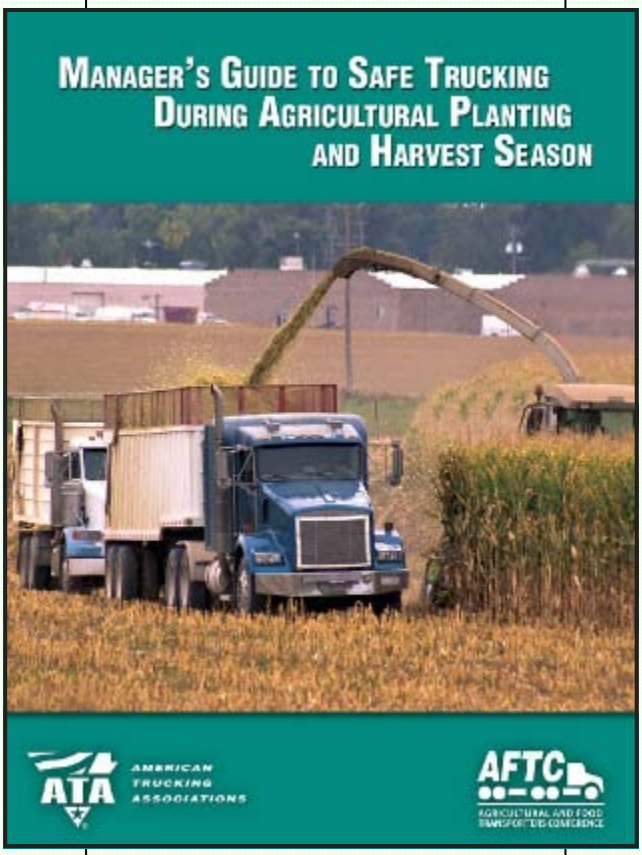
The guide provides educational resources for truck drivers and their managers in the agricultural industry, encouraging active strategies to improve safety during peak times of production.

Promoting safety is important in all agricultural operations but especially critical in the case of truck driving. This publication gives practical strategies that can implement to help improve highway safety.

The guide focuses on active strategies for hiring decisions, communicating with drivers, and monitoring and managing fatigue.

Generally, truck drivers are limited to a maximum of 11 driving hours per day under federal law, which are recorded in a log book that must be presented to a law enforcement officer upon request. However, during planting and harvest seasons, exemptions to these rules are given to motor carriers hauling agricultural products in certain parts of the country.

Agricultural seasons often do not comply with exact schedules. Weather determines when and how fast you move, so farmers need work flexibility to get their crops in and out of the fields.



Protecting the agricultural exemption for motor carriers is critical to crop production around the country. If eliminated, transportation for agriculture would become more difficult, more costly, and perhaps less safe. Imposing hours of service restrictions during planting and harvest seasons could force the use of more temporary and possibly less-experienced drivers. The measures outlined in the Manager's Guide can help the agricultural industry maintain the flexibility that is essential while achieving the safety results all desire.

The American Trucking Associations is the largest national trade association for the trucking industry. Through a federation of other trucking groups, industry-related conferences, and its 50 affiliated state trucking associations, ATA represents more than 37,000 members covering every type of motor carrier in the United States.

(Adapted by Grisso)

www.truckline.com/Federation/Conferences/AFTC/Documents/Safe%20Trucking%202009.pdf

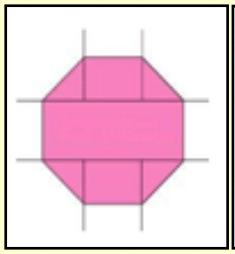
ENERGY: Sizing Air Conditioners

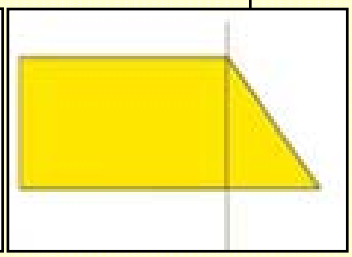
Many people buy an air conditioner that is too large, thinking it will provider better cooling. However, an oversized air conditioner is actually less effective — and wastes energy at the same time. Air conditioners remove both heat and humidity from the air. If the unit is too large, it will cool the room quickly, but only remove some of the humidity. This leaves the room with a damp, clammy feeling. A properly sized unit will remove humidity effectively as it cools.

To figure out which size unit is best for your cooling needs:

1) Determine the square footage of the area to be cooled using the following formulas:

- For square and rectangular rooms, multiply the length of the area by its width
- For a triangular area, multiply the length of the area by the width and divide by 2





Most rooms can be further divided into these basic shapes to determine the square footage.

If the shape of your room is other than square or rectangular, ask your sales associate to help you determine the square footage.

2) Using the square footage and the table, determine the correct cooling capacity.

Area To Be Cooled (square feet)	Capacity Needed (BTUs per hr)
100 to 150	5,000
150 to 250	6,000
250 to 300	7,000
300 to 350	8,000
350 to 400	9,000
400 to 450	10,000
450 to 550	12,000
550 to 700	14,000
700 to 1,000	18,000
1,000 to 1,200	21,000
1,200 to 1,400	23,000
1,400 to 1,500	24,000
1,500 to 2,000	30,000
2,000 to 2,500	34,000

3) Make any adjustments for the following circumstances:

a) If the room is heavily shaded, reduce capacity by 10 percent.

b) If the room is very sunny, increase capacity by 10 percent.

c) If more than two people regularly occupy the room, add 600 BTUs for each additional person.

If the unit is used in a kitchen, increase capacity by 4,000 BTUs. Consider where you install the unit. If you are mounting an air conditioner near the corner of a room, look for a unit that can send the airflow in the right direction.

(Adapted by Grisso)

www.energystar.gov/index.cfm?c=roomac.pr_properly_sized

Landscaping and Energy

More and more people are searching for cost-effective yet curb-appealing ways to lower their energy bills and reduce their impact on the environment. We all know that we cannot actually control the weather, but with design planning, we can cast shade, channel winds, and reduce moisture near our homes. Learning to control the effects of weather through landscaping can create a more comfortable home environment and actually reduce monthly utility bills.

Landscaping with a focus on energy efficiency has many benefits, including:

- Reducing energy costs by protecting the home from winter wind and summer sun
- Reducing consumption of water, pesticides, and fuel for landscaping and lawn maintenance
- Helping control noise and air pollution
- Reducing the surface temperature of the pavement with shade from adjacent trees

Quick Facts

Home designs in the Southeast that aim to reduce summer heat gain as the first priority are on the rise.

Deciduous trees shed all or most of their leaves once each year. Planting deciduous trees near the home helps reduce energy use for both cooling and heating. During the summer months, deciduous plants have a full canopy of leaves that provide shade. During the cooler months, they drop their leaves, allowing the warming effect of the sun to shine through.

Groups of trees have a greater cooling effect than the same number of individual trees scattered around the landscape.

Carefully positioned trees can save up to 25% of the energy a typical household uses for cooling.

Studies conducted found summer daytime air temperatures to be 3 –6 degrees cooler in tree-shaded neighborhoods than in treeless areas.

There is more to a plants' cooling effect than simple shading. Plants release large amounts of water from pores in their leaves, and the evaporative cooling that results from this release creates a zone of cool air around the plant. You can take advantage of this effect by using plants for shade and wind control, rather than structures such as fences or arbors.

The U.S. EPA has developed a Resource Conserving Landscaping Cost Calculator that estimates the cost of converting a landscape to a more resource efficient one and provides short term and longer term annual maintenance cost estimates. See www.epa.gov/osw/conserve/rrr/greenscapes/tools/landscape.pdf for details.

EPA's GreenScapes program also provides other cost-efficient and environmentally friendly solutions for landscaping http://epa.gov/epawaste/conserve/rrr/greenscapes/index.htm

Key Tips for Cultivating an Energy-Efficient Landscape

- Shade your house.
- Shade your AC unit (but keep it free of debris and don't block its circulation).
- Select and place plants carefully for greatest energy efficiency and least maintenance.
- Use less: water, fertilizer, pesticides.
- Select energy-efficient maintenance equipment.

GreenScapes
Environmentally Beneficial Landscaping

http://epa.gov/epawaste/conserve/rrr/greenscapes/index.htm

Survey Says Savings Motivate Energy Conservation

The majority of middle-class Americans want to use less energy but is more likely to act if the change will save them money, according to a national survey on energy conservation. Seventy-three percent of respondents indicated that they were concerned or very concerned about energy conservation. Nearly half (46 percent) indicated that they see energy conservation as a way to save money.

The survey was commissioned to gauge attitudes about energy consumption among middle-income Americans and to determine what average Americans might be willing to do to increase energy conservation in their daily lives. While most are driven by the current economic crisis, a significant number also want to reduce our dependence on foreign oil. These two factors combined should serve as real motivators for using less energy and fuel.

Twenty-seven percent of respondents said that they see energy conservation as a way to reduce the country's dependence on foreign oil. The survey identified the four most common behaviors that Americans are currently doing to use less energy and fuel: 1) turning off lights, 2) adjusting thermostats, 3) keeping tires inflated, and 4) changing HVAC filters

The four things respondents are not currently doing, but are most willing to consider are: 1) buying a more fuel-efficient vehicle, 2) using major appliances during non-peak times, 3) reducing car idling, and 4) walking or bicycling more often.

Almost half of the participants are not willing to carpool to get where they need to go. The research showed that a number of barriers made carpooling an unlikely solution to reducing fuel consumption such as: irregular work schedules, and the need to run personal errands. This study indicates that the resistance to carpooling is not going to change anytime soon, even with fluctuating fuel prices.

(Adapted by Grisso)

Officials say H1N1 flu threat is fading

The news has been dominated by the H1N1 (swine) flu outbreak, but the threat appears to be fading, experts say. However, these same experts say the virus may return in a new and more dangerous form when the flu season begins in late November. Other experts disagree, saying the H1N1 virus does not show signs of reappearing, or if it does, it will have simply blended with the less severe forms of the flu seen during the influenza season. Because viruses are unpredictable, the U.S. Centers for the Disease Control and the World Health Organization are concentrating their efforts on studying the virus and attempting to develop a vaccine in an effort to protect the public worldwide.

Virginia health officials reported that were no new confirmed cases in Virginia and the total confirmed cases remains 26 with no deaths. None of these cases involved hospitalization and all patients have recovered or are recovering well. As of 27 May, the CDC reported 7,927 confirmed and probable cases in 48 states including DC. The World Health Organization reports 53 countries have officially reported 15, 510 cases of influenza A (H1N1) infection, including 99 deaths.

(Adapted by Grisso)

Communication During Stressful Times

It seems as though every time you pick up a farm publication there is a headline about the high level of risk involved in today's farms. High levels of risk also mean high levels of stress for most individuals.

With so many other aspects of production, risk management and financial issues to worry about, you may think business and family communication is the least of your concerns. However, open and honest communication is even more important during times of high stress. Communication matters because your farm operation is made up of people, and people feel more comfortable when they know what is happening within the business even if the news is not good.

Good communication can help to build trust, promote understanding and motivate those involved in the farm whether they are family or non-family employees. Withdrawal and lack of communication sends a clear negative message about the future to employees and family members. It will appear as if management is giving up rather than trying to adjust to meet the challenges before them.

Communication is certainly a challenge during difficult times, but if conducted effectively it can help lead your farm through stressful times.

Communication involves both talking and listening. When talking, or sending the message, be sure to be clear and concise. Listeners will begin to tune out if you are rambling, so assemble your facts and prepare what you want to say ahead of time. Be honest, but deliver your message with care and tact.

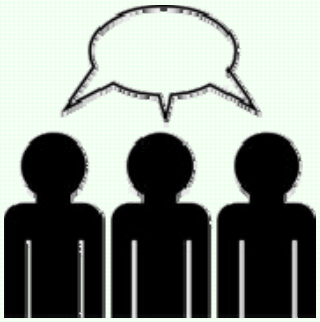
The use of 'I' statements are also important when discussing difficult subjects. 'I' statements help to keep the conversation positive and moving forward. For example instead of saying, "You shouldn't be spending any more money on new equipment." Try something like, "I'm not sure what your plans are for the new equipment purchase, can we talk about that some more?"

Some common problems that hinder effective communication that you will want to avoid are as follows:

- Judging – projecting our own interpretation or judgment into someone else's message.
- Criticizing – belittling another person's feelings or opinions.
- Blaming – making it someone else's fault
- Name-calling – used as an attempt to win an argument rather than resolve the issue.
- Labeling – "the main problem around here is that you're just plain lazy."
- Moralizing – telling others that they 'should,' or 'should not' or 'ought' and 'ought not' to do.
- Advising – "If I were you, this what I would do…"

The second part of communication is listening. Listening is difficult and is more than just hearing the words someone is speaking. Most often a speaker speak only about 125 words per minute, while the typical listener can receive somewhere between 400 and 600 words per minute. This extra time can allow listeners to get sidetracked or start thinking ahead to what they are going to say next.

The key to good listening is to become an active listener who is prepared to listen. Put aside your own thoughts and focus on what the other person is saying and what they mean. Avoid giving your opinion or resolution suggestions before the speaker is finished. Do provide feedback to the speaker by nodding your head to show understanding or asking questions for clarification. Make eye contact and lean forward toward the speaker. Becoming an engaged listener takes practice and concentration, but will help



to improve communication within the family and the farm.

(Continued on page 13)

Communication During Stressful Times

(Continued from page 12)

Many times during periods of high stress, individuals need to share their thoughts and feelings about what is happening, and being a good listener will help to encourage employees and family members to communicate more about important issues.

Communication should not stop at the barn door. By staying in touch with outside advisors such as your lender, feed and seed dealers, agronomist, nutritionist, veterinarian, etc. you can gain valuable information to help make decisions concerning your operation. By keeping these lines of communication open, you will build strong relationships with this support group that can be very helpful in times of high stress for your farm.

One very important note to make is communication takes time and effort. It is easy to say, "I'll do it tomorrow." However, too often tomorrow comes and goes, and there has still been no effort made to increase communication between management and employees or within the family.

Stressful situations make it even more difficult to find time to communicate, as everyone is consumed by working to keep up and worrying about what will or could happen. It is during these times of high stress that it is even more important to make time to communicate with employees and family members.

One way to find time to communicate with employees and/or family members is to hold a family business meeting. This will provide an opportunity for the manager to share the current situation and for those involved to understand what is happening within the farm business. The group can then discuss the situation and develop an action plan to meet the challenges the farm is facing.

The current situation may be bleak, but by communicating the manager is letting those around him/her know that they value them as a part of the farm team.

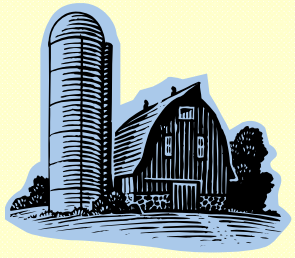
Other ways to communicate may just be sitting down in the farm office for ten minutes of uninterrupted time, talking while working together, or scheduling a set time each day to catch up with one another.

Finally, understand people communicate differently depending upon their personality characteristics. While some personalities are action-oriented and will want to get all the issues out in the open and get started on solving the problem immediately; others will need more time to understand the issues and then think about the issues before they begin to explore ways to tackle them. It will take an effective manager to recognize the differences in communication styles and adjust accordingly. The important thing to remember is to include employees and family members as much as possible by keeping the lines of communication open.

Open, honest, positive and consistent communication has been shown to be one of the most crucial elements in establishing and maintaining strong family relationships. During times of crisis, conflict or stress overload, good family communication takes on added importance, because the emotional imbalance caused by these events makes interpersonal relationships even more difficult.

A practical application of the principles can contribute positively toward better communication, resulting in more effective management of stress and more satisfying family relationships.

(adapted from Family Communication During Times of Stress, North Carolina Cooperative Extension Service)



www.ces.ncsu.edu/depts/fcs/pdfs/fcs424.pdf

Preparing to shelter pets in disasters-VIDEO

Veterinarian offers tips on evacuating with your pet in a disaster. In this short video (4:07), K-State veterinarian and professor Dr. Susan Nelson offers advice on evacuating with a pet.

Whether the emergency is weather-related, a house fire or other disaster, Nelson tells pet owners the main things they'll need to get their dog, cat or other pet to safety.

Resources: *www.fema.gov/plan/prepare/animals.shtm*

www.k-state.edu/media/Disasterprep.mov

Tips for Increasing Hay Dry-Down

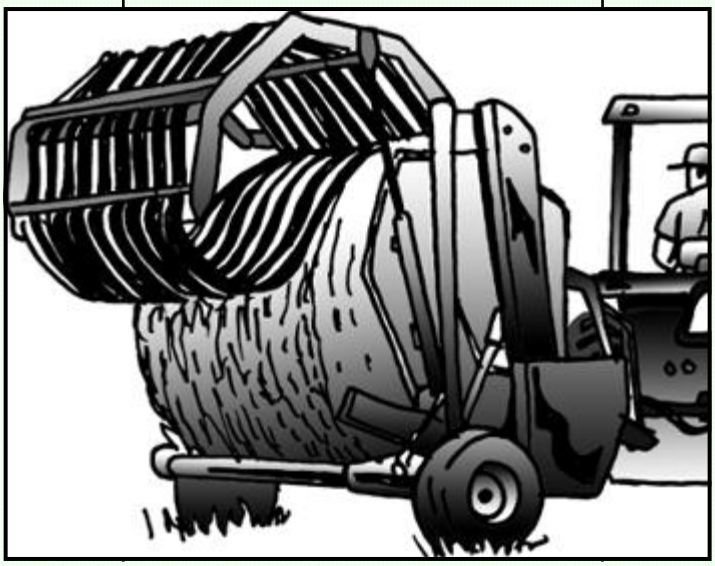
"Make hay while the sun shines" is an old, old saying but today's science has shown how true it really is.

The most important weather factor affecting the rate of hay dry-down is sunlight. Temperature, humidity, wind speed, and soil moisture all are important, but solar radiation has the greatest impact on drying rate.

Research has shown as much as a 10-fold increase in drying rate as solar radiation changes from heavy cloud cover to full sunlight. No other factor affected drying rate even half as much.

While you can't control the amount of sunlight, you can take steps to use it to its full advantage:

- Watch weather reports and plan to cut hay during sunny weather. (Yes, this may be stating the obvious, but it's not always as easily done with hectic spring field work.)
- Spread your cut hay out in as wide a swath as possible. This will expose more of your hay to direct sunlight, enabling it to absorb as much energy from the sun as possible to evaporate moisture out of the hay. This may cause a little more sun bleaching than thick windrows, but fast dry-down is usually more valuable than green color.



- Mechanically conditioning your hay and turning it gently after the top gets dry will expose moister hay underneath and help hasten dry-down.

(Adapted from University of Nebraska)

Preparations for Hurricane Season

As the 2009 hurricane season nears, remind farmers to take necessary steps to help protect their farms, families and workers if a storm strikes.

Planning is essential to reducing the potential damage from hurricanes and tropical storms. Preparing now can help farmers avoid learning hard lessons later.

Hurricane season runs June 1-November 30, and weather forecasters predict 12 to 16 named tropical storms in the Atlantic this year.

Farmers need to make preparations for their families, workers, equipment and buildings, and have backup plans for electricity for their barns and other critical farm facilities. In addition, livestock operations should maintain emergency plans that address power needs and on-site feed capabilities.

Farmers should have a transfer switch properly installed so they can use a generator. A properly installed transfer switch is critical for the protection of farm facilities and utility workers.

Use following tips for preparing farms for major storms:

• Store or secure items or equipment that might blow away.

• Identify places to relocate animals from low-lying areas.

• Check generators to be sure they are in good working order and secure a sufficient amount of fuel to operate them.

• Turn off the propane supply at tanks.

• Secure propane tanks in the event of flooding to prevent them from floating away.

• Move equipment to the highest open ground possible away from trees or buildings that could cause damage.

• Mark animals with an identifier so they can be easily returned if lost. Examples are ear tags with name of farm and phone numbers, brands, paint markings on hooves or coat or clipped initials in the hair.

• Move feed to higher ground or to a more accessible place in case of flooding or transportation problems.

• Pesticide storage areas should be secure, and farmers in low-lying areas should do whatever they can to elevate or move pesticides to locations that are less likely to flood.

• Coordinate with neighbors beforehand and discuss what resources can be shared. Examples include a backhoe or set of livestock panels.

• Keep a list of important phone numbers in order to make calls following a storm. Examples include the local emergency management office, county extension agent, insurance agent, county Farm Service Agency and private veterinarian.

• Monitor local weather reports for up-to-the-minute information on storms.

For more information, go to:

www.ext.vt.edu/news/mediakits/emergencypreparedness.html

www.ncagr.com/paffairs/stormprep.htm

(Adapted by Grisso)

Steps for Washing Pesticide-Contaminated Clothing

Clothing worn during pesticide application can become contaminated, endangering the health of the wearer as well as others who might come in contact with the clothes or pesticide. Using proper laundering procedures can help avoid re-exposure to the applicator or exposure to other family members.

Contamination can occur with any pesticide formulation — liquid, granular, or powder.

To reduce potential exposure to pesticide residues during an application, always wear the appropriate personal protective equipment and clean, uncontaminated clothing.

To reduce exposure after the application, remove clothing immediately upon finishing the job. Wear chemical resistant gloves when handling pesticide contaminated clothing. Change into clean clothes before going home for the day. Another option is to wear chemically resistant, disposable (non-reusable) coveralls over your clothing when applying pesticides.

When possible, wash contaminated clothing immediately. Otherwise, store it separately from the family's laundry and wash it separately. Even when you aren't aware of potential contamination, don't wear those same clothes the next day. Wash pesticide-contaminated clothing daily.

When washing contaminated clothing:

- Wash only a few items at a time and do not mix with regular laundry.
- Use liquid detergent.
- Use hot water and the highest water level on the regular wash cycle.
- After washing, remove clothing from the machine and run the empty washer through another cycle with hot water and detergent before laundering other clothing.
- Line dry the clothing, if possible, or use the regular dryer setting.
- If clothing is too heavily soiled with pesticides, dispose of it. This includes pesticide saturated shoes and boots. Always follow the label for proper disposal instructions.

In case of a pesticide emergency, contact The Poison Center (for aid in human poisoning cases) at (800)-222-1222 or The National Pesticide Information Center at (800) 858-7378.

Visit our website:
http://www.bse.vt.edu