Coming Soon: New Programming!

By Carmen Agouridis, Ph.D., P.E., M.P.P.
Associate Extension Professor
Bioenvironmental Engineering

This summer, we are hard at work developing new programming that focuses on water and the environment. The three programs that are in development and are anticipated to launch this summer/fall are: 1) Backyard Streams, 2) KYH2O Podcast, and 3) Kentucky Master Naturalist.

Backyard Streams

The Backyard Streams program seeks to help homeowners understand how to protect and manage their backyard streams. The program is based on the extension publication ID-242 Central Kentucky Backyard Streams.

Interested in becoming a certified Backyard Stream Steward? Be on the lookout for our online certification course, which will launch this summer. The course is comprised of 11 modules covering the
following topics: backyard stream basics, urban stream challenges, fluvial geomorphology, ecosystem services, streambank erosion, riparian vegetation, stream restoration, stormwater, low impact development, permitting, and karst.

If you have questions about your backyard stream, would like to attend a workshop, or would like to become a certified Backyard Stream Steward, contact Carmen Agouridis (carmen.agouridis@uky.edu) or Amanda Gumbert (amanda.gumbert@uky.edu) to learn more.

KYH2O Podcast

Always on the go? Learn more about water in Kentucky with the KYH2O podcast series. With a 10-12 minute timeframe, the KYH2O podcast series is designed to provide the listener with information on water-related topics, an understanding of why the topic is of importance, and information on how citizens can modify their behavior to protect water resources and the environment.

Podcasts include a mixture of in-the-field expert interviews interspersed with discussions between the hosts, Drs. Carmen Agouridis and Amanda Gumbert. Drs. Agouridis and Gumbert help frame podcast topics, provide points of clarification for listeners, and provide suggestions for listeners who wish to delve deeper into the topics. At the end of each podcast, listeners will be directed to the podcast series website where they can learn more. The website will contain aired podcasts, podcast transcripts, relevant UK Cooperative Extension publications, and educator resources. Podcasts are produced by Brian Volland of UK’s Agricultural Communications and will be aired on WUKY, Lexington’s National Public Radio station and will be available on iTunes. Be sure to add KYH2O to your playlist.

To learn more, contact Carmen Agouridis (carmen.agouridis@uky.edu) or Amanda Gumbert (amanda.gumbert@uky.edu). Funding is provided, in part, by the Kentucky Division of Water.

Kentucky Master Naturalist

Did you know that Kentucky is only one of five states without a Master Naturalist program? Well, that is about to change. Pulling together experts from UK’s Colleges of Agriculture, Food and Environment, Arts & Sciences, and Public Health, along with Kentucky State University and the Kentucky Geological Survey, to form a core team, we are building the Kentucky Master Natural (KYMN) program. The goal of the program is to develop a community of well-informed citizen-volunteers.
Is Your Farm Equipment Prepared for the Road?

By Mark Purschwitz, Ph.D.
Extension Professor
Agricultural Safety and Health

Roadway travel with farm equipment is one situation when you do not have total control of your farming operation. You cannot control what the other driver will do. However, there is quite a bit you can do to minimize the risk of a collision, to protect both yourself and others who share the road with you.

Brakes and Tires

First, are all your tires in good condition and properly inflated? Nobody ever needs a flat tire, but you also cannot afford to lose control of your tractor or trailing implement and either hit other vehicles or end up in the ditch. If a collision occurs because of your tires, you will be held responsible. That is a high price to pay for holding on to bad tires.

Second, do your brakes work properly, and can they stop any loads you are carrying or pulling? Are they properly adjusted to stop in a straight line? Do you and others who operate your equip-

ment lock the brakes together for roadway travel? Although it is easy to put off maintenance and repairs, the last thing you want to do is cause a collision with poor brakes, or by swerving because your brakes were not locked together.

Lights and Safety Markings

Last, but not least, how are your lights and safety markings? Given the slow speed and large size of farm equipment, you want to do everything you can to attract attention from other motorists. They need time to make the right decisions to avoid running into you, no matter which direction they are going, and they need to be aware of the size of your equipment so that they do not clip you while going past. That is bad for you as well as for them.

This is why I recommend that operators of trac-
tors and self-propelled machines on roads turn on their headlights day or night. Same with amber flashers – turn them on day or night. These are simple things you can do to help attract attention. For the same reason, this is why I recommend adding a rotating amber beacon; such beacons are increasingly common and are often standard on new combines and other large machines. You cannot control what other motorists will do, but you can do your best to get their attention. It can also help you if you are involved in a collision, to show that you made an extra effort to make yourself visible.

Make sure all your lights – headlights, tail lights, and flashers – are working. If you are involved in a collision and it turns out that you had broken lights, it might be held against you. Don’t take that chance – keep all your lights in good condition and use them day or night.

Kentucky Law

Kentucky law requires an SMV emblem on equipment out on the road at any time. It must be visible from the rear, so if it is on your tractor but is blocked by an implement you are pulling, that implement must have its own SMV emblem. In fact, if you carry large round bales, you might be blocking the emblem and not realizing it. In that case, you can attach an SMV emblem to a sharpened rod and stick it in the bale. And of course the emblem must be clean and bright, so wipe it off when it gets dirty, and replace it when it is faded or torn. You are protecting yourself as well as other motorists.

You can also help protect yourself by marking the extremities of your equipment on both the front and the rear, so that motorists can see how wide your equipment really is. Yellow reflective tape should be used for the front extremities, and red reflective tape for the rear. In addition, bright orange fluorescent tape (the same as the inner triangle on an SMV emblem) is recommended for the rear, to help catch motorists’ attention during the day. Take a look at new equipment on a dealer lot and see how it is marked. And if your equipment has lights and flashers on the extremities, which new equipment typically does, be sure to hook up the cable and turn them on.

So check your equipment now and make sure it is ready for the road. A collision can happen any time, and result in serious injuries or fatalities. You do not want to be in a collision, and you definitely do not want to cause one.

Mark Purschwitz, Ph.D., is an Extension Professor in Agricultural Safety and Health.

Early Arrival of Summer Heat

By Matt Dixon
Meterologist
UK Ag Weather Center

Ohio Valley weather keeps us meteorologists on our toes. Just a month ago, the talk was that winter had gone into overtime. It was the seventh coldest April on record for Kentucky as “Freeze Warnings” and “Frost Advisories” were common features on the hazards map throughout the month. The state even saw some snow accumulations over the early and middle stages of April. Corn planting progress and emergence was hindered due to the cold, wet weather and the question became: When will spring arrive?

Table 1. Top 10 Warmest Kentucky Months of May (1895-2017)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Year</th>
<th>Avg.</th>
<th>Normal</th>
<th>Dep.</th>
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<tbody>
<tr>
<td>1</td>
<td>2018</td>
<td>71.6</td>
<td>64.3</td>
<td>7.3</td>
</tr>
<tr>
<td>2</td>
<td>1962</td>
<td>71</td>
<td>64.3</td>
<td>6.7</td>
</tr>
<tr>
<td>3</td>
<td>1896</td>
<td>70.4</td>
<td>64.3</td>
<td>6.1</td>
</tr>
<tr>
<td>4</td>
<td>1991</td>
<td>70</td>
<td>64.3</td>
<td>5.7</td>
</tr>
<tr>
<td>5</td>
<td>1944</td>
<td>69.8</td>
<td>64.3</td>
<td>5.5</td>
</tr>
<tr>
<td>6</td>
<td>1987</td>
<td>69.5</td>
<td>64.3</td>
<td>5.2</td>
</tr>
<tr>
<td>7</td>
<td>2012</td>
<td>69.4</td>
<td>64.3</td>
<td>5.1</td>
</tr>
<tr>
<td>8</td>
<td>2004</td>
<td>69.2</td>
<td>64.3</td>
<td>4.9</td>
</tr>
<tr>
<td>9</td>
<td>1902</td>
<td>69.1</td>
<td>64.3</td>
<td>4.8</td>
</tr>
<tr>
<td>10</td>
<td>1965</td>
<td>68.8</td>
<td>64.3</td>
<td>4.5</td>
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</table>

Cold April, Warm May

Fast-forward into May and a cold April seems like a distant memory. In fact, some would argue Mother Nature flipped a switch and completely skipped the spring season. Looking at the official data for the month of May, “skipping spring” seems like a good remark. May 2018 was the warmest May that Kentuckians have ever seen. Looking at the table above, with data provided from the Midwestern Regional Climate Center, 2018 now takes the top spot with an average temperature of 71.6°, breaking a record that has stood since 1962. At least some part of the Commonwealth hit 90 degrees each week of the month and led the way to four straight weeks of above normal temperatures. Putting this into perspective, normal high temperatures run in the upper 70s to lower 80s for late May.

Heat and Humidity

Will the heat continue? The latest one-month outlook from Climate Prediction Center (Figure 1) shows higher confidence in above normal temperatures for Kentucky during the month of June. In addition to the warmth, summer humidity also returned ahead of schedule. Dew points jumped well into the 60s and even into the 70s at times, further magnifying the abrupt change from April to May.

This is a challenge not only for us, but also for animals. The above normal temperatures and high humidity pushed the livestock heat stress index into the “Danger” category several times throughout the month. This index can be accessed for your own farm using the Point Ag Forecast.

Mitigating Heat Impacts

As we head into the warmer months of 2018, this is a good reminder to review some of the
Pricing and Building a Cattle Working/Handling Facility

By Josh Jackson, Ph.D.
Assistant Extension Professor
Livestock Systems

Summer is here, and it is already time to think about summer projects. One aspect which could be evaluated and updated is your cattle handling and working facility. Flies are especially bad already and animals will need to be worked for pinkeye and other seasonal challenges. When constructing a working facility, a number of factors must be taken into consideration: location, safety, utilities, alley width, height, materials, type of cattle being worked, and available resources. Shortcuts must not be taken, as several design considerations specify the minimum requirements for safety and functionality.

Fence Height

For instance, the minimum height of a facility is considered to be 60 - 72 inches with the general recommendation being for the latter. This value is partially dependent upon the type and size of animals being worked (e.g., Angus are generally smaller than Charolais and backgrounding calves would be smaller than the mamma cows). With all cattle breeds, there are always a couple of excitable animals that will try to jump out, climb, or go under different points in the facility. I’ve heard the cattle that try to jump or climb anything called gazelles, among other things. For cow-calf producers especially, my advice would be to cull the “gazelles” and difficult animals as soon as possible. From a structural standpoint, at least 50 percent of the working height needs to be composed of boards. For an overall height of 72 inches, the total cumulative height of boards would need to be approximately 36” (as shown in Figure 1).

Post Spacing

The working facility could be made up of boards, guard rail, and panels. The post spacing for wood boards within a working facility would typically range from 6-8’ on centers. If panels are used for the working area, the post spacing would be equivalent to the length (~10-12’). For the guard rail, the post spacing would be 13’ for the end sections and 12.5’ on centers for the middle sections.

Working Panels

Don’t even consider a panel that is anything less...
than a 16 gauge, unless you’re going to move the panel often and only need a visible barrier. For most corral areas, 19-gauge panel would not be appropriate. Cattle in a working facility would use a 19-gauge panel as a Kleenex. They will take it, blow their nose on it, crumple it up, and throw it down. Alternatively, a 14-gauge panel would handle most rough stock situations.

**Plank**

If lumber is used for the working facility, use two-inch-thick plank as this will ensure the resilience of the system. Plank is generally strong and economical. Nominal dimension pressure-treated lumber or rough-cut oak can be used within the facility. Painting will increase the live span of the rough-cut lumber. The typical lifespan for treated lumber is approximately 20-30 years.

**Concrete**

If the ground is “soft,” concrete can be used to ensure the posts remain rigid. If the ground conditions are a concern, it may be advantageous to reevaluate the location and determine if there are other locations for the facility that drain better.

**Cost**

Cost is one of the factors which is at the forefront of most farmers’ minds when thinking about reworking their cattle handling facilities. Wooded fence is generally considered to be the most cost effective. However, when the different post spacing is taken into account, the cost per foot becomes very similar for the different options shown in Table 1, above. Surprisingly, the total cost for a guard rail fence will be about $1 more per foot than a wooden fence. Panels with post every 12 ft were also comparable, but slightly more expensive than wood. Assuming the same size post, reducing the spacing of posts from 8 ft to 6 ft increased the cost per foot of fence by 2-10%. To help you price your facility, a downloadable Working Facility Cost Calculator is on the UK Biosystems and Agricultural Engineering website at https://www.uky.edu/bae/handling-facility. The spreadsheet has modifiable input to more closely resemble prices/options in your area. Determine the estimated cost of modifying/updating your facility and good luck working your cattle!

**Table 1.**

<table>
<thead>
<tr>
<th>Plank (based on 96’ section with 8’ post spacing and 8” posts)</th>
<th>Total Unit Cost</th>
<th>Fastener Cost</th>
<th>Posts Cost</th>
<th>Total Cost per Section</th>
<th>Total Cost Per Foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>2” x 6” x 16’</td>
<td>611</td>
<td>11</td>
<td>176</td>
<td>798</td>
<td>8.31</td>
</tr>
<tr>
<td>2” x 8” x 16’</td>
<td>629</td>
<td>9</td>
<td>176</td>
<td>814</td>
<td>8.48</td>
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<tr>
<td>2” x 10” x 16’</td>
<td>648</td>
<td>7</td>
<td>176</td>
<td>830</td>
<td>8.65</td>
</tr>
<tr>
<td>2” x 12” x 16’</td>
<td>716</td>
<td>8</td>
<td>176</td>
<td>899</td>
<td>9.37</td>
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<table>
<thead>
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<th>Plank (based on 96’ section with 6’ post spacing and 6” posts)</th>
<th>Total Unit Cost</th>
<th>Fastener Cost</th>
<th>Posts Cost</th>
<th>Total Cost per Section</th>
<th>Total Cost Per Foot</th>
</tr>
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<tbody>
<tr>
<td>2” x 6” x 12’</td>
<td>566</td>
<td>14</td>
<td>179</td>
<td>759</td>
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<td>2” x 8” x 12’</td>
<td>647</td>
<td>12</td>
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<td>8.72</td>
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<td>2” x 10” x 12’</td>
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<td>10</td>
<td>179</td>
<td>859</td>
<td>8.95</td>
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<td>2” x 12” x 12’</td>
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<td>7</td>
<td>179</td>
<td>900</td>
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<table>
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<th>Guard rail (based on 101’ section with 12.5-13’ spacing and 8” posts)</th>
<th>Total Unit Cost</th>
<th>Fastener Cost</th>
<th>Posts Cost</th>
<th>Total Cost per Section</th>
<th>Total Cost Per Foot</th>
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<tbody>
<tr>
<td>Guard rail (3 high)</td>
<td>780</td>
<td>48</td>
<td>122</td>
<td>950</td>
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<table>
<thead>
<tr>
<th>Working panel based on 96’ section with 12’ spacing and 8” posts</th>
<th>Total Unit Cost</th>
<th>Fastener Cost</th>
<th>Posts Cost</th>
<th>Total Cost per Section</th>
<th>Total Cost Per Foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working panels (6 bar)</td>
<td>800</td>
<td>16</td>
<td>122</td>
<td>938</td>
<td>9.77</td>
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</tbody>
</table>
Winter Feeding Facilities

By Morgan Hayes, Ph.D., P.E.
Assistant Extension Professor
Livestock Systems

As hay season is upon us, this may seem like an unusual time to talk about plans for winter feeding facilities, but now is the time for farmers to make decisions about any changes they want to make in their winter feeding facilities. The heavy rainfall in February and March challenged many farmers and forced them to consider alternative ways to feed hay in the winter months. This spring and early summer I have received many questions about winter feeding options from the fence line feeders like those demonstrated at Eden Shale to the concrete winter feed pads being supported by NRCS and state cost share to gravel heavy-use pads to provide support for animals around hay rings.

Getting Ready for Next Winter

Developing a new winter feeding strategy may take a significant investment of time and finances, but now is the time to begin working on your plan, so it can be ready for next winter. Over the past three weeks, I have been assisting my family with a major investment in a large heavy use area to improve winter feeding, and while it has been intense, the relief in having it ready for next winter is significant.

Fence Line Feeders

When thinking about winter feeding facilities, there are a few considerations with the different types of facilities that should be mentioned. Fence line feeders are particularly useful for the effort is to feed along and establish drive or road. If your winter feeding strategy involves feeding...
in a large field towards the back of the farm or the drive alley is very narrow, fence line feeders may be less effective. When developing a fence line feeder, it’s very important to consider placement as you will be using these feeders for the foreseeable future. Considerations include the slope in the field, distance to the water tank, how you plan to clean the feeding area, and how many fence line feeders you need for your cattle compared to the length of the fence line.

Concrete Feeding Pad

The concrete feeding pad is another option for winter feeding. I constructed this type of structure prior to last winter; I found it effective for feeding in wet weather. I experienced two challenges with the winter feed pad. First, I expected to be able to spread some of the manure getting cleaned off the pad over the winter months, but with the wet winter I did not have adequate storage for the build-up of manure. My second issue with the winter feed pad was wear and tear where cattle entered and exited the concrete pad. The gravel pad adjacent to the concrete was maintained but at the edge of the gravel significant tracks developed on a path to the waterer and to the field in general. Since the pad was built to prevent mud issues, the cattle walking in muddy tracks was frustrating. This challenge may have been exacerbated because the feed pad was finished in late fall and good vegetation was not developed on the hillside around the pad. Also, having enough spacing between the feed pad and waterer is critical to reducing these heavily traveled paths and this may be a challenge in some sacrificial fields.

Heavy Use Areas

The third design opportunity is to construct proper heavy use areas and well-traveled drives into fields. Constructing heavy use areas may be the least cost prohibitive option for farmers who already have hay rings and may provide some flexibility to farmers who have multiple winter feeding areas. The challenges with gravel pads are that they often need maintenance to remove the manure from the pad and they need additional rock added on a regular basis to maintain the structure of the pad from year to year. In addition, access to these pads still requires rutting up a portion of the field as there are not always drives to these gravel pads.

Ultimately winter feeding options should be based upon the individual farmer’s management, farm layout, and equipment the farmer currently has. For a farmer with good road access to the field and no four-wheel-drive tractor, fence line feeding may be a very practical option. For farmers with larger operations who need to put out more hay at one time, concrete feed pads may make more sense, and for farmers to perhaps use multiple lecture fields, some strategically located heavy use areas may be another option for reducing wear and tear during extremely wet weather.

Make Changes Now

For farmers who wish to make changes to their winter feeding facilities, now is the time to determine what they’re willing to invest, what type of winter feeding facility will work and to find the time, labor, and materials necessary to construct a new winter feeding facility.

This concrete feed pad provides a stable footing for cattle in the mud and allows hay to be supplied without taking the tractor through the field. Photos courtesy Morgan Hayes.

Morgan Hayes, Ph.D., P.E. is an Assistant Extension Professor in Livestock Systems.
Cost Trade-offs for Drying Wheat and Planting DC Soybeans

By Sam McNeill, Ph.D., P.E.
Extension Professor
Food and Bioprocess Engineering

An early June survey of local cash prices for wheat and soybeans showed current levels at $5.00 and $9.80/bu, respectively. Energy prices are near the same level as last year with LP gas around $1.50 per gallon, so drying costs will also be similar this spring.

Double Crop Farmers

Armed with this information, double crop farmers are deciding whether it’s better to harvest wheat early and dry it with heated air so that soybeans can be planted earlier to achieve their maximum yield potential...OR...is it better to let the wheat dry in the field and delay soybean planting a few days.

To help put some numbers to that decision, a spreadsheet was developed that takes into account grain and energy prices along with anticipated yield losses for both crops and the field drying rate for wheat. When combined, this information can be used to calculate gross profits from the soybean crop and net returns to the wheat enterprise after subtracting out drying costs.

Price, Yield, Yield Loss Data

For both crops, the spreadsheet uses price, yield, and yield loss per day. For wheat, a field drying rate is also assumed in addition to the price of LP gas to calculate the drying cost as the harvest season progresses. Of course, toward the end of the harvest season, wheat will be dry enough to avoid a drying charge, but by that time soybean yields will have fallen off dramatically.

To run through an example, consider the costs of the most important variables a week before and a week after the optimum harvest date. With the grain and energy prices mentioned earlier, average yields of 50 bu/ac for soybeans and 80 for wheat, a daily soybean yield loss of 2% for delayed planting, a wheat yield loss of 0.5% for each day that harvest is delayed, and a wheat moisture level of 24% when harvest begins, the drying and handling cost would be about 23 cents per bushel (or $19 per acre) and the returns would be $490/ac for soybeans and $381/ac for wheat after paying for drying, as shown in Table 1. However, if harvest is delayed a week beyond the optimum date, the returns falls sharply to $767 per acre.

Data for Daily Changes

Data in the table are shown in more detail in Figure 1, where daily changes in soybean and wheat yield losses, wheat drying and hauling and the total of these costs are illustrated. The slight rise in cost for wheat toward the end of this period is due to overdrying, which amounts to 6 cents per bushel for each point of moisture below 13.5%. Corresponding net returns for wheat harvest and gross returns for the soybean crop are shown in Figure 2, where loses average about $2 per acre-day before the optimum harvest date and increase to about $12/ac for each day soybean planting is delayed afterward.

For these reasons, more farmers may be interested in drying wheat this spring to boost soybean yields and net wheat profits. More information on wheat drying and this spreadsheet is available at the UK Biosystems and Agricultural Engineering website at https://www.uky.edu/bae/grain-storage-systems.

Note: Table 1 and Figures 1 and 2 appear on the following page.

1 Prepared by Sam McNeill, Extension Agricultural Engineer, University of Kentucky Cooperative Extension Service, Biosystems and Agricultural Engineering Department, Princeton, KY 42445-0469 (sam.mcneill@uky.edu). Ph: 270-365-7541 x 213.
Table 1. Returns to the soybean and wheat enterprises when wheat harvest is delayed for field drying over a two-week period.

<table>
<thead>
<tr>
<th>Days before or after optimum</th>
<th>Soybean @ $9.80</th>
<th>Wheat @ $5.00 Sbu</th>
<th>Gross Soy + Net Wheat</th>
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<tbody>
<tr>
<td></td>
<td>Yield</td>
<td>Return</td>
<td>Yield</td>
</tr>
<tr>
<td></td>
<td>bu/ac</td>
<td>$/ac</td>
<td>bu/ac</td>
</tr>
<tr>
<td>-7</td>
<td>50.0</td>
<td>490</td>
<td>80.00</td>
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<tr>
<td>0</td>
<td>50.0</td>
<td>490</td>
<td>77.2</td>
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<tr>
<td>7</td>
<td>43.4</td>
<td>425</td>
<td>74.6</td>
</tr>
</tbody>
</table>

Fig. 1. Changes in operating costs for drying wheat/planting soybeans early vs field drying/delayed planting with current grain and energy prices ($9.80 for beans, $5.00 for wheat and $1.50 for LP gas).
Fig. 2. Gross returns to double crop enterprises for 2018 with stated assumptions for grain and energy prices.