Historical Custom Rates in Kansas & Projections for 2012

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Kansas State University Department of Agricultural Economics

Kevin C. Dhuyvetter
Extension Agricultural Economist
785-532-3527 • kcd@ksu.edu
Kansas State University
Department of Agricultural Economics

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Introduction

COSTS ASSOCIATED WITH OWNING AND OPERATING FARM MACHINERY IS A MAJOR expense for most farming operations. Rather than owning all the required equipment, some farm operations rely on hiring others to perform certain field operations (e.g., custom harvesters, chemical applications). Likewise, some producers perform custom work for others as a means of spreading the fixed costs associated with machinery ownership over more acres, thus reducing their per acre costs. Because of this, information regarding custom rates for various field operations is of interest to both those hiring work done as well as those doing custom work. Another use of custom rates information is to allocate whole-farm costs to specific enterprises and to benchmark machinery costs. For example, see *Custom Rates and the Total Cost to Own and Operate Farm Machinery in Kansas, MF-2583* (Beaton, Dhuyvetter, and Kastens) and the associated decision tool (*KSU-MachCost*) available on www.AgManager.info for a discussion of evaluating and benchmarking farm machinery costs.

Historically, the Kansas Department of Agriculture Statistics Division (Kansas Ag Statistics, or KAS for short) in cooperation with the National Agricultural Statistics Service published a *Custom Rates* book based on annual surveys of farmers and ranchers, custom operators, co-ops, and elevators.[1] Similarly, the Land Grant Universities of the states surrounding Kansas also publish custom rates based on surveys that are done either annually, or in some cases, every other year. Table 1 lists the most current information that is available for Kansas and the surrounding states.

Due to budget reductions at KAS, the annual survey was discontinued in 2010 and without additional funding this survey might be permanently discontinued, at least as previously done by KAS. Thus, Kansas producers looking to hire custom operators, custom operators themselves, and farm managers that use the information in the KAS *Custom Rates* publication will need to come up with estimates of custom rates in order to make decisions for the upcoming year. While custom operators that know their actual costs of production should be in a good position to determine what appropriate rates should be for the coming year, producers often like to see values from a third party as well. One possibility is to rely on information from neighboring states, assuming this information will continue to be available in the future. However, producers, custom operators, lenders, and others who have used the Kansas *Custom Rates* publication in the past, likely would prefer to have future custom rates information that is consistent with what they have used

[1] *The Custom Rates booklet was published in hard copy format from approximately the early 1970's up until 2001(no report was available in 1986 due to budget reductions). Starting in 2002 the publication was published in electronic format (pdf file) only. Custom rates reports for the years 2001 through 2009 are available online at http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Custom_Rates/index.asp.*

historically. Thus, the purpose of this paper is to provide projections of many of the custom rates previously published by KAS for Kansas that are believed to be reasonable for the year 2012. In addition, because the most recent data reported by KAS were for 2009, model-estimated values for 2010 and 2011 are also reported allowing users to examine year-to-year changes both in absolute and percentage terms.

Table 1. Custom Rate Information Available in Kansas and Surrounding States

State	Publication name and web link*	Source
KS	Custom Rates 2009	Kansas Ag Statistics
	www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Custom_Rates/custom09.pdf	
CO	Custom Rates for Colorado Farms & Ranches in 2010	Colorado State University
	www.coopext.colostate.edu/abm/custrates10.pdf	
IA	2011 Iowa Farm Custom Rate Survey (A3-10)	Iowa State University
	www.extension.iastate.edu/publications/fm1698.pdf	
NE	2010 Nebraska Farm Custom Rates -- Part I (EC823)	University of Nebraska
	http://agecon.unl.edu/c/document_library/get_file?uuid=60422c9e-670f-4895-bb09-4f58d6ae4e1a&groupId=2369805	
	2010 Nebraska Farm Custom Rates -- Part II (EC823)	University of Nebraska
	http://agecon.unl.edu/c/document_library/get_file?uuid=49378fda-eb82-4acf-8dfd-a558aa2bf33a&groupId=2369805	
MO	2009 Custom Rates for Farm Services in Missouri (G 302)	University of Missouri
	http://extension.missouri.edu/explorepdf/agguides/agecon/g00302.pdf	
OK	Oklahoma Farm and Ranch Custom Rates, 2009-2010 (CR-205)	Oklahoma State University
	http://greatplainscanola.org/wp-content/uploads/2010/02/Custom-Canola-Harvest-Rates-CR-205-.pdf	

* All websites listed were accessed on November 1, 2011.

Projecting Machinery Costs

In the absence of having actual production costs for specific field operations, there are basically two approaches to projecting costs. The first approach is to use an engineering approach where the relevant machinery complement (e.g., tractor and planter, sprayer, etc.) is identified and then all the relevant costs (i.e., depreciation, interest, repairs, fuel, labor, and TIS (taxes, insurance and shelter)) are estimated using economic and engineering formulas. A downside to this approach is that it requires many assumptions regarding intensity of use, purchase price, useful life, etc. Lazarus published a paper in May of 2011 of machinery cost estimates for many of the typical field operations in Minnesota using an economic engineering approach (http://faculty.apec.umn.edu/wlazarus/documents/machdata.pdf). While there is a lot of good information in this publication (i.e., the costs to own and operate many different types of machinery), the usefulness of this information to Kansas producers is somewhat limited due to varying soil types, field size, available field days, machinery sizes, etc. relative to what are common in Minnesota. Thus, this published information would either need to be adjusted to reflect Kansas conditions or re-estimated using assumptions and machinery complements appropriate for typical Kansas farms.

A second approach to projecting future custom rates is to use historical data to develop models that can be used for predicting future values. Average custom rates for various farming operations in Kansas from 1990 to 2009, as reported by KAS, are shown in Figures 1 and 2. It can be seen that custom rates generally increase over time and have been fairly consistent with inflation rates. The

one notable exception to the annual growth rates is the large increases that were observed in several of the rates in 2008, which was associated with record high diesel fuel prices that year.

Figure 1.

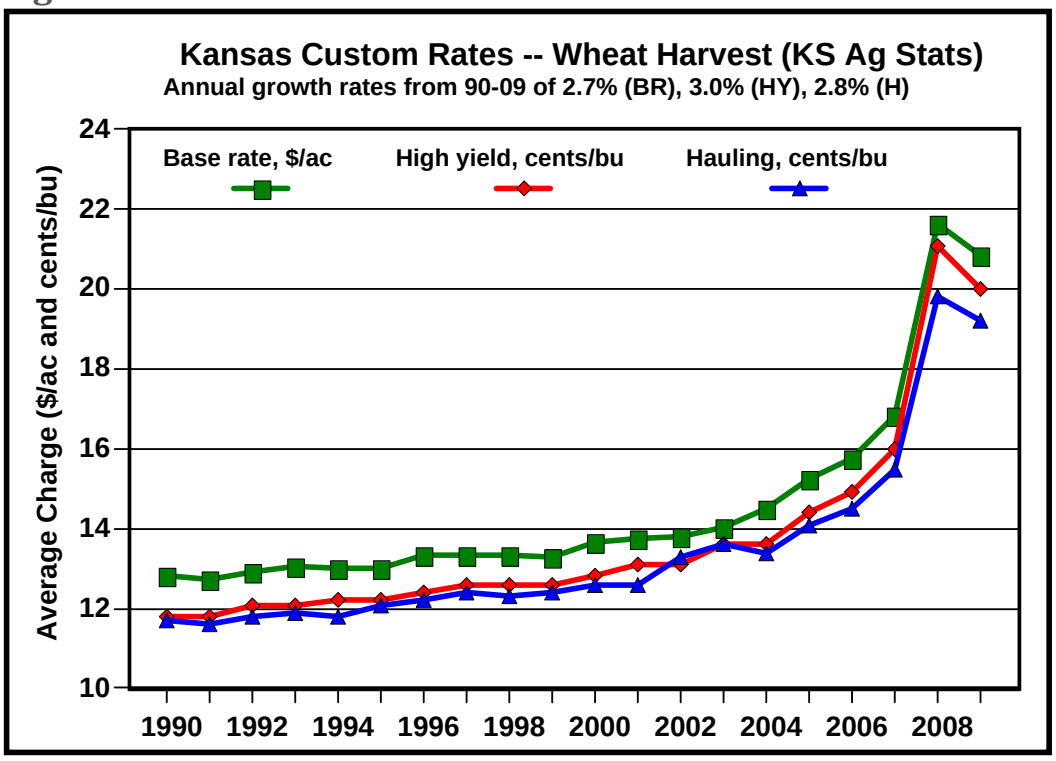
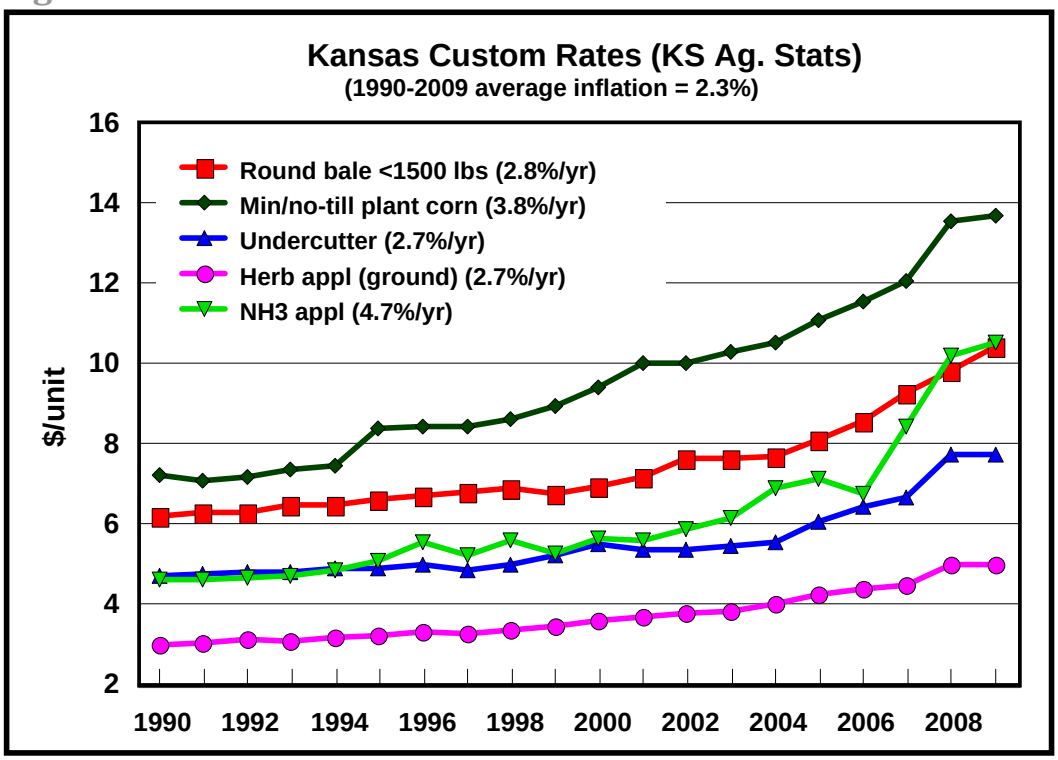
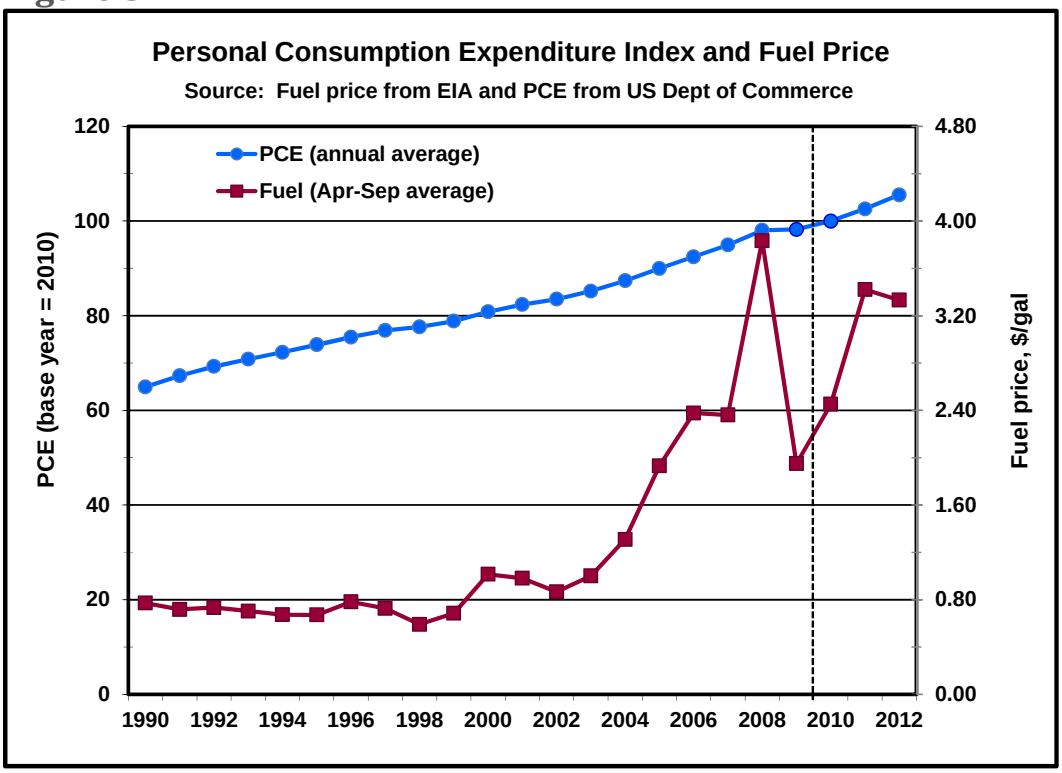


Figure 2.



Based on the data displayed in Figures 1 and 2, it seems logical that custom rates might be estimated as a function of an inflation index as well as fuel prices. Figure 3 shows historical data for non-taxable diesel fuel and the personal consumption expenditure (PCE) index along with projections for 2012. The projected price for diesel fuel in 2012 (as of November 8, 2011) is $3.27 per gallon, which is a slight decrease from the 2011 price of $3.42, but a significant increase from 2009 and 2010 prices ($1.95 and $2.45/gallon, respectively). Visually comparing the custom rates in Figures 1 and 2 with the patterns in Figure 3 (data to the left of the dashed line is for the time period where custom rate data exist), it appears that these two variables, i.e., PCE and fuel, when combined likely would explain changes in custom rates over time reasonably well.

Figure 3.



While it is likely the case that the many different custom rates that are reported would have different models, it was decided to estimate the same model for all custom rates related to costs. Thus, the following model was estimated for all relevant custom rates:

$$CustomRate_{it} = B0_i + B1_i(PCE_t) + B2_i(Fuel_t) + B3_i(PCE_t \times Fuel_t),$$

where *CustomRate* refers to the natural log of the historical custom rates published by KAS (rates are always in dollars, but the units vary, e.g., acres, bale, ton, bushel, mile), *PCE* is a personal consumption expenditure index, *Fuel* is the U.S. average non-taxable diesel fuel price for the months of April through September, *i* is an index for the different custom rate operations (total of 85 different operations were analyzed), *t* is an index for year (data from 1990-2009 were analyzed), and B's are parameters to estimate.[2] Several custom rates also include physical components such

[2] *Custom rate data are state averages from Kansas Agricultural Statistics Custom Rates publications for the relevant years. Out of the 1,660 potential values (85 operations x 20 years), there were 47 missing observations. These missing values (2.76% of total sample) were "filled in" using relationships of years when data existed and with similar operations. PCE data are annual averages based on quarterly reported data from the U.S.*

as bushels or miles (i.e., harvest yields often have a charge per bushel for yields above some level). In these cases the physical measure was estimated using a linear time trend.

As an indicator of how well the estimated models might work for projecting future values, the R^2 (R-square) statistic, which is an in-sample measure as to the goodness of fit of a model, was examined. This statistic reflects the percentage of the variability in the dependent variable (i.e., custom rate) that is explained by variability in the independent variables (i.e., PCE and fuel). R^2 is bounded by 0 and 1 (or 0 and 100 if expressed as a percentage) with higher values indicating a better statistical fit. As a general rule, the estimated models fit the data quite well and the average R^2 across the 85 models was 0.87. However, there were several models with considerably lower values indicating they may not work quite as well for predicting future values.

Tables 2 through 8 report historical custom rates, as published by KAS, for 2008 and 2009 and model-projected values for 2010 through 2012. Projected values for PCE for the fourth quarter of 2011 through the fourth quarter of 2012 were based on the value in the quarter prior times the average quarter-to-quarter percentage change for the previous four quarters as shown with the following:

$$PCEq = PCEq\text{-}1 \times + [PCEq\text{-}1 / PCEq\text{-}2 + PCEq\text{-}2 / PCEq\text{-}3 + PCEq\text{-}3 / PCEq\text{-}4 + PCEq\text{-}4 / PCEq\text{-}5]/4,$$

where *q* refers to the quarter of interest (i.e., fourth quarter 2011 through fourth quarter 2012). The quarterly data are then averaged to arrive at an annual PCE value. Projected monthly fuel prices for November 2011 through December 2012 are from the U.S. Energy Information Administration (EIA) Short-Term Energy Outlook (STEO) released November 8, 2011. The fuel price used in the models was a simple average across the months of April through September. In addition to the projections for 2012, changes in both absolute terms and percentages from 2011 are reported. These changes might be the most relevant measure if producers are looking at how they might change rates in 2012 relative to what they were in 2011.

Planting Rates (Table 2)

Table 2 includes the custom rates per acre for planting various crops for both regular-till and minimum/no-till. Averge rates for no-till are generally about $1.00 to $3.00/acre higher than regular-till with small grains (i.e., wheat) having a larger difference than spring crops. Changes for 2012, relative to 2011, are for increases of approximately 5-6% ($0.60-$0.85) for regular-till and 5.5-6.5% ($0.80-$0.95) for minimum/no-till. The R^2 values indicate that the estimated models fit the historical data very well, which gives us confidence that the forecasts should be reasonable.

Chemical Application Rates (Table 3)

Table 3 includes the custom rates per acre for applying chemicals with different application methods. Increases for 2012 compared to 2011 range from about 1.5% to about 4.5%, but most increases are in the 3-4% range ($0.20-$0.30/acre). The projected increases for anhyrous ammonia (NH3) application and dry fertilizer application are the highest at 4.8% ($0.50/acre) and 4.4% ($0.23/acre), respectively. Projected increases for aerial applications of herbicide and insecticide (1.5% and 2.3%, respectively) were the lowest of all rates. The R^2 values were highest

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Department of Commerce Bureau of Economic Analysis (PCECTPI series available at http://research.stlouisfed.org/fred2/categories/18. Diesel fuel price data are from the Energy Information Administration (EIA) and are available at www.eia.doe.gov/emeu/steo/pub/cf_query/index.cfm. Models estimated and reported in 2011 did not use the natural log of custom rates and included an interaction term. It was determined this functional form is more appropriate and thus models have been re-estimated. Results reported here should not be directly compared with those reported in the earlier version of this paper.

for liquid and dry fertilizer applications and ground rig application for herbicides and insecticides, which is not surprising given that these operations generally have had the largest number of responses in the KAS surveys. The models for aerial applications and row crop cultivation (with and without fertilizer) did not fit the historical data quite as well. Put another way, there was a little more unexplained variation in the custom rates of these operations, i.e., variability due to factors other than inflation (PCE) and fuel price.

Tillage Rates (Table 4)

Custom rates per acre for the various different tillage operations are reported in Table 4. Percentage increases from 2011 are generally in the 2-3.5% range, which equate to $0.20-$0.30/acre for most operations. Most of the models fit the historical data quite well, the exceptions tended to be those operations with the fewest reports and thus rates tend to be more variable from year to year.

Silage Harvesting Rates (Table 5)

Custom rates per ton for silage harvesting and hauling are reported in Table 5. Rates for chopping and hauling or chopping only are projected to be up approximately 2-2.5% ($0.14/ton in both cases) compared to 2011 rates. Rates for chopping, hauling & filling silo and hauling only are both up about 0.5% compared to 2011 rates. Based on the R^2 measure, the models for chopping, hauling & filling silo and chopping and hauling only are likely more accurate of actual costs than the chopping only and hauling only projections.

Grain Harvesting Rates (Table 6)

Custom rates for grain and oilseed harvesting and hauling are reported in Table 6. Custom harvest rates tend to have a fixed rate per acre and an extra charge per bushel for yields above some fixed level and a hauling charge per bushel. In almost all cases, projected rates are steady to up about 1.5% compared to projected rates in 2011. Models for high yield levels (bu/acre) are projected to be the same as in the past (i.e., no change). Remember the model for this variable was a linear time trend and thus the models are suggesting high yield levels have been quite stable over time (21-22 bu for wheat and 35-37 bu for sorghum). The models for the cost variables fit the historical data quite well (i.e., R^2 values were mostly in the range of 0.85). The R^2 values were very low for the high yield variables for all crops, however, that does not mean the projected values will not be accurate necessarily. Rather, this is indicative of the fact that these yields have been stable over time and thus there has been very little variation that could be explained with a trend variable.

Hay and Forage Rates (Table 7)

Custom rates for the many different operations pertaining to putting up and hauling hay and forage are presented in Table 7 (rotary mowing on both a $/acre and $/hour basis are also included). Of the 20 hay-related models, 14 had R^2 values above 0.90 (considerably higher in some cases) indicating that generally speaking the estimated models fit the historical data quite well. The models that fit the data worst were custom rate for hauling large round bales on a per ton basis, stacking hay, and baling large square bales on a per bale basis. The projected percentage increases for haying operations ranged from a slight decrease to increases of 5-7% (rotary mow on a per hour basis is projected to be up 8.1%) depending upon the specific operation.

Feed Preparation and Delivery Rates (Table 8)

Custom rates for the different methods of processing feed as well as several different methods of charging for delivery are reported in Table 8. As a group, the projected increases for these operations are generally higher than many of those previously discussed. As previously discussed

with some of the other custom rates, models with relatively poorer fit (i.e., lower R2 values) tend to be the result of smaller samples in the historical data and thus more year-to-year variability.

Summary

Custom rates have many uses for different people. Obviously people hiring others for certain farm operations benefit from having information as to what reasonable expectations are. Likewise, custom operators themselves benefit from having information to help them as they negotiate rates with their customers. Producers, lenders, and farm management consultants also use custom rates information as proxies for machinery costs and benchmarking. Historically, Kansas Agricultural Statistics (KAS) has conducted a survey annually regarding custom rates and reported these results. However, due to budget reductions, this survey was discontinued in 2010 and thus a void exists regarding custom rate information in Kansas. This paper reports projected custom rates for many of the categories that have been historically reported by KAS where the projections are based on models incorporating an inflation index (Personal Consumption Expenditure (PCE) index) and diesel fuel prices. Of the 85 models estimated, the vast majority of them fit the historical data very well indicating that the projections from these models should be reasonable and provide a good starting point for producers and custom operators to beging their negotiation process. The projected values for 2010 through 2012 reported here are based on projections of PCE for the fourth quarter of 2011 as well as the entire year of 2012 as well as monthly diesel prices for April 2012 through September 2012 as of early January 2012.

Users of the information reported in tables 2-8 are reminded that the projected values are for state averages as opposed to region-specific values. Custom rates will vary regionally due to varying factors (e.g., soil type, field size and shape, distance between fields, traffic) and therefore an estimate of statewide averages will likely be too high in some cases and too low in others. Because of this, it is more appropriate to apply projected year-to-year changes (either percent or $/ac) to rates charged in previous years as opposed to using the absolute values reported in tables 2-8. Additionally, it is important to remember that these forecasts were made at a specific point in time (January 2012) and thus are based on expected future inflation and diesel prices at that time. As additional information becomes known, or as these projected values for PCE and fuel change, forecasts of the custom rates reported here could also be revised. An online calculator (available at www.agmanager.info/Tools/default.asp#MACHINERY) can be used to modify the forecasts provided in tables 2-8 by changing the fuel price.

References

Beaton, A.J., K.C. Dhuyvetter, and T.L. Kastens. "Custom Rates and the Total Cost to Own and Operate Farm Machinery in Kansas." Kansas State Univ. Coop. Ext. Serv. Bull. MF-2583. April 2003.

Lazarus, W. F. and A. Smale. "Machinery Cost Estimates." University of Minnesota Extension Paper. June 2010. Available at www.apec.umn.edu/faculty/wlazarus/documents/machdata.pdf.

Table 2. Historical and Projected Custom Rates -- PLANTING ($/acre)

			Projections			2012 versus 2011		
Operation	2008	2009	2010	2011	2012	$/unit chg	% chg	R^2
Regular-Till								
Small grains	$11.09	$11.14	$10.52	$11.78	$12.40	$0.62	5.3%	0.959
Sorghum	$12.30	$12.61	$11.91	$13.09	$13.84	$0.75	5.7%	0.960
Corn	$12.51	$12.52	$12.36	$13.44	$14.23	$0.78	5.8%	0.984
Soybeans	$12.87	$12.58	$12.57	$13.74	$14.59	$0.84	6.1%	0.984
Grass	$14.65	$14.02	$14.05	$15.56	$16.34	$0.78	5.0%	0.967
Alfalfa	$13.75	$12.68	$13.23	$14.48	$15.36	$0.88	6.1%	0.952
Minimum-Till or No-Till								
Small grains	$13.73	$13.31	$13.82	$14.60	$15.43	$0.82	5.6%	0.966
Sorghum	$13.49	$13.63	$13.72	$14.55	$15.48	$0.93	6.4%	0.979
Corn	$13.57	$13.70	$13.81	$14.59	$15.48	$0.89	6.1%	0.984
Soybeans	$14.07	$13.68	$14.31	$15.01	$15.95	$0.95	6.3%	0.975

Table 3. Historical and Projected Custom Rates -- CHEMICAL APPLICATIONS ($/acre)

			Projections			2012 versus 2011		
Operation	2008	2009	2010	2011	2012	$/unit chg	% chg	R^2
Row crop cultivate w/ fertilizer	$8.41	$8.00	$8.01	$8.44	$8.69	$0.25	3.0%	0.810
Row crop cultivate w/o fertilizer	$8.46	$7.24	$7.80	$8.24	$8.55	$0.32	3.9%	0.849
Dry fertilizer application	$4.96	$4.68	$4.78	$5.14	$5.37	$0.23	4.4%	0.987
Liquid fertilizer application	$4.98	$4.82	$4.87	$5.25	$5.45	$0.20	3.8%	0.987
Anhydrous ammonia application	$10.20	$10.55	$9.27	$10.44	$10.94	$0.50	4.8%	0.895
Aerial herbicide application	$6.20	$6.93	$5.61	$6.17	$6.26	$0.09	1.5%	0.660
Ground rig herbicide application	$5.01	$4.98	$4.93	$5.28	$5.48	$0.20	3.7%	0.984
Aerial insecticide application	$6.20	$6.60	$5.81	$6.32	$6.47	$0.15	2.3%	0.810
Ground rig insecticide application	$5.07	$4.95	$5.00	$5.34	$5.55	$0.20	3.8%	0.985

Table 4. Historical and Projected Custom Rates -- TILLAGE ($/acre)

			Projections			2012 versus 2011		
Operation	2008	2009	2010	2011	2012	$/unit chg	% chg	R^2
Disking	$9.02	$9.06	$8.74	$9.59	$9.92	$0.34	3.5%	0.964
One-way disking	$9.00	$9.06	$8.54	$9.54	$9.77	$0.23	2.4%	0.890
Off-set disking	$9.56	$9.52	$9.16	$10.07	$10.37	$0.30	3.0%	0.961
Spiketooth harrow	$6.71	$7.30	$6.61	$7.21	$7.41	$0.20	2.7%	0.840
Springtooth harrow	$6.42	$8.40	$6.52	$7.05	$7.28	$0.23	3.3%	0.669
Chisel (4-12")	$11.19	$10.06	$10.23	$11.32	$11.61	$0.29	2.5%	0.974
Deep chisel (over 12")	$15.81	$13.70	$13.33	$15.25	$15.59	$0.33	2.2%	0.937
Moldboard plow	$15.41	$14.00	$12.78	$14.50	$14.62	$0.12	0.8%	0.817
Undercutter (large V-blade)	$7.73	$7.42	$7.08	$7.80	$7.95	$0.15	1.9%	0.951
Shank cultivator	$8.95	$8.84	$8.34	$9.21	$9.52	$0.31	3.4%	0.951
Wheel springtooth	$6.93	$7.43	$7.30	$7.83	$8.11	$0.28	3.6%	0.884

Table 5. Historical and Projected Custom Rates -- SILAGE HARVESTING ($/ton)

			Projections			2012 versus 2011		
Operation	2008	2009	2010	2011	2012	$/unit chg	% chg	R^2
Chopping, hauling, & filling silo	$7.93	$7.39	$7.16	$8.11	$8.15	$0.04	0.5%	0.894
Chopping & hauling	$6.86	$6.54	$6.34	$6.98	$7.12	$0.14	2.0%	0.964
Chopping only	$5.61	$4.68	$4.71	$5.29	$5.43	$0.14	2.6%	0.664
Hauling only	$2.72	$2.18	$2.40	$2.52	$2.54	$0.02	0.6%	0.751

Table 6. Historical and Projected Custom Rates -- GRAIN HARVESTING

Operation	2008	2009	Projections 2010	2011	2012	2012 versus 2011 $/unit chg	% chg	R^2
Wheat								
Base charge, $/acre	$21.65	$20.86	$18.32	$20.57	$20.75	$0.18	0.9%	0.842
High yield, bu/acre	21.0	22.0	22.0	22.0	22.0	0.0	0.0%	0.154
Extra charge for yield > high yld, cents/bu	21.1	20.0	17.7	19.9	20.1	0.25	1.2%	0.850
Hauling charge, cents/bu	19.8	19.2	17.1	18.9	19.2	0.29	1.6%	0.851
Sorghum								
Base charge, $/acre	$22.99	$22.37	$19.28	$21.60	$21.70	$0.10	0.5%	0.792
High yield, bu/acre	36.0	35.0	36.0	36.0	36.0	0.0	0.0%	0.054
Extra charge for yield > high yld, cents/bu	21.6	20.4	17.9	20.2	20.5	0.28	1.4%	0.844
Hauling charge, cents/bu	19.8	18.9	16.9	18.9	19.1	0.27	1.4%	0.860
Corn								
Base charge, $/acre	$26.51	$26.35	$24.00	$26.05	$26.29	$0.25	0.9%	0.861
High yield, bu/acre	68.0	73.0	73.0	74.0	74.0	0.0	0.0%	0.130
Extra charge for yield > high yld, cents/bu	20.3	19.2	18.4	20.0	20.7	0.75	3.7%	0.838
Hauling charge, cents/bu	18.3	16.4	15.4	17.4	17.5	0.11	0.6%	0.878
Flat rate charge, cents/bu	32.0	29.0	29.4	31.8	32.2	0.46	1.4%	0.950
Soybean								
Base charge, $/acre	$26.47	$25.66	$23.97	$26.11	$26.35	$0.24	0.9%	0.905
High yield, bu/acre	26.0	27.0	28.0	28.0	28.0	0.0	0.0%	0.532
Extra charge for yield > high yld, cents/bu	20.6	19.8	17.5	20.0	20.1	0.04	0.2%	0.840
Hauling charge, cents/bu	18.9	17.5	16.0	17.8	18.0	0.19	1.1%	0.856
Sunflowers								
Base charge, $/acre	$26.28	$26.26	$23.66	$25.51	$26.16	$0.65	2.6%	0.840
High yield, cwt/acre	18.0	19.0	12.0	13.0	13.0	0.0	0.0%	0.095
Extra charge for yield > high yld, cents/cwt	26.5	27.4	24.2	29.5	30.6	1.08	3.6%	0.865
Hauling charge, cents/cwt	26.1	26.7	27.0	31.0	31.0	0.09	0.3%	0.683

Table 7. Historical and Projected Custom Rates -- HAY AND FORAGE

			Projections			2012 versus 2011		
Operation	2008	2009	2010	2011	2012	$/unit chg	% chg	R^2
Rotary mow, $/acre	$12.85	$12.00	$11.44	$13.10	$13.43	$0.33	2.5%	0.945
Rotary mow, $/hour	$65.17	$76.00	$73.21	$79.56	$86.04	$6.48	8.1%	0.904
Hay-mow/swath, $/acre	$11.49	$11.52	$10.87	$11.81	$12.13	$0.32	2.7%	0.947
Forage-mow/swath, $/acre	$13.63	$13.09	$13.11	$14.22	$14.87	$0.65	4.6%	0.971
Swathing and condition, $/acre	$11.83	$11.77	$11.65	$12.53	$13.14	$0.61	4.9%	0.974
Sideraking hay, $/acre	$4.21	$3.82	$3.73	$4.13	$4.18	$0.05	1.2%	0.922
Small square with wire, $/bale	$0.91	$0.91	$0.88	$0.99	$1.04	$0.05	4.9%	0.954
Small square with twine, $/bale	$0.81	$0.92	$0.84	$0.90	$0.96	$0.06	7.2%	0.938
Round (< 1500 lbs) w/o net, $/bale	$9.83	$10.45	$9.72	$10.39	$10.73	$0.35	3.4%	0.934
Round (< 1500 lbs) w/ net, $/bale	$10.72	$10.71	$10.28	$11.07	$11.35	$0.28	2.6%	0.954
Round (> 1500 lbs) w/o net, $/bale	$11.52	$10.56	$9.93	$10.96	$11.12	$0.15	1.4%	0.901
Round (> 1500 lbs) w/ net, $/bale	$11.10	$10.86	$10.58	$11.23	$11.49	$0.26	2.3%	0.956
Square (approx 1 ton), $/bale	$14.76	$13.58	$13.14	$14.18	$14.00	-$0.18	-1.2%	0.708
Stacking hay (4-6 tons), $	$58.33	$58.17	$58.78	$61.21	$62.23	$1.02	1.7%	0.697
Hauling small squares, $/bale	$0.85	$0.84	$0.75	$0.87	$0.92	$0.05	5.8%	0.914
Hauling large round, $/bale	$4.25	$4.35	$4.08	$4.43	$4.56	$0.13	3.0%	0.851
Hauling large round, $/ton	$8.79	$9.29	$7.42	$8.85	$8.71	-$0.14	-1.6%	0.524
Entire operation (small square), $/bale	$1.48	$1.77	$1.63	$1.68	$1.79	$0.11	6.4%	0.939
Entire operation (large round), $/bale	$20.26	$19.10	$18.11	$20.07	$20.23	$0.16	0.8%	0.869
Entire operation, $/ton	$32.29	$34.52	$30.90	$33.11	$33.83	$0.72	2.2%	0.774

Table 8. Historical and Projected Custom Rates -- FEED PREPARATION AND DELIVERY

			Projections			2012 versus 2011		
Operation	2008	2009	2010	2011	2012	$/unit chg	% chg	R^2
Grinding grain, $/cwt	$0.40	$0.41	$0.43	$0.45	$0.47	$0.02	4.3%	0.909
Rolling grain, $/cwt	$0.36	$0.37	$0.40	$0.41	$0.42	$0.02	4.7%	0.944
Grinding hay, $/cwt	$0.69	$0.61	$0.56	$0.57	$0.56	$0.00	-0.4%	0.002
Mixing, $/cwt	$0.34	$0.32	$0.34	$0.36	$0.38	$0.02	5.7%	0.969
Rolling and mixing, $/cwt	$0.64	$0.61	$0.66	$0.69	$0.72	$0.04	5.3%	0.944
Grinding and mixing, $/cwt	$0.68	$0.67	$0.70	$0.72	$0.76	$0.04	5.5%	0.949
Pelleting, $/cwt	$1.03	$0.90	$0.96	$1.01	$1.04	$0.03	3.1%	0.817
Grinding, mixing and pelleting, $/cwt	$1.52	$1.51	$1.38	$1.44	$1.47	$0.03	2.1%	0.569
Sacking, $/cwt	$1.44	$1.30	$1.45	$1.57	$1.68	$0.12	7.3%	0.932
Delivery -- Method 1 (per load + mileage)								
$/load	$25.57	$24.42	$25.17	$28.82	$30.43	$1.60	5.6%	0.960
$/mile	$1.78	$1.70	$1.77	$1.88	$1.98	$0.10	5.3%	0.862
average load, tons	9.2	9.2	9.4	9.6	9.8	0.2	1.8%	0.885
Delivery -- Method 2 (per mile)								
$/mile	$2.66	$2.54	$2.49	$2.88	$2.93	$0.06	2.0%	0.888
average load, tons	10.1	10.4	10.7	10.9	11.1	0.2	1.8%	0.438
Delivery -- Method 3 (per ton)								
$/ton	$9.88	$10.06	$8.17	$9.32	$9.40	$0.08	0.8%	0.533
average load, tons	6.5	6.5	8.1	8.2	8.3	0.1	1.1%	0.127
Delivery -- Method 4 (per load)								
$/load	$32.27	$32.85	$34.63	$39.13	$42.15	$3.03	7.7%	0.961
average load, tons	6.5	6.6	7.2	7.3	7.3	0.0	0.6%	0.193
Delivery -- extra charge, $/mile	$2.62	$2.10	$1.92	$2.40	$2.47	$0.06	2.6%	0.892