

# Historical Custom Rates in Kansas & Projections for 2011



**Kevin C. Dhuyvetter**  
Extension Agricultural Economist  
785-532-3527 • [kcd@ksu.edu](mailto:kcd@ksu.edu)  
Kansas State University  
Department of Agricultural Economics

# Historical Custom Rates in Kansas and Projections for 2011

January 2011

Kevin C. Dhuyvetter, Extension Agricultural Economist

785-532-3527 • [kcd@ksu.edu](mailto:kcd@ksu.edu)

Kansas State University Department of Agricultural Economics

## Introduction

**C**OSTS 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](http://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.<sup>1</sup> 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 not conducted in 2010 and without additional funding this survey might be permanently discontinued, at least as currently 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

---

<sup>1</sup> 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](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 2011. In addition, because the most recent data reported by KAS were for 2009, model-estimated values for 2010 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 <a href="http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Custom_Rates/custom09.pdf">www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Custom_Rates/custom09.pdf</a>	Kansas Ag Statistics
CO	Custom Rates for Colorado Farms & Ranches in 2009 <a href="http://www.coopext.colostate.edu/ABM/custrates09.pdf">www.coopext.colostate.edu/ABM/custrates09.pdf</a>	Colorado State University
IA	2010 Iowa Farm Custom Rate Survey (A3-10) <a href="http://www.extension.iastate.edu/publications/fm1698.pdf">www.extension.iastate.edu/publications/fm1698.pdf</a>	Iowa State University
NE	2010 Nebraska Farm Custom Rates -- Part I (EC823) <a href="http://agecon.unl.edu/c/document_library/get_file?uuid=60422c9e-670f-4895-bb09-4f58d6ae4e1a&amp;groupId=2369805">http://agecon.unl.edu/c/document_library/get_file?uuid=60422c9e-670f-4895-bb09-4f58d6ae4e1a&amp;groupId=2369805</a>	University of Nebraska
	2010 Nebraska Farm Custom Rates -- Part II (EC823) <a href="http://agecon.unl.edu/c/document_library/get_file?uuid=49378fda-eb82-4acf-8dfd-a558aa2bf33a&amp;groupId=2369805">http://agecon.unl.edu/c/document_library/get_file?uuid=49378fda-eb82-4acf-8dfd-a558aa2bf33a&amp;groupId=2369805</a>	University of Nebraska
MO	2009 Custom Rates for Farm Services in Missouri (G 302) <a href="http://extension.missouri.edu/explorepdf/agguides/agecon/g00302.pdf">http://extension.missouri.edu/explorepdf/agguides/agecon/g00302.pdf</a>	University of Missouri
OK	Oklahoma Farm and Ranch Custom Rates, 2009-2010 (CR-205) <a href="http://greatplainscanola.org/wp-content/uploads/2010/02/Custom-Canola-Harvest-Rates-CR-205-.pdf">http://greatplainscanola.org/wp-content/uploads/2010/02/Custom-Canola-Harvest-Rates-CR-205-.pdf</a>	Oklahoma State University

\* All websites listed were accessed on January 10, 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 and Smale published a paper in June of 2010 of machinery cost estimates for many of the typical field operations in Minnesota using an economic engineering approach (this publication is typically updated each year). While there is a lot of 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.

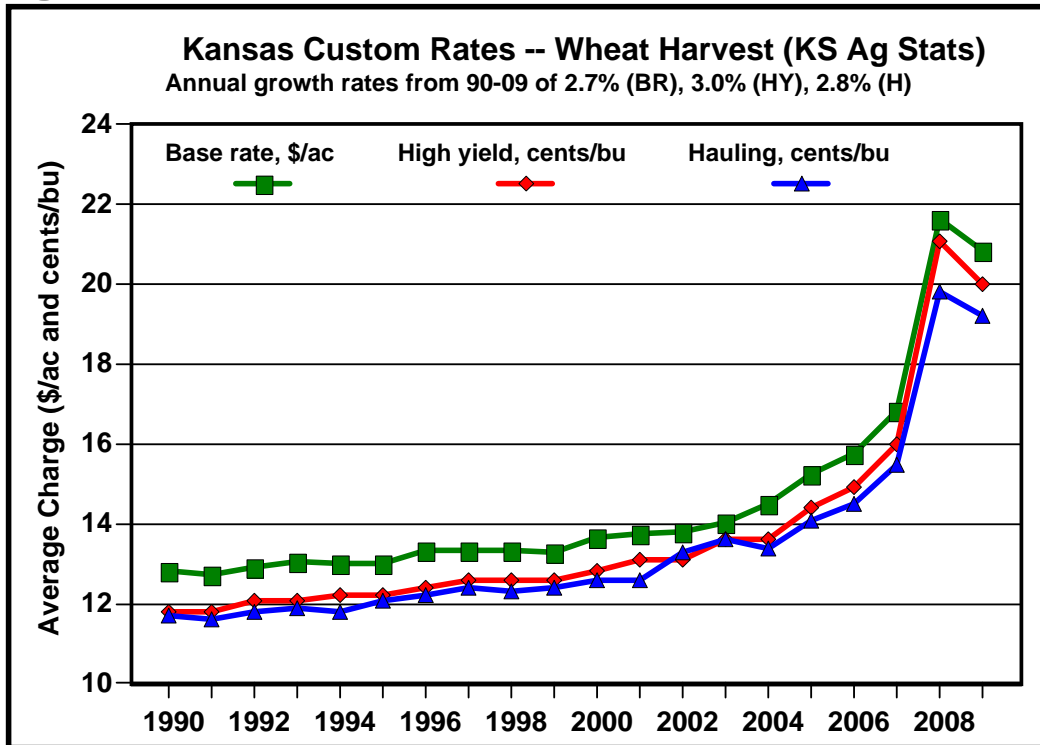
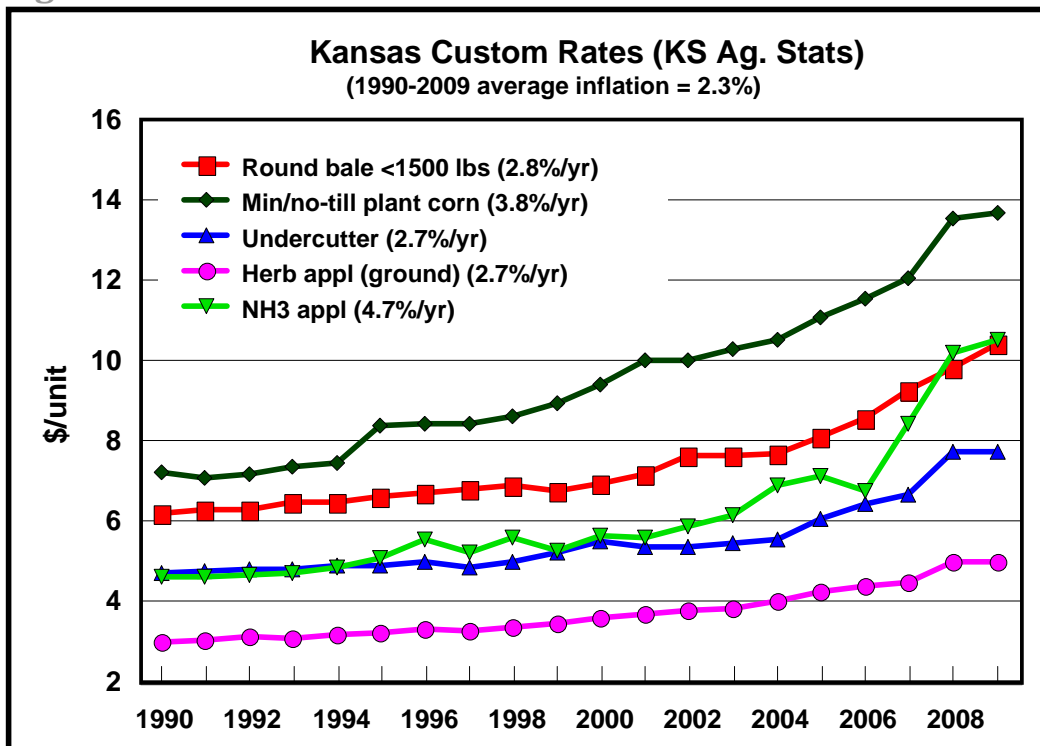
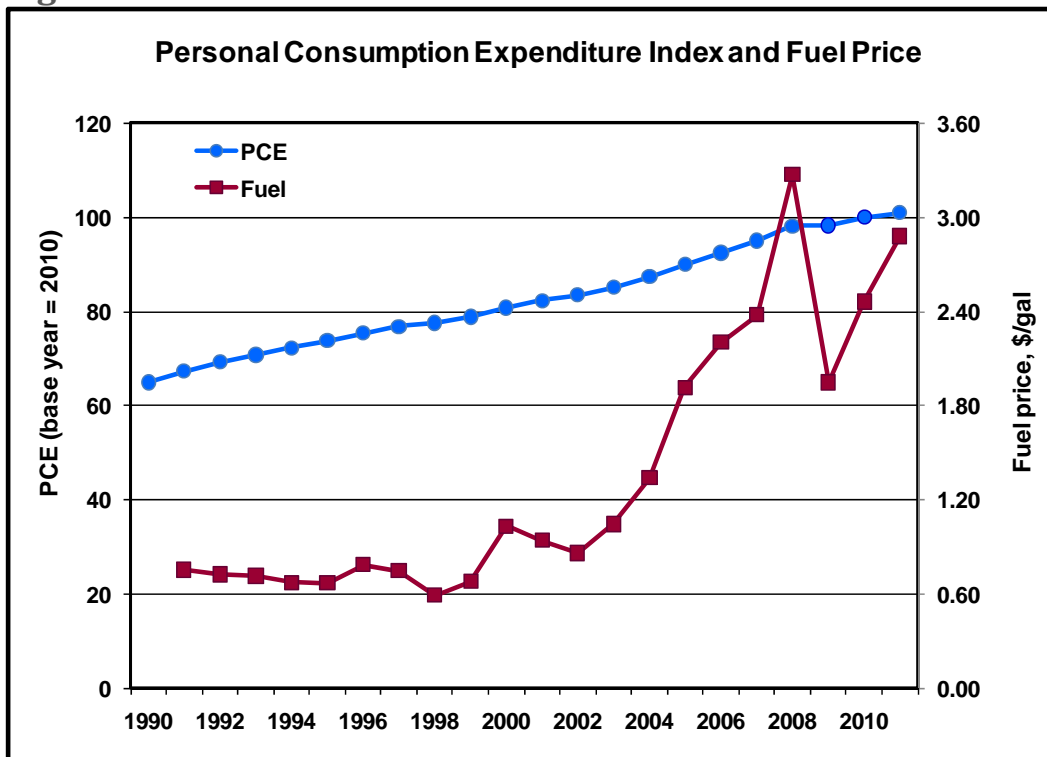


Figure 2.



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 2011. The projected value for diesel fuel is \$2.88 per gallon, which is an increase of about \$0.42/gallon from the 2010 average. Visually comparing the custom rates in Figures 1 and 2 with the patterns in Figure 3, 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 historical custom rate published by KAS (rates are always in dollars, but the units vary, e.g., acres, bale, ton, bu, mile), *PCE* is a personal consumption expenditure index, *Fuel* is a U.S. annual average non-taxable diesel fuel price, *i* is an index for the different operations (total of 83 different operations were analyzed), *t* is an index for year (data from 1990-2009 were analyzed), and *B*'s are parameters to estimate.<sup>2</sup> Several custom rates also

<sup>2</sup> Custom rate data are state averages from Kansas Agricultural Statistics Custom Rates publications for the relevant years. Out of the 1,660 potential values (83 operations x 20 years), there were 45 missing observations. These missing values (2.7% 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. 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](http://www.eia.doe.gov/emeu/steo/pub/cf_query/index.cfm).

include physical components such 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 R2 (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). R2 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 R2 across the 83 models was 0.899. 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 2007 through 2009 and model-projected values for 2010 and 2011. Projected values for PCE for the fourth quarter of 2010 through the fourth quarter of 2011 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:

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

where  $q$  refers to the quarter of interest (i.e., fourth quarter 2010 through fourth quarter 2011). The quarterly data are then averaged to arrive at an annual PCE value. Projected monthly fuel prices for January 2011 through December 2011 are from the U.S. Energy Information Administration (EIA) Short-Term Energy Outlook (STEO) released January 11, 2011. The annual fuel price used in the models was a simple average across months. In addition to the projections for 2011, changes in both absolute terms and percentages from 2010 are reported. These changes might be the most relevant measure if producers are looking at how they might change rates in 2011 relative to what they were in 2010.

## **Planting Rates (Table 2)**

Table 2 includes the custom rates per acre for planting various crops for both regular-till and minimum/no-till. Average rates for no-till are generally about a \$1/acre higher than regular-till for spring crops and about \$2/acre higher for small grains (i.e., wheat). Changes for 2011, relative to 2010, are for increases of approximately 5-6% (\$0.65-\$0.75) for regular-till and 2.5-3.5% (\$0.35-\$0.45) for minimum/no-till. The R2 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 2011 compared to 2010 range from 2.5% to over 8%, but most increases were in the 3-4% range (\$0.15-\$0.30/acre). The projected increase for anhydrous ammonia (NH3) application is 8.6% (\$0.88/acre), which would be expected to be higher as this operation uses more fuel than the other application methods. The other larger increases were aerial applications of herbicide and insecticide (8.1% and 6.7%, respectively). Not surprisingly, the R2 values were highest for liquid and dry fertilizer applications and ground rig application for herbicides and insecticides. 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 2010 are generally in the 5-6% range, which equate to \$0.40-\$0.50/acre for most operations. The largest increases are for deep chiseling (8.4% or \$1.22/acre) and moldboard plow (8.1% or \$1.14/acre). This is what would be expected given that these two operations represent the most fuel intensive operations and fuel prices are projected to be up \$0.42/gallon (\$2.88 in 2011 versus \$2.46 in 2010). 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.

## **Grain Harvesting Rates (Table 5)**

Custom rates for grain and oilseed harvesting and hauling are reported in Table 5. 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. For wheat and sorghum each these three rates are projected to be up about 9% compared to 2010. High yield levels (bu/acre) are basically projected to be flat. Remember the model for this variable was a linear time trend and thus the models are suggesting high yield levels have been pretty stable over time (21-22 bu for wheat and 35-37 bu for sorghum). Increases for corn, soybeans, and sunflowers follow similar patterns, but the increases from 2010 are slightly lower (generally in the range of 6.5-8.5%). Corn is sometimes harvested at a flat rate per bushel (fairly common on irrigated corn) and that rate is projected to be up 5.3% or 1.6¢ per bushel compared to 2010 rates. The models for the cost variables fit the historical data quite well (i.e., R2 values were mostly all at least 0.90). The worst was sunflowers where there tends to be less reported data historically. The R2 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.

## **Silage Harvesting Rates (Table 6)**

Custom rates per ton for silage harvesting and hauling are reported in Table 6. Rates for chopping, hauling and filling the silo or chopping and hauling only are projected to be up 5.5-7% compared to 2010 rates (\$0.52 and \$0.37/ton, respectively). Rates for chopping only are projected to be up 9.3% (\$0.50/ton) compared to 2010 and rates for hauling only are projected to be up 3.4% (\$0.09/ton) compared to 2010 rates. However, it should be pointed out that the estimated models for these last two rates are likely less accurate than the first two rates discussed (i.e., the R2 on these models are 0.725 and 0.739 compared to values over 0.90 for the other models).

## **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. Of the 18 hay-related models, 13 had R2 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 baling square bales, stacking hay, and hauling large round bales on a per ton basis. The projected percentage increases for most of the haying operations were in the 4.5-7% range and the dollar increase ranged considerably because of the varying units (i.e., acre, large bale, small bale, ton).

## **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 lower than many of those previously discussed. However, there are

several notable exceptions. For example, many of the projected increases are less than 3.5%, but grinding hay is projected to be up 6.5% and several of the delivery rates are projected to increase over 10% relative to 2010 rates. 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 83 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 begin their negotiation process. The projected values for 2010 and 2011 reported here are based on projections of PCE for the fourth quarter of 2010 as well as the entire year of 2011 as well as monthly diesel prices for January 2011 through December 2011 as of early January 2011. 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.

## **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](http://www.apec.umn.edu/faculty/wlazarus/documents/machdata.pdf).*

**Table 2. Historical and Projected Custom Rates – PLANTING (\$/acre)**

Operation	2007	2008	2009	Projections		2011 versus 2010		R <sup>2</sup>
				2010	2011	\$/unit chg	% chg	
<i>Regular-Till</i>								
Small grains	\$9.54	\$11.09	\$11.14	\$11.09	\$11.89	\$0.80	7.2%	0.961
Sorghum	\$10.65	\$12.30	\$12.61	\$12.45	\$13.24	\$0.79	6.4%	0.959
Corn	\$10.91	\$12.51	\$12.52	\$12.45	\$13.06	\$0.61	4.9%	0.976
Soybeans	\$10.94	\$12.87	\$12.58	\$12.65	\$13.31	\$0.66	5.2%	0.977
Grass	\$12.60	\$14.65	\$14.02	\$14.11	\$14.85	\$0.74	5.3%	0.962
Alfalfa	\$11.35	\$13.75	\$12.68	\$13.23	\$13.89	\$0.66	5.0%	0.946
<i>Minimum-Till or No-Till</i>								
Small grains	\$12.10	\$13.73	\$13.31	\$13.49	\$13.84	\$0.35	2.6%	0.964
Sorghum	\$12.04	\$13.49	\$13.63	\$13.54	\$13.99	\$0.45	3.3%	0.970
Corn	\$12.09	\$13.57	\$13.70	\$13.63	\$14.05	\$0.42	3.1%	0.977
Soybeans	\$12.34	\$14.07	\$13.68	\$13.93	\$14.26	\$0.33	2.4%	0.974

**Table 3. Historical and Projected Custom Rates – CHEMICAL APPLICATIONS (\$/acre)**

Operation	2007	2008	2009	Projections		2011 versus 2010		R <sup>2</sup>
				2010	2011	\$/unit chg	% chg	
Row crop cultivate w/ fertilizer	\$6.33	\$8.41	\$8.00	\$8.04	\$8.24	\$0.20	2.5%	0.805
Row crop cultivate w/o fertilizer	\$6.32	\$8.46	\$7.24	\$8.03	\$8.35	\$0.32	4.0%	0.868
Dry fertilizer application	\$4.20	\$4.96	\$4.68	\$4.80	\$4.99	\$0.19	3.9%	0.983
Liquid fertilizer application	\$4.37	\$4.98	\$4.82	\$4.87	\$5.05	\$0.18	3.7%	0.983
Anhydrous ammonia application	\$8.46	\$10.20	\$10.55	\$10.23	\$11.12	\$0.88	8.6%	0.919
Aerial herbicide application	\$5.19	\$6.20	\$6.93	\$6.43	\$6.95	\$0.52	8.1%	0.762
Ground rig herbicide application	\$4.50	\$5.01	\$4.98	\$4.96	\$5.13	\$0.17	3.5%	0.979
Aerial insecticide application	\$5.48	\$6.20	\$6.60	\$6.39	\$6.82	\$0.43	6.7%	0.865
Ground rig insecticide application	\$4.49	\$5.07	\$4.95	\$4.97	\$5.13	\$0.16	3.2%	0.980

**Table 4. Historical and Projected Custom Rates – TILLAGE (\$/acre)**

Operation	2007	2008	2009	Projections		2011 versus 2010		R <sup>2</sup>
				2010	2011	\$/unit chg	% chg	
Disking	\$7.93	\$9.02	\$9.06	\$8.88	\$9.31	\$0.43	4.8%	0.962
One-way disking	\$8.06	\$9.00	\$9.06	\$8.77	\$9.25	\$0.49	5.6%	0.897
Off-set disking	\$8.37	\$9.56	\$9.52	\$9.40	\$9.88	\$0.48	5.1%	0.962
Spiketooth harrow	\$6.68	\$6.71	\$7.30	\$6.99	\$7.40	\$0.41	5.8%	0.859
Springtooth harrow	\$5.83	\$6.42	\$8.40	\$7.12	\$7.54	\$0.42	5.9%	0.696
Chisel (4-12")	\$9.75	\$11.19	\$10.06	\$10.59	\$11.20	\$0.61	5.8%	0.975
Deep chisel (over 12")	\$11.46	\$15.81	\$13.70	\$14.51	\$15.73	\$1.22	8.4%	0.942
Moldboard plow	\$10.64	\$15.41	\$14.00	\$14.03	\$15.17	\$1.14	8.1%	0.834
Undercutter (large V-blade)	\$6.66	\$7.73	\$7.42	\$7.49	\$7.95	\$0.46	6.1%	0.966
Shank cultivator	\$7.25	\$8.95	\$8.84	\$8.74	\$9.26	\$0.52	6.0%	0.953
Wheel springtooth	\$7.56	\$6.93	\$7.43	\$7.32	\$7.57	\$0.26	3.5%	0.883

**Table 5. Historical and Projected Custom Rates – GRAIN HARVESTING**

Operation	2007	2008	2009	Projections		2011 versus 2010		R <sup>2</sup>
				2010	2011	\$/unit chg	% chg	
<i>Wheat</i>								
Base charge, \$/acre	\$16.85	\$21.65	\$20.86	\$20.85	\$22.69	\$1.84	8.8%	0.922
High yield, bu/acre	21.0	21.0	22.0	22.0	22.0	0.0	0.0%	0.154
Extra charge for yield > high yld, cents/bu	16.0	21.1	20.0	20.3	22.1	1.9	9.2%	0.931
Hauling charge, cents/bu	15.5	19.8	19.2	19.2	20.8	1.6	8.1%	0.922
<i>Sorghum</i>								
Base charge, \$/acre	\$17.45	\$22.99	\$22.37	\$22.14	\$24.13	\$1.99	9.0%	0.892
High yield, bu/acre	36.0	36.0	35.0	36.0	36.0	0.0	0.0%	0.054
Extra charge for yield > high yld, cents/bu	15.9	21.6	20.4	20.6	22.6	2.0	9.6%	0.923
Hauling charge, cents/bu	15.3	19.8	18.9	19.0	20.6	1.6	8.4%	0.921
<i>Corn</i>								
Base charge, \$/acre	\$22.14	\$26.51	\$26.35	\$25.85	\$27.38	\$1.53	5.9%	0.906
High yield, bu/acre	71.0	68.0	73.0	73.0	74.0	1.0	1.4%	0.130
Extra charge for yield > high yld, cents/bu	16.4	20.3	19.2	19.4	20.6	1.1	5.9%	0.848
Hauling charge, cents/bu	14.3	18.3	16.4	17.1	18.5	1.4	8.5%	0.914
Flat rate charge, cents/bu	29.0	32.0	29.0	31.0	32.6	1.6	5.3%	0.970
<i>Soybean</i>								
Base charge, \$/acre	\$22.61	\$26.47	\$25.66	\$25.66	\$27.17	\$1.51	5.9%	0.940
High yield, bu/acre	28.0	26.0	27.0	28.0	28.0	0.0	0.0%	0.532
Extra charge for yield > high yld, cents/bu	15.8	20.6	19.8	19.7	21.5	1.8	9.0%	0.893
Hauling charge, cents/bu	14.3	18.9	17.5	17.9	19.3	1.4	8.0%	0.909
<i>Sunflowers</i>								
Base charge, \$/acre	\$20.88	\$26.28	\$26.26	\$26.08	\$27.80	\$1.72	6.6%	0.901
High yield, cwt/acre	14.0	18.0	19.0	12.0	13.0	1.0	8.3%	0.095
Extra charge for yield > high yld, cents/cwt	19.8	26.5	27.4	25.1	27.3	2.1	8.5%	0.879
Hauling charge, cents/cwt	30.3	26.1	26.7	26.3	27.5	1.2	4.7%	0.780

**Table 6. Historical and Projected Custom Rates – SILAGE HARVESTING (\$/ton)**

Operation	2007	2008	2009	Projections		2011 versus 2010		R <sup>2</sup>
				2010	2011	\$/unit chg	% chg	
Chopping, hauling, & filling silo	\$6.97	\$7.93	\$7.39	\$7.55	\$8.07	\$0.52	6.9%	0.915
Chopping & hauling	\$5.89	\$6.86	\$6.54	\$6.60	\$6.97	\$0.37	5.5%	0.969
Chopping only	\$4.17	\$5.61	\$4.68	\$5.37	\$5.87	\$0.50	9.3%	0.725
Hauling only	\$2.30	\$2.72	\$2.18	\$2.49	\$2.57	\$0.09	3.4%	0.739

**Table 7. Historical and Projected Custom Rates – HAY AND FORAGE**

Operation	2007	2008	2009	Projections		2011 versus 2010		R <sup>2</sup>
				2010	2011	\$/unit chg	% chg	
Hay-mow/swath, \$/acre	\$10.27	\$11.49	\$11.52	\$11.50	\$12.15	\$0.65	5.7%	0.964
Forage-mow/swath, \$/acre	\$11.64	\$13.63	\$13.09	\$13.24	\$13.83	\$0.60	4.5%	0.966
Swathing and condition, \$/acre	\$10.35	\$11.83	\$11.77	\$11.71	\$12.18	\$0.47	4.0%	0.967
Sideraking hay, \$/acre	\$3.54	\$4.21	\$3.82	\$4.03	\$4.31	\$0.28	7.0%	0.951
Small square with wire, \$/bale	\$0.85	\$0.91	\$0.91	\$0.91	\$0.97	\$0.06	6.9%	0.955
Small square with twine, \$/bale	\$0.71	\$0.81	\$0.92	\$0.85	\$0.89	\$0.04	4.7%	0.919
Round (< 1500 lbs) w/o net, \$/bale	\$9.30	\$9.83	\$10.45	\$10.16	\$10.63	\$0.48	4.7%	0.943
Round (< 1500 lbs) w/ net, \$/bale	\$9.95	\$10.72	\$10.71	\$10.75	\$11.29	\$0.54	5.0%	0.970
Round (> 1500 lbs) w/o net, \$/bale	\$9.11	\$11.52	\$10.56	\$11.07	\$11.93	\$0.86	7.8%	0.966
Round (> 1500 lbs) w/ net, \$/bale	\$9.88	\$11.10	\$10.86	\$10.92	\$11.33	\$0.42	3.8%	0.962
Square (approx 1 ton), \$/bale	\$13.07	\$14.76	\$13.58	\$13.95	\$14.70	\$0.75	5.4%	0.769
Stacking hay (4-6 tons), \$	\$56.25	\$58.33	\$58.17	\$56.70	\$57.02	\$0.33	0.6%	0.729
Hauling small squares, \$/bale	\$0.66	\$0.85	\$0.84	\$0.85	\$0.94	\$0.09	10.7%	0.940
Hauling large round, \$/bale	\$3.88	\$4.25	\$4.35	\$4.34	\$4.60	\$0.25	5.8%	0.871
Hauling large round, \$/ton	\$8.76	\$8.79	\$9.29	\$9.24	\$10.43	\$1.20	12.9%	0.699
Entire operation (small square), \$/bale	\$1.47	\$1.48	\$1.77	\$1.61	\$1.64	\$0.03	1.8%	0.915
Entire operation (large round), \$/bale	\$17.95	\$20.26	\$19.10	\$19.71	\$21.12	\$1.41	7.2%	0.918
Entire operation, \$/ton	\$30.24	\$32.29	\$34.52	\$34.10	\$36.31	\$2.21	6.5%	0.860

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

Operation	2007	2008	2009	Projections		2011 versus 2010		R <sup>2</sup>
				2010	2011	\$/unit chg	% chg	
Grinding grain, \$/cwt	\$0.44	\$0.40	\$0.41	\$0.41	\$0.41	\$0.00	0.3%	0.917
Rolling grain, \$/cwt	\$0.39	\$0.36	\$0.37	\$0.37	\$0.37	\$0.00	-0.7%	0.964
Grinding hay, \$/cwt	\$0.57	\$0.69	\$0.61	\$0.71	\$0.76	\$0.05	6.5%	0.215
Mixing, \$/cwt	\$0.33	\$0.34	\$0.32	\$0.34	\$0.35	\$0.01	3.8%	0.972
Rolling and mixing, \$/cwt	\$0.57	\$0.64	\$0.61	\$0.63	\$0.64	\$0.01	1.5%	0.949
Grinding and mixing, \$/cwt	\$0.58	\$0.68	\$0.67	\$0.67	\$0.67	\$0.01	0.9%	0.954
Pelleting, \$/cwt	\$0.83	\$1.03	\$0.90	\$0.98	\$1.02	\$0.03	3.4%	0.829
Grinding, mixing and pelleting, \$/cwt	\$1.34	\$1.52	\$1.51	\$1.51	\$1.59	\$0.08	5.2%	0.650
Sacking, \$/cwt	\$1.27	\$1.44	\$1.30	\$1.37	\$1.41	\$0.04	3.1%	0.935
Delivery -- Method 1 (per load + mileage)								
\$/load	\$24.18	\$25.57	\$24.42	\$25.30	\$27.02	\$1.71	6.8%	0.960
\$/mile	\$1.57	\$1.78	\$1.70	\$1.77	\$1.83	\$0.06	3.5%	0.861
average load, tons	8.8	9.2	9.2	9.4	9.6	0.2	1.9%	0.885
Delivery -- Method 2 (per mile)								
\$/mile	\$2.43	\$2.66	\$2.54	\$2.53	\$2.70	\$0.17	6.6%	0.906
average load, tons	12.5	10.1	10.4	10.7	10.9	0.2	1.9%	0.438
Delivery -- Method 3 (per ton)								
\$/ton	\$8.43	\$9.88	\$10.06	\$10.69	\$12.07	\$1.38	13.0%	0.799
average load, tons	8.7	6.5	6.5	8.1	8.2	0.1	1.1%	0.127
Delivery -- Method 4 (per load)								
\$/load	\$32.95	\$32.27	\$32.85	\$32.76	\$34.41	\$1.65	5.0%	0.962
average load, tons	8.0	6.5	6.6	7.2	7.3	0.0	0.6%	0.039
Delivery -- extra charge, \$/mile	\$1.66	\$2.62	\$2.10	\$2.34	\$2.68	\$0.34	14.6%	0.933