

August 2008

EDR 08-08



# Economic Development Report

Colorado  
State  
University

Extension

Department of Agricultural and Resource Economics, Fort Collins, CO 80523-1172  
<http://dare.colostate.edu/pubs>

## PIONEER AND LAIRD DITCH LITIGATION: ECONOMIC ACTIVITY GENERATED BY IRRIGATED AGRICULTURE IN THREE YUMA COUNTY ZIP CODES

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Ground water users in the Northern High Plains Designated Ground Water Basin and senior surface water right users on the North Fork of the Republican River recently agreed to a settlement that avoids the potential fallowing of 190,000 irrigated acres in Yuma County. Stipulations of the settlement include the lease and purchase of surface water rights from the Pioneer/Laird Ditch Company for \$20 million. Funding is contingent on \$5 million financing by the Republican River Water Conservation District as well as voter approval of a \$15 million bond issue. The Yuma County Water Authority will be seeking approval of the bond issue in November 2008.

This study analyzes the regional economic activity generated by irrigated agriculture in three zip codes of Yuma County: Eckley (zip code 80727), Wray (80758) and Yuma (80759). These three zip codes were subject to potential fallowing as a result of the litigation, so understanding the importance of irrigated agriculture to the region is useful when considering the Pioneer/Laird Settlement and the Yuma County Water Authority's bond issue. It should be noted that this fact sheet *does not* consider the economic activity generated by high capacity wells within the cities of Wray and Yuma, which were also subject to the lawsuit.

Yuma County has a highly productive agricultural sector that is described in the next sections of the fact sheet. The description is followed by calculation of the economic activity generated by 190,000 acres of irrigated agriculture in the three zip code region.

### Economic Profile

Yuma County is home to roughly 9,830 residents. The average unemployment rate is 2.2 percent. Employment and earnings are concentrated in the agricultural and related industries. Annual value of sales and services of the study area is just under \$1,200 million, with agriculture industries comprising \$646 million (nearly 54 percent) of this value. There are few economic alternatives to agriculture in the area, and the county is heavily dependent on agriculture for its economic base. Areas relying more exclusively on irrigated agriculture for economic activity, such as Yuma County, are likely to suffer greater impacts from a loss of irrigated agriculture versus regions with a broader, more diverse economic base. Table 1 lists the major industrial sectors of the study area.

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## Agriculture

Yuma County is one of the most agriculturally productive regions of the U.S. The area's agricultural output has both regional and national significance [Thorvaldson and Pritchett]. The total land area of Yuma County is more than 1.5 million acres with 90% of the acres held in farms and ranches. Cropping totals more than 700,000 acres of the land in farms and ranches, and irrigated cropping comprises more than 35% of total land for cropping. Irrigated agriculture is economically important netting more than \$200 million in sales during 2007. Table 2 lists historical value of

sales for economically important crops grown in Yuma County.

The productivity of irrigated lands has contributed to the economic and social well-being of the area. Communities throughout the region depend on the agricultural sector for their economic base and stability. The productivity of these lands contributes to individual operators' standard of living, as well as supporting employment opportunities on and off the farm. The next portion of the fact sheet considers the economic activity generated by 190,000 of irrigated acres in Yuma County.

**Table 1: Economic Demographics for the Yuma County in 2006**

Industry	Output (million \$)	Output as % of Total	Employment
Cattle ranching and farming	\$349.25	29.1%	727
Irrigated Crops	\$178.07	14.8%	636
Machinery and equipment rental and leasing	\$92.23	7.7%	194
Animal production (except cattle and poultry)	\$91.48	7.6%	599
Securities, commodity contracts, investments	\$83.33	6.9%	1,110
Drilling oil and gas wells	\$63.11	5.3%	128
Owner-occupied dwellings	\$27.08	2.3%	0
State & Local Government, Non-Education	\$25.37	2.1%	553
Monetary authorities, depository credit	\$22.71	1.9%	126
Wholesale trade	\$23.27	1.9%	237
Other State and local government enterprises	\$17.59	1.5%	94
Pipeline transportation	\$13.17	1.1%	12
<b>Total</b>	<b>\$1,199.18</b>	<b>100.0%</b>	<b>7,797</b>

**Table 2: Irrigated Acres and Value of Sales by Crop for Yuma County in 2007 (NASS)**

<i>Crop</i>	<i>Harvested Acres</i>	<i>Value of Irrigated Crop Sales</i>
Corn Grain	211,500	\$ 173,430,000
Corn Silage	6,000	\$ 4,992,000
Alfalfa	15,200	\$ 10,907,520
Wheat	20,500	\$ 9,372,600
Dry Edible Beans	12,800	\$ 7,498,368
Sugar Beets	5,300	\$ 6,148,000
Potatoes	1,700	\$ 507,110
<b>Total</b>	<b>273,000</b>	<b>\$ 212,855,598</b>

## Results

This analysis uses the most recently available data (2006) and the IMPLAN software program to create an input-output model of the region. This model is then “shocked” to simulate the conversion of cropped acres to grassland. The total economic impact has three components:

1. Direct impacts: A reduction in irrigated acreage will result in decreased revenue flow from the sale of irrigated crops.
2. Indirect impacts: As irrigated agriculture changes in size and scope, its demand for inputs provided by other industries will also experience different revenue flows. For

instance, if a farmer reduces his/her production of irrigated crops, he/she will demand less fertilizer, seed, etc. from the industries that supply those inputs.

3. Induced impacts: Changing crop production activity leads to altered demand for labor inputs. As an example, the income loss associated with decreased employment leads to a reduction in spending of wages in the area.

I-O models represent a snapshot in time (i.e., what the economic loss would be if all of the acres were taken out of production simultaneously) and economic activity is calculated for just one year. The total economic activity generated by 190,000 acres in Yuma County under 2007 price and yield conditions is more than \$170 million (Table 3)

**Table 3: Economic Activity Generated from 190,000 acres of Irrigated Cropping in Yuma County, Colorado**

Sector	Estimated Economic Activity by Sector
Irrigated Crops	\$148,141,258.68
Wholesale trade	\$ 4,301,421.45
Agriculture and forestry support activities	\$ 2,467,292.52
Owner-occupied dwellings	\$ 1,889,500.82
Cattle ranching and farming	\$ 1,259,174.92
Monetary authorities and depository credit intermediaries	\$ 1,038,752.85
Real estate	\$ 654,894.59
Other State and local government enterprises <sup>2</sup>	\$ 652,753.14
Water, sewage, etc.	\$ 612,656.26
Food services and drinking places	\$ 606,200.25
Truck transportation	\$ 501,458.89
<b>Total*</b>	<b>\$170,202,570.01</b>

**\*This table includes sectors with the largest economic activity derived from irrigated agriculture; however other sectors included in the total activity but not listed in this table.**

<sup>2</sup> Other state and local government enterprises include sanitation, sewerage, water supply, gas supply, airports, water transportation and terminals, housing and community development, and liquor stores.

As indicated in Table 3, the irrigated cropping of 190,000 acres generates nearly \$150 million in direct economic activity. The wholesale trade sector, which includes seed and fertilizer businesses, derives more than \$4 million in sales each year from these direct sales of the irrigated crop sector. Likewise, agriculture consultants (found in the agriculture and forest support industries) and banking (monetary authorities) receive significant support from the sector. All told, indirect economic activity totals more than \$20 million each year.

### **Property Tax Revenues**

When irrigated land is permanently fallowed, it is appropriate to reclassify the fallowed land in its new use when assessing property taxes. The new use (generally grassland or dryland crop production) generates lower profits in subsequent years, and the market value of the land in its new use declines. As a result, the assessed value of land falls, and so too does the tax revenue stream to the school district and local government. The retirement of irrigation wells will certainly impact the county service and school district tax base.

The appraised value of agricultural land is generally based on a crop rotation (e.g., corn and alfalfa), and the owner's share of profits generated from the crop rotation. Profits are capitalized at a statutory rate of 13%. The assessed value of irrigated land is set by state statute as 29% of the appraised value. In 2005, the average appraised value of land was \$64.36 per acre for Yuma County and \$60.39 for Phillips County. Annual property taxes for county services and school districts are calculated when a mill rate is multiplied to the assessed value. Based on assessed values and local mill rates the county service taxes and school district taxes average \$3.65 per acre for irrigated cropland in Yuma County. When measured across the proposed fallowed area, \$693,500 of county service and school tax revenues will be lost each year. Note that the reduction in services provided to these landowners has not been calculated.

### **Limitations of I-O Models**

While the I-O model is useful for providing a snapshot of the local economy, it has limitations. As an example, this model is instantaneous rather than dynamic, and thus do not account for any substitution effects (i.e., how business owners might adapt to changing circumstances). Neither new lines of business that may arise

in response to reduced irrigated agriculture, nor migration of businesses and residences out of the dwindling economy, are taken into account. Impacts have been calculated for a single year -- multiple year impacts are not calculated.

All impacts are marginal rather than cumulative. This means that the ultimate outcome of the impact also depends on previous impacts of economic events to the regional economy. Because we don't know the tipping point (i.e., the critical threshold of economic activity) of the regional economy, we cannot say with certainty how it will ultimately fare when faced with this new impact.

If 190,000 acres (more than 75 percent of all irrigated acres in Yuma County) were fallowed as a result of litigation, it is likely that a tipping point would be crossed. That is, too little economic activity would exist to support many of the agricultural support and non-agricultural businesses in Yuma county and a net migration of businesses and population will result. The consequences of migration are beyond the scope of this fact sheet.

I-O models do not take into account forward linkages (effects to downstream industries who use the outputs of irrigated agriculture as inputs to their own production), such as a reduction in the supply of corn to feedlots, dairies, or ethanol plants; rather, they only address backward linkages (e.g., reductions in the demand for inputs to irrigated agriculture, such as seed, fertilizer, etc.) Colorado is a grain-deficit state, meaning that it already imports grain (mainly for feedlots), but it is uncertain if enough grain might be imported to replace lost local production. Certainly, costs will increase as represented by local basis appreciation. Howe, Lazo, and Weber (1990) studied the economic impacts of agriculture-to-urban water transfers in the Arkansas River Basin and found no evidence that the phase-outs of feed grains, hay, and irrigated pasture held back the expansion of feedlots over the historical period from 1955 to 1985. However, the Arkansas Basin did not lose as high a proportion of its irrigated acres when compared to Yuma County.

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