

# Southern Alberta Resource Economics Centre

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## **Estimating the Producers' Surplus from Irrigating Crops in Southern Alberta**

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# **Estimating the Producers' Surplus from Irrigating Crops in Southern Alberta**

## **Abstract**

In this study, we estimate the producers' surplus of water for irrigating agricultural crops in four sub-basins in Southern Alberta over the years 2004 to 2008. This is estimated as the net returns of crops grown in the 13 irrigation districts (above variable costs of production) minus the net returns that would have been obtained had the irrigated land been planted to dryland crops during those years and the crops had to rely on rainfall for their growth. The average annual net benefit from irrigation was \$232 million, varying from a low of \$212.5 million in 2007 to a high of \$255 million in 2005. This is an annual average net benefit of about \$430 per hectare planted.

## **Introduction**

Nearly two-thirds of irrigation activity in Canada is in Alberta (Statistics Canada, 2006). Irrigation in Southern Alberta has increased the returns from crop production in Southern Alberta for more than a century and has enhanced economic activity in the region. Irrigation enables growers to produce crops such as potatoes and sugar beets, which require more water than traditional dryland crops such as barley or hard red spring wheat in Southern Alberta (Nicol, 2005). One study estimated that increases in primary production from irrigation and the spin-offs in agri-food processing contribute over 18 percent to the agri-food portion of gross domestic product for Alberta (AIPA, 2002).

Irrigation is easily the largest consumer of surface water in Alberta, accounting for 71% of consumptive use of surface water in the entire province (AENV, 2002). Of the 650,000 hectares under irrigation in the South Saskatchewan River Basin (SSRB), about 82% takes place within 13 organized irrigation districts (AAFRD, 2005). The irrigation districts hold water licenses and their member irrigators pay an annual flat fee per hectare to the district for their water. The annual fee covers the costs of administration and some rehabilitation of infrastructure and varies from zero in the Eastern Irrigation District to as high as \$52.00 per

hectare in the Ross Creek Irrigation District (AARD, 2009). The variation in annual fees depends on several factors, including whether or not the districts have piped and pressurized water supply and whether or not the districts have access to other sources of income. Irrigators do not pay for the water itself. They also do not pay for the cost of head works and supply infrastructure that delivers water from the river or storage reservoir to the irrigation district. Some irrigation districts supply water to municipalities, golf courses, feedlots, oil and gas wells, and other industries, which results in a complex fee structure among districts. The irrigation districts are governed by the Irrigation Districts Act (2000).

In a recent study, Samarawickrema and Kulshreshtha (2008) noted that the main advantage of irrigation water is its role in increasing yields of crops. In a careful analysis, they found that the short-run benefits from irrigation during the drought years of 2001 and 2002 ranged from \$37 per dam<sup>3</sup> in the Bow River sub-basin to \$42 per dam<sup>3</sup> in the Oldman River sub-basin of the SSRB. The estimated benefits of irrigation water were defined as the differences in producer surpluses between irrigated and dryland farming systems in a drought year. While the dryland crop yields were severely depressed in those two drought years (thereby increasing the return from irrigation water), the economic benefits of supplementary water also depend greatly on the level of input and output prices. As a result of greatly increased use of corn and wheat for ethanol, rapid growth in several developing countries and other factors, prices of grains and oilseeds spiked in 2007-8 (Klein and Le Roy 2010). From May 2006 to July 2008 when the commodities price bubble burst, corn, soybeans, red spring wheat, oats and feed barley prices increased 193%, 149%, 92%, 125% and 124%, respectively. At the same time, prices of fertilizers and other major inputs rose. Over the five-year period 2004 to 2008, net farm income in Canada ranged from a low of \$140 million to a high of \$6.6 billion with an average of \$2.8 billion (Statistics Canada 2009b).

The purpose of this study is to investigate how the producers' surpluses from use of water for irrigating crops in Southern Alberta irrigation districts vary over a five-year period (2004 through 2008) during which time crop prices and certain input costs varied widely. To isolate the effects on the short-run benefits of irrigation of changing prices of outputs and inputs, yields were held constant.

## Study Area

The 13 irrigation districts in Southern Alberta are located in the South Saskatchewan River Basin (Figure 1). The South Saskatchewan River Basin includes the sub-basins of the Bow, Red Deer, Oldman and South Saskatchewan River sub-basins (Figure 1). All of the sub-basins begin in the Rocky Mountains, with the river systems generally flowing eastward through foothills and prairie. The combined watershed of the basins is 121,095 km<sup>2</sup>, of which 41% is in the Red Deer River sub-basin, 22% in the Oldman River sub-basin, 21% is in the Bow River sub-basin, and 16% is in the South Saskatchewan River sub-basin. The mean annual discharge from the basin into the neighbouring province of Saskatchewan is 9,280,000 dam<sup>3</sup>.

All of the province's 13 irrigation districts are found within the South Saskatchewan River Basin: Aetna Irrigation District (AID), Bow river Irrigation District (BRID), Eastern Irrigation District (EID), Leavitt Irrigation District (LID), Lethbridge Northern Irrigation District (LNID), Magrath Irrigation District (MID), Mountain View Irrigation District (MVID), Ross Creek Irrigation District (RCID), Raymond Irrigation District (RID), SaintMary River Irrigation District (SMRID), Taber Irrigation District (TID), United Irrigation District (UID) and Western Irrigation District (WID) (Figure 2).

## Methods

Determining the benefit of using a resource in a market economy generally is straightforward. It depends on the willingness of a consumer or a producer to pay for the last unit of the good or resource acquired. However, in the case of water for irrigation in Southern Alberta, water is provided free of charge to the irrigation farmers. The costs of supplying the water (conveyance, infrastructure, etc.) to the farms are paid directly by the irrigation districts (and indirectly by the farmers through the assessment of an annual fee that is independent of the amount of water used). The only variable costs associated with irrigation that face the farmer are the costs of applying water to their crops. Since a market price of water is not determined, a different method must be used to estimate the benefits from applying irrigation water on crops.

Following Samarawickrema and Kulshreshtha (2008), the concept of producers' surplus was used to estimate the benefits from irrigation water on crop production in Southern Alberta. Producers' surplus measures the difference between total revenue earned from the sale of a good and the minimum amount a producer will accept to cover the costs of producing the good. In Figure 3, S(1) represents the supply curve for production of a crop on dryland and S(2) represents the supply curve for its production on irrigated land. The supply curve S(2) lies to the right of S(1) because more output will be produced and offered for sale at each price under irrigated conditions. The area between the horizontal demand curve and the supply curve represents the amount of producers' surplus. Generally, due to the higher yields, producers' surplus would be higher under irrigated than under dryland conditions.

The procedure for calculating producers' surplus from irrigation is illustrated in Figure 4. To isolate the effects on producers' surplus of changing prices of outputs and inputs, yields for each of the 16 crops were held constant at their five-year (2000-2004) average levels. The actual areas planted to each of the irrigated crops in each sub-basin was multiplied by its appropriate five-year average yield and then by the average farm-level price of each crop for each year. The gross income thus obtained was then reduced by the amount of variable costs for each crop during each year to arrive at the net revenue for each sub-basin for each year.

To obtain an estimate of the net revenue from applying irrigation water to crops in Southern Alberta, it was assumed that the total area under irrigation would be planted to dryland crops if irrigation was unavailable. To estimate the net revenue under dryland conditions, it was assumed that the dryland cropping patterns that existed on neighbouring land would be used on the irrigated area if supplementary water for irrigation was unavailable. Data were available on the areas planted to the following seven crops on dryland in counties that were adjacent to the irrigated area in Southern Alberta: durum wheat, spring wheat, barley, oats, canola, feed peas, and alfalfa hay. Five year (2000-2004) average dryland yields for each of the seven crops in each sub-basin were obtained. Costs of production data were available by major soil zone in Southern Alberta: brown, dark brown and black. The variable costs of production for each crop for each sub-basin were apportioned on the basis of the percentage of each soil zone in each sub-basin. The resulting estimates of area of each crop in each sub-basin for each year then were multiplied by the yield and the appropriate price of each crop to

obtain an estimate of gross revenues for each sub-basin under assumed dryland conditions. The variable costs of dryland production of each crop for each year (2004-2008) are then subtracted from the gross revenues to arrive at estimates of what net revenue for dryland crop production for each sub-basin would have been in the absence of irrigation water. The estimated producers' surplus then was calculated by subtracting the estimated net revenue under assumed dryland conditions from estimated net revenue under irrigation for each sub-basin.

While there were a total of 60 crops grown under irrigation in the 13 irrigation districts of Southern Alberta during the years 2004-2008, the areas of minor crops were added to major crops to make the analysis more manageable. For example, the relatively small areas of flax and mustard seed were added to the area of canola, the small areas of malt barley, grain corn, rye and triticale were added to the area of barley, the small areas of dry peas and fresh peas were added to the area of beans, alfalfa silage was added to alfalfa hay, etc. In the end, all crops planted on irrigated land were aggregated to 16 crops: barley, Canada Prairie Spring wheat, durum wheat, spring wheat, oats, soft wheat, alfalfa, barley silage, corn silage, grass hay, tame pasture, timothy, canola, beans, potatoes and sugar beets.

While crop production data were available for each irrigation district in Southern Alberta, it was necessary to assemble these data by sub-basin. Geographically, the Oldman River sub-basin includes all of the AID, LID, LNID, MID, MVID, RID, TID and UID, 48% of BRID, and 40% SMRID. The Bow River sub-basin includes 45% of the EID, 55% of the WID and 52% of the BRID. The Red Deer River sub-basin includes 52% of the EID and 45% of the WID. The South Saskatchewan River sub-basin includes all of the RCID, 60% of the SMRID, and 3% of the EID. The areas of each of the 16 aggregated crops were calculated for each of the four sub-basins for each of the five years on the basis of the percentages of each irrigation district in each sub-basin.

## **Data**

### **Crop prices**

As noted earlier, about 60 different crops are grown annually on irrigated land in Southern Alberta, though many have small areas. These were aggregated into 16 crops for simplification: six cereals (barley, CPS wheat, durum, spring wheat, oats and soft wheat), six

forages (alfalfa hay, barley silage, corn silage, grass hay, tame pasture and timothy hay), one oil seed (canola) and three specialty crops (beans, potatoes and sugar beets). Annual prices of the 16 irrigated crops are shown in Table 1. In general, crop prices decreased slightly from 2004 to 2005, then increased dramatically from 2006 to 2008. The highest price crop was dry beans, which increased from \$495/mt in 2004 to \$725/mt in 2008. The price of canola went down from \$387/mt in 2004 to \$278/mt in 2006 but then increased to \$553/mt in 2008. From 2004 to 2008, the prices of all major cereal crops increased dramatically: over the five year period, barley increased by 58%, wheat by 79%, durum by 127% and oats by 70%.

### **Crop Areas**

The total area irrigated in the 13 irrigation districts of Southern Alberta was nearly constant over the five-year period. The area irrigated averaged 493,149 ha, with a small annual variation (Table 2).

The irrigation districts are situated within four sub-basins. The Oldman River sub-basin accounts for approximately 45% of the total irrigated cropping area in irrigation districts in Southern Alberta, followed by the Bow River sub-basin, the South Saskatchewan River sub-basin, and the Red Deer River sub-basin.

The principal crops grown in the four sub-basins are forages (alfalfa hay on an average of 93,621 ha and tame pasture on an average of 53,781 ha), barley, spring wheat and canola. In response to market signals and rotational constraints, the areas planted to some crops (durum, spring wheat, canola and corn silage) increased from 2004 to 2008 while the areas planted to others (barley, Canadian prairie spring wheat, soft white wheat, alfalfa hay, barley silage, timothy, beans and sugar beets) decreased. Other crops remained almost unchanged in cropping area.

To estimate the benefits of irrigation water in Southern Alberta, it was assumed that in the absence of supplementary water, dryland crop production would take place on an equivalent land base with the cropping pattern chosen by farmers on neighbouring areas of land (Table 3). Seven major dryland crops are grown in the area: durum, spring wheat, barley, oats, canola, feed peas and alfalfa hay. On dryland, spring wheat and barley were the two most heavily planted crops. When allocated to the irrigated area, they would be planted on an average of 157,600 ha and 157,859 ha, respectively. These two crops accounted for almost two-thirds of the

area in the assumed dryland situation. Alfalfa hay and durum accounted for 12% (59,480 ha) and 11% (54,780 ha) of the cropped area, respectively.

### **Crop Yields**

In this analysis, crop yields were fixed at their five-year (2000-4) average level. The yields of the 16 crops on irrigated land are shown in Table 4; the yields of the seven crops on dryland are shown in Table 5. Obviously, crop yields on dryland are much lower than they are on irrigated land. In the case of barley, the yield on irrigation was 4.8 metric tonnes per hectare whereas on dryland, it was only 1.8 metric tonnes per hectare. The yield improvement from supplemental water was even higher for alfalfa where the yield under irrigation was 12.4 metric tonnes per hectare as compared to only 1.85 metric tonnes per hectare in the Bow, Oldman and South Saskatchewan River sub-basins. Furthermore, some high-yielding crops on irrigated land like barley silage (29.1 metric tonnes per hectare), corn silage (43 metric tonnes per hectare), potatoes (about 32 metric tonnes per hectare), and sugar beets (about 47 metric tonnes per hectare) are not even grown on dryland in Southern Alberta.

### **Crop Costs**

The costs of crop production are divided into variable and fixed cost categories. The variable costs include the costs of seed, fertilizer, chemical, crop insurance, trucking and marketing, fuel, oil and lube, machinery repairs, building repairs, irrigation fuel and electricity, custom work, paid labour, utilities and miscellaneous, and operating interest. The variable costs for producing each crop were obtained from the AgriProfit\$ Benchmarks that Alberta Agriculture and Rural Development publishes each year. The fixed costs include taxes, water rates, licenses, insurance and depreciation on farm equipment and buildings.

#### **(1) Variable costs on irrigated land**

The variable costs per hectare of major crops on irrigated land in Southern Alberta for the years 2004 to 2008 are shown in Table 12. On irrigated land, variable costs for silage more than doubled over the five-year period. For cereals (barley, CPS wheat, durum, spring wheat, oats, and soft wheat), variable costs increased by 40-60% over this period. Variable costs for cereal crops were considerably higher in 2008 than they were during the 2004 - 2007 period.

Sugar beets and potatoes are high-cost crops: the variable costs of sugar beets increased from \$1320/ha to \$1635/ha from 2004 to 2008, and variable costs of potato production soared from \$2725/ha to \$4438/ha from 2004 to 2008. On average, variable costs of crop production on irrigated land increased by more than 50% from 2004 to 2008 (Table 12). The variable costs for each crop were assumed to be the same among the four sub-basins.

## **(2) Variable costs on dryland**

The data on variable costs of dryland crop production were available by soil types: brown, dark brown and black. The total variable costs of producing each of the seven dryland crops are shown in Table 13. The Bow River sub-basin consists of 45% brown soil and 55% black soil (Table 14). The Oldman River sub-basin consists of 61.3% dark brown soil and 38.7% brown soil. The Red Deer River sub-basin consists of 66.7% brown soil, 22.2% dark brown and 11.1% black soil. Soil in the South Saskatchewan River sub-basin is completely brown. Since the variable costs of producing each crop differ by soil zone and the proportions of each soil zone in the four sub-basins are different, the variable costs of producing each of the seven crops in each sub-basin were computed on the basis of the relative proportion that they contained of each soil zone (Table 15). The variable costs of dryland cropping increased slightly over the 2004 to 2007 period, with significant increases in 2008. For example, the average variable costs of durum in the four sub-basins slightly increased from \$231/ha in 2004 to \$282/ha in 2007, then soared to \$448/ha in 2008.

## **(3) Fixed costs on irrigated land**

At the time of writing, data for fixed costs in 2008 were not yet available so fixed cost data for 2007 were also assumed to apply in 2008. Data on fixed costs were not available for the production of grass hay, tame pasture, timothy hay and potatoes during the years of the study. Therefore, fixed costs for tame pasture, timothy hay and potatoes were held constant at their 2004 level; fixed costs for grass hay were assumed to be the same as that for alfalfa hay. Data on fixed costs most major crops (such as barley, spring wheat, alfalfa hay and beans) were available but they show no clear trends over the five year period (Table 16). For example, fixed costs on irrigated land for barley decreased from \$159/ha in 2004 to \$139/ha in 2008 and,

fixed costs for beans decreased from \$315/ha in 2004 to \$51/ha in 2008. The fixed costs of potatoes on irrigated land was \$1033/ha.

#### (4) Fixed costs on dryland

The fixed costs of dryland crop production were available by soil zone (Table 17). These were converted to fixed costs of each crop in each sub-basin on the basis of the proportion of each soil zone in each sub-basin (Table 18).

#### Calculation of Producers' Surplus from Irrigation

The producers' surplus from irrigation in crop production is defined as the difference between the net revenues of crop production on irrigated land and the estimated net revenues of crop production under no irrigation. The net revenues are calculated as gross revenues minus variable costs. Fixed costs are excluded from the calculation because they are affected by the level of profitability of the enterprise. The method used to calculate the producers' surplus of irrigation water in sub-basins of Southern Alberta is described in Equations 1-3.

$$PS_t = RI_t - RD_t \quad (1)$$

$$RI_t = AI_{ist} * YI_i * P_{it} - AI_{ist} * VCI_{it} \quad (2)$$

$$RD_t = AD_{dst} * YD_d * P_{it} - AD_{dst} * VCD_{dst} \quad (3)$$

where:

$PS_t$  is producers' surplus from irrigation in year t (t=2004...2008);

$RI_t$  is net revenues on irrigated land in year t (t=2004...2008);

$RD_t$  is net revenues on dryland in year t (t=2004...2008);

$AI_{ist}$  is area irrigated for crop i (i=1 ... 16) in sub-basin s (s=1...4) in year t (t=2004...2008);

$YI_c$  is average crop yield on irrigated land for crop i (i=1...16);

$P_{it}$  is price for crop i (i=1...16) in year t (t=2004...2008);

$VCI_{it}$  is variable cost of production on irrigated land for crop i (i=1...16) in year t (t=2004...2008);

$Y_d$  is crop yields on dryland for crop d (d=1...7);

$AD_{dst}$  is area dryland for crop d (d=1...7) in sub-basin s (s=1...4) in year t (t=2004...2008);

$VCD_{dst}$  is variable costs of production on dryland for crop  $d$  ( $d=1\dots7$ ) in sub-basin  $s$  ( $s=1\dots4$ ) in year  $t$  ( $t=2004\dots2008$ ).

## **Results**

### **(1) Net revenue of crops on irrigated land**

The net revenues of each of the 16 crops in each of the sub-basins for each of the five years are presented in Table 19. These calculations are based on the area of each crop in hectares times yield times price minus variable costs of production. The net revenues of the 16 crops in each sub-basin are then summed to get the total net revenue of the crops under irrigation in the irrigation districts of Southern Alberta in each of the years. The total net revenue on irrigated land increased from \$273.67 million in 2004 to \$336.55 million in 2008. From 2004 to 2007, the total net revenues on irrigated land were fairly stable but it increased greatly in 2008 due, in part, to much higher commodity prices that year. However, the net returns for individual crops varied throughout the five-year period. For example, the net returns from potatoes declined from \$81.09 million in 2005 to just \$35.47 million in 2008. The situation with durum and spring wheat was just the opposite, increasing from \$14.30 and \$12.63 million, respectively, in 2004 to \$53.20 and \$48.01 million in 2008. Canola went from \$0.46 million in 2006 to \$31.74 million in 2008.

### **(2) Net revenue of crops on dryland**

If irrigation was unavailable and the presently irrigated land was planted on dryland to crops that are the norm in neighbouring areas, the net revenues from cropping activities would be much lower than on irrigated land (Table 20). The highest net revenue would have been in 2008 due to the very high crop prices that year. However, the net revenue would have been only \$92.88 million, as compared to the \$336.55 million on equivalent irrigated area. In 2006, the dryland crops would have produced only \$16.34 million in net revenue as compared to \$244.24 million on irrigated land. Several dryland crops, including canola, feed peas and alfalfa hay would not have covered the variable costs of production during many of those five years. Net revenue of canola varied from a loss of \$1.10 million in 2006 to a high of \$2.54 million in 2008. Total revenues from feed peas did not cover variable costs of production during four of the five years and just about equaled variable costs of production in one year

(2004). On the other hand, production of cereal crops would have covered their variable costs of production during most years.

### **(3) Producers' surplus from irrigation**

The producers' surplus from irrigation water was defined as the difference between net revenues on irrigated land and net revenues if that land had not been irrigated. The producers' surpluses of irrigation water to this land for each sub-basin for each of the five years are shown in Table 21. The producers' surplus was surprisingly stable over the five-year period, ranging from a low of \$212.5 million in 2007 to a high of about \$255 million in 2005. The Oldman River sub-basin contributed more than 45% of the producers' surplus of irrigation in the irrigation districts of Southern Alberta.

## **Conclusions**

The producers' surplus from irrigation water applied to crop production in irrigation districts in Southern Alberta appear to be remarkably stable over the years even when considering relatively large annual changes in farm output and input prices. During the five years of the analysis, despite quite dramatic changes in output and input prices and fairly large changes in patterns of crop production, the average annual net benefit from irrigation was \$228.2 million with the lowest during those five years being \$212.5 million in 2007 and the highest being \$255 million in 2005. This is an annual average of about \$430 per hectare planted.

It is obvious that irrigation plays an important role in crop production in Southern Alberta. The revenue from crop production on dryland is much lower than that on irrigated land, as shown in Figure 5.

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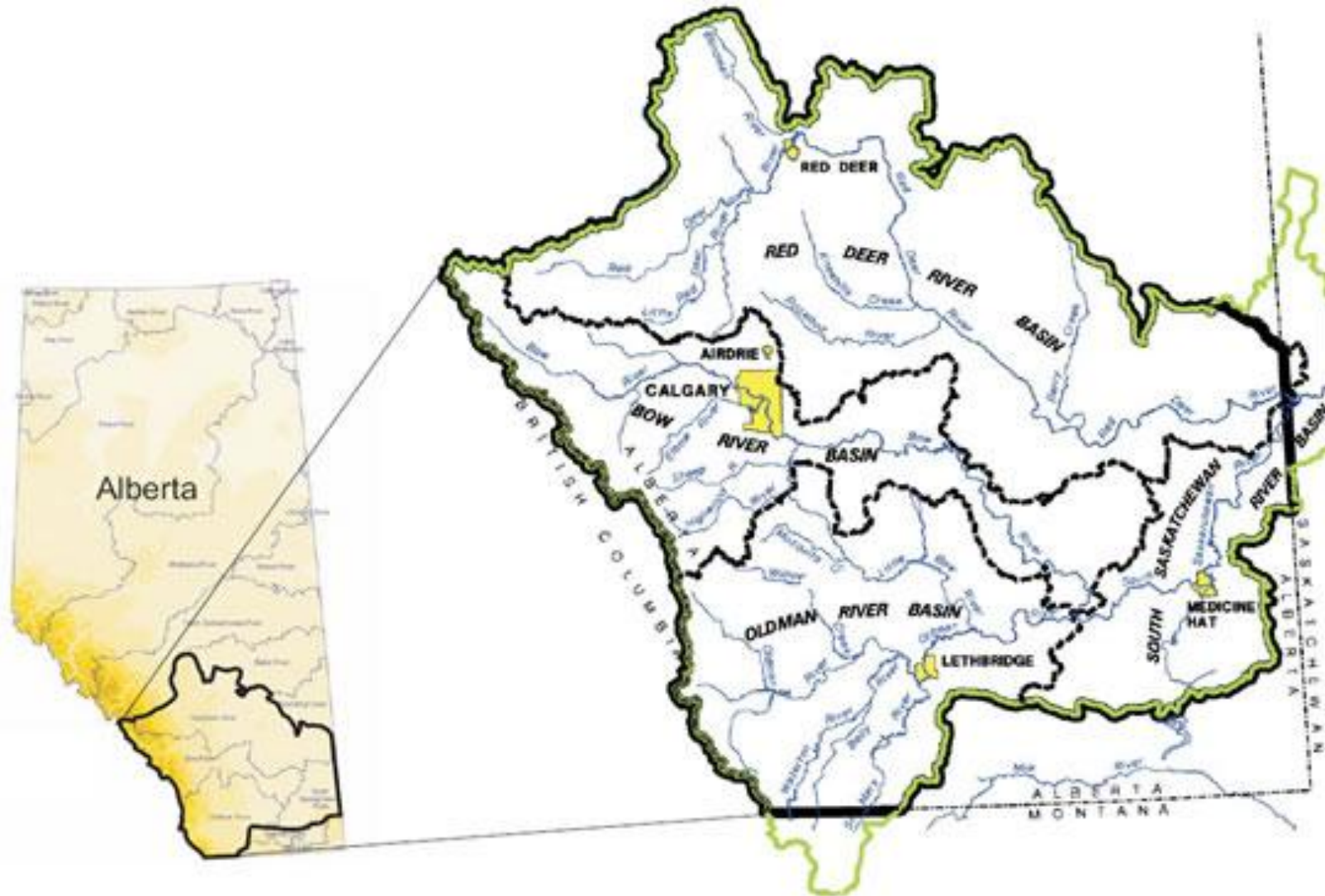
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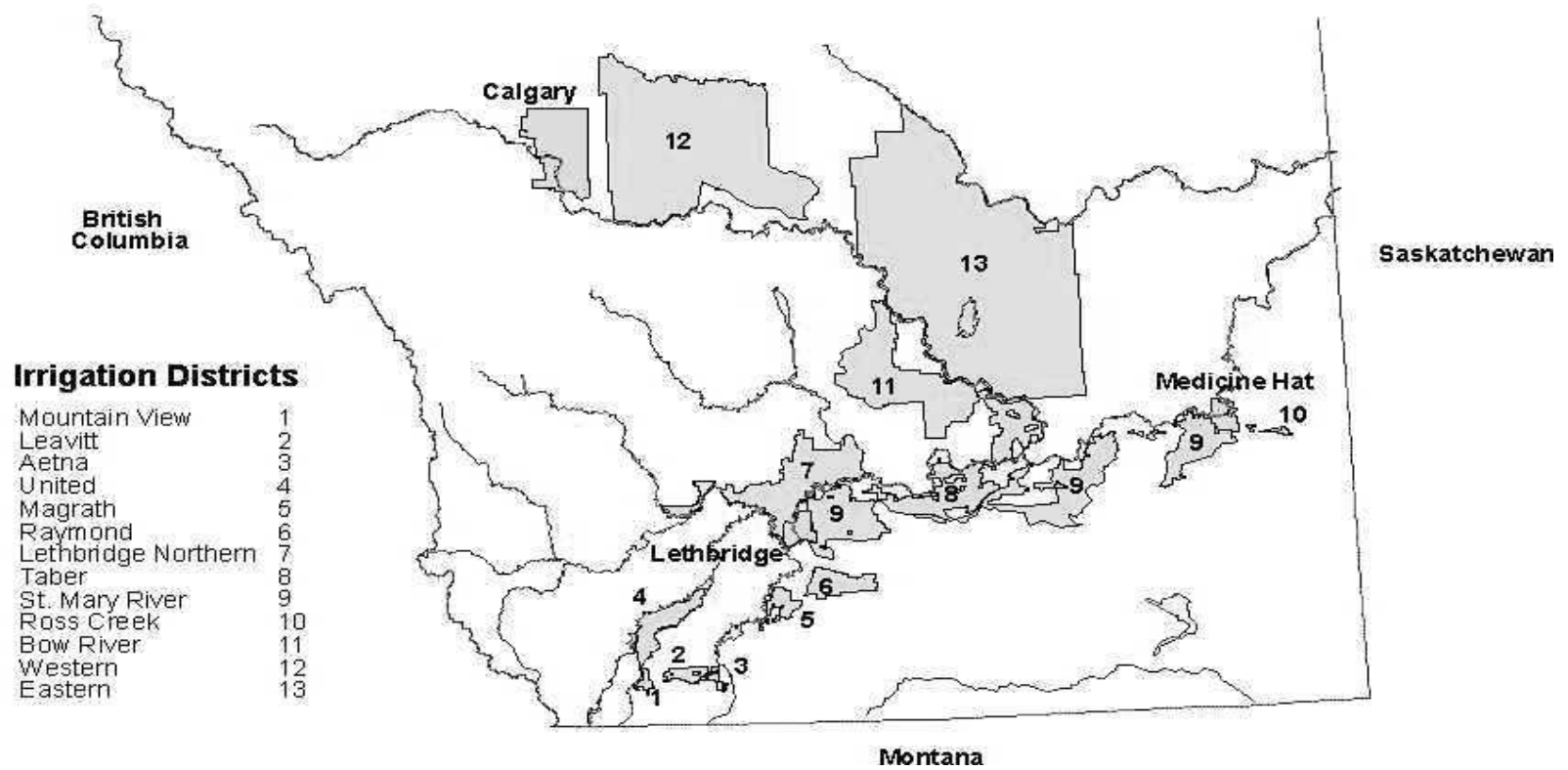
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Source : Government of Alberta, Environment.

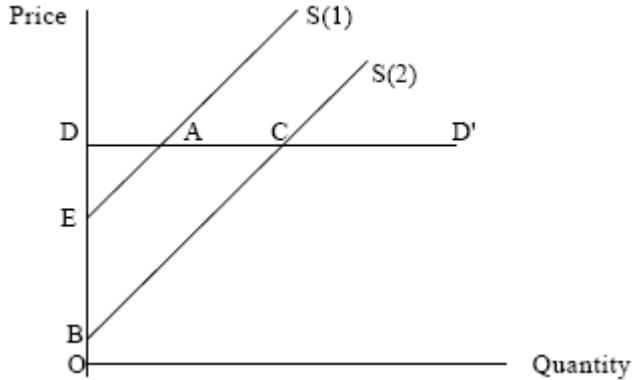
**Figure 1. South Saskatchewan River Basin (SSRB)**



Source: <http://www.agric.gov.ab.ca/irrigate/irrbase.html>

**Figure 2. Southern Alberta's 13 Irrigation Districts**

**Figure 3. Concept of Producer Surplus**



Source: Gardner Pinfold Consulting Economists Limited et al, 2002

**Figure 4. Flowchart Showing Procedure for Calculating Producers' surplus from Irrigation**

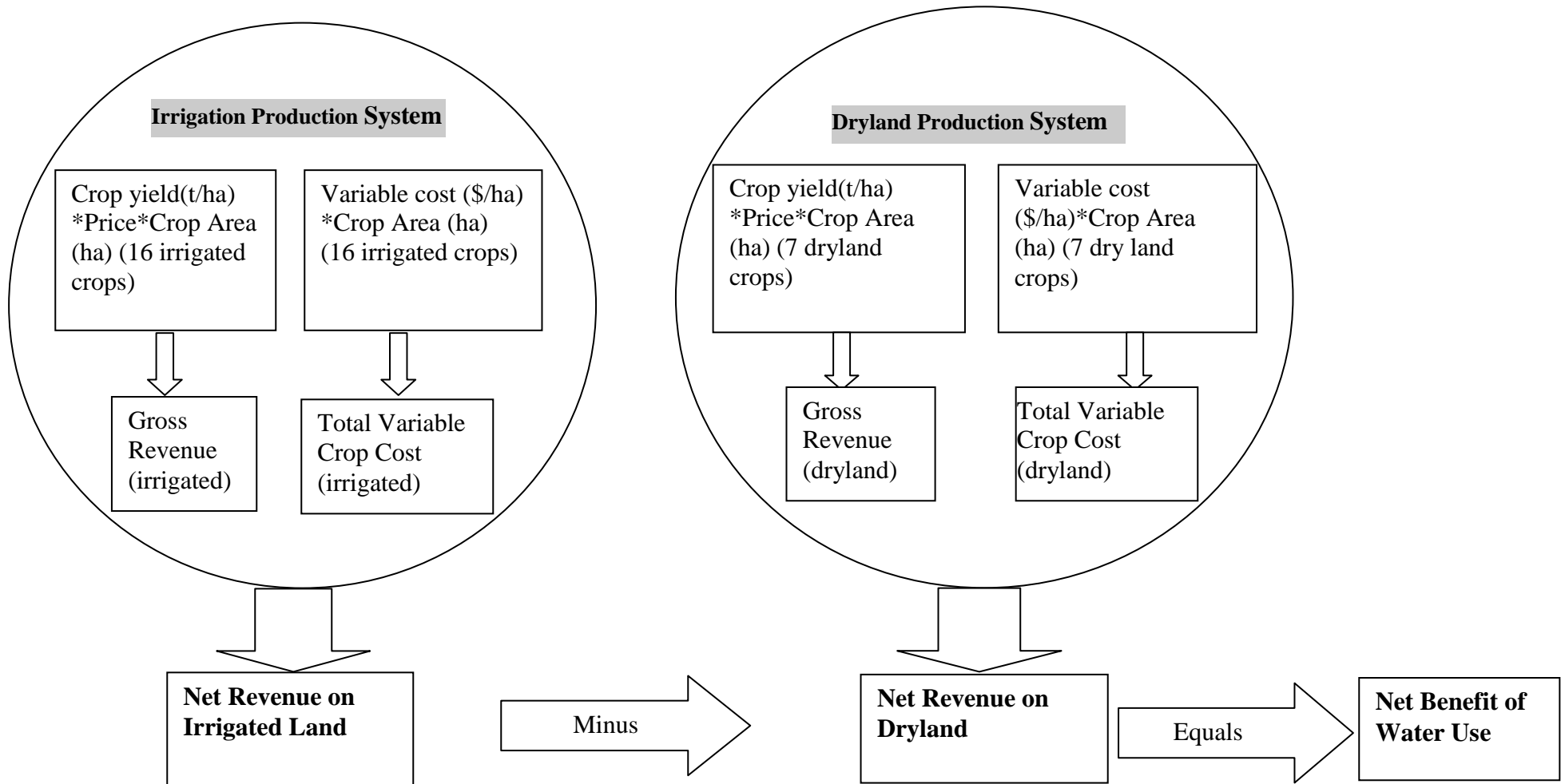
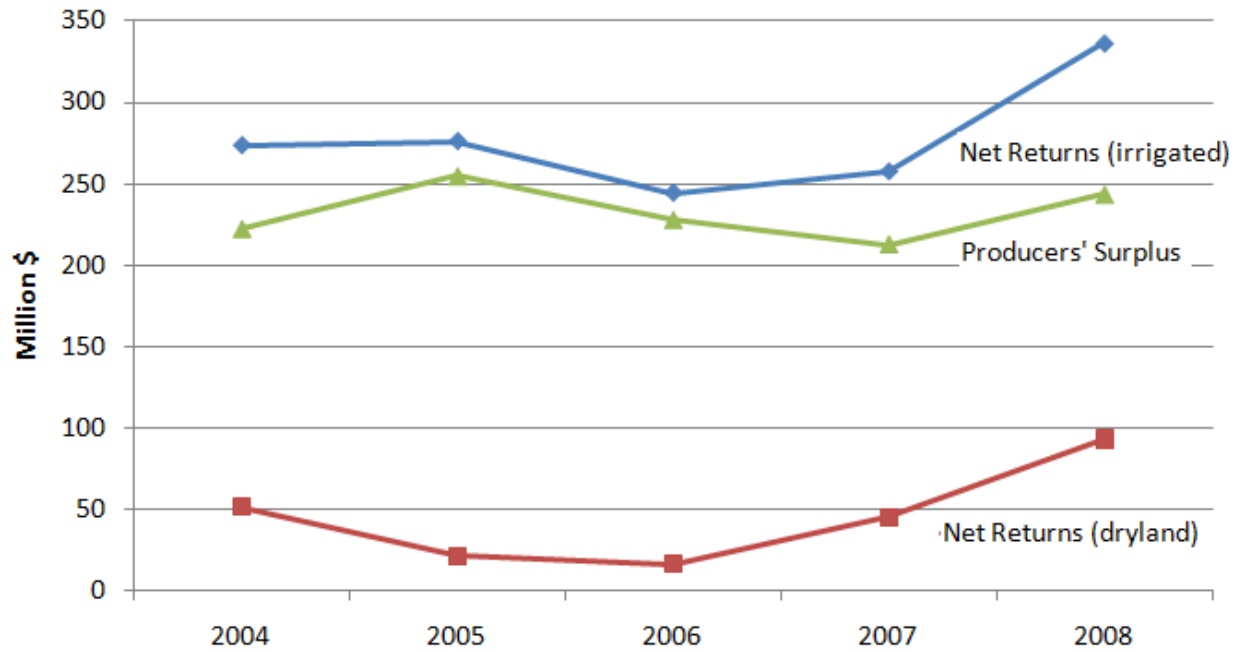


Figure 5. Trends in Net Returns from Irrigated and Dryland Crops and Producers' Surplus from Irrigation



**Table 1. Crop Prices from 2004 to 2008 (\$/Mt)**

	Barley	CPS Wheat	Durum	Spring Wheat	Oats	Soft Wheat	Alfalfa	Barley Silage	Corn Silage	Grass Hay	Tame Pasture	Timothy	Canola	Beans	Potatoes	Sugar Beets	Feed Peas
<b>2004</b>	136	206	224	206	137	206	65	43	43	65	65	126	387	495	168	44	145
<b>2005</b>	112	190	201	190	131	190	60	26	26	60	120	140	309	650	215	45	95
<b>2006</b>	110	183	181	183	144	183	67	44	44	67	90	154	278	495	189	40	112
<b>2007</b>	165	209	223	209	193	209	76	33	33	76	111	168	370	520	200	45	177
<b>2008</b>	214	369	510	369	233	369	90	27	27	90	111	183	553	725	191	42	187
<b>Increased by*</b>	0.58	0.79	1.27	0.79	0.70	0.79	0.38	-0.37	-0.37	0.38	0.71	0.45	0.43	0.46	0.14	-0.06	0.29

Note: \*= (price in 2008- price in 2004)/ price in 2004

Source: Canada: Grains and Oilseeds Supply and Disposition (2005-2009)

Ministry of Agriculture, Food and Rural affairs

Canada: Pulse and Special Crops Outlook (Agriculture and Agri-Food Canada)

Service Bulletin Canadian Potato Production (July 2009)

Service Bulletin Canadian Potato Production (Jan 2007)

Commodity Price Lists (2004-2008) Agriculture Financial Services Corporation (AFSC)

AgriProfit\$ Benchmarks for Alberta Crop and Forage Producers 2004-2007(AAFRD)

**Table 2. Irrigated Cropped Area in Sub-basins of Alberta from 2004 to 2008 (Ha)**

		Barley	CPS Wheat	Durum	Spring Wheat	Oats	Soft Wheat	Alfalfa Hay	Barley Silage	Corn Silage	Grass Hay	Tame Pasture	Timothy Hay	Canola	Beans	Potatoes	Sugar Beets	TOTAL
<b>2004</b>	<b>Bow</b>	10,805	2,440	2,890	9,408	849	4,418	24,765	5,212	1,995	2,107	16,680	2,547	10,642	3,845	3,298	3,327	<b>105,227</b>
	<b>Oldman</b>	35,033	2,243	13,319	13,660	929	8,634	41,658	22,395	9,971	5,982	15,770	9,207	20,835	14,173	9,867	9,286	<b>232,963</b>
	<b>Red Deer</b>	6,887	1,980	449	6,380	624	638	20,264	4,676	1,161	1,404	15,133	1,013	7,263	1,384	1,185	515	<b>70,955</b>
	<b>S. Sask</b>	9,424	1,216	7,998	6,815	281	4,565	12,436	5,002	1,855	1,814	6,392	2,950	11,080	9,936	4,569	3,357	<b>89,690</b>
	<b>TOTAL</b>	<b>62,151</b>	<b>7,879</b>	<b>24,656</b>	<b>36,263</b>	<b>2,684</b>	<b>18,255</b>	<b>99,123</b>	<b>37,285</b>	<b>14,981</b>	<b>11,306</b>	<b>53,975</b>	<b>15,717</b>	<b>49,820</b>	<b>29,338</b>	<b>18,919</b>	<b>16,484</b>	<b>498,834</b>
<b>2005</b>	<b>Bow</b>	10,540	1,593	3,279	13,243	569	4,112	24,617	3,823	2,231	2,083	17,901	2,087	9,830	4,643	3,425	3,381	<b>105,240</b>
	<b>Oldman</b>	29,895	1,436	13,091	17,276	648	7,784	40,496	24,871	10,045	6,209	16,230	8,559	20,222	14,684	9,792	10,059	<b>231,108</b>
	<b>Red Deer</b>	6,948	1,281	363	8,273	477	694	20,410	2,987	1,308	1,685	15,790	949	5,808	908	1,331	419	<b>67,833</b>
	<b>S. Sask</b>	8,582	381	7,335	8,336	348	3,538	12,100	5,088	1,820	1,989	6,152	3,033	9,929	10,624	4,610	4,044	<b>89,219</b>
	<b>TOTAL</b>	<b>55,965</b>	<b>4,691</b>	<b>24,068</b>	<b>47,127</b>	<b>2,043</b>	<b>16,127</b>	<b>97,623</b>	<b>36,771</b>	<b>15,403</b>	<b>11,965</b>	<b>56,073</b>	<b>14,628</b>	<b>45,789</b>	<b>30,860</b>	<b>19,159</b>	<b>17,903</b>	<b>493,400</b>
<b>2006</b>	<b>Bow</b>	10,876	1,489	1,701	14,467	805	3,697	23,702	4,229	2,200	2,984	16,769	1,838	8,876	3,885	3,397	3,668	<b>104,581</b>
	<b>Oldman</b>	31,304	1,190	8,870	22,213	792	7,212	40,544	25,985	9,839	6,423	16,299	7,916	18,179	14,190	10,505	10,785	<b>232,243</b>
	<b>Red Deer</b>	7,287	1,407	216	7,969	603	428	19,711	3,141	1,323	2,061	15,177	860	4,531	622	1,267	242	<b>66,846</b>
	<b>S. Sask</b>	7,964	380	4,629	13,612	226	3,072	11,123	4,699	2,101	1,852	5,787	2,543	8,759	9,589	4,888	3,594	<b>84,817</b>
	<b>TOTAL</b>	<b>57,431</b>	<b>4,466</b>	<b>15,416</b>	<b>58,261</b>	<b>2,425</b>	<b>14,409</b>	<b>95,079</b>	<b>38,053</b>	<b>15,463</b>	<b>13,319</b>	<b>54,033</b>	<b>13,156</b>	<b>40,345</b>	<b>28,286</b>	<b>20,057</b>	<b>18,288</b>	<b>488,487</b>
<b>2007</b>	<b>Bow</b>	13,525	827	1,679	12,076	437	3,726	22,072	3,887	2,928	2,464	15,795	1,337	11,393	4,266	3,342	3,469	<b>103,223</b>
	<b>Oldman</b>	36,857	838	10,144	18,622	707	7,402	39,977	24,833	10,481	4,988	17,017	6,387	21,221	13,309	11,265	9,390	<b>233,436</b>
	<b>Red Deer</b>	9,507	628	208	6,844	287	263	18,653	2,554	2,040	2,453	14,222	728	6,279	715	1,126	761	<b>67,268</b>
	<b>S. Sask</b>	10,325	36	6,258	10,620	168	3,376	11,754	3,776	3,035	1,793	6,058	2,146	11,500	8,614	4,832	3,404	<b>87,695</b>
	<b>TOTAL</b>	<b>70,214</b>	<b>2,329</b>	<b>18,290</b>	<b>48,161</b>	<b>1,599</b>	<b>14,766</b>	<b>92,456</b>	<b>35,050</b>	<b>18,484</b>	<b>11,698</b>	<b>53,092</b>	<b>10,599</b>	<b>50,394</b>	<b>26,904</b>	<b>20,565</b>	<b>17,024</b>	<b>491,622</b>
<b>2008</b>	<b>Bow</b>	9,767	989	4,714	17,122	531	3,214	19,273	2,692	2,379	1,489	16,427	802	16,667	3,968	3,483	1,724	<b>105,240</b>
	<b>Oldman</b>	29,503	900	15,835	23,383	714	8,063	38,091	20,541	10,799	4,687	15,238	5,358	29,046	12,307	10,377	6,268	<b>231,108</b>
	<b>Red Deer</b>	6,859	920	725	10,026	487	243	16,032	1,908	1,638	1,498	14,521	538	10,097	830	1,354	158	<b>67,833</b>
	<b>S. Sask</b>	8,697	146	8,847	11,435	319	5,119	10,429	2,084	2,840	1,477	5,545	1,225	16,109	7,911	5,058	1,977	<b>89,219</b>
	<b>TOTAL</b>	<b>54,825</b>	<b>2,955</b>	<b>30,122</b>	<b>61,967</b>	<b>2,051</b>	<b>16,639</b>	<b>83,824</b>	<b>27,226</b>	<b>17,655</b>	<b>9,151</b>	<b>51,730</b>	<b>7,922</b>	<b>71,919</b>	<b>25,015</b>	<b>20,272</b>	<b>10,127</b>	<b>493,400</b>
<b>Average</b>		<b>60,117</b>	<b>4,464</b>	<b>22,510</b>	<b>50,356</b>	<b>2,160</b>	<b>16,039</b>	<b>93,621</b>	<b>34,877</b>	<b>16,397</b>	<b>11,488</b>	<b>53,781</b>	<b>12,404</b>	<b>51,653</b>	<b>28,081</b>	<b>19,794</b>	<b>15,965</b>	<b>493,149</b>

Note: "Average" refers to the average number of total cropped area along all the four sub-basins for each crop during the five years.

Source: Alberta Irrigation Information 2004 - 2008 (AAFRD)

**Table 3. Estimated Irrigated Cropped Area Replaced by Dryland Crops in Alberta from 2004 to 2008 (Ha)**

	River Basin	Durum	Spring Wheat	Barley	Oats	Canola	Feed Peas	Alfalfa Hay	TOTAL
<b>2004</b>	<b>Bow</b>	3,215	22,801	43,493	6,305	9,708	3,468	16,238	<b>105,227</b>
	<b>Oldman</b>	23,184	75,176	85,189	8,718	6,828	6,425	27,442	<b>232,963</b>
	<b>Red Deer</b>	2,441	18,544	22,602	5,985	7,414	1,966	12,003	<b>70,955</b>
	<b>S. Sask</b>	26,370	42,856	7,832	4,603	0	3,463	4,566	<b>89,690</b>
	<b>TOTAL</b>	<b>55,210</b>	<b>159,376</b>	<b>159,116</b>	<b>25,612</b>	<b>23,950</b>	<b>15,322</b>	<b>60,248</b>	<b>498,834</b>
<b>2005</b>	<b>Bow</b>	3,280	23,263	44,373	6,433	9,905	3,538	16,567	<b>105,240</b>
	<b>Oldman</b>	23,018	74,638	84,579	8,656	6,779	6,379	27,245	<b>231,108</b>
	<b>Red Deer</b>	2,396	18,198	22,181	5,873	7,276	1,930	11,780	<b>67,833</b>
	<b>S. Sask</b>	25,847	42,005	7,677	4,512	0	3,394	4,475	<b>89,219</b>
	<b>TOTAL</b>	<b>54,540</b>	<b>158,104</b>	<b>158,810</b>	<b>25,474</b>	<b>23,959</b>	<b>15,241</b>	<b>60,067</b>	<b>493,400</b>
<b>2006</b>	<b>Bow</b>	3,195	22,661	43,226	6,266	9,649	3,446	16,138	<b>104,581</b>
	<b>Oldman</b>	23,112	74,944	84,926	8,692	6,807	6,406	27,357	<b>232,243</b>
	<b>Red Deer</b>	2,300	17,470	21,293	5,638	6,984	1,853	11,308	<b>66,846</b>
	<b>S. Sask</b>	24,938	40,528	7,407	4,353	0	3,275	4,318	<b>84,817</b>
	<b>TOTAL</b>	<b>53,545</b>	<b>155,602</b>	<b>156,851</b>	<b>24,950</b>	<b>23,440</b>	<b>14,979</b>	<b>59,121</b>	<b>488,487</b>
<b>2007</b>	<b>Bow</b>	3,153	22,367	42,664	6,185	9,523	3,402	15,929	<b>103,223</b>
	<b>Oldman</b>	23,231	75,329	85,362	8,736	6,842	6,438	27,497	<b>233,436</b>
	<b>Red Deer</b>	2,315	17,580	21,428	5,674	7,028	1,864	11,379	<b>67,268</b>
	<b>S. Sask</b>	25,784	41,902	7,658	4,501	0	3,386	4,464	<b>87,695</b>
	<b>TOTAL</b>	<b>54,483</b>	<b>157,178</b>	<b>157,112</b>	<b>25,096</b>	<b>23,394</b>	<b>15,090</b>	<b>59,270</b>	<b>491,622</b>
<b>2008</b>	<b>Bow</b>	3,215	22,804	43,498	6,306	9,709	3,468	16,240	<b>105,240</b>
	<b>Oldman</b>	22,999	74,578	84,511	8,649	6,774	6,374	27,223	<b>231,108</b>
	<b>Red Deer</b>	2,334	17,728	21,608	5,722	7,087	1,880	11,475	<b>67,833</b>
	<b>S. Sask</b>	26,232	42,631	7,791	4,579	0	3,445	4,542	<b>89,219</b>
	<b>TOTAL</b>	<b>54,780</b>	<b>157,740</b>	<b>157,407</b>	<b>25,256</b>	<b>23,570</b>	<b>15,167</b>	<b>59,480</b>	<b>493,400</b>
<b>Average</b>		<b>54,512</b>	<b>157,600</b>	<b>157,859</b>	<b>25,278</b>	<b>23,663</b>	<b>15,160</b>	<b>59,637</b>	<b>493,149</b>

Note: “Average” refers to the average number of total cropped area along all the four sub-basins for each crop during the five years.

Source: Own Calculation

**Table 4. Crop Yield on Irrigated Land (5 year average 2000-2004) (Mt/Ha)**

<b>CROPS</b>	<b>Barley</b>	<b>CPS Wheat</b>	<b>Durum</b>	<b>Spring Wheat</b>	<b>Oats</b>	<b>Soft Wheat</b>	<b>Alfalfa Hay</b>	<b>Barley Silage</b>	<b>Corn Silage</b>	<b>Grass Hay</b>	<b>Tame Pasture</b>	<b>Timothy Hay</b>	<b>Canola</b>	<b>Beans</b>	<b>Potatoes</b>	<b>Sugar Beets</b>
<b>Bow</b>	4.4	4.4	4.8	4.1	3.1	4.4	12.4	29.1	43.0	9.9	9.9	9.9	2.5	2.3	28.9	44.9
<b>Oldman</b>	5.2	5.0	5.1	4.2	6.2	5.5	12.4	29.1	43.0	9.9	9.9	9.9	2.4	2.4	33.3	48.1
<b>Red Deer</b>	4.5	4.5	4.8	4.2	2.9	4.8	12.4	29.1	43.0	9.9	9.9	9.9	2.5	2.2	31.1	48.4
<b>S. Sask</b>	4.9	4.3	5.3	4.6	3.6	5.7	12.4	29.1	43.0	9.9	9.9	9.9	2.3	2.4	33.3	47.9
<b>Average</b>	<b>4.8</b>	<b>4.5</b>	<b>5.0</b>	<b>4.3</b>	<b>3.9</b>	<b>5.1</b>	<b>12.4</b>	<b>29.1</b>	<b>43.0</b>	<b>9.9</b>	<b>9.9</b>	<b>9.9</b>	<b>2.4</b>	<b>2.4</b>	<b>31.6</b>	<b>47.3</b>

Source: Rob Cruickshank. Research Analyst, Alberta Financial Services Corporation. Personal Communication, February 2004.

**Table 5. Crop Yield on Dry Land (5 year average 2000-2004) (Mt/Ha)**

<b>CROPS</b>	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
<b>Bow</b>	1.9	2.1	2.4	2.2	1.1	1.8	1.8
<b>Oldman</b>	1.9	2.1	2.4	2.2	1.1	1.8	1.8
<b>Red Deer</b>	1.7	2.0	2.2	2.2	1.1	1.7	2.5
<b>S. Sask</b>	1.6	1.3	1.5	2.2	0.8	1.2	1.8
<b>Average</b>	1.8	1.9	2.1	2.2	1.0	1.6	2.0

Source: Rob Cruickshank. Research Analyst, Alberta Financial Services Corporation. Personal Communication, February 2004.

**Table 6a: Production Costs (\$/Ha) on Irrigated Land, 2004**

	Barley	CPS Wheat	Durum	Spring Wheat	Oats	Soft Wheat	Alfalfa Hay	Barley Silage	Corn Silage	Grass Hay	Tame Pasture	Timothy Hay	Canola	Beans	Potatoes	Sugar Beets
Seed	27	37	37	31	27	38	27	28	28	27	0	6	65	92	507	123
Fertilizer	111	153	153	150	111	164	34	68	68	34	198	250	153	143	371	123
Chemical	48	65	65	70	48	66	2	24	24	2	0	37	112	203	379	211
Crop Insurance	15	28	28	18	15	25	0	3	3	0	0	0	52	67	80	50
Trucking & Marketing	4	5	5	5	4	5	3	0	0	3	0	49	6	3	51	194
Fuel, Oil & Lube	37	44	44	49	37	36	20	36	36	20	0	53	44	67	213	98
Machinery Repairs	49	61	61	72	49	42	27	24	24	27	0	95	36	76	462	134
Building Repairs	7	3	3	1	7	3	47	12	12	47	0	0	4	2	45	6
Irrigation Fuel and Electricity	36	51	51	51	36	48	41	20	20	41	48	48	61	47	36	67
Custom Work	58	36	36	10	58	40	45	50	50	45	0	131	46	42	97	113
Paid Labour	40	47	47	18	40	32	17	40	40	17	22	0	16	97	48	108
Utilities & Miscellaneous	30	33	33	41	30	49	42	17	17	42	0	79	50	40	407	80
Operating Interest	12	5	5	12	12	8	23	8	8	23	14	14	15	7	31	14
<b>Total Variable cost</b>	<b>473</b>	<b>568</b>	<b>568</b>	<b>527</b>	<b>473</b>	<b>556</b>	<b>328</b>	<b>329</b>	<b>329</b>	<b>328</b>	<b>282</b>	<b>763</b>	<b>659</b>	<b>885</b>	<b>2725</b>	<b>1320</b>
Taxes, Water Rates, License & Ins.	38	59	59	62	38	53	48	36	36	48	45	45	69	66	138	45
Equip't. & Bldg : Depreciation	122	187	187	150	122	164	126	74	74	126	136	124	147	249	896	207
<b>Total Fixed Costs</b>	<b>159</b>	<b>247</b>	<b>247</b>	<b>213</b>	<b>159</b>	<b>218</b>	<b>174</b>	<b>110</b>	<b>110</b>	<b>174</b>	<b>181</b>	<b>168</b>	<b>216</b>	<b>315</b>	<b>1033</b>	<b>252</b>
<b>Total Costs</b>	<b>633</b>	<b>815</b>	<b>815</b>	<b>740</b>	<b>633</b>	<b>774</b>	<b>502</b>	<b>439</b>	<b>439</b>	<b>502</b>	<b>463</b>	<b>932</b>	<b>875</b>	<b>1200</b>	<b>3759</b>	<b>1572</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 6b: Production Costs (\$/ha) of Crops on Irrigated Land, 2005**

	Barley	CPS Wheat	Durum	Spring Wheat	Oats	Soft Wheat	Alfalfa Hay	Barley Silage	Corn Silage	Grass Hay	Tame Pasture	Timothy Hay	Canola	Beans	Potatoes	Sugar Beets
Seed	32	43	43	40	32	28	12	11	11	12	0	3	65	149	507	116
Fertilizer	125	149	149	133	125	141	45	59	59	45	198	211	153	119	371	118
Chemical	58	68	68	80	58	43	0	5	5	0	0	37	112	189	379	223
Crop Insurance	21	32	32	31	21	27	0	0	0	0	0	26	52	83	80	53
Trucking & Marketing	17	21	21	12	17	19	25	0	0	25	0	74	6	9	51	234
Fuel, Oil & Lube	39	51	51	76	39	39	71	40	40	71	0	51	44	65	213	136
Machinery Repairs	42	84	84	81	42	30	122	33	33	122	0	14	36	91	462	131
Building Repairs	6	3	3	4	6	7	0	7	7	0	0	2	4	7	45	13
Irrigation Fuel and Electricity	16	38	38	19	16	22	58	54	54	58	48	86	61	28	36	42
Custom Work	18	13	13	5	18	44	0	3	3	0	0	99	46	4	97	82
Paid Labour	28	60	60	56	28	11	38	20	20	38	22	99	16	67	48	137
Utilities & Miscellaneous	33	39	39	39	33	42	68	27	27	68	0	9	50	38	407	89
Operating Interest	6	27	27	12	6	1	17	10	10	17	14	7	15	23	31	28
<b>Total Variable cost</b>	<b>441</b>	<b>629</b>	<b>629</b>	<b>588</b>	<b>441</b>	<b>455</b>	<b>457</b>	<b>270</b>	<b>270</b>	<b>457</b>	<b>282</b>	<b>718</b>	<b>659</b>	<b>873</b>	<b>2725</b>	<b>1403</b>
Taxes, Water Rates, License & Ins.	34	48	48	74	34	25	30	38	38	30	45	45	69	52	138	52
Equip't. & Bldg : Depreciation	163	66	66	158	163	121	207	97	97	207	0	124	147	100	896	238
<b>Total Fixed Costs</b>	<b>197</b>	<b>114</b>	<b>114</b>	<b>232</b>	<b>197</b>	<b>146</b>	<b>236</b>	<b>135</b>	<b>135</b>	<b>236</b>	<b>45</b>	<b>168</b>	<b>216</b>	<b>152</b>	<b>1033</b>	<b>291</b>
<b>Total Costs</b>	<b>638</b>	<b>743</b>	<b>743</b>	<b>819</b>	<b>638</b>	<b>601</b>	<b>693</b>	<b>405</b>	<b>405</b>	<b>693</b>	<b>327</b>	<b>886</b>	<b>875</b>	<b>1025</b>	<b>3759</b>	<b>1693</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 6c: Production Costs (\$/ha) of Crops on Irrigated Land, 2006**

	Barley	CPS Wheat	Durum	Spring Wheat	Oats	Soft Wheat	Alfalfa Hay	Barley Silage	Corn Silage	Grass Hay	Tame Pasture	Timothy Hay	Canola	Beans	Potatoes	Sugar Beets
Seed	25	37	37	31	25	40	6	25	25	6	0	3	62	104	494	119
Fertilizer	136	201	201	201	136	201	20	79	79	20	198	211	206	86	414	136
Chemical	62	70	70	70	62	70	4	22	22	4	0	37	98	159	593	218
Crop Insurance	21	16	16	15	21	15	0	17	17	0	0	26	15	30	2	66
Trucking & Marketing	147	4	4	4	147	4	2	0	0	2	0	74	4	34	161	301
Fuel, Oil & Lube	59	51	51	51	59	51	86	77	77	86	0	51	51	72	148	157
Machinery Repairs	53	44	44	44	53	44	90	53	53	90	0	14	44	39	148	126
Building Repairs	7	5	5	5	7	5	4	5	5	4	0	2	5	0	49	12
Irrigation Fuel and Electricity	17	46	46	46	17	46	47	16	16	47	48	86	46	21	138	98
Custom Work	43	17	17	17	43	17	14	11	11	14	0	99	17	0	148	32
Paid Labour	9	68	68	68	9	68	19	7	7	19	22	99	68	43	692	108
Utilities & Miscellaneous	51	35	35	35	51	35	68	43	43	68	0	9	35	12	39	66
Operating Interest	9	8	8	8	9	8	52	16	16	52	14	7	10	25	161	19
<b>Total Variable cost</b>	<b>639</b>	<b>602</b>	<b>602</b>	<b>595</b>	<b>639</b>	<b>604</b>	<b>412</b>	<b>370</b>	<b>370</b>	<b>412</b>	<b>282</b>	<b>718</b>	<b>659</b>	<b>626</b>	<b>3188</b>	<b>1457</b>
Taxes, Water Rates, License & Ins.	45	48	48	74	45	25	31	34	34	31	45	45	31	3	138	44
Equip't. & Bldg : Depreciation	179	66	66	158	179	121	136	131	131	136	0	124	121	39	896	221
<b>Total Fixed Costs</b>	<b>224</b>	<b>114</b>	<b>114</b>	<b>232</b>	<b>224</b>	<b>146</b>	<b>167</b>	<b>165</b>	<b>165</b>	<b>167</b>	<b>45</b>	<b>168</b>	<b>153</b>	<b>42</b>	<b>1033</b>	<b>265</b>
<b>Total Costs</b>	<b>863</b>	<b>717</b>	<b>717</b>	<b>827</b>	<b>863</b>	<b>750</b>	<b>579</b>	<b>535</b>	<b>535</b>	<b>579</b>	<b>327</b>	<b>886</b>	<b>812</b>	<b>667</b>	<b>4221</b>	<b>1721</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 6d: Production Costs (\$/ha) of Crops on Irrigated Land, 2007**

	Barley	CPS Wheat	Durum	Spring Wheat	Oats	Soft Wheat	Alfalfa Hay	Barley Silage	Corn Silage	Grass Hay	Tame Pasture	Timothy Hay	Canola	Beans	Potatoes	Sugar Beets
Seed	36	43	43	46	36	30	19	31	31	19	0	9	65	109	684	136
Fertilizer	176	145	145	152	176	138	59	64	64	59	198	205	171	111	478	188
Chemical	70	78	78	103	70	75	0	17	17	0	0	25	60	209	966	236
Crop Insurance	35	42	42	36	35	31	0	15	15	0	0	26	50	29	35	16
Trucking & Marketing	21	45	45	22	21	0	0	0	0	0	0	74	0	35	309	210
Fuel, Oil & Lube	55	56	56	86	55	34	100	82	82	100	0	62	78	92	247	136
Machinery Repairs	53	53	53	81	53	49	97	44	44	97	0	62	30	78	177	132
Building Repairs	0	0	0	0	0	1	3	1	1	3	0	6	2	0	59	12
Irrigation Fuel and Electricity	47	60	60	60	47	52	57	57	57	57	48	86	68	38	150	62
Custom Work	32	0	0	0	32	75	20	163	163	20	0	99	38	0	156	104
Paid Labour	18	20	20	37	18	40	17	19	19	17	22	99	40	49	741	210
Utilities & Miscellaneous	64	26	26	50	64	85	73	29	29	73	0	49	30	9	111	85
Operating Interest	2	14	14	17	2	1	17	5	5	17	14	12	1	25	55	19
<b>Total Variable cost</b>	<b>609</b>	<b>580</b>	<b>580</b>	<b>691</b>	<b>609</b>	<b>610</b>	<b>463</b>	<b>527</b>	<b>527</b>	<b>463</b>	<b>282</b>	<b>815</b>	<b>633</b>	<b>784</b>	<b>4169</b>	<b>1547</b>
Taxes, Water Rates, License & Ins.	24	4	4	67	24	30	63	18	18	63	45	45	31	4	138	44
Equip't. & Bldg : Depreciation	116	65	65	181	116	112	179	144	144	179	0	124	121	47	896	221
<b>Total Fixed Costs</b>	<b>139</b>	<b>68</b>	<b>68</b>	<b>249</b>	<b>139</b>	<b>142</b>	<b>242</b>	<b>163</b>	<b>163</b>	<b>242</b>	<b>45</b>	<b>168</b>	<b>153</b>	<b>51</b>	<b>1033</b>	<b>265</b>
<b>Total Costs</b>	<b>748</b>	<b>648</b>	<b>648</b>	<b>940</b>	<b>748</b>	<b>752</b>	<b>704</b>	<b>690</b>	<b>690</b>	<b>704</b>	<b>327</b>	<b>984</b>	<b>785</b>	<b>835</b>	<b>5202</b>	<b>1811</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 6e : Production Costs (\$/ha) of Crops on Irrigated Land, 2008**

	Barley	CPS Wheat	Durum	Spring Wheat	Oats	Soft Wheat	Alfalfa Hay	Barley Silage	Corn Silage	Grass Hay	Tame Pasture	Timothy Hay	Canola	Beans	Potatoes	Sugar Beets
Seed	42	51	77	51	42	54	35	37	37	35	0	12	90	163	708	124
Fertilizer	262	280	280	280	262	280	103	262	262	103	198	267	301	234	651	251
Chemical	86	86	86	86	86	86	7	28	28	7	0	25	125	232	974	239
Crop Insurance	35	45	63	43	35	57	12	0	0	12	0	21	39	78	38	18
Trucking & Marketing	10	10	10	10	10	10	10	0	0	10	0	74	17	30	309	210
Fuel, Oil & Lube	66	66	66	66	66	66	77	77	77	77	0	77	66	111	307	169
Machinery Repairs	48	48	48	48	48	48	48	25	25	48	0	62	48	100	177	132
Building Repairs	6	6	6	6	6	6	2	2	2	2	0	6	6	6	59	12
Irrigation Fuel and Electricity	50	50	50	50	50	50	50	50	50	50	48	86	50	50	150	62
Custom Work	19	19	19	19	19	19	19	62	62	19	0	99	19	33	156	104
Paid Labour	86	86	86	86	86	86	86	86	86	86	22	99	86	210	741	210
Utilities & Miscellaneous	34	34	34	34	34	34	34	34	34	34	0	49	34	58	111	85
Operating Interest	12	12	12	12	12	12	10	10	10	10	14	12	12	16	55	19
<b>Total Variable cost</b>	<b>756</b>	<b>794</b>	<b>837</b>	<b>792</b>	<b>756</b>	<b>809</b>	<b>492</b>	<b>674</b>	<b>674</b>	<b>492</b>	<b>282</b>	<b>1087</b>	<b>894</b>	<b>1320</b>	<b>4438</b>	<b>1635</b>
Taxes, Water Rates, License & Ins.	24	4	4	67	24	30	63	18	18	63	45	45	31	4	138	44
Equip't. & Bldg : Depreciation	116	65	65	181	116	112	179	144	144	179	0	124	121	47	896	221
<b>Total Fixed Costs</b>	<b>139</b>	<b>68</b>	<b>68</b>	<b>249</b>	<b>139</b>	<b>142</b>	<b>242</b>	<b>163</b>	<b>163</b>	<b>242</b>	<b>45</b>	<b>168</b>	<b>153</b>	<b>51</b>	<b>1033</b>	<b>265</b>
<b>Total Costs</b>	<b>896</b>	<b>862</b>	<b>906</b>	<b>1041</b>	<b>896</b>	<b>951</b>	<b>733</b>	<b>836</b>	<b>836</b>	<b>733</b>	<b>327</b>	<b>1255</b>	<b>1046</b>	<b>1371</b>	<b>5471</b>	<b>1899</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 7a: Production Costs (\$/ha) on Dryland –Brown Soil, 2004**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	24	17	22	21	62	35	0
Fertilizer	56	27	17	109	72	22	0
Chemical	50	45	44	21	63	40	0
Crop Insurance	29	25	26	18	35	40	0
Trucking & Marketing	6	6	0	1	2	7	16
Fuel, Oil & Lube	14	14	37	8	22	15	9
Machinery Repairs	16	13	60	23	35	17	21
Building Repairs	3	4	0	0	1	2	0
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	1	4	21	32	13	0	0
Paid Labour	11	3	18	7	8	12	33
Utilities & Miscellaneous	21	17	26	12	24	18	26
Operating Interest	2	3	10	8	8	5	1
<b>Total Variable cost</b>	<b>231</b>	<b>177</b>	<b>281</b>	<b>260</b>	<b>345</b>	<b>213</b>	<b>104</b>
Taxes, Water Rates, License & Ins.	11	11	35	13	22	10	11
Equip't. & Bldg : Depreciation	34	26	80	42	47	29	59
<b>Total Fixed Costs</b>	<b>45</b>	<b>37</b>	<b>115</b>	<b>55</b>	<b>69</b>	<b>39</b>	<b>69</b>
<b>Total Costs</b>	<b>276</b>	<b>214</b>	<b>396</b>	<b>316</b>	<b>414</b>	<b>252</b>	<b>173</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 7b: Production Costs (\$/ha) on Dryland –Dark Brown Soil, 2004**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	21	20	14	21	62	39	1
Fertilizer	44	53	63	109	72	16	20
Chemical	40	42	33	21	63	57	0
Crop Insurance	24	19	10	18	35	21	7
Trucking & Marketing	4	3	1	1	2	3	0
Fuel, Oil & Lube	13	18	18	8	22	22	11
Machinery Repairs	12	20	16	23	35	23	17
Building Repairs	1	2	2	0	1	2	7
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	2	10	11	32	13	7	2
Paid Labour	6	4	7	7	8	7	15
Utilities & Miscellaneous	17	20	13	12	24	20	23
Operating Interest	3	3	3	8	8	4	6
<b>Total Variable cost</b>	<b>187</b>	<b>216</b>	<b>191</b>	<b>260</b>	<b>345</b>	<b>221</b>	<b>109</b>
Taxes, Water Rates, License & Ins.	8	11	12	13	22	13	11
Equip't. & Bldg : Depreciation	39	61	50	42	47	44	56
<b>Total Fixed Costs</b>	<b>47</b>	<b>72</b>	<b>61</b>	<b>55</b>	<b>69</b>	<b>57</b>	<b>66</b>
<b>Total Costs</b>	<b>234</b>	<b>288</b>	<b>252</b>	<b>316</b>	<b>414</b>	<b>279</b>	<b>175</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 7c: Production Costs (\$/ha) on Dryland –Black Soil, 2004**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	33	25	24	29	55	73	0
Fertilizer	77	93	95	96	113	17	36
Chemical	58	64	57	32	78	90	3
Crop Insurance	15	11	16	19	27	19	5
Trucking & Marketing	7	3	7	6	4	3	0
Fuel, Oil & Lube	20	22	25	22	24	25	15
Machinery Repairs	23	30	33	42	30	24	22
Building Repairs	5	5	6	4	4	4	1
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	1	6	7	15	11	11	10
Paid Labour	12	9	11	15	10	3	9
Utilities & Miscellaneous	10	21	22	14	23	31	16
Operating Interest	3	1	5	3	5	3	1
<b>Total Variable cost</b>	<b>289</b>	<b>313</b>	<b>333</b>	<b>318</b>	<b>406</b>	<b>321</b>	<b>141</b>
Taxes, Water Rates, License & Ins.	10	11	11	12	14	10	12
Equip't. & Bldg : Depreciation	64	65	78	81	69	65	50
<b>Total Fixed Costs</b>	<b>74</b>	<b>76</b>	<b>90</b>	<b>93</b>	<b>82</b>	<b>75</b>	<b>62</b>
<b>Total Costs</b>	<b>363</b>	<b>389</b>	<b>423</b>	<b>410</b>	<b>488</b>	<b>396</b>	<b>203</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 8a: Production Costs (\$/ha) of Crops on Dryland- Brown Soils, 2005**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	20	23	22	21	62	35	0
Fertilizer	44	44	17	109	72	22	0
Chemical	31	31	44	21	63	40	0
Crop Insurance	30	34	26	18	35	40	0
Trucking & Marketing	3	7	0	1	2	7	16
Fuel, Oil & Lube	17	24	37	8	22	15	9
Machinery Repairs	16	21	60	23	35	17	21
Building Repairs	1	1	0	0	1	2	0
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	0	4	21	32	13	0	0
Paid Labour	7	12	18	7	8	12	33
Utilities & Miscellaneous	17	20	26	12	24	18	26
Operating Interest	3	7	10	8	8	5	1
<b>Total Variable cost</b>	<b>190</b>	<b>228</b>	<b>281</b>	<b>260</b>	<b>345</b>	<b>213</b>	<b>104</b>
Taxes, Water Rates, License & Ins.	8	10	35	13	22	10	11
Equip't. & Bldg : Depreciation	26	26	0	42	47	0	0
<b>Total Fixed Costs</b>	<b>34</b>	<b>36</b>	<b>35</b>	<b>55</b>	<b>69</b>	<b>10</b>	<b>11</b>
<b>Total Costs</b>	<b>225</b>	<b>264</b>	<b>316</b>	<b>316</b>	<b>414</b>	<b>223</b>	<b>114</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 8b: Production Costs (\$/ha) of Crops on Dryland-Dark Brown Soils, 2005**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	21	20	14	21	47	39	1
Fertilizer	44	73	63	109	80	37	20
Chemical	40	59	33	21	51	73	0
Crop Insurance	24	29	10	18	19	34	7
Trucking & Marketing	4	41	1	1	40	8	0
Fuel, Oil & Lube	13	28	18	8	29	36	11
Machinery Repairs	12	20	16	23	26	20	17
Building Repairs	1	3	2	0	2	5	7
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	2	22	11	32	19	6	2
Paid Labour	6	2	7	7	3	3	15
Utilities & Miscellaneous	17	27	13	12	21	24	23
Operating Interest	3	9	3	8	11	1	6
<b>Total Variable cost</b>	<b>187</b>	<b>332</b>	<b>191</b>	<b>260</b>	<b>347</b>	<b>286</b>	<b>109</b>
Taxes, Water Rates, License & Ins.	8	14	12	13	11	13	11
Equip't. & Bldg : Depreciation	39	67	50	42	54	71	56
<b>Total Fixed Costs</b>	<b>47</b>	<b>81</b>	<b>61</b>	<b>55</b>	<b>65</b>	<b>84</b>	<b>66</b>
<b>Total Costs</b>	<b>234</b>	<b>413</b>	<b>252</b>	<b>316</b>	<b>412</b>	<b>370</b>	<b>175</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 8c: Production Costs (\$/ha) of Crops on Dryland-Black Soils, 2005**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	41	37	25	23	65	48	15
Fertilizer	107	97	96	84	114	35	0
Chemical	69	60	63	17	63	87	0
Crop Insurance	33	25	19	15	27	22	0
Trucking & Marketing	22	10	11	15	6	4	0
Fuel, Oil & Lube	35	32	39	35	37	34	21
Machinery Repairs	41	28	34	33	36	25	16
Building Repairs	1	3	2	2	3	1	1
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	17	8	16	6	6	20	6
Paid Labour	27	20	23	26	17	19	14
Utilities & Miscellaneous	25	20	22	24	23	14	18
Operating Interest	12	4	6	8	4	4	2
<b>Total Variable cost</b>	<b>433</b>	<b>345</b>	<b>354</b>	<b>287</b>	<b>400</b>	<b>313</b>	<b>93</b>
Taxes, Water Rates, License & Ins.	10	14	10	11	14	14	13
Equip't. & Bldg : Depreciation	65	77	75	67	77	77	34
<b>Total Fixed Costs</b>	<b>75</b>	<b>91</b>	<b>86</b>	<b>78</b>	<b>91</b>	<b>91</b>	<b>46</b>
<b>Total Costs</b>	<b>508</b>	<b>436</b>	<b>440</b>	<b>365</b>	<b>491</b>	<b>404</b>	<b>140</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 9a: Production Costs (\$/ha) of Crops on Dryland- Brown Soils, 2006**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	38	20	27	27	65	41	0
Fertilizer	65	57	81	81	69	17	13
Chemical	32	43	55	55	54	50	0
Crop Insurance	27	23	26	26	34	23	3
Trucking & Marketing	16	15	10	10	29	22	1
Fuel, Oil & Lube	22	25	26	26	22	29	15
Machinery Repairs	21	21	22	22	2	22	12
Building Repairs	2	1	2	2	2	3	1
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	0	2	4	4	16	6	1
Paid Labour	6	2	1	1	3	5	4
Utilities & Miscellaneous	22	19	17	17	18	17	13
Operating Interest	13	3	9	9	4	11	0
<b>Total Variable cost</b>	<b>266</b>	<b>231</b>	<b>280</b>	<b>280</b>	<b>337</b>	<b>247</b>	<b>63</b>
Taxes, Water Rates, License & Ins.	14	10	9	9	12	11	6
Equip't. & Bldg : Depreciation	37	55	60	60	67	60	47
<b>Total Fixed Costs</b>	<b>51</b>	<b>66</b>	<b>70</b>	<b>70</b>	<b>79</b>	<b>71</b>	<b>54</b>
<b>Total Costs</b>	<b>317</b>	<b>297</b>	<b>350</b>	<b>350</b>	<b>416</b>	<b>319</b>	<b>117</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 9b: Production Costs (\$/ha) of Crops on Dryland- Dark Brown Soils, 2006**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	38	20	27	27	65	41	0
Fertilizer	65	57	81	81	69	17	13
Chemical	32	43	55	55	54	50	0
Crop Insurance	27	23	26	26	34	23	3
Trucking & Marketing	16	15	10	10	29	22	1
Fuel, Oil & Lube	22	25	26	26	22	29	15
Machinery Repairs	21	21	22	22	2	22	12
Building Repairs	2	1	2	2	2	3	1
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	0	2	4	4	16	6	1
Paid Labour	6	2	1	1	3	5	4
Utilities & Miscellaneous	22	19	17	17	18	17	13
Operating Interest	13	3	9	9	4	11	0
<b>Total Variable cost</b>	<b>266</b>	<b>231</b>	<b>280</b>	<b>280</b>	<b>337</b>	<b>247</b>	<b>63</b>
Taxes, Water Rates, License & Ins.	14	10	9	9	12	11	6
Equip't. & Bldg : Depreciation	37	55	60	60	67	60	47
<b>Total Fixed Costs</b>	<b>51</b>	<b>66</b>	<b>70</b>	<b>70</b>	<b>79</b>	<b>71</b>	<b>54</b>
<b>Total Costs</b>	<b>317</b>	<b>297</b>	<b>350</b>	<b>350</b>	<b>416</b>	<b>319</b>	<b>117</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 9c: Production Costs (\$/ha) of Crops on Dryland- Black Soils, 2006**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	37	30	23	35	58	67	1
Fertilizer	91	89	81	66	123	89	4
Chemical	66	60	51	28	66	73	2
Crop Insurance	32	21	19	21	25	21	2
Trucking & Marketing	7	6	10	1	10	5	0
Fuel, Oil & Lube	33	31	33	33	29	26	28
Machinery Repairs	37	25	27	32	25	23	24
Building Repairs	0	2	3	1	2	4	2
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	10	8	16	13	9	5	10
Paid Labour	22	19	16	37	16	36	17
Utilities & Miscellaneous	38	26	20	39	25	17	15
Operating Interest	12	5	8	6	8	6	2
<b>Total Variable cost</b>	<b>386</b>	<b>323</b>	<b>307</b>	<b>312</b>	<b>397</b>	<b>372</b>	<b>108</b>
Taxes, Water Rates, License & Ins.	13	14	12	16	11	17	18
Equip't. & Bldg : Depreciation	74	81	76	74	76	94	74
<b>Total Fixed Costs</b>	<b>87</b>	<b>94</b>	<b>88</b>	<b>90</b>	<b>87</b>	<b>111</b>	<b>93</b>
<b>Total Costs</b>	<b>472</b>	<b>417</b>	<b>395</b>	<b>402</b>	<b>483</b>	<b>483</b>	<b>201</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 10a: Production Costs (\$/ha) of Crops on Dryland- Brown Soils, 2007**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	32	23	19	25	62	40	0
Fertilizer	27	55	75	69	111	16	32
Chemical	30	38	46	21	57	36	8
Crop Insurance	26	24	26	18	58	15	1
Trucking & Marketing	10	5	20	9	0	13	0
Fuel, Oil & Lube	31	37	24	25	48	45	12
Machinery Repairs	32	26	20	21	15	58	13
Building Repairs	0	1	1	2	1	1	0
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	10	11	39	4	10	29	7
Paid Labour	8	17	3	37	39	12	16
Utilities & Miscellaneous	25	28	20	21	30	45	18
Operating Interest	2	0	3	5	0	0	0
<b>Total Variable cost</b>	<b>234</b>	<b>264</b>	<b>295</b>	<b>257</b>	<b>432</b>	<b>309</b>	<b>107</b>
Taxes, Water Rates, License & Ins.	11	12	8	6	11	16	6
Equip't. & Bldg : Depreciation	36	45	42	37	57	46	41
<b>Total Fixed Costs</b>	<b>47</b>	<b>57</b>	<b>50</b>	<b>42</b>	<b>68</b>	<b>62</b>	<b>47</b>
<b>Total Costs</b>	<b>281</b>	<b>321</b>	<b>346</b>	<b>299</b>	<b>499</b>	<b>370</b>	<b>153</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 10b: Production Costs (\$/ha) of Crops on Dryland- Dark Brown Soils, 2007**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	22	22	19	19	67	55	2
Fertilizer	51	69	75	83	94	21	4
Chemical	61	63	46	28	60	72	1
Crop Insurance	24	29	26	8	48	36	5
Trucking & Marketing	11	13	20	12	16	13	3
Fuel, Oil & Lube	30	30	24	27	29	29	14
Machinery Repairs	24	21	20	17	18	23	23
Building Repairs	12	12	1	0	5	14	2
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	2	11	39	25	26	3	8
Paid Labour	3	3	3	1	1	3	1
Utilities & Miscellaneous	29	29	20	17	18	34	17
Operating Interest	2	2	3	4	1	3	2
<b>Total Variable cost</b>	<b>274</b>	<b>303</b>	<b>295</b>	<b>242</b>	<b>384</b>	<b>309</b>	<b>80</b>
Taxes, Water Rates, License & Ins.	11	11	8	6	8	10	6
Equip't. & Bldg : Depreciation	69	69	42	37	45	72	40
<b>Total Fixed Costs</b>	<b>80</b>	<b>80</b>	<b>50</b>	<b>42</b>	<b>53</b>	<b>82</b>	<b>46</b>
<b>Total Costs</b>	<b>353</b>	<b>383</b>	<b>346</b>	<b>284</b>	<b>436</b>	<b>390</b>	<b>126</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 10c: Production Costs (\$/ha) of Crops on Dryland- Black Soils, 2007**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	34	26	27	26	69	83	0
Fertilizer	122	105	88	56	138	49	2
Chemical	75	57	57	31	52	71	0
Crop Insurance	22	16	15	17	21	23	0
Trucking & Marketing	7	1	3	6	2	5	0
Fuel, Oil & Lube	38	30	33	29	32	47	15
Machinery Repairs	56	23	38	33	34	52	11
Building Repairs	1	1	3	1	2	4	2
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	0	6	3	6	5	2	3
Paid Labour	40	16	25	37	20	41	25
Utilities & Miscellaneous	65	18	31	31	31	61	17
Operating Interest	13	5	7	4	7	5	0
<b>Total Variable cost</b>	<b>474</b>	<b>305</b>	<b>330</b>	<b>278</b>	<b>411</b>	<b>444</b>	<b>76</b>
Taxes, Water Rates, License & Ins.	10	11	11	19	12	19	16
Equip't. & Bldg : Depreciation	102	78	110	88	83	112	28
<b>Total Fixed Costs</b>	<b>112</b>	<b>89</b>	<b>121</b>	<b>108</b>	<b>95</b>	<b>131</b>	<b>44</b>
<b>Total Costs</b>	<b>586</b>	<b>394</b>	<b>451</b>	<b>386</b>	<b>506</b>	<b>575</b>	<b>120</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 11a: Production Costs (\$/ha) of Crops on Dryland- Brown Soils, 2008**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	57	38	28	27	72	58	8
Fertilizer	119	119	119	90	130	49	40
Chemical	65	65	36	21	68	59	3
Crop Insurance	50	34	34	23	45	32	10
Trucking & Marketing	9	9	7	9	12	9	0
Fuel, Oil & Lube	31	31	31	31	31	31	28
Machinery Repairs	21	21	21	21	21	21	15
Building Repairs	2	2	2	2	2	2	2
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	4	4	4	4	4	6	7
Paid Labour	37	37	37	37	37	37	44
Utilities & Miscellaneous	21	21	21	21	21	21	11
Operating Interest	6	6	6	5	10	6	2
<b>Total Variable cost</b>	<b>422</b>	<b>387</b>	<b>346</b>	<b>292</b>	<b>452</b>	<b>332</b>	<b>171</b>
Taxes, Water Rates, License & Ins.	7	7	7	7	7	7	7
Equip't. & Bldg : Depreciation	62	62	62	62	62	62	62
<b>Total Fixed Costs</b>	<b>69</b>	<b>69</b>	<b>69</b>	<b>69</b>	<b>69</b>	<b>69</b>	<b>69</b>
<b>Total Costs</b>	<b>491</b>	<b>456</b>	<b>415</b>	<b>361</b>	<b>521</b>	<b>401</b>	<b>240</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 11b: Production Costs (\$/ha) of Crops on Dryland- Dark Brown Brown Soils, 2008**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	63	42	32	31	90	64	8
Fertilizer	143	143	136	99	158	53	47
Chemical	74	74	55	24	75	77	3
Crop Insurance	48	37	33	27	47	32	10
Trucking & Marketing	9	9	7	9	12	9	0
Fuel, Oil & Lube	34	34	34	34	34	34	28
Machinery Repairs	22	22	22	22	22	22	15
Building Repairs	2	2	2	2	2	2	2
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	5	5	5	5	5	7	7
Paid Labour	40	40	40	40	40	40	49
Utilities & Miscellaneous	21	21	21	21	21	21	11
Operating Interest	6	6	6	5	10	6	2
<b>Total Variable cost</b>	<b>467</b>	<b>434</b>	<b>393</b>	<b>318</b>	<b>516</b>	<b>368</b>	<b>183</b>
Taxes, Water Rates, License & Ins.	7	7	7	7	7	7	7
Equip't. & Bldg : Depreciation	62	62	62	62	62	62	62
<b>Total Fixed Costs</b>	<b>69</b>	<b>69</b>	<b>69</b>	<b>69</b>	<b>69</b>	<b>69</b>	<b>69</b>
<b>Total Costs</b>	<b>536</b>	<b>504</b>	<b>463</b>	<b>387</b>	<b>585</b>	<b>437</b>	<b>252</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 11c: Production Costs (\$/ha) of Crops on Dryland- Black Soils, 2008**

	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
Seed	51	44	37	34	90	82	25
Fertilizer	189	189	170	121	200	61	59
Chemical	86	86	73	28	75	97	3
Crop Insurance	37	34	28	27	36	38	16
Trucking & Marketing	10	10	10	10	17	10	0
Fuel, Oil & Lube	37	37	38	38	38	38	28
Machinery Repairs	25	25	25	25	31	25	25
Building Repairs	4	4	4	4	4	4	1
Irrigation Fuel and Electricity	0	0	0	0	0	0	0
Custom Work	7	7	7	5	7	12	7
Paid Labour	44	44	44	44	44	44	62
Utilities & Miscellaneous	22	22	22	22	22	22	12
Operating Interest	9	9	9	9	14	9	4
<b>Total Variable cost</b>	<b>522</b>	<b>511</b>	<b>468</b>	<b>368</b>	<b>579</b>	<b>441</b>	<b>242</b>
Taxes, Water Rates, License & Ins.	12	12	12	12	12	12	12
Equip't. & Bldg : Depreciation	74	74	74	74	74	74	74
<b>Total Fixed Costs</b>	<b>86</b>	<b>86</b>	<b>86</b>	<b>86</b>	<b>86</b>	<b>86</b>	<b>86</b>
<b>Total Costs</b>	<b>608</b>	<b>598</b>	<b>555</b>	<b>454</b>	<b>666</b>	<b>528</b>	<b>328</b>

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 12. Total Variable Costs of Crops on Irrigated Land and Percentage Increase from 2004 to 2008 (\$/Ha)**

	Barley	CPS Wheat	Durum	Spring Wheat	Oats	Soft Wheat	Alfalfa Hay	Barley Silage	Corn Silage	Grass Hay	Tame Pasture	Timothy Hay	Canola	Beans	Potatoes	Sugar Beets
<b>2004</b>	473	568	568	527	473	556	328	329	329	328	282	763	659	885	2725	1320
<b>2005</b>	441	629	629	588	441	455	457	270	270	457	282	718	659	873	2725	1403
<b>2006</b>	639	602	602	595	639	604	412	370	370	412	282	718	659	626	3188	1457
<b>2007</b>	609	580	580	691	609	610	463	527	527	463	282	815	633	784	4169	1547
<b>2008</b>	756	794	837	792	756	809	492	674	674	492	282	1087	894	1320	4438	1635
<b>(2008/2004)</b>	160%	140%	147%	150%	160%	146%	150%	205%	205%	150%	100%	142%	136%	149%	163%	124%

Note: Cost data for tame pasture unobtainable, assumed constant.

Source: AgriProfit\$ Benchmarks for Alberta Crop and Forage Producers 2004-2007(AAFRD),  
AgriProfit\$ Cropping Alternatives 2008 (AAFRD)

**Table 13. Total Variable Costs of Crops on Dryland by Soil Type from 2004 to 2008 (\$/Ha)**

	Soil Type	Barley	Durum	Spring Wheat	Oats	Alfalfa	Canola	Feed Peas
2004	Brown	231	177	281	260	345	213	104
	Dark Brown	187	216	191	260	345	221	109
	Black	289	313	333	318	406	321	141
2005	Brown	190	228	281	260	345	213	104
	Dark Brown	187	332	191	260	347	286	109
	Black	433	345	354	287	400	313	93
2006	Brown	266	231	280	280	337	247	63
	Dark Brown	266	231	280	280	337	247	63
	Black	386	323	307	312	397	372	108
2007	Brown	234	264	295	257	432	309	107
	Dark Brown	274	303	295	242	384	309	80
	Black	474	305	330	278	411	444	76
2008	Brown	422	387	346	292	452	332	171
	Dark Brown	467	434	393	318	516	368	183
	Black	522	511	468	368	579	441	242

Source: AgriProfit\$ Benchmarks for Alberta Crop and Forage Producers 2004-2007(AAFRD)  
 AgriProfit\$ Cropping Alternatives 2008 (AAFRD)

**Table 14. Soil Composition in Each River Basin**

Bow	45% brown soil+55% black soil
Oldman	61.3% dark brown soil+38.7% brown soil
Red Deer	66.7% brown soil+22.2% dark brown soil+11.1% black soil
S.Sask	100% Brown soil

**Table 15. Total Variable Costs of Crops on Dryland from 2004 to 2008 (\$/Ha)**

CROPS		Durum	Spring Wheat	Barley	Oats	Canola	Feed Peas	Alfalfa Hay
2004	Bow	263	252	310	292	379	272	124
	Oldman	204	201	226	260	345	218	107
	Red Deer	228	201	267	266	352	227	109
	S. Sask	231	177	281	260	345	213	104
	Average	231	208	271	270	355	233	111
2005	Bow	324	292	321	275	375	268	98
	Oldman	188	292	226	260	346	258	107
	Red Deer	216	264	269	263	352	240	104
	S. Sask	190	228	281	260	345	213	104
	Average	230	269	274	264	355	245	103
2006	Bow	332	282	295	298	370	316	88
	Oldman	266	231	280	280	337	247	63
	Red Deer	279	241	283	284	344	261	68
	S. Sask	266	231	280	280	337	247	63
	Average	286	246	284	285	347	268	70
2007	Bow	366	287	314	269	420	383	90
	Oldman	259	288	295	248	403	309	90
	Red Deer	270	277	299	256	419	324	98
	S. Sask	234	264	295	257	432	309	107
	Average	282	279	301	257	419	331	96
2008	Bow	477	455	413	334	522	392	210
	Oldman	450	416	375	308	491	354	178
	Red Deer	443	411	370	306	480	352	182
	S. Sask	422	387	346	292	452	332	171
	Average	448	417	376	310	486	358	185

Source: AgriProfit\$ Benchmarks for Alberta Crop and Forage Producers 2004-2007(AAFRD),  
 AgriProfit\$ Cropping Alternatives 2008 (AAFRD)

**Table 16. Total Fixed Costs on Irrigated Land from 2004 to 2008 (\$/ha)**

	Barley	CPS Wheat	Durum	Spring Wheat	Oats	Soft Wheat	Alfalfa Hay	Barley Silage	Corn Silage	Grass Hay	Tame Pasture	Timothy Hay	Canola	Beans	Potatoes	Sugar Beets
<b>2004</b>	159	247	247	213	159	218	174	110	110	174	181	168	216	315	1033	252
<b>2005</b>	197	114	114	232	197	146	236	135	135	236	45	168	216	152	1033	291
<b>2006</b>	224	114	114	232	224	146	167	165	165	167	45	168	153	42	1033	265
<b>2007</b>	139	68	68	249	139	142	242	163	163	242	45	168	153	51	1033	265
<b>2008</b>	139	68	68	249	139	142	242	163	163	242	45	168	153	51	1033	265

Note: Data were not available for Grass hay, tame pasture, timothy hay and potatoes in each observation year. Therefore, fixed costs for tame pasture, timothy hay and potatoes were held constant on the 2004 level; fixed costs for grass hay were kept the same with that for alfalfa hay.

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 17. Total Fixed Costs of Crops on Dryland by Soil Type from 2004 to 2008 (\$/Ha)**

		<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
<b>2004</b>	<b>Brown</b>	45	37	115	55	69	39	69
	<b>Dark Brown</b>	47	72	61	55	69	57	66
	<b>Black</b>	74	76	90	93	82	75	62
<b>2005</b>	<b>Brown</b>	34	36	35	55	69	10	11
	<b>Dark Brown</b>	47	81	61	55	65	84	66
	<b>Black</b>	75	91	86	78	91	91	46
<b>2006</b>	<b>Brown</b>	51	66	70	70	79	71	54
	<b>Dark Brown</b>	51	66	70	70	79	71	54
	<b>Black</b>	87	94	88	90	87	111	93
<b>2007</b>	<b>Brown</b>	47	57	50	42	68	62	47
	<b>Dark Brown</b>	80	80	50	42	53	82	46
	<b>Black</b>	112	89	121	108	95	131	44
<b>2008</b>	<b>Brown</b>	69	69	69	69	69	69	69
	<b>Dark Brown</b>	69	69	69	69	69	69	69
	<b>Black</b>	86	86	86	86	86	86	86

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)  
 AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 18. Total Fixed Costs for Dryland Crops from 2004 to 2008 (\$/Ha)**

	<b>CROPS</b>	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>
2004	Bow	61	58	101	76	76	59	65
	Oldman	46	58	82	55	69	50	67
	Red Deer	49	49	100	59	70	47	68
	S. Sask	45	37	115	55	69	39	69
	<b>Average</b>	50	51	100	61	71	49	67
2005	Bow	57	66	63	68	81	55	30
	Oldman	42	64	51	55	67	55	45
	Red Deer	41	52	46	58	71	35	27
	S. Sask	34	36	35	55	69	10	11
	<b>Average</b>	43	54	49	59	72	39	28
2006	Bow	71	81	80	81	83	93	75
	Oldman	51	66	70	70	79	71	54
	Red Deer	55	69	72	72	80	75	58
	S. Sask	51	66	70	70	79	71	54
	<b>Average</b>	57	71	73	73	80	78	60
2007	Bow	83	75	89	78	83	100	45
	Oldman	67	71	50	42	59	74	46
	Red Deer	62	66	58	49	68	74	46
	S. Sask	47	57	50	42	68	62	47
	<b>Average</b>	65	67	62	53	69	78	46
2008	Bow	78	78	78	78	78	78	78
	Oldman	69	69	69	69	69	69	69
	Red Deer	71	71	71	71	71	71	71
	S. Sask	69	69	69	69	69	69	69
	<b>Average</b>	72	72	72	72	72	72	72

Note: Dryland fixed costs in 2008 are assumed to be same for different crops

Source: AgriProfit\$ Regional Benchmark Analysis (AAFRD)

AgriProfit\$ Cropping Alternatives (AAFRD)

**Table 19. Net Revenue of Crops on Irrigated Land in Southern Alberta from 2004 to 2008 (Million \$)**

	CROPS	Barley	CPS Wheat	Durum	Spring Wheat	Oats	Soft Wheat	Alfalfa Hay	Barley Silage	Corn Silage	Grass Hay	Tame Pasture	Timothy Hay	Canola	Beans	Potatoes	Sugar Beets	TOTAL
2004	Bow	1.35	0.83	1.47	2.99	-0.04	1.55	11.84	4.81	3.03	0.66	6.03	1.23	3.28	0.97	7.03	2.18	49.21
	Oldman	8.20	1.04	7.65	4.62	0.35	4.98	19.91	20.65	15.16	1.89	5.70	4.46	5.62	4.29	28.31	7.40	140.24
	Red Deer	0.96	0.71	0.23	2.16	-0.05	0.28	9.69	4.31	1.76	0.44	5.47	0.49	2.24	0.28	2.96	0.42	32.35
	S. Sask	1.82	0.39	4.95	2.87	0.01	2.82	5.94	4.61	2.82	0.57	2.31	1.43	2.56	3.01	13.11	2.64	51.87
	TOTAL	12.34	2.96	14.30	12.63	0.27	9.63	47.38	34.39	22.77	3.57	19.51	7.61	13.71	8.56	51.41	12.64	273.67
2005	Bow	0.55	0.33	1.10	2.53	-0.02	1.57	7.07	1.86	1.89	0.29	16.22	1.39	1.12	2.89	11.95	2.09	52.81
	Oldman	4.23	0.46	5.19	3.63	0.24	4.59	11.62	12.10	8.52	0.85	14.70	5.72	1.67	10.09	43.42	7.66	134.69
	Red Deer	0.44	0.29	0.12	1.74	-0.03	0.32	5.86	1.45	1.11	0.23	14.31	0.63	0.66	0.51	5.27	0.32	33.23
	S. Sask	0.93	0.07	3.20	2.38	0.01	2.22	3.47	2.48	1.54	0.27	5.57	2.03	0.51	7.30	20.44	3.04	55.48
	TOTAL	6.14	1.15	9.61	10.28	0.20	8.70	28.02	17.89	13.06	1.64	50.80	9.77	3.96	20.78	81.09	13.12	276.20
2006	Bow	-1.69	0.30	0.45	2.25	-0.16	0.74	9.93	3.85	3.35	0.75	10.21	1.48	0.32	1.99	7.73	1.24	42.75
	Oldman	-2.10	0.37	2.85	3.86	0.20	2.90	16.98	23.66	14.97	1.61	9.93	6.39	0.15	7.97	32.63	5.04	127.41
	Red Deer	-1.05	0.31	0.06	1.38	-0.13	0.12	8.25	2.86	2.01	0.52	9.24	0.69	0.16	0.29	3.41	0.12	28.24
	S. Sask	-0.80	0.07	1.65	3.36	-0.03	1.35	4.66	4.28	3.20	0.47	3.52	2.05	-0.17	5.39	15.18	1.65	45.83
	TOTAL	-5.63	1.06	5.01	10.85	-0.11	5.11	39.82	34.64	23.53	3.35	32.91	10.61	0.46	15.64	58.94	8.05	244.24
2007	Bow	1.58	0.28	0.82	2.00	0.00	1.15	10.58	1.68	2.61	0.71	12.90	1.13	3.33	1.76	5.38	1.64	47.58
	Oldman	9.18	0.39	5.65	3.48	0.42	3.99	19.16	10.76	9.35	1.44	13.90	5.42	5.41	6.18	28.06	5.80	128.59
	Red Deer	1.27	0.23	0.10	1.28	-0.01	0.10	8.94	1.11	1.82	0.71	11.62	0.62	1.83	0.26	2.31	0.48	32.66
	S. Sask	2.06	0.01	3.77	2.87	0.01	1.96	5.63	1.64	2.71	0.52	4.95	1.82	2.51	4.00	12.04	2.07	48.56
	TOTAL	14.09	0.91	10.35	9.63	0.41	7.21	44.32	15.19	16.49	3.39	43.37	8.99	13.08	12.19	47.79	9.99	257.39
2008	Bow	1.81	0.82	7.59	12.34	-0.02	2.62	12.03	0.30	1.16	0.59	13.42	0.58	8.14	1.38	3.77	0.43	66.97
	Oldman	10.53	0.95	27.93	17.72	0.49	9.84	23.77	2.29	5.26	1.87	12.45	3.88	12.58	5.17	19.95	2.41	157.09
	Red Deer	1.42	0.80	1.17	7.60	-0.04	0.23	10.00	0.21	0.80	0.60	11.86	0.39	4.93	0.23	2.03	0.06	42.30
	S. Sask	2.54	0.12	16.51	10.35	0.03	6.63	6.51	0.23	1.38	0.59	4.53	0.89	6.09	3.32	9.72	0.74	70.18
	TOTAL	16.30	2.68	53.20	48.01	0.46	19.32	52.31	3.04	8.60	3.65	42.26	5.74	31.74	10.10	35.47	3.65	336.55

Source: Own Calculation

**Table 20. Estimated Net Revenues Had the Irrigated Area Not Been Irrigated from 2004 to 2008 (Million \$)**

	<b>CROPS</b>	<b>Durum</b>	<b>Spring Wheat</b>	<b>Barley</b>	<b>Oats</b>	<b>Canola</b>	<b>Feed Peas</b>	<b>Alfalfa Hay</b>	<b>TOTAL</b>
<b>2004</b>	<b>Bow</b>	0.52	4.12	0.73	0.06	0.46	-0.04	-0.12	5.73
	<b>Oldman</b>	5.14	17.42	8.57	0.36	0.55	0.28	0.27	32.58
	<b>Red Deer</b>	0.37	3.92	0.73	0.21	0.55	0.04	0.64	6.46
	<b>S. Sask</b>	3.36	3.89	-0.60	0.19	0.00	-0.14	0.06	6.76
	<b>TOTAL</b>	9.39	29.35	9.43	0.82	1.56	0.14	0.85	51.54
<b>2005</b>	<b>Bow</b>	0.19	2.48	-2.32	0.09	-0.35	-0.34	0.17	-0.09
	<b>Oldman</b>	4.46	8.00	3.63	0.24	-0.04	-0.55	0.03	15.77
	<b>Red Deer</b>	0.30	2.11	-0.50	0.15	-0.08	-0.15	0.54	2.36
	<b>S. Sask</b>	3.40	0.80	-0.87	0.13	0.00	-0.34	0.02	3.14
	<b>TOTAL</b>	8.35	13.39	-0.06	0.61	-0.48	-1.38	0.75	21.18
<b>2006</b>	<b>Bow</b>	0.04	2.33	-1.33	0.12	-0.62	-0.39	0.53	0.67
	<b>Oldman</b>	1.80	11.49	-1.36	0.32	-0.21	-0.29	1.58	13.32
	<b>Red Deer</b>	0.07	2.18	-0.87	0.19	-0.26	-0.13	1.13	2.29
	<b>S. Sask</b>	0.59	0.28	-0.85	0.16	0.00	-0.37	0.25	0.06
	<b>TOTAL</b>	2.49	16.28	-4.42	0.79	-1.10	-1.18	3.48	16.34
<b>2007</b>	<b>Bow</b>	0.18	3.41	3.49	0.97	-0.13	-0.22	0.75	8.44
	<b>Oldman</b>	3.84	11.37	8.62	1.54	0.03	0.06	1.27	26.74
	<b>Red Deer</b>	0.25	2.48	1.37	0.96	-0.08	-0.04	1.05	5.98
	<b>S. Sask</b>	3.17	0.32	-0.36	0.75	0.00	-0.33	0.13	3.69
	<b>TOTAL</b>	7.44	17.58	13.12	4.22	-0.18	-0.53	3.21	44.85
<b>2008</b>	<b>Bow</b>	1.58	7.29	4.37	1.13	0.84	-0.19	-0.78	14.24
	<b>Oldman</b>	11.95	26.78	11.73	1.77	0.79	-0.11	-0.45	52.46
	<b>Red Deer</b>	0.99	5.79	2.18	1.18	0.91	-0.06	0.50	11.48
	<b>S. Sask</b>	10.34	3.95	-0.19	1.01	0.00	-0.37	-0.04	14.69
	<b>TOTAL</b>	24.85	43.82	18.08	5.09	2.54	-0.74	-0.77	92.88

Source: Own Calculation

**Table 21. Net Benefit of Irrigation in Four River Sub-Basins of Southern Alberta from 2004 to 2008 (Million \$)**

	<b>River Sub-Basin</b>	<b>Net Revenue in Irrigated Production</b>	<b>Net Revenue in Dry Land Production</b>	<b>Producer Surplus</b>
<b>2004</b>	<b>Bow</b>	49.211	5.73	43.476
	<b>Oldman</b>	140.238	32.58	107.654
	<b>Red Deer</b>	32.352	6.46	25.893
	<b>S. Sask</b>	51.870	6.76	45.108
	<b>TOTAL</b>	273.672	51.54	222.131
<b>2005</b>	<b>Bow</b>	52.808	-0.09	52.899
	<b>Oldman</b>	134.690	15.77	118.919
	<b>Red Deer</b>	33.228	2.36	30.867
	<b>S. Sask</b>	55.476	3.14	52.335
	<b>TOTAL</b>	276.202	21.18	255.020
<b>2006</b>	<b>Bow</b>	42.755	0.67	42.086
	<b>Oldman</b>	127.406	13.32	114.083
	<b>Red Deer</b>	28.245	2.29	25.955
	<b>S. Sask</b>	45.831	0.06	45.775
	<b>TOTAL</b>	244.237	16.34	227.898
<b>2007</b>	<b>Bow</b>	47.577	8.44	39.136
	<b>Oldman</b>	128.590	26.74	101.846
	<b>Red Deer</b>	32.660	5.98	26.676
	<b>S. Sask</b>	48.564	3.69	44.879
	<b>TOTAL</b>	257.392	44.85	212.538
<b>2008</b>	<b>Bow</b>	66.972	14.24	52.734
	<b>Oldman</b>	157.095	52.46	104.633
	<b>Red Deer</b>	42.299	11.48	30.815
	<b>S. Sask</b>	70.183	14.69	55.492
	<b>TOTAL</b>	336.549	92.88	243.674

Source: Own Calculation