

Impact of Agriculture on Wyoming's Economy

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INTRODUCTION

Depressed economic conditions were prevalent in Wyoming during much of the 1980s. The decline in the energy industry, accompanied by low prices for agriculture commodities created economic hardships in many Wyoming communities. The vitality of the basic industries including energy, agriculture, tourism, timber and manufacturing is critical to the health of Wyoming's economy. Basic industries are the sectors that attract "new dollars" into the State's economy through export sales of goods and services to consumers, businesses, and institutions located outside the State. New dollars are important, not only because they directly generate employment and income for State residents, but also because they stimulate additional regional purchases of products and services from the rest of the local economy. The respending of export sales dollars generates additional business activity in the State, creating additional personal income and employment for State residents. Thus, the State's basic industries act as the initiators of economic activity in the local economy.

Economic growth and development opportunities for Wyoming are dependent, in part, on increasing economic activity in the basic industries. Historically Wyoming has developed around a natural resource-based economy. The first renewable resource activities centered around hunting, trapping, and livestock production. Water development projects established irrigated agriculture as a major industry in various parts of the State. Sawmills were built to provide finished lumber products including railroad ties and timbers which generated significant economic activity as the State grew. Extractive resources have been relied upon as a major employer and the major provider of the tax base. Scenic areas of the State and abundant wildlife support a growing tourism and recreation industry.

As Wyoming approaches the twenty-first century, there is an increasing" need for long range planning regarding the future use of the State's natural resource base. Part of this planning involves evaluating how potential changes in resource use could affect Wyoming's economy. In order to measure the full effect of potential changes in resource use, it is necessary to consider the total effects of the changes in terms of overall business activity, personal income, and employment. The purpose of this report is to provide background information and a descriptive overview of the total economic impact of Wyoming agriculture on the State's economy. The information is intended to provide a reliable database for State and community leaders, agriculture organizations, business people, and agriculture producers to evaluate the economic aspects of the agriculture industry in Wyoming.

BACKGROUND

Wyoming is a natural resource State with much of its economy based on the value of extractive and renewable natural resources. Agriculture is an important basic industry in Wyoming, particularly in terms of economic stability for local communities. Agriculture producers have a fixed level of operating expenses that must be incurred in any given year. Many of these expenditures involve the purchase of items from local businesses.

stability of the local economy.

The stability of annual operating expenses for agriculture producers is directly related to physical production. Producers typically have little control over prices paid and must generally accept market prices for both outputs and inputs. Thus, fluctuations in operating expenses occur from changes in prices paid for inputs and the level of production. Because these factors are

relatively stable over time, agriculture serves as a stabilizing force for Wyoming communities.

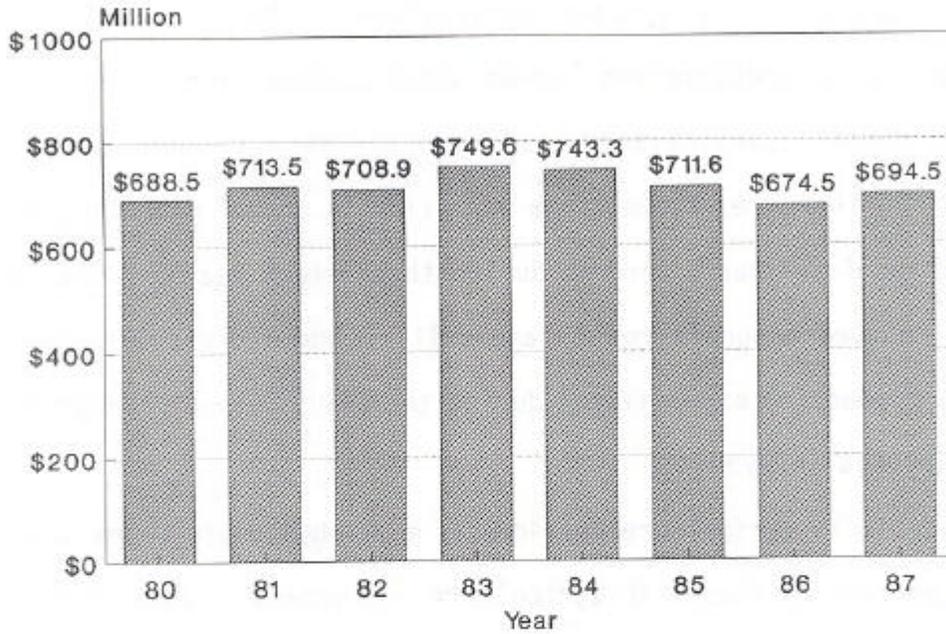
As an example, low prices for agriculture commodities during the early 1980's adversely affected Wyoming agriculture. Many farmers and ranchers experienced low or negative net incomes during this time period. Yet, total operating expenses averaged \$710.6 million per year for the period 1980-1987 (Figure 1). Furthermore, the maximum variation in annual operating expenses for agriculture was less than 6 percent during these eight years. Thus, while lower net income reduced expenditures by agriculture households, the consistency of agriculture production expenditures during the 1980's helped provide stability to local communities in Wyoming.

The stability agriculture provides is most obvious in terms of employment. The annual percentage change in agriculture employment in Wyoming has been less than 5 percent in all but two of the 18 years between 1969 and 1987 (See figure 2). By comparison, the annual percentage change in mining employment in Wyoming has exceeded 5 percent in all but two of those 18 years. In some years the annual percentage change in mining employment for Wyoming has exceeded 20 percent. Because of agriculture's stabilizing role in a relatively volatile economy, it is important to evaluate the impact of agriculture on the total Wyoming economy.

DATA SOURCES

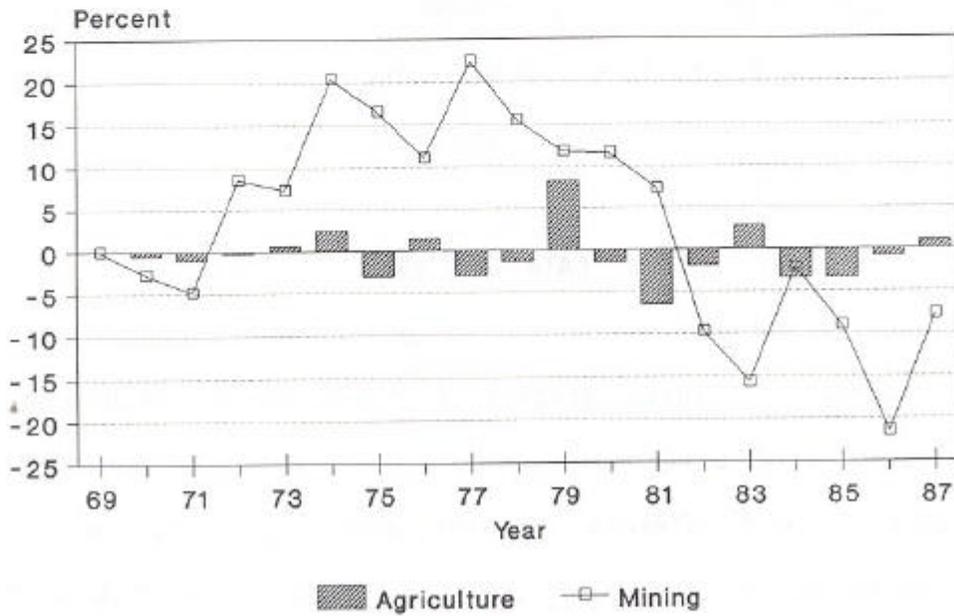
There are a variety of published production data sources for the agriculture industry. These statistics are used by both industry and governmental agencies to analyze the economic contribution of agriculture at the national, State, and county levels. However, none of these data sources measure all sources of income for Wyoming agriculture. Most of the data used in

Figure 1.
Wyoming Agriculture Production Expenses



Source: Wyoming Agricultural Statistics

Figure 2.
Percent Change In Wyoming Employment



Source: Bureau of Economic Analysis

developing this report were taken from the *Wyoming Agricultural Statistics*. This source was used to facilitate future updating of the analysis on a regular basis.

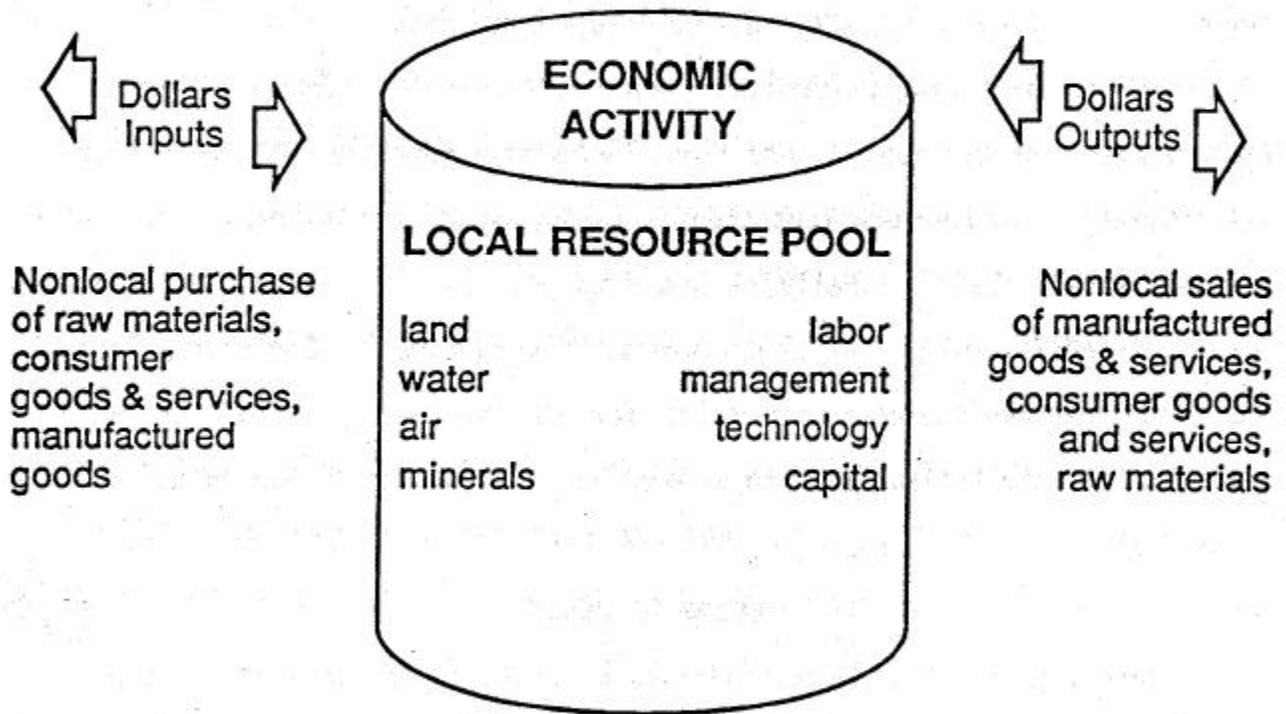
The structure of Wyoming agriculture has changed in recent years, particularly in the livestock sector. For example, the number of summer pasture cattle has increased substantially, while the number of feeder cattle produced on more traditional year-round livestock operations has decreased. Income from summer pasturing is not reported in the *Wyoming Agricultural Statistics*.

This study has attempted to capture all sources of income for Wyoming farms and ranches. Although all the required data are not readily available, estimates of income from pasturing summer cattle were made with assistance from the Wyoming Stock Growers Association. In addition, income from ranch recreation enterprises was estimated based on previous studies conducted at the University of Wyoming (Jacobs, et al, 1990). Finally, income from private timber sales was estimated through interviews with sawmill operators, Wyoming Forestry Division personnel, and published wholesale timber sales for the State. This information was incorporated into the analysis to account for all sources of agriculture income in Wyoming.

ECONOMIC IMPACT

Measuring economic impact involves an analysis of how a region's economy functions and how it relates to the rest of the world. Conceptually, the analysis views the region's economy as a barrel. This barrel is connected to the rest of the world through two types of flows -a goods flow and a dollars flow (Figure 3). The goods flow consists of the inflow of purchased items from outside the region, which are combined with the local resource pool to produce various goods and service as outputs. Some of these goods and services are sold

Figure 3.
A Simplified Regional Economy



to businesses, consumers, and institutions located outside the region as export sales, while others are used or consumed locally.

Running counter to the goods flow is a dollars flow. The dollars flow consists of an inflow of dollars from the export sales of regional output. These dollars are then respent within the region's economy for local resources to be combined with non-local items to produce additional products and services. This respending continues until the export sales dollars "leak" from the region's economy in the form of imported products used in the production process. Economic impact analysis concentrates on the dollar flows because it provides a common unit of measurement, the dollar.

From this perspective, the economic impact of an industry on the region's economy depends not only on the amount of dollars flowing into the region (i.e. the quantity of export sales), but also on the amount of internal respending that occurs (i.e. the quantity of local resources used in the production process) and the amount of leakage (i.e. the quantity of non-local items used in the production process). The larger the quantity of export sales and local resources used, the larger the economic impact of the industry on the region's economy. The larger the quantity of non-local items used in the production process, the smaller the economic impact of the industry.

It is important to consider the effects of the internal respending as well as the quantity of export sales when measuring economic impact. Each time a dollar is respent in the region's economy it generates additional business activity, employment, and personal income for regional residents. In some cases, the effects of internal respending are actually greater than the initial effects of the export sale. Both export sales and internal respending are important to the region's economy. The export sales initiate business activity within the

region, while the internal maximizes the benefits the region realizes from trade with the outside world.

Input/Output Models

Economic impact can be measured through the use of input/output models. An input/output model is a mathematical representation of the purchasing and sales patterns within a region. It is essentially a map of the economic linkages between industries within the region and between regional industries and the rest of the world. The map describes how the region's economy functions. With this information it is possible to: 1) describe the present economic impact of an industry by tracing the current dollar flows through the economy, and 2) forecast the effects of changes in an industry by modifying the specifications of the model and observing the resulting changes in the overall economy. As a part of this project, input/output models were developed for the state of Wyoming, the five crop reporting districts in the State, and each of the 23 counties. A complete description of these models is available from the authors.

Agriculture Impacts

Based on a weighted average, 1983-87, the agriculture industry in Wyoming is estimated to have produced \$803 million in agriculture products. This represents \$803 million of business activity in the agriculture sectors. Figure 4 shows the distribution of this production among the various sectors of the agriculture industry in Wyoming. In some cases, such as livestock, most of this production is exported as raw materials that are processed after they leave the State. In other cases, such as sugar beets, processing occurs before the product leaves the State. In either case, agriculture is a significant source of export sales for the State's economy.

As a result of agriculture production, jobs are created and personal income is generated within the agriculture sectors of the Wyoming economy. From the data within the Wyoming input/output model, it is estimated that agriculture production directly supports the equivalent of 14,390 full-time jobs and \$208 million in personal income for residents employed in the State's agriculture sectors (Table 1).

Total Impacts

Due to internal respending within the State's economy, the total economic impact of the agriculture industry on Wyoming was actually greater than the \$803 million. Based on the state input/output model, it is estimated that the internal respending resulting from agriculture production generated an additional \$645 million in business activity, the equivalent of 22,918 additional full-time jobs, and \$294 million more personal income throughout the rest of the State's economy in 1987. The effects of agriculture production on the rest of Wyoming economy are relatively large for two reasons. First, agriculture is able to obtain many of the items it needs for production from the local resource pool. Seventy-five cents of every dollar of expenditures by the agriculture industry are spent in the State. Secondly, because agriculture resources are typically locally owned, the State retains not only the wage and salary payments, but also profits and other income from agriculture production. As a result, every dollar of agriculture production generates 63 cents of personal income in the Wyoming economy. When both agriculture and non-agriculture are considered, the total impact of the agriculture industry on Wyoming's economy in 1987 was \$1.4 billion in business activity, the equivalent of 37,308 full-time jobs, and \$502 million in personal income (Table 1). This represents approximately 15 percent of the

Figure 4.
Value of Wyoming Agricultural
Production - 1987

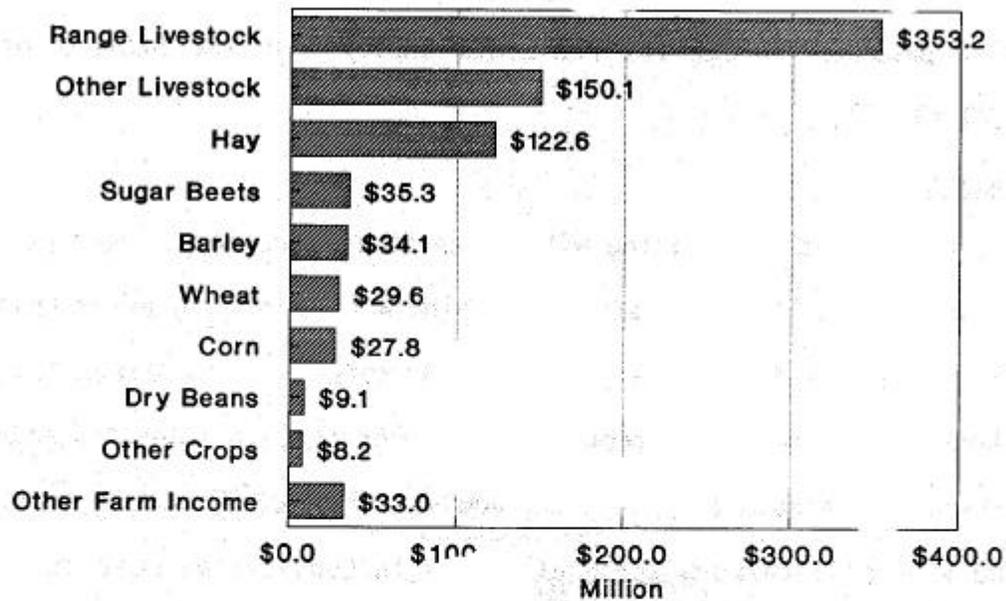


Table 1. Economic Impact
of Wyoming Agriculture - 1987

	<u>Agriculture</u>	<u>Total</u>
Business Activity	\$803 million	\$1,448 million
Employment*	14,390 FTE's	37,308 FTE's
Personal Income	\$208 million	\$502 million

* Expressed as full-time equivalents (FTE's)

total employment in Wyoming and approximately 10 percent of the total personal income.

SUMMARY

Agriculture is one of Wyoming's most important basic industries. Basic industries initiate economic activity in the State by bringing new dollars into the local economy through the sale of goods and services to consumers, businesses, and institutions located outside the region. Economic growth and development opportunities for Wyoming are dependent, in part, upon increasing economic activity in the basic industries such as agriculture.

Agriculture is particularly important because of the economic stability it provides local communities. This stability results from the relatively fixed level of operating expenditures that must be incurred by farmers and ranchers in any given year. Many of these expenditures involve local purchases that contribute to the stability of the local economy. Agriculture is also important because of its ability to purchase a large portion of its production inputs from the local resource pool and because local ownership of agriculture resources tends to retain income from agriculture production within the State.

This report provides background information and a overview of the economic aspects of the agriculture industry in Wyoming. This information can be used by state and community leaders, agriculture organizations, businesspeople, and agriculture producers to evaluate the economic impacts of the agriculture industry in Wyoming. The information can also be used to measure the effects of changes in the agriculture industry on the Wyoming economy in terms of the effects on business activity, employment, and personal income. Additional information on the economic impact of agriculture for each county in Wyoming is presented in the appendix.

REFERENCES

Jacobs, James J., David T. Taylor, Karl and Carl Olson. *Hunting Enterprises on Wyoming Ranches: Costs and Returns*. Department of Agricultural Economics, Cooperative Extension, College of Agriculture, University of Wyoming. Bulletin July, 1990.

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APPENDIX:
Economic Impact
of Agriculture
in Wyoming Counties

Appendix Table 1. Economic Impact

of Agriculture by County

Sector:	Albany (000's)	Big Horn (000's)	Campbell (000's)	Carbon (000's)
1 Range Livestock	\$14,954	\$13,647	\$20,983	\$28,313
2 Other Livestock	1,017	6,172	863	3,070
3 Hay	5,107	5,808	2,674	7,097
4 Wheat	0	328	4,136	173
5 Barley	19	5,122	243	124
6 Sugar Beets	0	8,248	0	0
7 Dry Beans	0	1,799	0	0
8 Corn	0	2,938	5	0
9 Other Crops	45	747	280	98
10 Other Farm Inc.1	1,636	1,262	1,670	2,525
Ag. Business Activity	\$22,778	\$46,071	\$30,854	\$41,400
Total Business Activity	\$37,998	\$81,841	\$47,383	\$64,775
Employment (FTE's)				
Agriculture Employment	408	826	553	742
Total Employment	894	1,689	1,048	1,586
Personal Income(000's)				
Agriculture Income	\$5,881	\$15,322	\$5,307	\$10,011
Total Income	\$11,968	\$26,905	\$10,003	\$20,016

Sector:	Converse (000's)	Crook (000's)	Fremont (000's)	Goshen (000's)
1 Range Livestock	\$22,702	\$18,761	\$22,009	\$15,099
2 Other Livestock	6,008	1,470	7,357	42,979
3 Hay	4,030	4,954	13,685	9,760
4 Wheat	293	1,929	175	5,354
5 Barley	180	139	4,567	614
6 Sugar Beets	0	0	464	7,835
7 Dry Beans	88	0	662	2,039
8 Corn	337	33	2,047	12,039
9 Other Crops	186	518	733	438
10 Other Farm Inc.	1,852	1,988	2,175	1,377
Ag. Business Activity	\$35,676	\$29,792	\$53,874	\$97,534
Total Business Activity	\$54,011	\$46,048	\$101,262	\$158,094
Employment (FTE's)				
Agriculture Employment	639	534	965	1,748
Total Employment	1,363	1,000	2,364	3,705
Personal Income(000's)				
Agriculture Income	\$7,955	\$7,529	\$16,821	\$19,508
Total Income	\$16,425	\$13,251	\$35,357	\$42,676

Appendix Table 1. Economic Impact of Agriculture
by County (Continued)

	Hot Springs (000's)	Johnson (000's)	Laramie (000's)	Lincoln (000's)
Sector: -				
1 Range Livestock	\$9,346	\$20,316	\$14,359	\$11,954
2 Other Livestock	309	972	7,611	9,537
3 Hay	3,599	3,453	7,013	10,675
4 Wheat	18	119	11,454	56
5 Barley	216	56	944	7,113
6 Sugar Beets	75	0	258	0
7 Dry Beans	0	0	1,466	0
8 Corn	163	0	2,150	0
9 Other Crops	78	177	2,484	107
10 Other Farm Inc.!	789	1,514	1,278	2,350
Ag. Business Activity	\$14,593	\$26,607	\$49,017	\$41,792
Total Business Activity	\$25,266	\$43,625	\$87,843	\$74,078
Employment (FTE's)				
Agriculture Employment	262	477	878	749
Total Employment	627	1,026	2,014	1,504
Personal Income(000's)				
Agriculture Income	\$4,129	\$6,646	\$12,169	\$15,077
Total Income	\$8,850	\$13,169	\$26,384	\$25,199

	Natrona (000's)	Niobrara (000's)	Park (000's)	Platte (000's)
Sector:				
1 Range Livestock	\$16,110	\$14,398	\$12,665	\$14,513
2 Other Livestock	1,194	1,096	17,432	21,043
3 Hay	2,522	2,729	6,724	5,227
4 Wheat	129	759	222	2,999
5 Barley	27	340	7,881	412
6 Sugar Beets	0	0	8,482	1,810
7 Dry Beans	0	0	2,158	790
8 Corn	61	790	2,045	4,368
9 Other Crops	202	394	589	477
10 Other Farm Inc.	1,265	1,200	1,219	1,338
Ag. Business Activity	\$21,510	\$21,706	\$59,417	\$52,977
Total Business Activity	\$35,098	\$34,370	\$103,155	\$70,975
Employment (FTE's)				
Agriculture Employment	385	389	1,065	949
Total Employment	780	813	2,495	2,225
Personal Income(000's)				
Agriculture Income	\$5,288	\$5,212	\$16,949	\$7,209
Total Income	\$10,131	\$10,508	\$35,441	\$17,357

Appendix Table 1. Economic Impact of Agriculture
by County (Continued)

	Sherida n (000's)	Sublette (000's)	Sweet- Water (000's)	Teton (000's)
Sector: -				
1 Range Livestock	\$20,022	\$16,247	\$6,755	\$3,891
2 Other Livestock	4,894	754	343	1,476
3 Hay	5,642	7,969	2,056	2,596
4 Wheat	1,032	0	0	0
5 Barley	396	0	51	1,734
6 Sugar Beets	0	0	0	0
7 Dry Beans	0	0	0	0
8 Corn	23	0	0	0
9 Other Crops	268	14	31	19
10 Other Farm Inc.	1,924	1,581	532	428
Ag. Business Activity	\$34,201	\$26,565	\$9,768	\$10,144
Total Business Activity	\$57,473	\$46,233	\$16,057	\$17,472
Employment (FTE's)				
Agriculture Employment	613	476	175	182
Total Employment	1,359	1,134	361	401
Personal Income(000's)				
Agriculture Income	\$8,386	\$7,605	\$2,670	\$3,334
Total Income	\$17,578	\$15,889	\$4,969	\$6,192

	Uinta (000's)	Washakie (000's)	Weston (000's)
Sector:			
1 Range Livestock	\$12,690	\$9,598	\$13,704
2 Other Livestock	1,472	6,474	6,580
3 Hay	5,062	2,680	1,566
4 Wheat	0	45	363
5 Barley	136	3,810	30
6 Sugar Beets	0	8,171	0
7 Dry Beans	0	131	0
8 Corn	0	783	43
9 Other Crops	12	113	155
10 Other Farm Inc.1	1,305	754	1,071
Ag. Business Activity	\$20,677	\$32,559	\$23,512
Total Business Activity	\$35,950	\$61,417	\$33,629
Employment (FTE's)			
Agriculture Employment	371	583	421
Total Employment	863	1,367	879
Personal income(000's)			

Agriculture Income	\$5,866	\$10,189	\$4,022
Total Income	\$12,254	\$20,586	\$8,662