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ABSTRACT

Various surveys were conducted to determine the current level of personnel on Montana farms/ranches and in agribusinesses as well as the projected number of persons to be employed in those occupations through 1990. The study found that the current family work force on farms and ranches in Montana has remained the same since 1981 and it is likely that this figure will remain constant through 1990. The study also found that a reduction of 9,000 full- and part-time agricultural production workers took place in the state between 1974 and 1981, and a further reduction of about 5 percent is expected between 1983 and 1990. About two-thirds of these workers are considered part-time employees. In addition, the surveys found that there are about 1,900 agribusinesses in the state. In 1983, these businesses employed 15,704 persons, and they are expected to employ 19,660 persons, a 25 percent increase, by 1990. Finally, four regional corporations/cooperatives who operated 200 agribusiness firms in Montana in 1983 indicated that they had 1,303 employees in the state in 1979 and 1,243 employees in 1983. They expected this figure to decrease by 5 percent by 1990. (A number of statistical tables are contained in this report.) (KC)

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AGRICULTURAL MANPOWER STUDY 1983-1990

Submitted to

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Office of Public Instruction
Helena, Montana

by

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INTRODUCTION

The average American farmer in 1983 produced enough food to feed themselves and 78 others. Producers have become so proficient at food production that the food, feed or fibers on every third acre now goes into the export market to feed the people of the world. In the U.S. about 2.4 million producers account for this tremendous output of food and fiber. The creation of this renewable natural resource base manifolds itself in subsequent increased employment. Presently, it is estimated that 1 of every 5 jobs (20%) of the total work force in the U.S. deals in some way with servicing, processing or delivery of agricultural products. The jobs created by the American farmers productivity exist in service producing industries, in areas of wholesale and retail trades, transportation, communication and finance.

Agricultural producers and those employers in related areas have been quick to adopt new technological developments. The results of increased technology have had a significant impact on the number of people employed and on the educational level of those entering and remaining employed in the agricultural/agribusiness work force. The agricultural industry will remain efficient to the degree that it is able to provide a work force that possesses the appropriate knowledge, skills, attitudes and experiences. Obviously the nature of the work force changes constantly. As a result, it is essential to monitor these changes regularly to make sound vocational educational decisions. The technique used to gather data has been primarily surveys directed to owners/operators of agricultural production units (farms & ranches) and to agribusinesses. These surveys, over time, have provided the data needed to adjust the several educational programs preparing persons for the work force in agriculture.

The trend in Montana is for farms and ranches to remain specialized, but with slightly less acreage per farm and ranch unit than in previous years. In 1975 there were 23,400 farms/ranches that had an average size of 2,693 acres. In 1982

there were more (24,000) farms/ranches that had an average size of 2,588 acres.

The data in table 1 show the trend in numbers of farms and farm size from 1950-1982.

Table 1 Number of Farms/Ranches, All Land In Farm/Ranches and Average Size of Farm, 1950-1982

Year	Number of Farms	All Land In Farms	Average Size of Farms
	Thous.	Thous. Acres	Acres
1950	37.2	65,000	1,747
1951	36.8	65,200	1,772
1952	36.4	65,500	1,799
1953	35.9	65,800	1,833
1954	35.4	66,100	1,867
1955	34.8	66,100	1,899
1956	34.2	66,200	1,936
1957	33.6	66,300	1,973
1958	33.0	66,500	2,015
1959	32.4	66,600	2,056
1960	31.7	66,700	2,104
1961	30.8	66,800	2,169
1962	30.1	66,800	2,219
1963	29.5	66,800	2,264
1964	28.9	67,200	2,325
1965	28.4	66,700	2,349
1966	28.0	66,200	2,364
1967	27.6	65,700	2,380
1968	27.1	65,200	2,406
1969	26.7	64,700	2,423
1970	26.4	64,200	2,432
1971	26.0	63,700	2,450
1972	25.5	63,200	2,478
1973	25.1	63,000	2,510
1974	24.6	62,800	2,553
1975	23.4 1/	62,200	2,693
1976	23.4	62,200	2,658
1977	23.5	62,100	2,643
1978	23.6	62,100	2,631
1979	23.7	62,100	2,620
1980	23.8	62,100	2,609
1981	23.9	62,100	2,598
1982	24.0	62,100	2,588

1/ Places which had annual sale of agricultural products of $1000 or more. Series initiated with 1975.

Montana Agricultural Statistics 1982.

The agricultural production work force is made up of two distinct groups: family workers, and hired full and part-time workers. Data in Table 2 indicates the number of workers in these two categories.

Table 2 NUMBER OF WORKERS ON FARMS/RANCHES
Family and Hired Workers, 1972 - 1982

Year	January	April	July	October	Annual Average
			Family Workers		
1972	23,000	33,000	31,000	28,000	29,000
1973	22,000	31,000	30,000	28,000	28,000
1974	16,000	26,000	31,000	26,000	25,000
1975	18,000	20,000	26,000	23,000	22,000
1976	21,000	25,000	27,000	23,000	24,000
1977	18,000	28,000	29,000	22,000	24,000
1978	20,000	27,000	27,000	26,000	25,000
1979	23,300	23,000	32,000	17,000	24,000
1980	16,000	25,000	31,000	28,000	25,000
1981	16,000	25,000	31,000	28,000	25,000
			Hired Workers		
1972	4,000	12,000	20,000	9,000	11,000
1973	4,000	11,000	25,000	10,000	13,000
1974	6,000	11,000	20,000	13,000	13,000
1975	8,000	9,000	15,000	10,000	11,000
1976	7,000	9,000	12,000	9,000	9,300
1977	4,600	8,000	12,000	6,000	7,700
1978	4,500	7,100	14,000	5,600	7,800
1979	6,900	11,000	11,000	9,000	9,500
1980	9,000	10,000	11,000	6,000	9,000
1981	9,600	10,000	11,000	6,000	6,000

. Montana Agricultural Statistics 1982

Educating Montana Farmers, Ranches Owners/Operators and Hired Workers

Montana's vocational agriculture program has as its major purpose to prepare persons for employment in the broad area of agriculture production, agribusiness at less than the professional levels. The program is driven by the five major objectives:

1. to develop agricultural competencies needed by individuals preparing to engage in agricultural production occupations
2. to develop competencies needed by individuals preparing to engage in agricultural business related occupations

3. to develop an awareness of career opportunities for men and women in agriculture/agribusiness and the preparation needed to enter and progress in agricultural occupations

4. to develop those abilities in human relations, leadership, responsibility, citizenship, and cooperation essential in agricultural occupations

5. to develop the ability to secure satisfactory placement (employment, enterpreneurship, or postsecondary training)

As the objectives point up, the program assumes responsibility for training not only hired workers (part and full time), but for those persons who will be the owners and operators of Montana farms and ranches. Preparing for the following occupations and the major concern of the programs of vocational agriculture (C.I.P. 01.13)

Table 3 Family, Full and Part Time Agricultural Production Workers in Montana

Job Title	Numbers of Employees (Full & Part Time) 1974-75	1982-83	1986	*1990
1. Owners/operators/including family labor	31,000	31,000	31,000	31,000
2. General farm workers, including combination, livestock, sheep, beef, poultry, dairy, hogs, field crops, hay, grain, sugar beets, vegetable, fruits, and potatoes	17,522	7,095	6,740	6,740
3. Farm machinery operators	2,367	275	261	261
4. Agricultural mechanics	201	187	178	178
5. Irrigators	976	121	115	115
6. Farm & Ranch Farmers	1,094	2,035	1,933	1,933
7. Artificial Inseminators (nonreported)	101	-0-	-	-
8. Herdsman	228	396	376	376
9. Milkers	81	121	115	115
10. Sheep Herders	88	154	146	146
11. Cowboy	248	286	271	271
12. Truck drivers	235	77	73	73
13. Others	135	253	240	240
	23,276	11,000	10,448	10,448
TOTALS	54,276	42,000	41,448	41,448

*Respondents indicated that employment would stabilize in 1990 at the 1986 level.

The data in Table 3 represents the total of both part and full time agricultural employees in Montana, and were projected to the population of 31,00 producers. A sample of 4161 were drawn, 1495 or 35.93% responded to the study. As can be noted from the data presented in Table 2 the January 1981 total hired employment was 9600, while the July hired employment climbed to 11,000. This difference of 2400 was obviously made up of part-time workers. An earlier study by Amberson and Bishop (1) indicated that 65 percent of the producers in Montana hired seasonal (part-time) employees. Thus, one could assume that 65 percent or 7150 of the total July hired work force in agricultural production are part time and the remainder 3850 or 35 percent are full time agricultural production workers. This data should be accepted with caution since they are projected on the basis of producers in Montana reporting and not on actual reported numbers of part-time and full-time employees as reported by producers. However, these data agree in general with national employment levels in agricultural which show that nearly two-thirds of all farmers that hire labor specfically hire seasonal labor.

AGRICULTURAL BUSINESS

Introduction

It is estimated that there are about 2000 agribusinesses in Montana. These businesses are extremely important and are the silent partners of farmers and ranchers. These functions are to deliver the goods and services essential for production and assist in marketing, transporting, processing, and distributing the products produced.

A search of the telephone yellow pages from all of the Montana's telephone exchanges revealed 1900 businesses in the following areas: Agricultural resources (114), horticulture (152), agricultural services and supplies (1178), agricultural mechanics (171), and agricultural products and processing (285). The researchers realize there are small family sized operations who do not use this means of advertising and therefore may have been missed in the population. In a previous

(1) Amberson, Max L.; Bishop, Douglas D.; Agricultural Production Manpower Report Department of Agricultural & Industrial Education, MSU, Bozeman, MT 1972.

study (1972) using a rather exhaustive population study identification process, the name of 2,213 agribusinesses were obtained. One might hypothesize that in the 11 year period between studies, several businesses have been consolidated or discontinued.

CURRENT AGRIBUSINESS EMPLOYMENT IN MONTANA

During 1983-84, 275 of the 1900 Montana agribusiness in the areas of service and supplies, mechanics, products and processing, resources, and horticulture reported their employment figures. Table 4 contains data pointing up current employment among agribusinesses in Montana. These businesses reported current employment, when projected to the total number of agribusinesses, of 15,704 workers. Based on this projection, employment totaled 8599 in service and supplies, 1996 in mechanics, 3719 in product and processing, 524 in resources and 866 in horticulture. Based on the sample size and population reporting the standard deviation was computed. A range of agribusiness employment in Montana at the .95 confidence level was determined. As noted, there is a rather broad range due to the large standard deviations (SD) in the areas of agricultural mechanics and products and processing. Persons using the data could be 95% confident that the predicted employment range wou accommodate the numbers of workers employed in the agribusiness area in Montana.

Current Employment Data by Agribusiness Area (1983)

Table 4

	Sample Size n	Total Business TB	Mean Employees Per Business $\bar{X}$	Current Employment $\bar{X}$ (TB)	SD S_x	t Values	$S_{\bar{X}} = \frac{S_x}{\sqrt{n}}$	$tS_{\bar{X}}TB$	Emp. Range @ .95 Conf. Level
Agr. S/S 01.05	129	1178	7.3	8599	8.9	1.96	.78	1801	6797-10401
Agr. M. 01.02	48	171	11.7	1996	11.2	2.01	1.62	557	1440-2552
Agr. P & P 01.04	58	285	13.05	3719	25.06	2.00	3.29	1875	1844-5594
Agr Res. 03	25	114	4.6	524	5.4	2.06	1.08	254	271-777
Hort. 01.06	15	152	5.7	866	3.8	2.13	.98	317	549-1184
TOTALS	275	1900		15,704					10,901-20509

Explanation of Statistics

S_x - Standard Deviation

t - Two tailed t Value

$S_{\bar{X}} = \frac{S_x}{\sqrt{n}}$ - Standard deviation of the sample mean

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PROJECTED EMPLOYMENT (1984)

Of the 1900 agribusinesses surveyed in 1983, 179 responded to the questions about projected employment. By projecting the sample figures to the total population, it was possible to determine the work force that would be with them in 1984. As can be noted from Table 5, the current (1983) work force was 15,704 whereas the data in Table 5 points out that the workforce is projected to be 16,305. When statistics were applied to discern the agricultural employment, one can be 95% confident that in 1984 the range of employment will be between 9997 and 23,370.

Projected Employment by Agribusiness Area 1984

Table 5

	Sample Size n	Total Business TB	Mean Employees Per Business $\bar{X}$	Current 1 yr. Proj. Emp. $\bar{X}$ (TB)	SD S_x	t Value	$S_{\bar{X}} = \frac{S_x}{\sqrt{n}}$	$tS_{\bar{X}}TB$	Emp. Range @ .95 Conf. Level
Agr. S/S 01.05	81	1178	7.6	8593	7.4	2.0	.82	1931	6662-10524
Agr. M 01.02	33	171	11.9	2035	10.9	2.03	1.84	639	1396-2674
Agr. P & P 01.04	43	285	14.4	4104	29.4	2.02	4.48	2579	1525-6683
Agr. Res 03	14	114	5.8	661	6.2	2.14	1.65	402	259-1063
Hort. 01.06	6	152	6	912	5.0	2.44	2.04	757	155-2426
TOTALS	179	1900		16,305					9997-23,370

Explanation of Statistics

S_x - Standard Deviation

t - Two tailed t Value

$S_{\bar{X}} = S_x$ - Standard deviation of the sample mean

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PROJECTED EMPLOYMENT (1986-1990)

Within the 1900 agribusinesses surveyed, 173 firms responded to the questions about projected employment plans for the period 1986-1990. When the sample population was projected, Table 6, it revealed the work force would be 19,660, up to 3355 from the 16,305 projected 1984 employment and up 3956 from the 15,704 current (1983) agribusiness employment.

Using a 95% confidence level the employment range for agribusinesses projected for 1986-1990 will be between 11,828 and 28,737.

Projected Employment by Agribusiness Area 1986-1990

Table 6

	Sample Size n	Total Businesses TB	Mean Employees Per Business $\bar{X}$	Current 3 yr. Proj. Emp. $\bar{X}$ (TB)	SD S_x	t Value	$S_{\bar{X}} = \frac{S_x}{\sqrt{n}}$	$tS_{\bar{X}}TB$	Emp. Range @ .95 Conf. Level
Agr. S/S 01.05	78	1178	8.9	10,484	8.8	2.0	.99	2348	8136-12832
Agr. M. 01.02	33	171	13.18	2,257	12.36	2.04	2.15	750	1506-3007
Agr. P & P 01.04	41	285	16.8	4,788	36.7	2.02	5.73	3299	1489-9332
Agr Res. 03	15	114	6.3	718	6.9	2.13	1.78	432	285-1150
Hort. 01.06	6	152	9.3	1,413	6.7	2.44	2.7	1001	412-2414
TOTALS	173	1900		19,660					11,828-28,735

Explanation of Statistics

S_x - Standard Deviation

t - Two tailed t Value

$S_{\bar{X}} = \frac{S_x}{\sqrt{n}}$ - Standard deviation of the sample mean

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CURRENT AND PROJECTED MANPOWER OF FOUR REGIONAL AGRIBUSINESSES

"A region is defined as a large area having a high degree of homogeneity in several factors." (1) Such a region exists in Minnesota, North and South Dakota and Montana. The region is capable and subsequently produces similar grain crops, wheat, barley, and oats in large quantities. Traditionally, Minneapolis, Minnesota developed as a milling center because of its energy capacity from the several rivers at the headwaters of the Mississippi River. Due to its processing capacity a market developed and the early developing companies became large and eventually extended businesses into the Dakotas and Montana as these states developed their agricultural production capacity. Not only did these companies and cooperatives develop marketing capacity (grain elevators), but they also developed retail sales outlets to supply producers with the input needed for agricultural production. Thus petroleum, fertilizers, feed, seed, chemicals, and other supplies and services outlet developed and were owned and operated by these regionally owned and operated businesses. Later in their development they even extended their capacity to process some of the agricultural raw materials (wheat, barley, oats) into human food and processed livestock feed.

In Montana, About 200 of the 1900 agribusinesses are owned and controlled by four regional companies/cooperatives whose main offices are located in Minneapolis, Minnesota. This business arrangement is not presented as a criticism, but does provide a rationale for contacting these four companies/cooperatives as a means of determining their current and projected employment patterns and future plans. As one discerns from the data in Table 7 what these four firms are doing or plan to do in the way of providing employment, it may provide incites which can be generalized to the entire agribusiness population in Montana.

(1) Kranzel, Carl F., Great Plains in Transition, University of Oklahoma Press 1966, p. 349.

Aggregate Employment Data, 1979 to 1983 & projected to 1990, Reported by Four Reqionally Based (Minneapolis, Minnesota) Agribusinesses

Table 7

Agribusiness (01.05 & 01.04 areas only*)	Employment Period 1979	1981	1983	1990	Jobs Discontinued	Jobs Added
1	463	428	388	369	semi-skilled	
2	170	160	155	147	semi-skilled	Chem. Technician Fert. Technician
3	480	480	500	475	semi-skilled	Prof. petroleum workers Tech. petroleum workers
4	190	190	200	190	semi-skilled	Grain Merchd. Technicians Semi-skilled grain Mercd. Clerical Assist. in grain
Totals	1303	1258	1243	1181		

* Agricultural Sales & Service 01.05 (CIP)

Agricultural Products & Processing 01.04 (CIP)

The data in Table 7 indicate that in 1979 there were 1303 persons employed by these regional firms. In 1981 there were 1258 employees; in 1983 there was a slight decrease to 1243 persons. These businesses indicated that by 1990 they will experience a 5% reduction in their work force. The anticipated reduction will release unskilled and semi-skilled workers. This will be necessary because of improved technology being put into operation by those corporations/cooperatives. The new hires will be employees who possess needed knowledge, skills, attitudes and experiences and who will work at the skill and technical levels. Examples of job titles to be added are; agricultural chemical technicians, fertilizer technicians, soils technicians, agricultural petroleum technicians, grain merchandising technicians, semi-skilled and skilled grain merchandising technicians and clerical assistance in the broad grain merchandising and agribusiness areas.

CONCLUSIONS

1. The current family workforce on farms and ranches in Montana has remained the same between 1971 and 1981 when comparing July Montana Agricultural Statistics for 1982. It is likely this figure will remain constant through 1986 and 1990.
2. A reduction of 9,000 hired full and part-time agricultural production workers has taken place in Montana between 1974 and 1981. From 1983 to 1990 there will be a further reduction of about 5% in hired workers both full and part-time. About 65% of the hired agricultural production work force in Montana is considered part-time even though many of these workers are employed six or more months each year.
3. There are considered to be about 1900 agribusinesses in Montana. They are categorized as follows: supplies and services (1178), products and processing (205), mechanics (171), horticulture (152), and resources (114). These businesses in 1983 employed 15,704 persons.

4. Agribusiness firms in Montana in 1984 plan to employ 16,305 persons, an increase of 601 (3.87%) persons over current (1983) employment.

5. Montana Agribusinesses indicate, in the period 1986-1990, they plan to employ 19,660 persons. This would be an increase of 3,956 (25.19%) over the 1983 base year and 3,355 (21.36%) over the 1984 projected employment level.

6. Data from four regional corporations/cooperatives, who operate 200 agribusiness firms in Montana in 1983 indicated that they had 1,303 employees in Montana in their agribusiness firms in 1979. In 1981 this decreased to 1,258. In 1983 there was a slight decrease to 1,243 employees. In 1990 they project a 5% decrease in their work forces from the 1983 level.

Agricultural Production -- Agribusiness Employment for Montana (Continued)
1983-1990

Employment Area	1987			1988			1989			1990		
	N	R	T	N	R	T	N	R	T	N	R	T
*Agr Prod (family) 01.02	--	3,100	31,000	--	3,100	31,000	--	3,100	31,000	--	3,100	31,000
**Agr Prod (hired) 01.02	--	2,970	11,000	--	2,970	11,000	--	2,970	11,000	--	2,970	11,000
Agr Mechanics 01.02	37	210	2,147	37	214	2,184	37	218	2,221	36	222	2,257
Agr Resources 03.	9	81	688	9	83	697	9	84	706	12	85	718
Agr Products/Processing 01.04	114	520	4,446	114	534	4,560	114	547	4,674	114	561	4,788
Agr Supplies/Services 01.05	315	1,107	8,539	315	1,145	9,854	315	1,182	10,169	315	1,220	10,484
Horticulture 01.06	83	161	1,161	84	174	1,245	84	187	1,329	84	199	1,413
Total (including new employees)	558	8,149	59,986	559	8,220	60,540	559	8,288	61,099	561	8,357	61,660
Total (new & replacement employees)	8,707			8,779			8,847			8,918		

* Family and unpaid labor doing 15 or more hours of work during the week in July when the survey was conducted.

** Full and part time hired workers during July.

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Agricultural Production - Agribusiness Employment for Montana
1983-1990

Employment Area	Current Employment - 1983	***1984 New	***1984 Replacement	***1984 Total	1985 N	1985 R	1985 T	1986 N	1986 R	1986 T	continued
*Agr Prod (family) 01.02	31,000	.	3,100[1]	31,000	--	3,100	31,000	--	3,100	31,000	
**Agr Prod (hired) 01.02	11,000	.	2,970[2]	11,000	--	2,970	11,000	--	2,970	11,000	
Agr Mechanics 01.02	1,996	39	200[3]	2,035	38	204	2,073	37	207	2,110	
Agr Resources 03.	524	137	62[4]	661	9	80	670	9	80	679	
Agr Products/Processing 01.04	3,719	385	446[5]	4,104	114	492	4,218	114	506	4,332	
Agr Supplies/Services 01.05	8,599	(-6)	1,032[6]	8,593	315	1,031	8,908	316	1,069	9,224	
Horticulture 01.06	866	46	130[7]	912	83	137	995	83	150	1,078	
Total (including new employees)	57,704	601	7,940	58,305	559	8,014	58,864	559	8,082	59,423	
Total (new & replacement employees)		8,541			8,573			8,641			

*Family and unpaid labor doing 15 or more hours of work during the week in July when the survey was conducted.

**Full and part time hired workers during July

***1. Replacement determined to be 10%
2. Replacement determined to be 27%
3. Replacement determined to be 10%
4. Replacement determined to be 12%
5. Replacement determined to be 12%
6. Replacement determined to be 12%
7. Replacement determined to be 15%

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