Farm Animals — Do We Need Them?

Clayton Haugse

Humans have depended on animals for many necessities for more than two thousand years, with many people of the world supported almost entirely by animals as they live in area's unsuitable for crop production. Animals will continue to be important for the nutrition, by-products, economic benefits and companionship they provide. Animals products are excellent complements to fruits, vegetables and cereals and are needed to ensure a complete and balanced diet. Animals are said to be essential to the well-being of humans in all parts of the world. The American Society of Animal Science has published a brochure on the importance of farm animals, part of which is summarized in the following statements.

Animals fulfill a basic need of humans — a desire to be wanted, accepted and a need for attention and care. A mutual relationship between humans and animals has existed for centuries, each contributing to the wellbeing of the other. Humans provide the feed and housing for animals, and animals produce the milk, fiber, eggs, meat and recreation as well as draft power in some countries of the world.

Most ranchers or farmers feel close to their animals. Animals also serve as companions and pets as well as contributing to recreational needs. Animals used for sports such as horse racing provide jobs and income for many people and entertainment and recreation for millions.

HUMAN NUTRITION

Animals are vital contributors to improved nutrition. Animal products are important in the human diet because the assortment of amino acids in animal proteins more closely matches the needs of the human body than amino acids in plant proteins. Animal products also provide vitamin B_{12}, a vitamin not found in plants. Animal products contribute about three-fourths of the protein, one-third of the energy, a majority of the calcium, phosphorus and iron and substantial quantities of other minerals and vitamins to the human diet. Nutritional contributions of meat, milk and eggs constitute two of the four basic food groups that human nutritionists recommend for an optimum diet. Using both animal and plant products in human diets helps ensure adequate nutrition as animal products complement nutrient deficiencies of plant products.

Worldwide, over 85 percent of the population selects foods of animal origin, and as per capita income rises, consumers select more meat and milk in their diets because they enjoy meals created from animal products.

Haugse is chairman, Department of Animal and Range Science.

RECYCLING OF NUTRIENTS

Plant products are fed to animals with the animal waste returned to the soil, raising soil fertility. Nutrients in animal wastes are utilized by plants and result in increased yields and a reduced need for commercial fertilizers. Animal wastes (cow and buffalo) are also used as fuel in some countries of the world. Methane, a high energy fuel, can also be produced from animal waste. Animal waste is also used as livestock feed and bedding when properly processed.

Production of cereal grain is accompanied by about an equal dry weight of crop residue. Millions of tons of crop residues, which are unsuitable for human consumption, can be used by livestock, especially cattle, sheep, water buffalo and goats. With proper supplementation, ruminant animals can put this material to productive use.

BY-PRODUCTS

In the processing of crops such as grains, vegetables and oilseeds, many by-products are produced. Examples are sunflower meal, brewers grains, malt sprouts, soybean meal, beet pulp, canning waste and citrus pulp. Some of these feedstuffs can be used as the major ingredient in livestock rations while others provide specific nutrients. Animals make productive use of these by-products which, without animals, would be wasted and present a major disposal problem.

NON CROPLAND

Farm animals make productive use of lands which, due to inadequate rain, roads and rough terrain, are not suitable for farming. Only about 20 percent of the land in the United States is suitable as cropland. World wide, this figure is 10 percent. The remainder is grassland, pasture and range, forest land and urban land. Nearly all of the grassland and much of the forest land can be utilized by animals. These lands provide us with animal products without reducing food crop availability for human consumption. Without animals, this land would produce little or no food.

ANIMAL BY-PRODUCTS

By-products of animals include tallow and grease, which are used primarily in soaps and animal feeds and as sources of fatty acids for lubricants and other industrial uses. Tallow and grease are also used to make pharmaceuticals, candles and cosmetics. Much of the insulin used comes from hog and beef pancreas. Other hormones such as epinephrine, thyroxin, estrogen, cortisone and ACTH are also recovered as by-products. Gelatin is obtained from hides, skins and

bones and can be used in foods, fibers and glues. Collagen, obtained primarily from hides, is used to make sausage casings. The individual fatty acids from tallow and grease can be used to produce synthetic rubber, cosmetics, food emulsifiers, plasticizers, floor waxes, candles, paints and varnishes, printing inks and pharmaceuticals. In addition, animal hides provide for a variety of leather products. Other by-products are used as animal feed.

FOOD STORAGE

Animals are an effective means of food storage. In many countries there are no facilities to store crops throughout the seasons or to transport crops to market. By feeding crops to animals, they are available for food during years of low production. They can be used as food when people need it by consuming excess feed in productive years.

HUMAN RESEARCH APPLICATIONS

A further benefit from animals often overlooked is that knowledge gained from research on animals is often also applicable to humans. Research on animals in nutrition, reproductive physiology and general health can be transferred to humans due to similarities in body systems. Animal reseach has contributed immensely to our knowledge on how the human body functions and has improved human health and treatment.

ECONOMIC CONTRIBUTION

Farm animals are important economic contributors to agriculture and to the national and international economy. Animals provide employment and income for farmers/ranchers, for people who offer services to farmers and food processor. In many countries, a major portion of the cash farm income comes from livestock. Livestock contributes from 20 to 25 percent of North Dakota's agricultural cash receipts. This value is often underestimated because all contributions cannot be documented by numerical and monetary data.

Farm animals use grains that are available after human needs are met. It is not unusual for American farmers to produce much more grain than we can consume or export. Animals consume this grain and help utilize part of surplus grain in storage. The amount of grain fed to livestock is determined by demand and decreases as human consumption of cereal grains increases.

Farm animals produce natural fibers. World demand for wool has remained stable in recent years or increased. Animal fibers are utilized in nearly all countries for production of either clothing, bedding, housing or carpets. Wool fabrics have an important safety feature in that they do not burn as readily as many plant or man-made materials.

A recent Farm Research articles (Vol. 46, No. 1, pp 3-5) presented research incentives and discussed the importance of the livestock industry to the North Dakota economy. The North Dakota Agricultural Statistics Services publishes figures on land values yearly. Figures published in April 1989 were combined with cash receipt data published by the Bureau of Economic Analysis for the six-year period 1979-1984 and Agricultural Census data for 1964, 1969, 1974, 1978b and 1982 with average values calculated from adjusted data for each North Dakota county and the state average.

Cash receipts from livestock, crops and other sources are compared on a per acre basis resulting in a calculation of gross cash receipts for each category. These figures are converted to a ratio by dividing by either pasture or crop land values. The ratio for livestock receipts and pasture land values (state average = 37.0) is higher than the crop receipts: crop land values (state average = 21.6 percent ratio). Receipts from other sources is assumed to be largely the result of government payments. These receipts were added to crop receipts and a ratio calculated to crop land value. This increased the crop income: land value ratio to 27.0 percent. Tables 1, 2 and 3 present the livestock and crop statistics on a county basis.

Data in these tables suggest an economic advantage in the utilization of pasture land in livestock enterprises. The comparisons are based only on cash receipts. It can be assumed that some of the crops produced are not sold for cash but that a number of bushels of grain are marketed through livestock, especially by North Dakota dairy and swine enterprises. Farms with both crop and livestock enterprises should be able to take advantage of more opportunities to improve their income potential than farms or ranches which produce only crops or livestock.

Animal production is an integral part of a total sustainable agricultural system that is vital to the competitive position of U.S. agriculture. A strong animal industry is essential to the nutrition and health of all people. Research objectives of animal and range scientists at NDSU and at other land grant universities are directed toward improving animal performance and efficiency of production to increase the economic return to animal agriculture.

Table 1. Livestock and Crops Statistics on a County Basis.

County	Land Farms (Acres)	Livestock Acres (%)	Receipts Livestock $(000)	Receipts Livestock (%)	Receipts Livestock (/Acre)	Grazing Land Value/ Acre	Livestock Receipt Ratio
Adams	608,148	41.48	12,130	39.96	46.19	104.00	44.41
Barnes	921,627	17.40	15,868	15.57	96.31	154.00	62.54
Benson	834,814	23.43	10,412	17.40	49.50	100.00	49.50
Billings	726,770	83.91	8,542	58.26	13.97	117.00	11.94
Bottineau	1,028,124	15.62	8,791	11.53	54.45	140.00	37,46
Bowman	734,241	54.37	13,048	44.96	32.24	104.00	31.00
Burke	647,928	25.15	5,143	15.98	28.56	122.00	23.41
Burleigh	963,090	47.88	23,079	45.71	46.34	112.00	41.38
Cass	1,082,716	10.08	22,543	11.73	199.73	304.00	65.70
Cavalier	917,222	13.23	4,352	4.92	34.00	107.00	31.78
Dickey	669,690	27.95	24,449	37.92	119.55	121.00	98.80
Divide	761,602	26.23	6,211	16.31	28.46	124.00	22.95
Dunn	1,267,481	67.94	29,912	59.02	34.53	129.00	26.77
Eddy	384,186	29.24	7,809	28.39	65.70	141.00	46.60
Emmons	882,350	40.14	25,285	47.27	65.47	113.00	57.94
Foster	398,758	21.11	15,555	33.08	178.37	142.00	125.61
Golden Valley	529,739	46.43	12,888	47.65	42.77	85.00	50.32
Grand Forks	865,600	11.67	10,541	7.91	98.16	200.00	49.08
Grant	988,631	52.94	23,327	53.99	41.33	117.00	35.32
Griggs	434,588	21.29	8,956	23.13	92.60	147.00	62.99
Hettinger	724,151	22.91	11,505	25.80	69.18	138.00	50.13
Kidder	772,498	43.72	22,158	52.27	58.33	104.00	56.09
LaMoure	714,538	23.28	20,312	29.89	120.04	126.00	95.27
Logan	617,485	43.59	21,644	54.36	77.54	140.00	55.39
McHenry	1,116,736	33.90	24,366	40.53	59.76	126.00	47.43
McIntosh	596,537	35.97	18,758	48.50	82.17	142.00	57.87
McKenzie	1,393,228	52.05	23,802	44.79	26.13	108.00	24.19
McLean	1,226,179	26.90	16,437	22.13	46.24	116.00	39.86
Mercer	600,172	48.59	16,130	52.75	49.80	148.00	33.65
Morton	1,182,621	57.22	40,346	62.73	57.38	113.00	50.78
Mountrail	1,091,588	34.97	12,115	23.48	29.76	109.00	27.30
Nelson	618,413	15.87	9,467	17.98	93.65	143.00	65.49
Oliver	420,889	53.08	12,616	57.60	51.52	125.00	41.22
Pembina	674,854	11.13	5,435	4.90	67.88	293.00	23.17
Pierce	648,910	21.29	10,931	30.13	77.31	115.00	67.23
Ramsey	758,947	12.61	4,623	7.37	46.01	186.00	24.74
Ransom	539,842	35.82	14,177	27.72	71.82	144.00	49.88
Renville	523,831	14.78	4,121	11.13	49.15	138.00	35.62
Richland	875,904	14.29	19,702	14.11	148.68	264.00	56.32
Rolette	509,666	26.11	7,126	21.48	46.72	132.00	35.39
Sargent	515,367	24.27	17,491	32.50	132.02	167.00	79.05
Sheridan	565,153	32.37	11,248	34.55	54.92	107.00	51.33
Sioux	695,140	78.14	10,415	64.56	18.88	74.00	25.51
Slope	752,462	61.27	10,295	42.62	21.44	118.00	18.17
Stark	829,135	40.93	27,170	49.25	78.82	161.00	48.96
Steele	451,690	13.67	3,230	5.98	52.00	162.00	32.10
Stutsman	1,345,198	27.33	32,172	27.95	81.24	134.00	60.63
Towner	641,245	12.81	2,954	5.82	34.89	156.00	22.37
Traill	533,327	8.41	5,151	5.49	*	*	*
Walsh	805,352	13.32	7,906	6.05	72.12	151.00	47.76
Ward	1,249,040	24.56	16,518	19.02	51.41	135.00	38.08
Wells	808,159	19.25	18,236	25.28	113.94	143.00	79.68
Williams	1,257,790	33.65	14,548	22.68	32.73	98.00	33.40
State	42,091,340	33.27	783,488	24.78	53.12	143.38	37.05

* Data not available.

Table 2. Livestock and Crops Statistics on a County Basis.

County	Land Crops (Acres)	Receipts Crops			Crop Land Value/ Acre	Crop Ratio Ratio
		$(000)	(%)	(/Acre)		
Adams	346,337	12,794	42.15	36.94	195.00	18.94
Barnes	748,136	71,595	70.24	95.70	386.00	24.79
Benson	624,464	39,640	66.23	63.48	269.00	23.60
Billings	112,916	3,896	26.57	34.50	215.00	16.05
Bottineau	851,077	52,831	69.30	62.08	360.00	17.24
Bowman	329,775	10,542	36.32	31.97	217.00	14.73
Burke	455,903	21,253	66.04	46.62	276.00	16.89
Burleigh	459,530	20,030	39.67	43.59	194.00	22.47
Cass	972,448	147,686	76.83	151.87	666.00	22.80
Cavalier	789,209	63,887	72.25	80.95	412.00	19.65
Dickey	459,367	32,056	49.72	69.78	253.00	27.58
Divide	543,383	24,051	63.15	44.26	255.00	17.36
Dunn	401,208	14,042	27.71	35.00	198.00	17.68
Eddy	261,469	15,565	56.58	59.53	308.00	19.33
Emmons	488,043	20,803	38.89	42.63	200.00	21.32
Foster	311,552	25,489	54.21	81.81	333.00	24.57
Golden Valley	228,417	9,599	35.49	42.02	233.00	18.03
Grand Forks	758,219	106,673	80.06	140.69	600.00	23.45
Grant	424,194	14,033	32.48	33.08	198.00	16.71
Griggs	332,375	23,900	61.74	71.91	342.00	21.03
Hettinger	557,979	25,233	56.58	45.22	281.00	16.09
Kidder	385,399	13,516	31.88	35.07	173.00	20.27
LaMoure	545,326	37,913	55.80	69.52	273.00	25.47
Logan	338,353	13,062	32.81	38.60	227.00	17.00
McHenry	700,206	27,224	45.28	38.88	238.00	16.34
McIntosh	368,258	14,804	38.28	40.20	216.00	18.61
McKenzie	482,207	21,088	39.69	43.73	275.00	15.90
McLean	870,604	43,129	58.06	49.54	333.00	14.88
Mercer	276,283	10,309	33.71	37.31	238.00	15.68
Morton	473,756	16,456	25.59	34.74	190.00	18.28
Mountrail	684,443	30,554	59.21	44.64	291.00	15.34
Nelson	506,586	32,924	62.53	64.99	325.00	20.00
Oliver	174,223	6,692	30.56	38.41	219.00	17.54
Pembina	594,786	91,416	82.48	153.70	800.00	19.21
Pierce	507,511	18,883	52.05	37.21	271.00	13.73
Ramsey	658,186	45,189	71.88	68.66	328.00	20.93
Ransom	337,287	29,567	57.82	87.66	318.00	27.57
Renville	439,981	25,802	69.71	58.64	331.00	17.72
Richland	743,259	103,398	74.07	139.11	737.00	18.88
Rolette	349,279	19,231	57.98	55.06	268.00	20.54
Sargent	375,385	29,184	54.23	77.74	340.00	22.86
Sheridan	353,490	16,472	50.60	46.60	226.00	20.62
Sioux	144,756	3,634	22.53	25.10	125.00	20.08
Slope	269,254	9,346	38.69	34.71	224.00	15.50
Stark	484,419	20,526	37.20	42.37	256.00	16.55
Steele	389,977	43,242	80.04	110.88	448.00	24.75
Stutsman	935,263	66,437	57.72	71.04	274.00	25.93
Towner	555,718	37,969	74.03	68.32	340.00	20.09
Traill	487,001	77,176	82.19	158.47	821.00	19.30
Walsh	695,726	105,818	81.01	152.10	701.00	21.70
Ward	927,762	55,095	63.46	59.38	342.00	17.36
Wells	641,685	43,342	60.08	67.54	327.00	20.65
Williams	811,242	37,706	58.78	46.48	230.00	20.21
State	27,342,155	1,902,753	60.18	69.59	322.57	21.57

Table 3. Livestock and Crops Statistics on a County Basis.

County	Land Area (Acres)	Land Farms (Acres)	Receipts Other $(00)	Receipts Other (%)	Receipts Other (/Acre)	Crops + Other Ratio
Adams	633,088	608,148	5,430	17.89	15.68	26.98
Barnes	946,624	921,627	14,471	14.20	19.34	29.80
Benson	897,728	834,814	9,802	16.38	15.70	29.43
Billings	728,960	726,770	2,223	15.16	19.69	25.20
Bottineau	1,073,408	1,028,124	14,611	19.17	17.17	22.01
Bowman	744,320	734,241	5,434	18.72	16.48	22.33
Burke	715,968	647,928	5,784	17.97	12.69	21.49
Burleigh	1,040,192	963,090	7,379	14.62	16.06	30.75
Cass	1,119,296	1,082,716	22,002	11.45	22.63	26.20
Cavalier	967,488	917,222	20,187	22.83	25.58	25.86
Dickey	731,648	669,690	7,964	12.35	17.34	34.43
Divide	831,808	761,602	7,826	20.55	14.40	23.00
Dunn	1,275,008	1,267,481	6,724	13.27	16.76	26.14
Eddy	406,400	384,186	4,134	15.03	15.81	24.46
Emmons	961,984	882,350	7,405	13.84	15.17	28.90
Foster	413,056	398,758	5,976	12.71	19.18	30.33
Golden Valley	648,960	529,739	4,560	16.86	19.96	26.60
Grand Forks	920,320	865,600	16,019	12.02	21.13	26.97
Grant	1,066,112	988,631	5,850	13.54	13.79	23.67
Griggs	454,336	434,588	5,857	15.13	17.62	26.18
Hettinger	726,016	724,151	7,857	17.62	14.08	21.10
Kidder	868,864	772,498	5,054	11.92	13.11	27.85
LaMoure	726,976	714,538	9,720	14.31	17.82	31.99
Logan	640,320	617,485	5,100	12.83	15.10	23.66
McHenry	1,202,752	1,116,736	8,534	14.19	12.19	21.46
McIntosh	634,688	596,537	5,111	13.22	13.88	25.04
McKenzie	1,750,400	1,393,228	8,248	15.52	17.10	22.12
McLean	1,321,600	1,226,179	14,722	19.82	16.91	19.95
Mercer	666,560	600,172	4,140	13.54	14.98	21.97
Morton	1,228,928	1,182,621	7,514	11.68	15.86	26.63
Mountrail	1,164,224	1,091,588	8,935	17.31	13.05	19.82
Nelson	636,928	618,413	10,259	19.59	20.25	26.23
Oliver	461,312	420,889	2,594	11.84	14.89	24.34
Pembina	719,360	674,854	13,984	12.62	23.51	22.15
Pierce	664,256	648,910	6,463	17.82	12.73	18.43
Ramsey	798,912	758,947	13,042	20.75	19.82	26.98
Ransom	551,104	539,842	7,396	14.46	21.93	34.46
Renville	567,232	523,831	7,090	19.16	16.11	22.58
Richland	927,424	875,904	16,490	11.81	22.19	21.89
Rolette	584,000	509,666	6,814	20.54	19.51	27.82
Sargent	545,856	515,367	7,301	13.57	19.45	28.59
Sheridan	632,704	565,153	4,832	14.84	13.67	26.67
Sioux	705,792	695,140	2,084	12.92	14.40	31.60
Slope	783,808	752,462	4,512	18.68	16.76	22.98
Stark	842,304	829,135	7,477	13.55	15.43	22.58
Steele	454,528	451,690	7,550	13.98	19.36	29.07
Stutsman	1,449,152	1,345,198	16,445	14.29	17.58	32.34
Towner	667,456	641,245	10,333	20.15	18.59	25.56
Traill	551,040	533,327	11,745	12.51	24.12	22.24
Walsh	822,976	805,352	16,896	12.94	24.29	25.16
Ward	1,308,160	1,249,040	15,212	17.52	16.40	22.16
Wells	831,296	808,159	10,564	14.64	16.46	25.69
Williams	1,321,088	1,257,790	11,706	18.25	14.43	26.48
State	44,334,720	42,091,340	475,375	15.04	17.39	26.96