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Trends, Developments, and Potentials for Growth: South Dakota's Beef Industry

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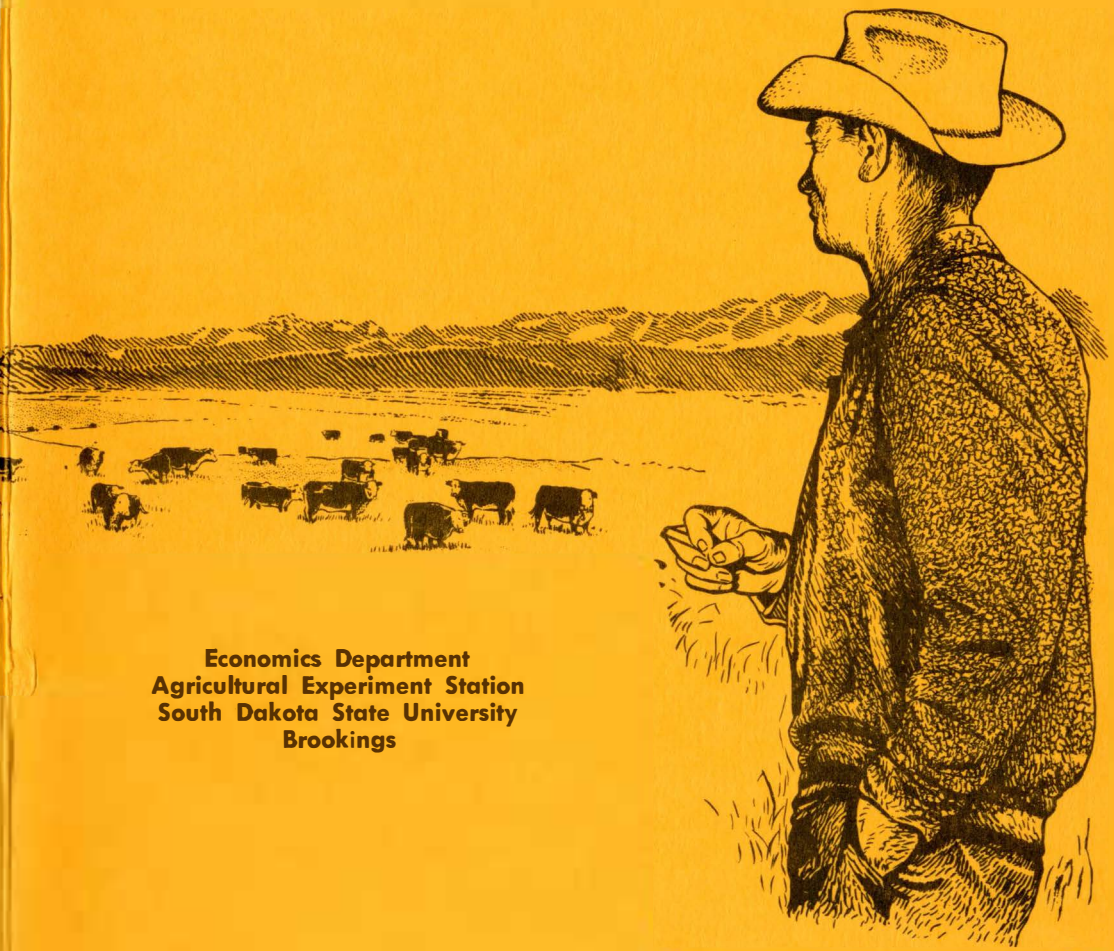

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Contents

This revision of Bulletin 585 contains additional data and information that alters previous conclusions concerning trends, developments and potential for growth of South Dakota's beef industry. This revised edition, dated December 1971, supercedes and replaces the original publication dated September 1971.

Trends, Developments, and Potentials for Growth

South Dakota's Beef Industry

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SUMMARY AND CONCLUSIONS

Beef is South Dakota's most important agricultural product. The state ranked 6th in the nation in the number of beef cows, and 11th in the number of cattle on feed on January 1, 1971. About half of all South Dakota cash receipts from farm marketings come from the sale of cattle and calves.

This report provides an assessment of past trends and of problems and potentials for beef production in South Dakota.

Output Growth

Total United States beef and veal production doubled in the 20 years of the 1950's and 1960's. Estimates are that annual production (and consumption) of beef in the United States will increase by one-third during the 1970's. South Dakota kept up with the rest of the nation during the 1950's and 1960's in increasing its beef output.

A considerable increase in irrigation or substantial improvements in animal, crop, and pasture management may be needed for South Dakota's beef calf production to continue growing at the rate of the rest of the nation. The central Corn Belt, like South Dakota, has had a large

feed grain surplus. However, it appears not to be utilizing its pasture land as fully as is South Dakota. The southeastern states also appear to have great potential for increased grazing capacity. Also, for cattle feeding to grow in an area, it must be relatively profitable there. Profitable feeding requires efficient and economical marketing and processing systems as well as an economical source of feed, and efficient production.

U. S. numbers of cattle on feed increased by 21% between January 1, 1966 and January 1, 1971. In spite of a considerable potential for growth, cattle feeding in South Dakota has not increased in recent years. Illinois, a state with even larger excess supplies of feed grains, suffered a 20% decline in cattle on feed between 1966 and 1971. Thus, a large excess feed grain supply does not assure, by itself, that cattle feeding in an area will grow or even be maintained.

The demand for beef will grow and increased production will be needed in the 1970's. Growth is expected to occur in most areas that have the resources. Some aspects of the South Dakota beef situation may seem negative compared to those of areas that have not yet so fully developed their potential. However, there is much potential in South Dakota to:

1. Continue to increase cattle feeding in view of large excess production of feed grains in the state,
2. continue to increase beef production from each cow through better management, nutrition, selection and cross breeding to obtain increased calving percent, calving at younger age, and increased weaning weights,
3. continue to improve pasture, forage and feedgrain yields.

Transportation Rates and Development

The level of freight rates, and also the relationships between different rates, can be helpful to an area or can retard its development. Relatively low rates on the shipping out of raw products, such as feeder cattle or feed grains, and relatively high rates for shipping out finished products, such as fed cattle or meat, can hinder economic development in South Dakota. The system of transportation facilities, rates and practices that evolves in the 1970's will have a major bearing on South Dakota's ability to compete. For example, if freight rates on meat are economical relative to freight rates on live animals, meat-packing and processing will be encouraged at the point of production.

Feeder Cattle Outlets

South Dakota sends about half of its feeder cattle to other states for finishing. Estimates of the state's net feeder cattle outshipments increas-

ed from about 300,000 head annually in the mid-1960's to nearly 600,000 head in the 1969-70 feeder marketing year.

South Dakota calf producers will be dealing with larger feedlots in the future. In 1969, for the first time, United States feedlots with a capacity of over 1,000 head handled half the nation's fed cattle production. In 1970, lots of this size marketed 55% of all fed cattle in the country.

To be competitive, the larger feedlots will need to stay at near full capacity the year around. They may integrate into calf production or develop agreements with individual calf producers to obtain the quantity, quality and timing of delivery that they need. Producers who are prepared to control their operations in accordance with the needs of large lots should be in a better bargaining position than those who are not.

Industry Structure

If pasture and other limitations slow the growth of South Dakota's beef industry, this may be unfortunate in terms of the state's short-run economic growth rate. However, an advantage can be that the South Dakota cattle industry may have more time than some areas have had to prepare for inevitable changes, and to develop plans or goals for its future. Some states that have experienced rapid growth in cattle feeding have also tended to experience substantial changes in ownership structure, unit size, and even community character.

Larger vertically integrated and large highly coordinated beef production-marketing-processing systems may be complex and difficult to manage. However, they have an advantage in their theoretical ability to respond immediately to problems for which corrective action must be taken at some other level. Poorly-muscled or overly-fat carcasses may be discovered in the slaughter plant, for example. But the place for corrective action is in the ranch breeding program.

It may be possible for marketing programs to be developed that will allow the present South Dakota producers, feeders and marketing and meatpacking firms to remain competitive with the large production-marketing-processing systems that have sprung up in other areas. A challenge for marketing agencies serving independent producers and feeders would be to develop a communication-incentive program that would give them the same ability to respond to problems that integrated operations have.

Whether South Dakota's beef industry is to grow by 5% or by 50% during the 1970's may not be as important to the present members of the industry as who will control the industry and what it will be like.

INTRODUCTION

Beef—S.D.'s most important product

South Dakota ranked as the 6th state in the nation in number of beef cows, and 11th in the number of cattle on feed on January 1, 1971. The state's cash receipts from all farm marketings were just over a billion dollars in 1970. More than half came from cattle and calf sales. Adding other livestock and livestock products, the total accounted for over 80% of South Dakota's cash receipts from farm marketings in 1970. Cash sales of crops made up the balance. Changes in the beef industry, therefore, have a special significance for South Dakotans.

Contents, purpose of this report

U. S. beef demand and supply trends as well as trends in South Dakota's calf production, feed production, and cattle feeding, are reviewed in this report. Recent beef production trends for South Dakota are compared with those for other leading cattle producing and feeding areas. In addition to reviewing past trends, the report contains information on the United States and South Dakota beef production potentials and on the outlook for beef demand in the 1970's. South Dakota's potential for increasing its beef output is compared with the potentials of other areas. It is hoped, however, that the information contained in this report will give the South Dakota beef industry a background of information for a realistic assessment of some of its problems and opportunities.[1] This report provides information on the background and overall outlook for beef production in South Dakota. Some individuals can, of course, find growth opportunities where total overall output is declining. Likewise, other individuals may fail in a relatively favorable environment.

TRENDS IN DEMAND FOR U. S. BEEF

U. S. Beef Demand and Outlook

U.S. beef demand strong and growing

The demand for South Dakota's main agricultural product, beef, has been strong and is growing. Except for times of very rapid increases in marketings,

[1]For those desiring more detailed information, a selected reference list is attached to this report.

United States beef prices have trended upward in the face of growing output (Figure 1). National consumer income also increased, so that even though both beef consumption and beef prices increased during the 1960's, the proportion of total consumer after-tax income that was spent on beef dropped from 2.4% to 2.3%. The proportion of consumer incomes spent on all food dropped more—from about 20% to about 16.5% during the 1960's. Beef's share of the consumers' food budget rose from about 12% to about 14%.

Continued beef demand growth

Beef consumption is at record levels (Figure 2), and continued growth in beef production, consumption and demand is expected in the 1970's. Population and incomes are expected to rise in the 1970's, and demand studies indicate that people would eat more beef if they had more money. An example is an analysis of a 1965 survey of household food consumption (Reference 18).[2] It was found that on the average, with a 10% increase in family income, quantity (pounds) of beef consumed per person increased by 2.3% and the value (dollars spent at retail) increased 3.4%.

Increase of a third in beef consumption

Projections indicate that the population of the United States can be expected to increase by about one-sixth during the 1970's, as it has in recent decades. In addition, by 1980, each person may be consuming one-sixth more beef. If these projections are correct—the population growth of one-sixth plus the increased consumption per person of about one-sixth—total annual consumption would be about 130 pounds of beef and veal per person. This would result in total United States beef consumption in 1980 around one-third higher than in 1970.

Export Beef Demand and Outlook

Trade barriers may block export growth

Although the United States exported large amounts of tallow, hides, and offal items, beef meat exports amounted to only 37 million pounds in 1969,

[2]See numbered reference list in appendix.

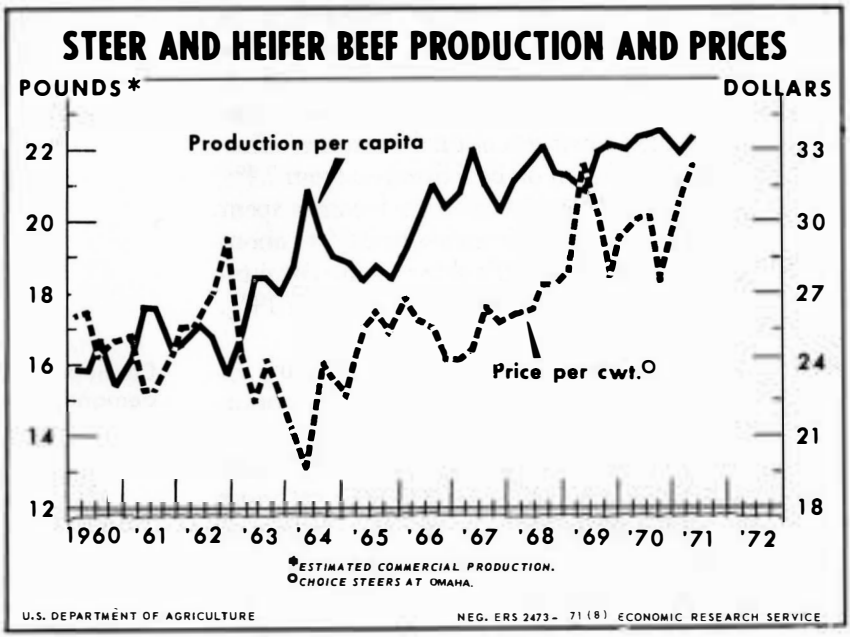
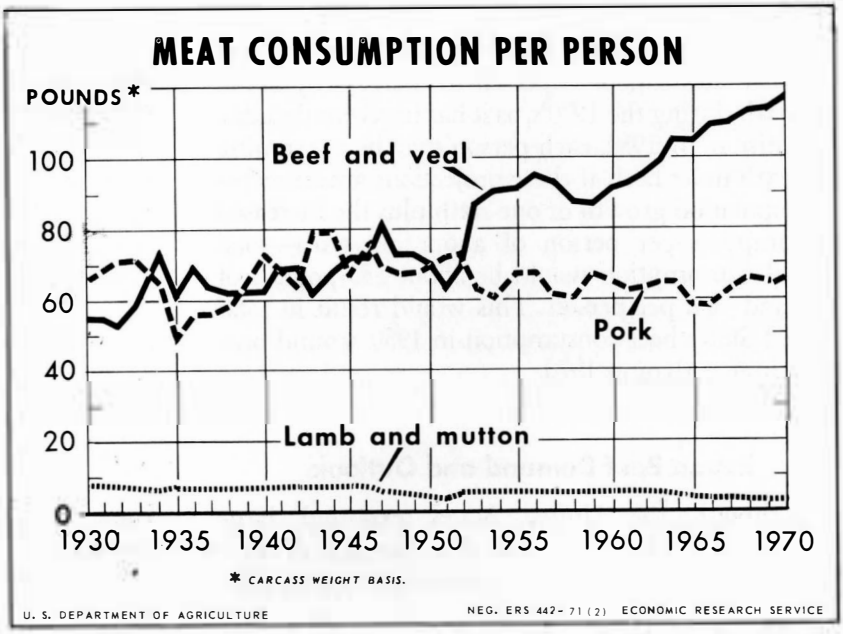


Figure 1

Figure 2



out of the total United States production of 21,125 million pounds. Incomes and beef demand are increasing in developed areas of the world, but such areas as Japan and Europe are discouraging large meat imports. The growing demand represents a potential market for United States beef. Therefore, at the risk of oversimplifying a very complex situation, it should be kept in mind that the United States, a nation with a need for additional outlets for its farm products, should think twice before turning its back on world markets.

TRENDS IN U. S. BEEF SUPPLY

U. S. Beef Production and Outlook

Beef, veal production doubled

Total beef and veal production in the United States doubled in the 20 years 1949-1969. As Table 1 shows, veal production dropped by one-half, while beef production more than doubled. Veal production dropped mainly because dairy cow numbers have decreased, and dairy steer calves are being fed to heavier weights.

Table 1. United States beef and veal production; 1949 and 1969, and 1969 as a percentage of 1949.

Item	1949	1969	1969 as percent of 1949
	(million pounds)		(percent)
Beef production	9,439	21,125	224
Veal production	1,334	673	50
Total	10,773	21,798	202

Source: USDA.

Per person consumption up 56%

While total beef and veal production doubled in 20 years, beef and veal consumption per person increased only 56% due to the growth in the number of consumers. During this time, feedlot (grain-fed) beef production more than tripled, becoming a more important part of total beef and veal production. For example, fed beef accounted for less than half of total United States beef production in the early 1950's and for about three-fourths in 1969.

Future growth may be slower

The need for an estimated one-third increase in beef for United States consumption by 1980 has been mentioned. While the growth in United States beef production in the 1970's will continue, it is expected to

be slower than it was in the 1950's and 1960's. A greater proportion of calves are now sent to feedlots rather than being slaughtered as vealers or calves, or as grass-fattened cattle, and most beef animals now come close to a mature weight before slaughter. Since large increases in weight marketed per animal may be about over, future growth in beef consumption will have to come either from raising more feeder cattle or from increased beef imports.

Timing may determine price patterns

Cattle and beef prices could be relatively high in the early 1970's if farmers decide to hold heifers off the slaughter market so that they can increase their cow herds as soon as possible. If the herd buildup is delayed until the later 1970's, beef prices would be lower in the early 1970's and higher later in the decade. In either event, cow herds are expected to have been expanded considerably by 1980, and beef supplies per person should be greater then than at present.

Outlook for Substitutes and Beef Imports

Imports help boost beef consumption

The United States is the world's largest producer of beef, and also the world's largest importer. In 1949, the United States produced about 72 pounds of beef and veal per person, and imported about one additional pound. In 1969, domestic production was about 106 pounds per person, and imports were about 8 pounds.

High prices, costs encourage imports

A common prediction for the 1970's is that meat prices will rise, feeder calves will be expensive, and cows (and boning beef prices) will be high. Feed will be plentiful but other farm production costs will increase. Consumers will strive for more imports and beef producing states will argue for import restraint.

Beef substitutes also encouraged

In addition to the fact that higher beef prices could strengthen the desire of consumers to permit more beef imports, high beef prices could also encourage the introduction and acceptance of meat substitutes. Meatless meats are commanding attention because of improvements in vegetable proteins.

SOUTH DAKOTA BEEF PRODUCTION AND OUTLOOK

Beef, feeder cattle, feed grains in surplus

South Dakota is a surplus state in beef production, cattle slaughter, and in feed grain production. For example:

1. South Dakota's net exports of feeder cattle are about equal to marketings of fed cattle from the state's feedlots.
2. From 1962 to 1969, an average of about 2 million tons more feed grains were produced in South Dakota each year than were fed in the state.
3. More than 10 times as much beef is produced in South Dakota as is consumed in the state (Figure 3).
4. More than 5 times as much beef is slaughtered in South Dakota as is consumed in the state (Figure 3).
5. Beef production in South Dakota is about 2½ times the amount slaughtered in the state (Figure 3).

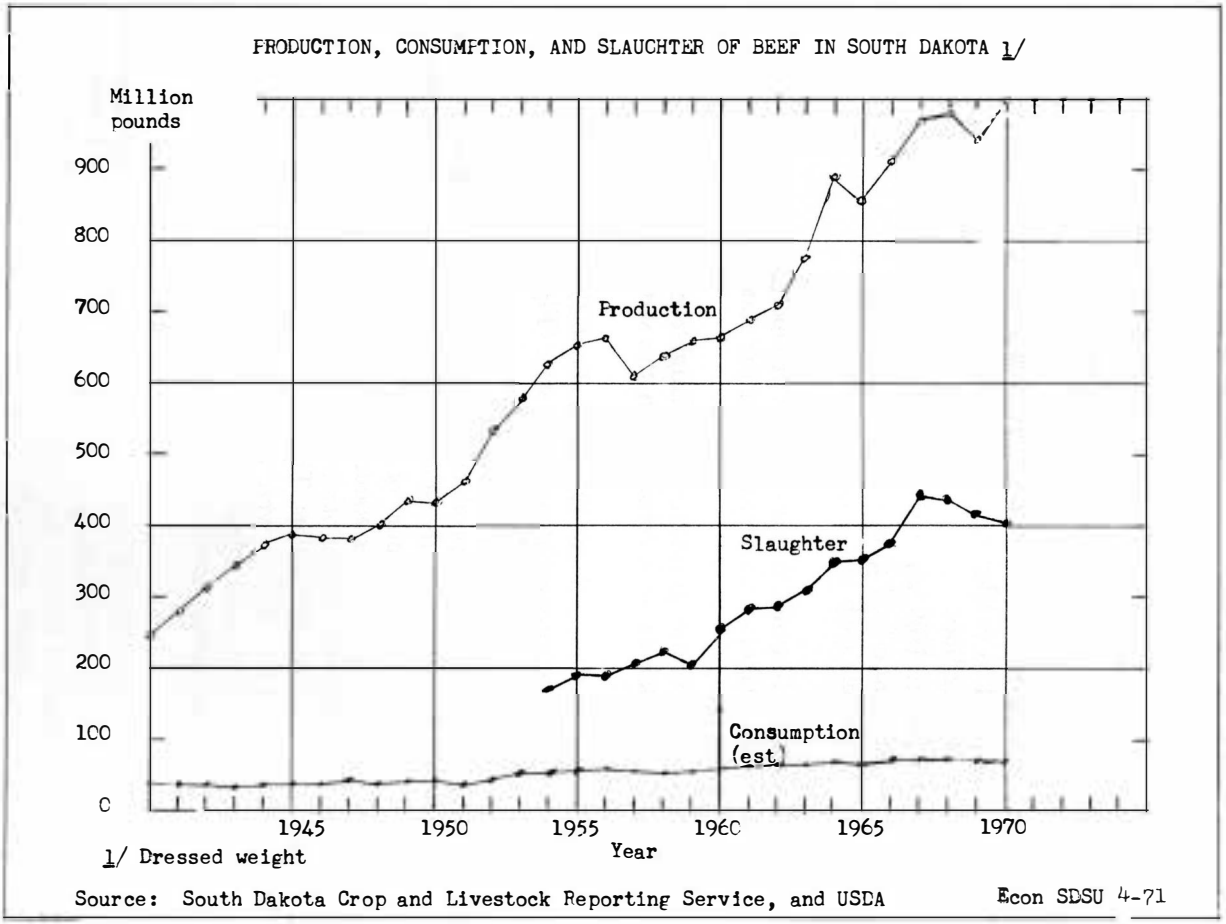
Slaughter about equals feeding

Much of the state's beef production, (see Figure 3 and item 5 above), leaves the state in the form of feeder calves. The total number of cattle slaughtered in South Dakota plants was about the same during the 1960's as the total number of steers and heifers finished by South Dakota feedlots. This does not mean that these steers and heifers were all slaughtered in South Dakota. The state's plants handle other cattle, such as cows and other non-fed cattle, and fed cattle from other states.

Grain available for increased feeding

Obviously, the value of the output of the South Dakota beef industry could be greater if beef calf and fed beef production were to increase, and if more of the state's farm output were shipped out as finished meat products rather than as feed and as live cattle. Although more investigation is needed, the facts available suggest that irrigation or improved crop and pasture management would be needed before

Figure 3


PRODUCTION, CONSUMPTION, AND SLAUGHTER OF BEEF IN SOUTH DAKOTA 1/
Million pounds
900
800
700
600
500
400
300
200
100
0
Production
Slaughter
Consumption (est.)
1945
1950
1955
1960
1965
1970
Year
1/ Dressed weight
Source: South Dakota Crop and Livestock Reporting Service, and USDA
Econ SDSU 4-71

large increases in the state's feeder calf production can be expected. However, sizable excess supplies of feed grains are already available for expansion of livestock feeding.

South Dakota Beef Calf Production, Range and Pasture Capacity

South Dakota 6th in beef cows

South Dakota entered 1971 ranking as the 6th state in the nation in the number of beef cows on farms. South Dakota's 1966-to-1971 increase in beef cow numbers was at about the United States average growth rate (Table 2). During this time, some leading states were growing very little and others were experiencing a considerably more rapid growth rate than that of South Dakota.

Table 2. Beef cows and heifers that have calved—number on farms January 1, 1971; 12 leading states and U. S.; and approximate percentage increase January 1, 1966 to January 1, 1971.

State	1,000 head, 1971	Approximate percentage Increase*
Texas	5,791	15
Oklahoma	2,188	13
Nebraska	1,913	5
Missouri	1,909	19
Kansas	1,899	19
South Dakota	1,731	11
Montana	1,570	10
Iowa	1,517	18
Mississippi	1,285	12
Colorado	1,110	21
Kentucky	1,087	32
North Dakota	964	1
United States	37,557	12

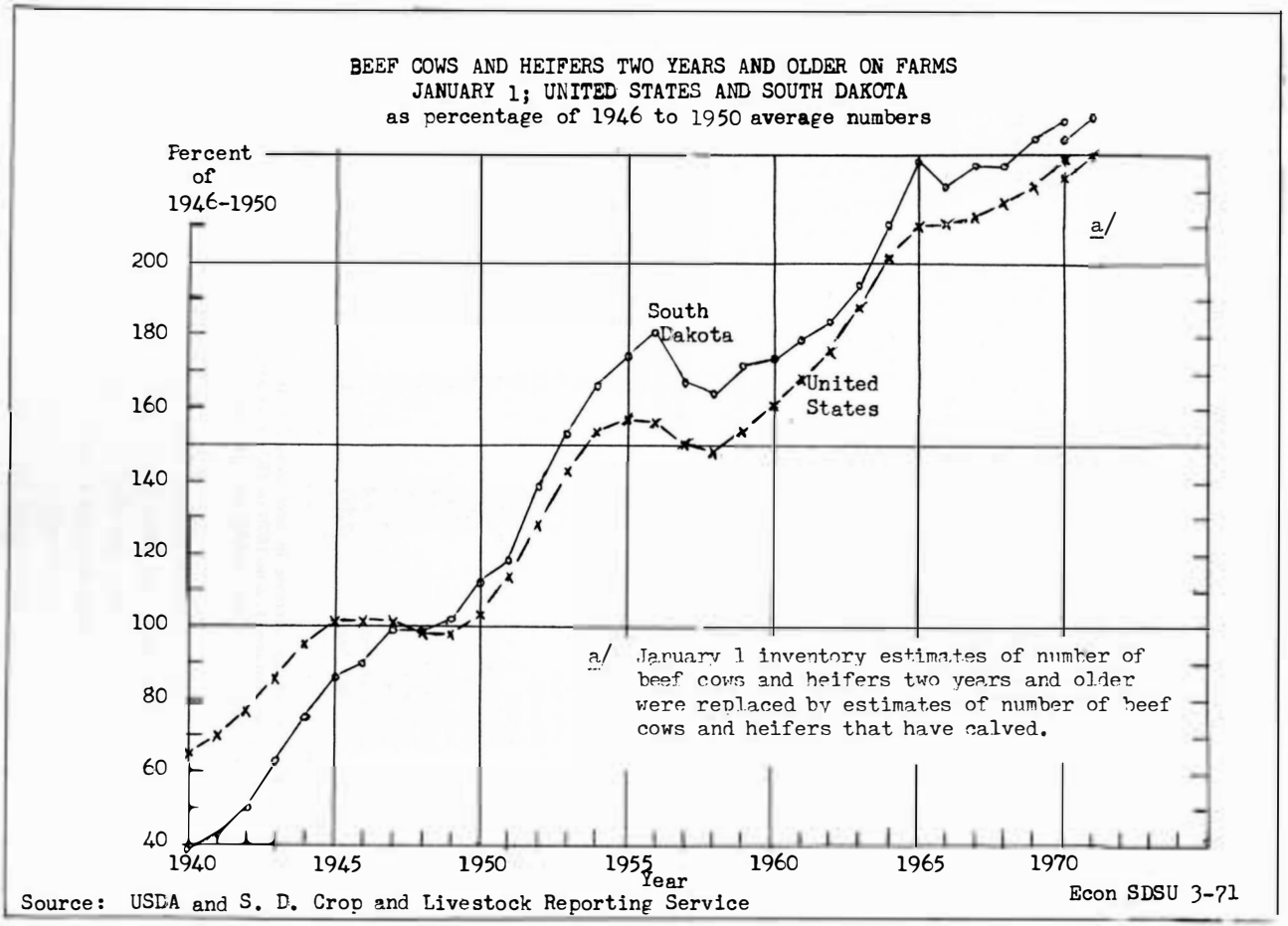
Source: USDA.

*1966 to 1970 percentage increase in beef cows 2 years and older on farms and ranches, January 1, plus 1970 to 1971 percentage increase in beef cows and heifers that have calved, on farms and ranches, Jan. 1.

Grazing heavier than ever

South Dakota's number of beef cows has increased to more than six times its 1940 level and the growth rate has been faster than for the United States as a whole (Figure 4). Data suggest that the state's range and pasture resources are being used more intensively than ever before. The increased beef cow grazing demands are also illustrated by comparing Figures 5 and 6. They show, in addition, the geographic distribution of beef cows throughout the state. In 1940,

Figure 4


BEEF COWS AND HEIFERS TWO YEARS AND OLDER ON FARMS
JANUARY 1; UNITED STATES AND SOUTH DAKOTA
as percentage of 1946 to 1950 average numbers
Percent of 1946-1950
200
180
160
140
120
100
80
60
40
South Dakota
United States
a/
1940
1945
1950
1955
1960
1965
1970
Year
a/ January 1 inventory estimates of number of beef cows and heifers two years and older were replaced by estimates of number of beef cows and heifers that have calved.
Source: USDA and S. D. Crop and Livestock Reporting Service
Econ SDSU 3-71

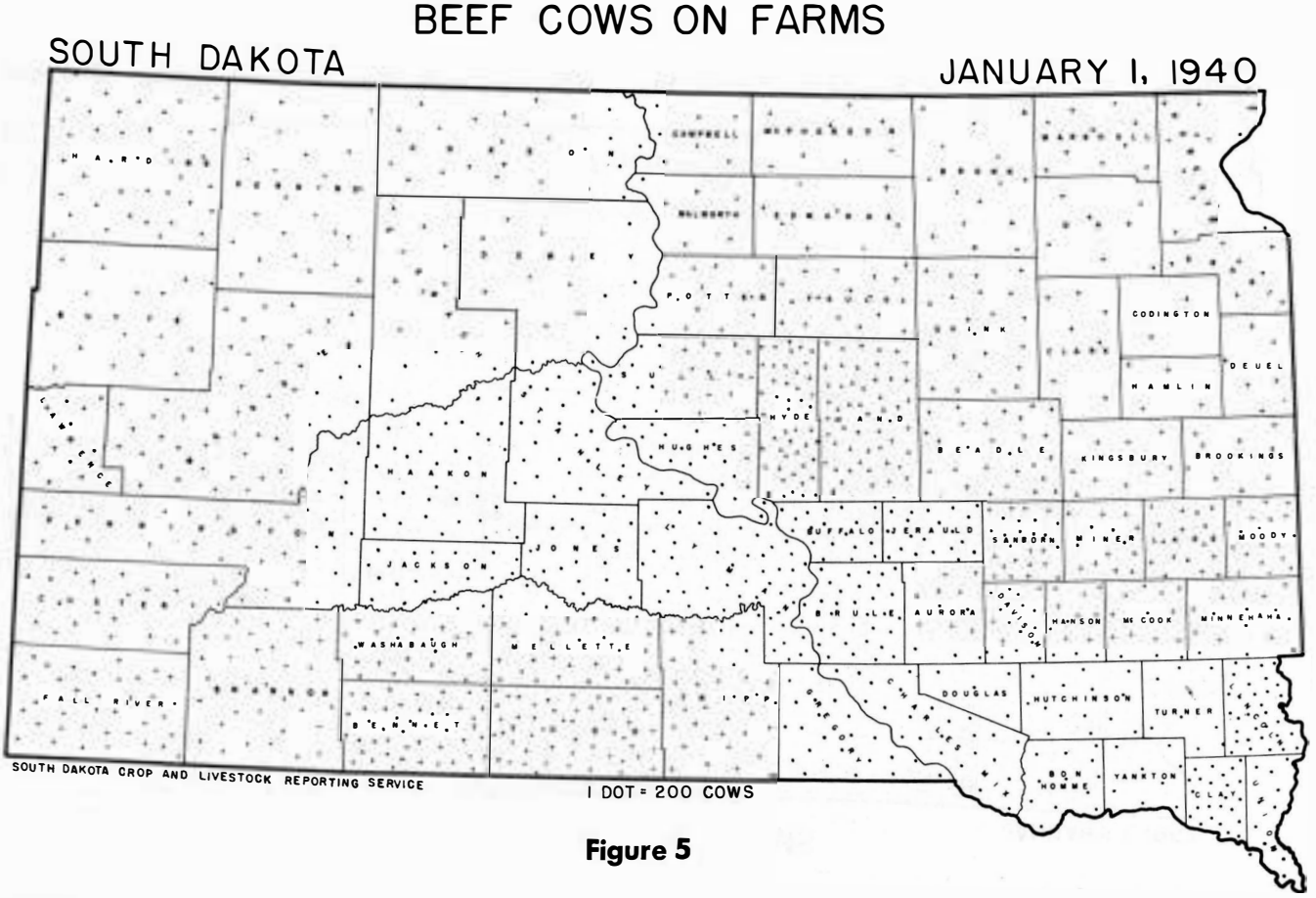

BEEF COWS ON FARMS
SOUTH DAKOTA
JANUARY 1, 1940
CAMPBELL
WALWORTH
POTTER
EDMUNDS
FAULK
SPINK
CODINGTON
DEUEL
HAMLIN
HYDE
HUGHES
SULLY
BEADLE
KINGSBURY
BROOKINGS
HAAKON
JACKSON
JONES
BUFFALO
JERAULD
SANBORN
MINER
MOODY
BRULE
AURORA
DAVISON
HANSON
MCCOOK
MINNEHAHA
WASHABAUGH
MELLETTE
DOUGLAS
HUTCHINSON
TURNER
FALL RIVER
TODD
BON HOMME
YANKTON
CLAY
UNION
SOUTH DAKOTA CROP AND LIVESTOCK REPORTING SERVICE
1 DOT = 200 COWS

Figure 5

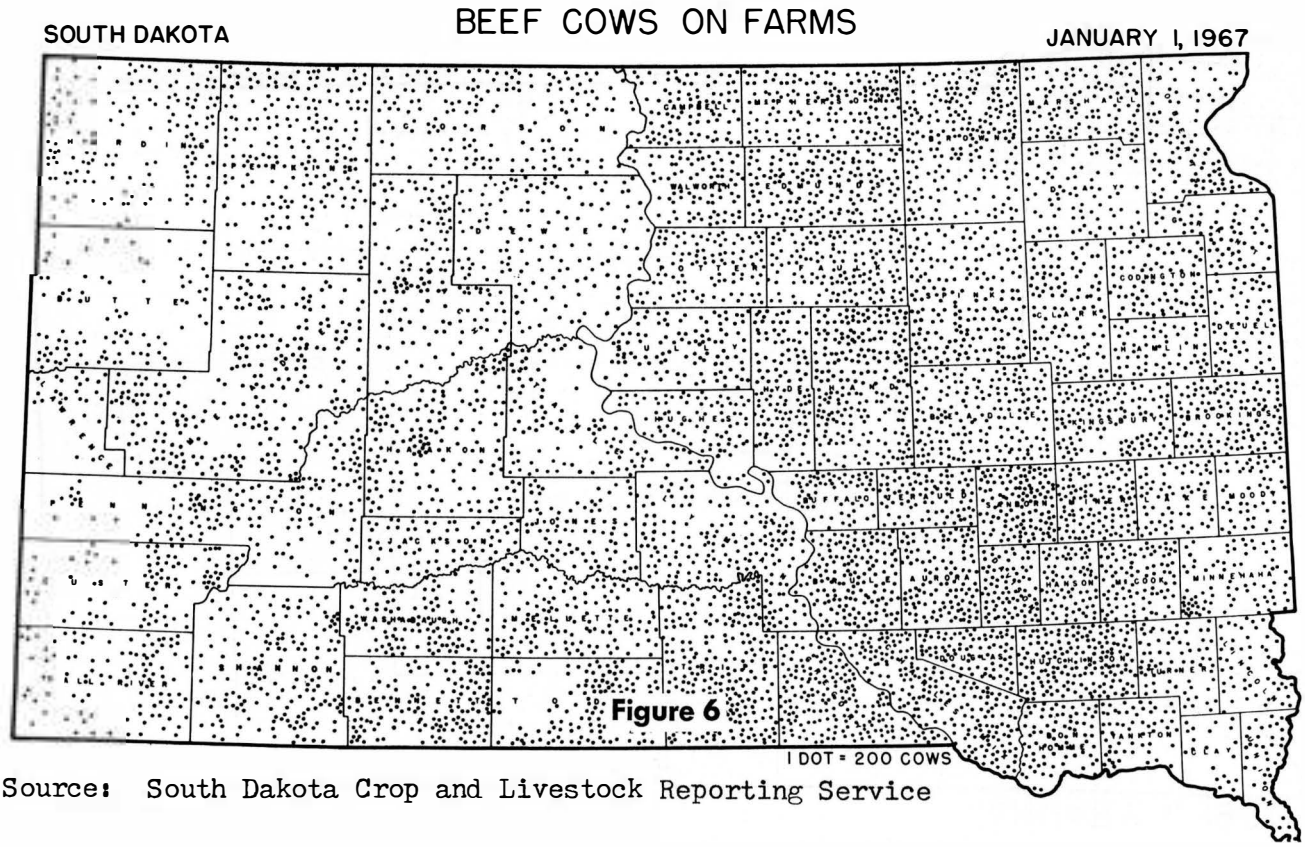


Figure 6

Source: South Dakota Crop and Livestock Reporting Service

when South Dakota was primarily a dairy state, most dairy cows (not shown on the maps) were concentrated in the southeastern part of South Dakota. While much of South Dakota's native and tame pasture land is overgrazed, research has shown that grazing capacity can be increased through animal and pasture management.

Calves off pasture younger

South Dakota's ranges and pastures are having to carry more beef cows than in the past. However, changes in the age of beef animals at marketing (feeder stock going to market as calves rather than as yearlings or older) have helped to increase the state's beef cow carrying capacity. South Dakota appears to have made a relatively big shift, compared to other areas, toward selling feeder animals at a younger age (Table 3).

Table 3. Percentage increase in farm marketings of cattle and calves, 1949 to 1964; selected regions*

Region	Cattle	Calves
South Dakota	49	176
North Central Region†	70	66
United States	67	81

*Source: Reference 6. (Computed from U. S. Census of Agriculture data)

†The North Central States in this analysis consisted of Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin.

Ranch yearling sales down

As another illustration of this shift, in the 1940's most ranches in the northwest part of South Dakota sold no steers younger than yearlings (Reference 9). In 1969, nearly half of the cash receipts of a sample of ranches in western South Dakota came from calf sales and only one-third came from the sale of yearlings (Reference 7).

Dairying decline lessens pasture demand

In 1940, South Dakota had more cows kept for milk, or being milked, than strictly for beef (Table 4). The 60% drop in milk cow numbers between 1940 and 1970 is another factor that has helped make room for more beef cows. About 17% of the increase in beef cow numbers was compensated for by the decrease in milk cow numbers. Also, a decline in sheep numbers (and work horse numbers) has released some feed for expanding beef cow herds.

Table 4. South Dakota cattle and calves on farms January 1, 1940 and 1970; number and percent by class and percentage change in numbers by class.

Class	Year				1970 as percent of 1940
	1940		1970		
	(Thousand)	(Percent)	(Thousand)	(Percent)	(Percent)
Kept for milk					
Cows, 2 yrs. and older	494	30	200	5	40
Heifers, 1-2 yrs.	122	8	39	1	32
Heifer calves	145	9	55	1	38
Beef and "other"					
Cows, 2 yrs. and older	280	17	1,719	39	614
Heifers, 1-2 years	87	5	401	9	461
Calves	355	22	1,470	33	414
Steers, 1 year and older	104	6	437	10	420
Bulls	45	3	89	2	198
All cattle	1,632	100	4,410	100	270

Source: Computed from data from South Dakota Crop and Livestock Reporting Service.

U.S. beef cow numbers may increase faster

The decline in dairy cow numbers in South Dakota, and the marketing of beef calves at a younger age have helped South Dakota keep up with the United States growth rate in beef cow numbers. In the 1970's United States beef cow numbers may increase faster than South Dakota's because much of the state's pasture land is overgrazed and because some other areas of the country such as the Corn Belt and the southeastern states may have greater unexploited potential for increasing beef cow herds. In summary, the growing demand for beef provides an incentive to producers to continue expanding their beef cow herds, but the potential for expansion may be greater in some other areas than it is in South Dakota.

"Backgrounding" could up beef output

Some land will produce more nutrients in hay or in silage than it will in grass. On such grass land, carrying capacity can be increased by "backgrounding" calves through the winter on hay or silage plus a small amount of grain. However, this type of program takes land that could otherwise be used to support more beef cows. Whether or not "backgrounding" will pay in the future, as it appears to have in the past, will depend upon a number of things, including:

1. the price relationship between feeder calves in the fall and backgrounded feeder cattle the next spring, and
2. the income foregone from having fewer beef cows (and calves).

South Dakota Cattle Feeding Trends and Potentials, and Feed Grain Supplies

South Dakota 11th in cattle on feed

South Dakota entered 1971 ranking as the 11th state in the nation in number of cattle being finished in feedlots. Between 1966 and 1971, the number of cattle on feed in South Dakota declined 3% and United States numbers increased by 21% (Table 5). While South Dakota's number on feed on January 1, 1971 was just 3% less than on the same date 5 years earlier, the number rose until 1968 and then fell back to just below 1966 levels by 1971 (Figure 7). U. S. numbers fell slightly (January 1, 1971 compared to a year earlier).

Elsewhere growth may be higher

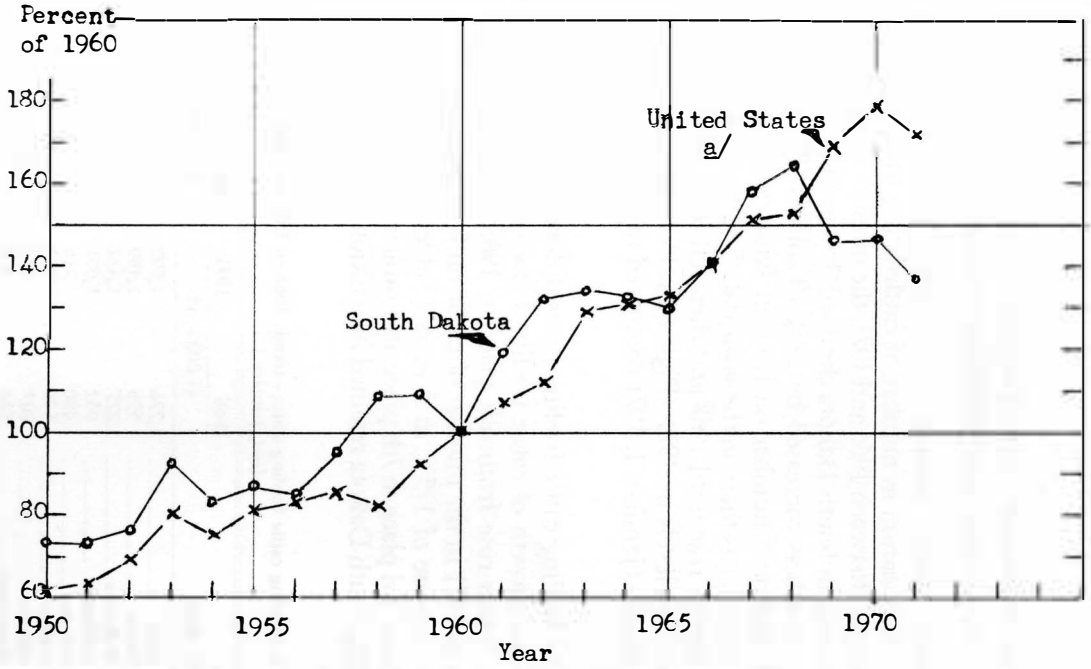
The leading cattle feeding states differed markedly in the growth of cattle feeding between 1966 and 1971. Texas rose from 6th place in 1966, to second place in 1971 in the number of cattle on feed January 1, an increase of 175% in 5 years (Table 5). Illinois fell from 3rd place to 7th place, its number decreasing by 20%. South Dakota retained its position as the 11th state.

Table 5. Leading cattle feeding states—trends 1966 to 1971 in cattle on feed, January 1.

Rank in 1971	State	1966 (1,000 head)	1971 (1,000 head)	Percentage Increase
1	Iowa	1,776	1,992	12
2	Texas	538	1,480	175
3	Nebraska	1,227	1,422	16
4	California	952	1,001	5
5	Kansas	480	916	91
6	Colorado	596	862	45
7	Illinois	807	649	(-20)
8	Minnesota	536	548	2
9	Arizona	364	524	44
10	Missouri	435	342	(-21)
11	South Dakota	348	339	(-3)
12	Indiana	321	328	2
	U. S.*	10,582	12,762	21

*39 states, Source: USDA.

CATTLE AND CALVES ON FEED JANUARY 1, U. S. AND SOUTH DAKOTA AS PERCENTAGES OF 1960



a/ 26 states

Source: USDA

Figure 7

Econ SDSU 1-71

South Dakota feedlots finished and marketed about 100,000 fewer fed cattle in 1969 and in 1970 than in 1968 (Figure 8). With beef cow numbers increasing more rapidly than feedlot finishing, more South Dakota feeder cattle and calves were being shipped to other states. The estimated volume of net feeder cattle outshipments was obtained by estimating in-state disposition of South Dakota beef calves and assuming that the remainder of the state's beef calf crop was exported to other states as feeders (the estimating procedure is shown in Table 6). The accuracy of the estimating procedure is not known, and probably varies from year to year, but it appears that net South Dakota feeder cattle and calf outshipments moved upward from about 300,000 head in the 1963-64 feeder marketing year (Figure 8 and Table 6) to nearly 600,000 head in the 1969-70 feeder marketing year.

Feeder outshipments up in 1960's

Table 6. Beef cows and heifers, beef calves born, and estimated net disposition of South Dakota feeder cattle, 1960 to 1970.

Year	Beef cows and heifers on farms, S.D., Jan. 1 — Age (years) 2+	1-2	Total	Beef calves born previous year*	Estimated net disposition of previous year's beef calves — Within South Dakota — To S.D. feed lots†	Deaths and S.D. slaughter off grass‡	Herd replacement Heifer§	Bull‖	Total	Net S.D. outshipments of feeder cattle
					(1,000 head)					
1960	1,250	261	1,511	1,124	362	112	200	19	693	431
1961	1,288	263	1,551	1,150	464	116	206	19	805	345
1962	1,327	306	1,633	1,186	451	118	212	20	801	385
1963	1,399	346	1,745	1,220	450	122	224	22	818	402
1964	1,521	388	1,909	1,288	590	128	243	24	985	303
1965	1,643	399	2,042	1,400	564	140	263	26	993	407
1966	1,594	394	1,988	1,512	563	152	255	25	995	517
1967	1,637	403	2,040	1,482	618	148	262	26	1,054	428
1968	1,638	402	2,040	1,522	660	152	262	26	1,100	422
1969	1,686	391	2,077	1,556	551	156	270	26	1,003	553
1970	1,719	401	2,120	1,602	552	160	275	26	1,013	589

*South Dakota calf crop percentage times beef cows, age 2+.

†Equals marketing of fed cattle from South Dakota feedlots, year indicated.

‡Assuming 10% of all beef calves born in South Dakota were slaughtered as calves or as nonfed cattle; or died as calves.

§Assuming 16% of beef cows and heifers 2 years old and older were replaced each year from the previous year's calf crop.

‖Assuming that one bull was needed per 20 cows and heifers one year and older, and that bulls were kept in service 4 years, resulting in an annual bull replacement rate equal to 1.25% of the number of cows and heifers one year and older.

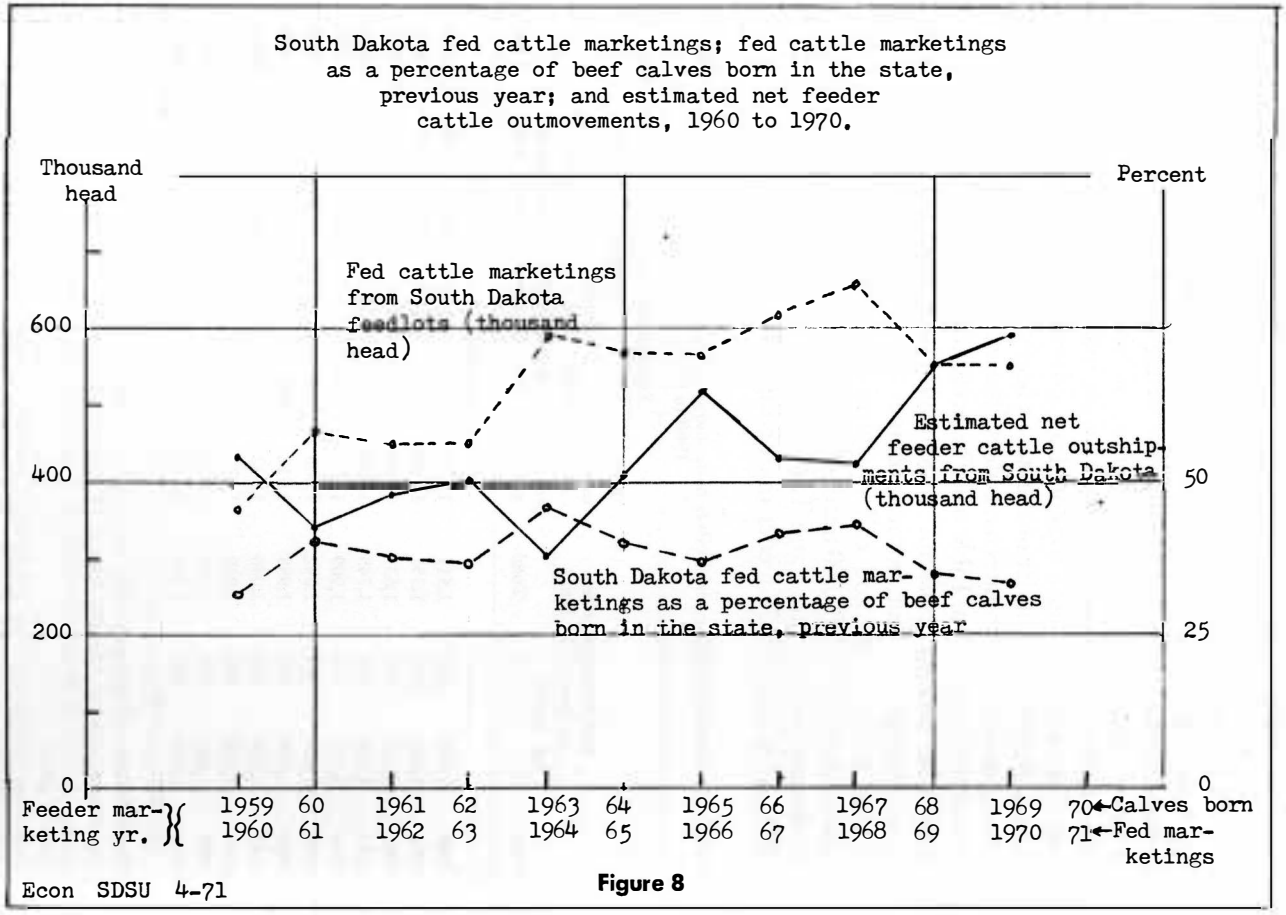

South Dakota fed cattle marketings; fed cattle marketings as a percentage of beef calves born in the state, previous year; and estimated net feeder cattle outmovements, 1960 to 1970.
Thousand head
Percent
Fed cattle marketings from South Dakota feedlots (thousand head)
Estimated net feeder cattle outshipments from South Dakota (thousand head)
South Dakota fed cattle marketings as a percentage of beef calves born in the state, previous year
600
400
200
0
50
25
0
Feeder marketing yr.
1959 60 1961 62 1963 64 1965 66 1967 68 1969 70 ←Calves born
1960 61 1962 63 1964 65 1966 67 1968 69 1970 71 ←Fed marketings
Econ SDSU 4-71

Figure 8

The procedure discussed above was used to estimate *net* feeder cattle outshipments from South Dakota. It does not estimate *total* interstate feeder cattle movements. For example, in 1969, according to Agricultural Statistics from Montana and North Dakota, each state sent about 100,000 feeder cattle to South Dakota. There are no statistics available to show whether these 200,000 head finally were sent on to other states for finishing or whether 200,000 South Dakota feeder cattle in addition to those shown in Figure 8 and Table 6 were exported in their place. The data merely show the estimated net balance of South Dakota feeder cattle outshipments over inshipments.

Total across borders larger than net

There is no shortage of feeder cattle available to South Dakota. After allowing for replacements, death losses and non-fed slaughter, the state produced enough calves in the 1960's to about double South Dakota cattle feeding (Figure 8). Not only does the state's beef calf supply far exceed feeding within the state, but South Dakota is on major feeder calf shipping routes from calf producing areas of Wyoming, Montana, and North Dakota to cattle feeding areas such as the Corn Belt. Some of the cattle now passing through could be intercepted and fed in the state.

No shortage of feeder cattle

The availability of an economical and adequate supply of feed grains, plus an excess or cushion, is one important requirement if cattle feeding is to increase in an area. Between the late 1940's and the late 1960's while cattle feeding in the United States and in South Dakota practically doubled:

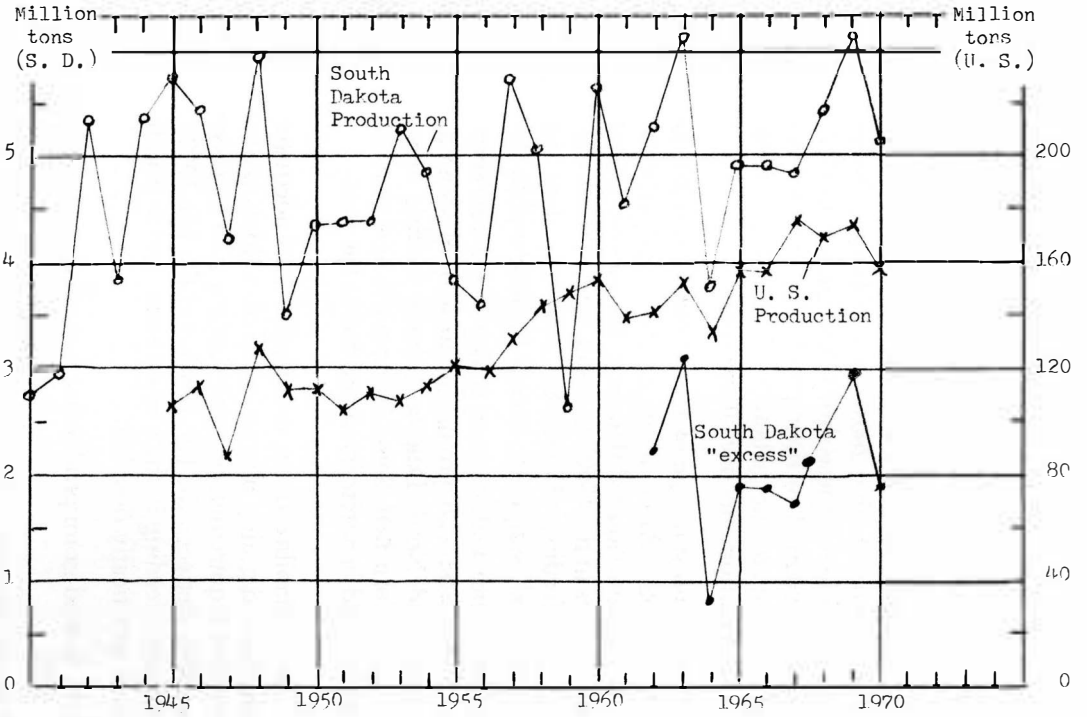
Feed use increasing

1. U. S. feed grain production increased by about 50%.
2. South Dakota's feed grain production showed no clear upward trend and was more variable than United States production (Figure 9).

Generally, however, a substantial feed grain surplus is available in South Dakota. United States Department of Agriculture estimates (Reference 3) suggest that in the 1960's annual feed grain production in

S. D. cattle feeding could at least double

FEED GRAIN PRODUCTION: SOUTH DAKOTA AND UNITED STATES -- AND SOUTH DAKOTA FEED PRODUCTION IN EXCESS OF AMOUNT FED



Source: USDA
South Dakota Crop and Livestock Reporting Service

Econ SDSU 1-71

Figure 9

the state averaged about 2 million tons more than the amount of feed used in the state (Figure 9). If this surplus were *ALL* used to increase cattle feeding in South Dakota, it would be enough to about triple the state's cattle feeding. In view of the fact that South Dakota produces twice as many beef calves as are fed out in the state (Figure 8) feeding could be doubled without using calves from other states.

Doubling not likely in 1970's however

The calculation that cattle feeding could triple[3] was made to show the maximum potential. It is, of

[3]The following assumptions were used in computing the potential for the state's cattle feeding:

1. The extra feeding would, on the average, consist of two-thirds steers and one-third heifers,
2. the extra feeding would be primarily of South Dakota calves that would otherwise leave the state as 425-pound steers or 400-pound heifers—and of similar calves imported from other states if additional calves were needed,
3. the steers would be fed to 1,025 pounds and the heifers to 850 pounds on a liberal grain (low roughage) ration.
4. feed requirements for the above situation would be:
   a. 56 bushels of corn, 500 pounds of supplement, and 1½ tons of corn silage per steer, and
   b. 42 bushels of corn, 375 pounds of supplement, 1½ tons of corn silage per heifer,
5. all the "excess" feed grain (Figure 9) or its equivalent in silage, is fed to cattle, and finally,
6. government acreage control of cropland would continue.

(Feed requirements are computed from liberal-grain dry lot calf rations in: *Cattle Feeders' Planning Guide and Worksheets for 1970-71,* EMC No. 628, September 1970, South Dakota Cooperative Extension Service. Corn silage was substituted for hay to keep the discussion in terms of corn land potential.)

Assuming the above feed requirements, the per head need for corn as grain would equal 51 bushels for the combination of two-thirds steers and one-third heifers (⅔ x 56 + ⅓ x 42=51). Land requirements for about 12 bushels of corn for grain would need to be used to produce 1½ tons of silage. Therefore, the need for 51 bushels of corn plus the 12-bushel equivalent of corn land for silage would total 63 bushels of corn equivalent per animal (3,528 pounds).

While estimated South Dakota "excess" feed grain supplies averaged about 2 million tons a year (from 1962 to 1970) the amount has been unstable (Figure 9). The 1963 "excess" of 3.1 million tons of feed grains (6.2 billion pounds) could have fed about 1.8 million additional head of cattle (6.2 billion pounds divided by 3528 pounds per head). The 1964 excess of .8 million tons (1.6 billion pounds) could have fed 454,000 additional head. Obviously, the state's cattle feeding industry would not undergo such violent adjustments in numbers fed just to avoid moving grain into or out of storage or into or out of the state. The recent average of about 2 million tons (4 billion pounds) excess feed grain a year would have fed about 1.1 million additional head. During the 1960's, total feedlot finishing of cattle in South Dakota was usually between .5 and .6 million head (Figure 8). Assuming a 1.1 million head addition, the state's total cattle feeding could have averaged 1.6 to 1.7 million head, or about triple the average for the 1960's.

course, not realistic to assume that the excess feed would all be used—or if it were all used that it would all go to cattle. Nor would state use of such a variable supply (Figure 9) be perfectly balanced with state production. Also, on a local basis as in a given county, the excess each year would be considerably more variable than the overall state average excess. As a result, feeders in any local area in a given year could not have counted on their share of the state average feed surplus cushion. Smaller cattle feeders, at least, would prefer a consistent local feed cushion rather than having to arrange feed inshipments every other year or so. While feeding may not be increased rapidly enough to double by 1980, the necessary feed and feeder cattle are already available.

Over $100 million potential in value added

South Dakota has been a major exporter of both feeder cattle and feed grain. If some of these resources were combined within the state, South Dakota cattle feeding and meatpacking could be expanded considerably. The difference between the cost of feed and feeders, and the total sale value of finished animals could easily amount to $80 per head.[4] Thus $44 million could be added to the gross value of South Dakota farm production if cattle feeding were doubled and $88 million if it were tripled. Meatpacker costs per head of beef slaughtered are in the area of $15, so if 1.1 million additional cattle were slaughtered in the state another $16.5 million could be added by processing to the value of South Dakota's exports. Much of that would be spent in the state for wages, supplies, etc. Each additional beef animal fed and slaughtered in the state could add about $95 to the value of South Dakota's farm product exports ($15 from processing and $80 from feeding).

While an immediate increase in cattle feeding and slaughter of a million head is not realistic in South

[4]For example, the following per-head items could contribute to the final value of slaughter cattle (in addition to the value of the feeder calf and the feed):

Supplement (460 pounds at $5.00/cwt.)=$23.00; Interest on cost of feeder calf for 10 months=$11.00; Building and Equipment use=$9.00; Miscellaneous cost=$12.00; Labor charge=$12.00; Profit =$13.00. These figures total $80.00.

Dakota, the great unexploited opportunities suggest that there should be some growth in both. New or expanded feedlot, slaughter plant, and formula feed mill facilities could be needed if substantial in-state use is made of South Dakota's "excess" feed grains (Reference 15).

Some of potential should be realized

South Dakota has a large surplus of beef calves and generally a larger surplus of feed grain. Large increases in feed grain production are possible, and if they occur throughout the nation, could cause feed grain prices to fall, favoring liberal feeding per animal as well as expanded livestock production. In the 1970's South Dakota's feed grain production could increase due to:

U.S. feed grain could increase

1. Increasing efficiency in production.
2. A drop in the demand for and price of wheat (should this happen, land in the small grain areas could be shifted from wheat to feed grain, hay or pasture—or to wheat as a feed grain).
3. Additional land in irrigation (this could both raise and stabilize grain production).

Feed grain production in South Dakota could grow substantially with major expansion of irrigation in the state. Even if that should happen, however, South Dakota may not find that the even greater grain production automatically results in increased cattle feeding. For example, Illinois is the leading state in the nation in feed grain excess supplies (Reference 3). Yet the state had a 20% decline in cattle feeding between 1966 and 1971. One researcher stated that marketing and meatpacking facilities, procedures and customs were less efficient and more costly in Illinois than in some states where cattle feeding was a new and growing industry. As a result, he argued, cattle feeding was less profitable in Illinois, and therefore Illinois grain went elsewhere to be fed (Reference 10). That author may not have been able to analyze all relevant variables, but his work does show the need for further investigation of cattle and beef

Excess no assurance of increased feeding

marketing costs and methods as they affect the South Dakota beef industry. Questions that may arise include the following:

1. If South Dakota were to develop a large irrigation project and larger surpluses of feed grain resulted, are the state's livestock marketing and processing facilities efficient enough to insure that the grain would be fed in South Dakota or will it be shipped out as it is from Illinois?
2. If more economical grain shipping techniques and facilities are developed for South Dakota, would they provide added incentive to the exporting of feed in the form of grain rather than in the form of meat? (This appears to have happened in Illinois.)

It should be recognized that, in the long run, marketing methods and systems should be competitive and equitable as well as economical. Also changes in livestock-feed freight rate relationships may change the competitive situation of an area.

Feedlot Size—South Dakota and Other Areas

Average feedlot size is increasing

There is a tendency for the very small feeders to either drop the cattle feeding enterprise or to grow into a larger size category. In 1969, for the first time, feedlots with a capacity of over 1,000 head handled more than half of the cattle feeding in the United States. In 1970, they handled 55%. South Dakota's lots with over 1,000 head capacity accounted for 16% of the state's 1970 cattle feeding and comprised just over 0.5% of the state's feedlots.

Changing size structure differs by region

States differ markedly in the structures of their cattle feeding industries. Over half the cattle fed in three of the leading states come from lots with more than 16,000 head capacity (Table 7). Yet the leading state, Iowa, had very few, if any, such lots in 1970. (Information on the very largest lots in some states is not reported separately by USDA to avoid disclosing individual operations.) In addition to Iowa, South Dakota and four other states among the leaders listed in Table 7 had few, if any, feedlots with over 16,000 head capacity.

Implications of larger lots

In the future, whether they sell at home, or to feeders in other states, South Dakota calf producers can expect to be dealing with larger feedlots. The larger lots tend not to be seasonal, but rather to be full-time operations which must continually be kept nearly full if they are to pay for fixed labor costs and for expensive equipment. The results could be new demands on the marketing system and on calf producers to develop better coordination of calf production with the needs of the large lots. The fact that large efficient lots exist also means that cattle feeding will be more competitive in the 1970's. Smaller feeders will have to give more attention to marketing and management knowledge, and this investment of time may not be justified unless the feeder intends to handle substantially more than the average 61 head marketed from South Dakota feedlots in 1970.

Coordination of large lots advantageous

The large new feeding and meatpacking operations in the Texas high plains and elsewhere tend to coordinate their individual activities toward the overall good of the total operation. Such coordination or

Table 7. Percent of all cattle marketed from feedlots, by feedlot size during 1970, in 12 leading states, and U. S.; and average number marketed per feedlot. States listed in order of number of cattle on feed January 1, 1971.

State	Capacity of feedlots (head)				Average number marketed per feedlot
	Under 1,000*	1,000 to 15,999*	16,000 and up	All lots	
	(Percent of all marketings)				(head)
Iowa	90	10	0	100	109
Texas	3	38	59	100	1,954
Nebraska	45	44	11	100	188
California	1	42	57	100	4,626
Kansas	26	36	38	100	210
Colorado	15	42	43	100	1,754
Illinois	91	9	0	100	49
Minnesota	93	7	0	100	48
Arizona	**	29	71	100	14,098
Missouri	90	10	0	100	43
South Dakota	84	16	0	100	61
Indiana	87	13	0	100	35
U.S.†	45	31	24	100	136

*Marketings from larger size groups may, in some instances, be included to avoid disclosing individual operations.

†23 leading states.

Source: Reference 21.

**Less than 0.5%.

integration, whether formal or informal, has powerful advantages. The most important may be the ability to make an immediate response, in any part of the system, to changes or problems that appear in any other part. For example, if it is discovered that some carcasses are not well muscled, a change in a ranch breeding or sire selection program can be started immediately. South Dakota's more traditional cattle raising, feeding and marketing operations may be slower in developing communications systems that can trigger such immediate response to this type of problem. Therefore, if South Dakota marketing agencies, cattle producers, feeders, and meatpackers are to compete successfully against new types of organization, they may need to work more closely together to improve their market communications system.

Farm feeder advantages, plus stiff competition

The large efficient feedlots, such as those in Texas high plains, can afford experts on such things as nutrition, disease control, marketing and business management. However, feed companies; marketing firms, organizations and cooperatives; and university research and extension activities make the needed information and assistance available to all cattle feeders. Farmer feeders also have some advantages over large integrated operations. One is that home-grown roughage and grain can be charged at what the farmer could sell it for, saving the marketing, hauling and other costs that must be paid by those who buy feed.

The Special Case of Texas

Texas growth affects whole industry

The revolution and the phenomenal growth in Texas cattle feeding (Table 5) invites special consideration by South Dakotans because Texas irrigation developments in the 1960's could be paralleled in South Dakota in the 1970's. Another reason for paying some attention to Texas is that when the 1960's began, that state was the nation's leading exporter (to other states) of feeder cattle (Reference 1). In the 1970's, Texas will not be able to supply feeder cattle to other areas if trends of the 1960's continue. The result could be a wider market and increased demand for South Dakota feeder cattle and tougher competition in cattle feeding.

Less irrigation water for Texas feed grains

The explosive growth in cattle feeding in the Texas high plains developed from a corresponding growth in grain sorghum production which, in turn, followed the introduction of new irrigation equipment. The new equipment was powerful enough to lift water economically from deep wells. Water levels there have dropped due to the intensive irrigation that followed. "If cotton and grain sorghum are to continue as the major crops of the Lower Texas Panhandle area, water will have to be imported. But the quantity involved and the distance over which it must be moved raise the specter of prohibitive costs." (Reference 24.)

Water shortage not to close Texas lots

Feed grain areas that do not rely on irrigation may have more long-run cattle feeding growth potential than areas dependent upon shrinking ground water supplies. Should water for irrigation of local feed grains become too expensive in the Texas high plains, cattle feeding could still continue there for some time on shipped-in grains. The sunk investment in highly efficient new feedlots and slaughter plants, the concentration of finances, and skills, the ideal weather and the nearby feeder cattle could keep the area highly competitive for some time even if it had to import grain. This concentration of feed grain demand by large organizations could lead to economical transportation and handling of feed grain inshipments.

South Dakota Beef Industry Goals

Growth versus other goals

If a large irrigation project is not developed in South Dakota in the 1970's, this may be unfortunate in terms of the state's economic growth. However, an advantage can be that the South Dakota cattle industry would have more time to develop plans and goals for its future. If a large irrigation project is to be developed in the 1970's, new feed grain supplies could spur rapid growth in cattle feeding in the state. The structure and organization of the South Dakota beef industry could also change rapidly. Whether South Dakota's beef industry is to grow by 5% or by 50% during the 1970's may not be as important to its present members as who controls it and what it will be like.

APPENDIX

Reference List

1. Abel, Harold and Capener, William. Shifts in the Production and Marketing of Western Stocker-feeder Cattle. Washington Agr. Exp. Sta. Bul. 667. November 1965.
2. Ahalt, J. Dawson and Harron, Meyer J. "Agriculture in the Seventies" *Demand and Price Situation.* ERS. U. S. Department of Agriculture. May 1970.
3. Allen, George C., Hodges, Earl F., and Devers, Margaret. National and State Livestock-Feed Relationships. U. S. Department of Agriculture. ERS. Supplement for 1970 to Stat. Bul. 446. December 1970 (and other issues in this series).
4. Brokken, R. F., and Heady, E. O. Interregional Adjustments in Crop and Livestock Production—A Linear Programming Analysis. U. S. Department of Agriculture. Technical Bul. 1396. July 1968.
5. Derscheid, Lyle A., and Parmeter, W. N. Grazing Management Based On How Grasses Grow. S. D. Coop. Ext. Serv. FS 302. February 1966.
6. Fraase, Ronald G. and Erlandson, Gordon W. Geographic Changes in the Production of Cattle and Calves in the North Central Region. North Central Regional Publication No. 202, South Dakota Agricultural Experiment Station. November, 1969.
7. Goodsell, Wylie D., and Belfield, Macie J. Costs and Returns: Northwest Cattle Ranches, 1969. U. S. Department of Agriculture, ERS. FCR 73. May 1970.
8. Gustafson, Ronald A., and Van Arsdall, Roy N., Cattle Feeding in the United States. U. S. Department of Agriculture, ERS. Agricultural Economic Report No. 186. October 1970.
9. Hoglund, C. R. and Johnson, M. B. Ranching in Northwestern South Dakota. S. D. Agr. Exp. Sta. Bul. 385. April 1947.
10. Johnson, Ralph D. The Status of Cattle Feeding in the Corn Belt. University of Missouri Agricultural Economics Paper 1969-36. 1969.
11. Lagrone, W. F., Hatch, R. E., and Helmers, G. A. Wheat and Feed Grains in the Great Plains and Northwest: Study Area Descriptions and State Statistical Summaries. Nebraska Agr. Exp. Sta. Res. Bul. 237. April 1970. (Great Plains Agricultural Council Publication No. 38.)
12. Larsen, John T. "Potential Feeder Cattle Supply" *Livestock and Meat Situation,* ERS. U. S. Department of Agriculture. February 1970.
13. Manley, William T., and Gallimore, William W. Emerging Product Inroads Into Agriculture: Synthetics and Substitutes. U. S. Department of Agriculture, ERS. Talk delivered at 1971 National Agricultural Outlook Conference. February 24, 1971.
14. Moore, R. A. "Pasture Systems for a Cow-calf Operation." *Journal of Animal Science.* January 1970.

15. Powers, Mark J. and Heier, Val. Optimum Shipment Patterns of Feeder Cattle and Feed Grains in South Dakota and Their Implications. Extension Circular 669, November, 1968. South Dakota Cooperative Extension Service.
16. Raleigh, R. J. "Manipulation of Both Livestock and Forage Management to Give Optimum Production." *Journal of Animal Science.* January 1970.
17. Rizek, Robert L. and Larsen, John T. "Our Beef Producing Potential." *Livestock and Meat Situation.* ERS. U. S. Department of Agriculture. October 1969.
18. Rizek, Robert L. and Rockwell, George R., Jr. "Household Consumption Patterns for Meat and Poultry, Spring 1965." U. S. Department of Agriculture. Agricultural Economics Report No. 173. February 1970.
19. Seaborg, Donald "Beef Cattle: The Next 10 Years" *Livestock and Meat Situation.* ERS. U. S. Department of Agriculture. May 1970.
20. Stout, Thomas T. The Big Job Confronting the Beef Industry. Economic Information for Ohio Agriculture. No. 513. November 1970.
21. U. S. Department of Agriculture. *Cattle on Feed January 1, 1971.* SRS MtAn 2-1(1-71) January 18, 1971 (and other issues in this series).
22. U. S. Department of Agriculture. *Feed Situation.* ERS. FdS-236. November 1970.
23. U. S. Department of Agriculture. *Feed Statistics.* Supplement for 1969 (to Statistical Bulletin No. 410). ERS.
24. U. S. Department of Agriculture. High Water Bills Could Dampen Gains for Texas Plains Farmers. ERS. *The Farm Index.* January 1971.
25. U. S. Department of Agriculture. U. S. Chilled Beef Gets Warm Welcome in Japan. *Foreign Agriculture.* January 25, 1971.