6-15-1943

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Agricultural Economics
Pamphlet No. 7

June, 1943

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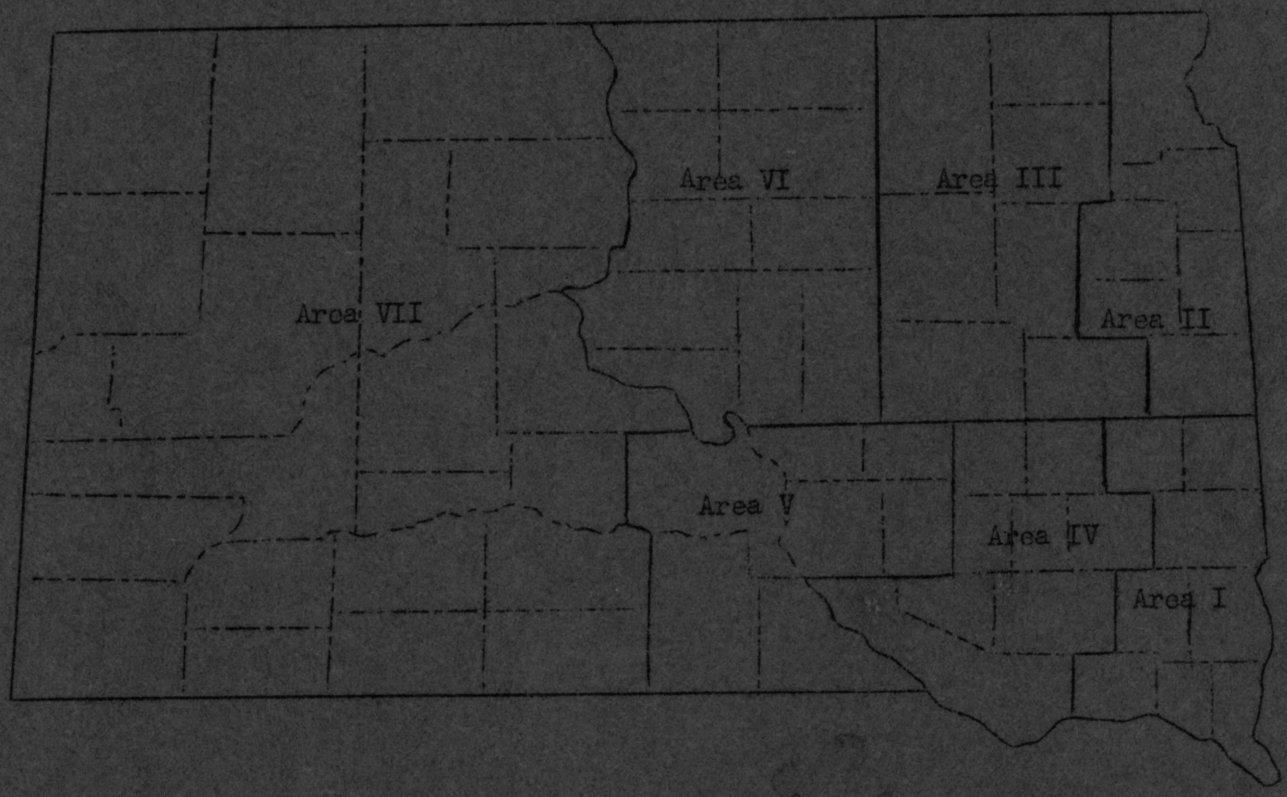

PRODUCTION AREAS IN SOUTH DAKOTA

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Bureau of Agricultural Economics

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FARM MANAGEMENT ASPECTS OF AGRICULTURAL WAR PRODUCTION

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Increasing demands for meat, milk, fats, cereals, and oils make it essential that South Dakota farmers adjust their individual programs to achieve maximum production. This increased production may be brought about by a fuller utilization of cropland and land otherwise left idle, by shifting from low to high nutrient production crops, by adjusting livestock feeding practices for a more efficient use of feed and by the adoption of other improved farm management practices.

Agricultural Price Ratios

Present purchasing power of farm products is high.

The question, "Are present farm prices sufficient to bring about maximum production?", has aroused considerable discussion throughout the country. Some of the price problems affecting South Dakota farmers will be discussed herein.

The purchasing power of South Dakota farm products is much greater at present price levels than it was during a comparable period of World War I. In other words, the price the farmer receives for his crop and livestock products (taken as a single measure) has advanced at a greater rate than has the cost of things the farmer must purchase for production and living. The April 1943 ratio of prices received to prices paid was 137 compared with 117 for a comparable period during World War I, figure 1. The purchasing power of farm products during 1938-40 was rather unfavorable but improved during the early part of 1941. Just how long the present favorable price situation will exist depends on the continuation of ceiling prices and other government controls applied to the prices of products the farmer buys and sells and to changes in the price levels of the two.

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The author acknowledges valuable suggestions and criticisms received from various members of the Experiment Station and Extension Service.

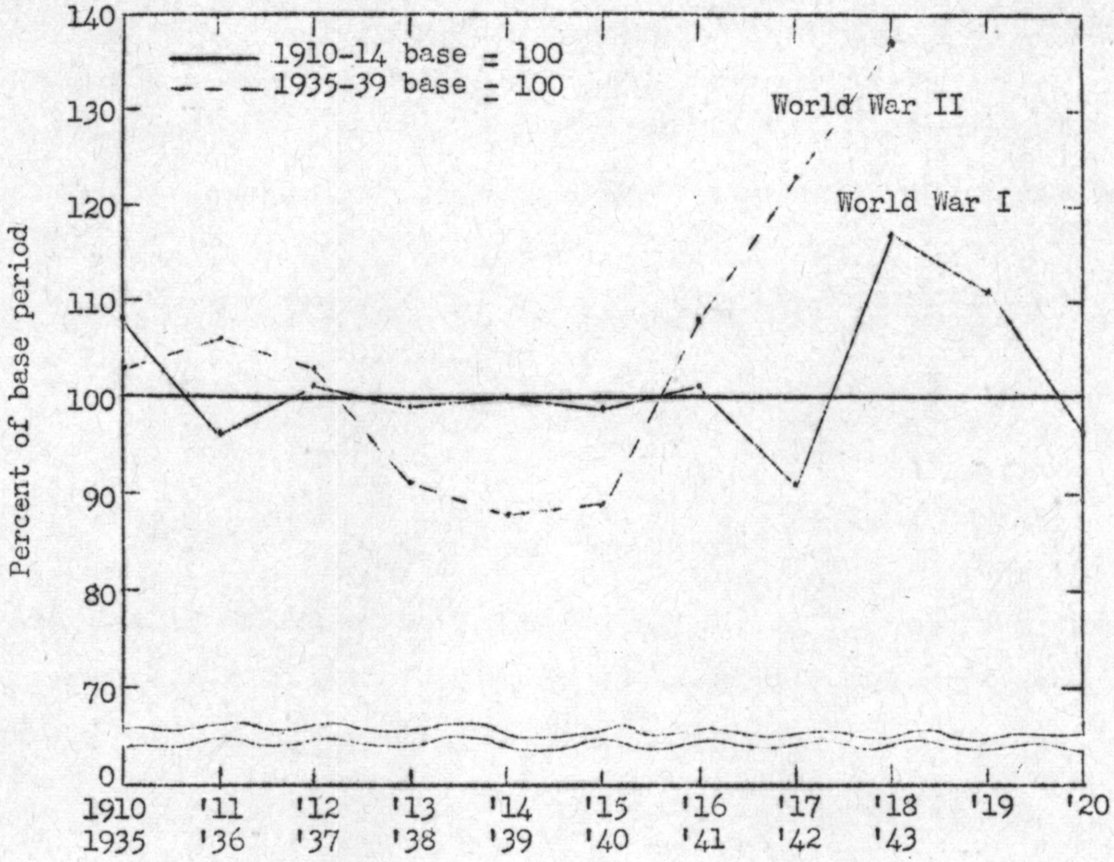

Figure 1. Purchasing Power of South Dakota Farm Products

Livestock farmer benefiting from price increase.

The South Dakota farm price-cost ratios are much more favorable for the production of livestock and livestock products and less favorable for crop production during the present war than they were during World War I.

During World War I, prices of grains started skyrocketing the latter part of 1916 and reached a peak about the middle of 1920. The grain price index has advanced somewhat slower than those for dairy, poultry, and meat up to the present time; the grain price reaching an index of 145 in April 1943 compared to 172 for dairy, 168 for poultry, and 186 for meat animals.1/ During a comparable period in World War I, the price index reached 246 for grain, 151 for dairy, 163 for poultry and 203 for meat animals.

1/ World War I index based on 1910-14 = 100 and World War II index on 1935-39 = 100.

A study of the changes that have occurred in prices since the 1935-39 base period would indicate that prices of meat animals, dairy products, and poultry and eggs have increased at about the same relative rate. This does not necessarily mean that prices for each class of product are at the optimum for maximum production.

The farmer who has been depending on crop sales (not including flax and other war crops) for his income has been at a disadvantage relative to the livestock farmer. This disadvantage to the crop farmer is disappearing as more of the feed crops are now fed on the farms where they are produced. Increased wheat prices are also in prospect due to an increased demand and probable higher loan rates.

Livestock-feed ratios now profitable.

Prices are an important factor in influencing livestock production. The farmer is interested, not only in the actual prices received for hogs, cattle, butterfat, poultry, and eggs, but also in the relationship of livestock prices to feed prices. Present high hog prices relative to corn makes it more profitable to market the corn crop through hogs. Livestock-feed ratios refer to the number of bushels or pounds of feed that can be purchased with a given amount of livestock product.1/ Generally speaking, the higher the ratio, the more profitable is the feeding of livestock.

Livestock feeding ratios in April, 1943, were more favorable for eggs and butterfat but less favorable for hogs and beef cattle than they were a year ago, but much more favorable than they were in 1935-39 or during the "parity period", 1910-14. Table 1.

Livestock farmers are vitally concerned with the returns they receive over feed costs. A further analysis of the hog-corn ratio indicates that returns over the cost of corn fed per 100 pounds of gain would be about $7.60 on the basis of April 15, 1943 prices of hogs and corn compared to an average of $3.50 for April,

1/ Hog-corn and beef-corn ratios refer to the number of bushels of corn that 100 pounds of hogs and 100 pounds of beef, respectively, will purchase. Egg-grain ratio refers to the number of pounds of a mixture of equal quantities of wheat, corn and oats that one dozen eggs will purchase and butterfat-grain ratio refers to the number of pounds of a mixture of 25 pounds corn, 50 pounds oats and 25 pounds of barley that can be purchased with one pound of butterfat.

Table 1. Livestock-feeding ratios April, 1943 with comparisons.*

	April 1943	April 1942	April 1935-39	April 1910-14
Hog-corn	17.1	20.6	12.8	15.0
Beef-corn	16.2	17.0	11.1	11.0
Egg-grain	17.8	17.4	11.9	15.9
Butterfat-grain	31.6	29.5	25.9	25.2

*Based on prices furnished by South Dakota Crop and Livestock Reporting Service.

1910-14, and $7.30 for July, 1919 when hogs reached a peak price of $20.00, table 2. These feed costs are based on the assumption that 8 bushels of corn are required per 100 pounds gain for all periods and does not take into consideration costs of protein supplements, a pasture charge, and other overhead costs.

Table 2. Prices of hogs and corn and returns over cost of corn per 100 pounds gain during April, 1943 compared with other periods.*

	April 1943	April 1942	July 1919	April 1910-14
Price of corn per bu.	.83	.66	1.59	.50
Price of hogs per 100 lbs.	14.20	13.60	20.00	7.50
Cost of 8 bushels corn	6.60	5.30	12.70	4.00
Return over corn cost	$ 7.60	$ 8.30	$ 7.30	$ 3.50

*Based on prices furnished by South Dakota Crop and Livestock Reporting Service.

Adjusting Crop Production To War Demands

Greater stress on crops for direct human consumption.

As the war progresses, America will be called upon to feed millions of hungry people in Europe, Asia, and Africa. This responsibility, added to the present job of furnishing great quantities of food for military and lend-lease purposes, will make it necessary for each acre to produce a maximum in food nutrients. This will indirectly affect the American food habits so that the average per capita consumption of animal products will be reduced and that of potatoes, cereals and legumes will be increased.

Crops such as wheat and soybeans yield higher quantities of digestible protein and calories per acre at a lower labor input than do most feed crops when fed to livestock. An acre of wheat will yield about twice as many calories and about five times the quantity of protein per acre as 350 pounds of pork will from an acre of feed crop, table 3.

Table 3. Human food from an acre of cropland*

	Yield Per Acre	Human Food Per Acre	
		Digestible Protein	Calories
	Pounds	Pounds	(000)
Livestock			
Milk	2190	72	712
Pork, 350 lbs. live wt.	273	23	673
Poultry, 267 lbs. live wt.	171	33	179
Beef, 216 lbs. live wt.	125	19	130
Eggs, 122 doz.	184	25	132
Crops			
Corn, 35 bu.	1960	147	3124
Potatoes, 100 bu.	6000	66	1908
Wheat, 20 bu.	1200	110	1788
Soybeans, 16 bu.	960	295	1534
Oats, 35 bu.	784	89	1254

*Adapted from Henry and Morrison "Feeds and Feeding", page 158.

Oil and feed crops badly needed.

Farmers have been requested to grow more flax and soybeans and to increase production of meat animals, milk, and poultry products. Obviously, all farmers cannot produce or increase production of the oil crops, therefore, crop changes must be adjusted to the individual farm.

What are some factors which a farmer should consider in choosing essential war crops for his farm? First, the individual farmer needs to study the possi-

bilities of growing the much needed soybean and flax crops. Soybean production in South Dakota has been limited chiefly to the corn area in the southeast corner of the state and should not be expanded in areas where it is not adapted. Flax has a greater range of possibilities and should be increased in areas in which it has proven successful. Second, the individual farmer must determine which feed crops yield the greatest nutrient production per acre. This information should be made available by the Experiment Station and Extension Service. Third, the individual farmer will need to study pasture and livestock feed requirements in order to budget his cropland between cash and feed crops.

Crop changes needed for maximum feed production.

It is essential that each crop acre be put to its fullest use if maximum production is to be reached. There is a considerable possibility of shifting from one feed crop to another on many farms in the state. Experimental data indicates that corn, barley, grain sorghum, and wheat can be used interchangeably as feed for hogs, dairy cows, beef cattle, sheep, and poultry. Wheat is particularly well adapted and equal in feeding value to corn for hog production. Barley and grain sorghums are equal to about 85 to 90 per cent of corn in feeding value. Barley is much higher than corn in protein content. Yields of corn and feed grains vary considerably from one area to another and a crop that yields a maximum nutrient production in one area may not be equally well suited elsewhere.

A comparison of per acre yields of total digestible nutrients from the five chief feed grains during the 1940-41 period indicates that corn was the highest yielder in areas I and II followed by barley and spring wheat, table 4. In area III, spring wheat produced the highest yield of nutrients per acre followed by corn and barley. In area IV and V barley was the high yielding crop followed by spring wheat and oats. In areas VI and VII, less difference occurred between nutrient yields per acre for the five feed grains. The yield data given for sorghum is not entirely comparable to that of the four other feed crops as farmers often plant sorghum for one purpose and harvest it for another. Experimental data at the South Dakota Experi-

ment Station indicates that grain sorghum has a very definite place in South Dakota agriculture.

Per acre nutrient production was highest for corn followed by oats, spring wheat, and barley for the state in 1942. Last year's crop season was exceptionally good and the 1940-41 crop seasons may have been somewhat below average. Long-time (1916-40) average yields put corn in first place in nutrient yield per acre in all areas, with barley in second place in all but one area and oats in third place in all but two areas. New hybrid corn and improved oats and barley varieties plus improved cultural practices may change yield relationships in the future. Grain sorghums, particularly in areas IV, V, and VI, may be the most desirable feed crop on many farms from the standpoint of drought and grasshopper resistance.

Table 4. Per acre yields of total digestible nutrients from corn, barley, spring wheat, oats and sorghum, 1940-41, 1942, and 1916-40.

Area	Corn	Barley	Spring Wheat	Oats	Grain Sorghum
1940-41	Pounds per harvested acre				
I	1438	960	908	759	808
II	1156	808	800	692	615
III	578	570	609	543	378
IV	493	599	578	545	456
V	318	535	531	444	396
VI	336	457	459	474	378
VII	444	538	495	460	357
1940-41 state av.	815	638	557	614	430
1942 state av.	1500	821	877	920	
1916-40 state av.	878	573	439	557	

Fuller use of idle and fallow land.

The great need for full utilization of all cropland of the state makes it necessary that idle and fallow land be reduced to a point at which production reaches the

maximum. Land that is subject to severe erosion or that does not yield a return sufficient to cover cropping costs obviously should not be cropped. The use of improved tillage practices, seed treatment and the use of adapted varieties on all of the cropland suitable for tillage will result in increased yields.

About 9.6 per cent of the cropland in South Dakota was idle or fallowed in 1942 compared to about 15 per cent in 1934 and 1940 and only 3 per cent in 1929, table 5. Estimates made by agricultural technicians in 1942 indicate that this idle and fallow land could be reduced to about 3 per cent for a short period of years without seriously depleting the soil. This latter estimate would make available about a million more acres for crop production than was used in 1942. A recent survey indicates that the idle acreage will be greatly reduced in 1943. Much of this idle and fallow acreage has undoubtedly come about through the various crop reduction programs since 1933. The effort now needs to be directed toward full utilization of this cropland. This does not mean to plow up grass land.

Table 5. Per cent of South Dakota cropland designated as idle or fallow, 1929-42, and wartime desirable.

Area	1929	1934	1940	1942	Wartime * Desirable
I	1.4	4.8	1.6	1.8	.2
II	2.1	7.1	6.0	4.8	.3
III	2.9	17.9	15.6	7.7	2.6
IV	1.7	7.6	5.2	2.5	.7
V	2.0	16.5	11.2	6.3	.6
VI	3.3	26.4	25.3	16.8	7.4
VII	5.2	23.4	30.5	23.7	7.8
State	3.0	15.7	14.6	9.6	3.0

*Estimates made by Extension and Experiment Station technicians.

Adjusting Livestock To Feed Supplies

Essentiality of crops determine feed production.

The extent to which shifts are being made in the production of such cash crops as flax, soybeans, potatoes, and dry beans, both on the individual farm and in the community, will determine the acreage available for feed crops, and will influence livestock production. A substantial increase in the acreage of any of these crops on a farm will result in a proportionate decrease in the feed crop acreage. On farms making such a shift it would be necessary either to reduce livestock production or purchase additional feed. As long as storage wheat can be purchased it might be profitable to increase production, particularly of hogs and poultry, on the individual farm to the maximum. Present indications are that hogs are increasing at a faster rate than feed supplies in many parts of the state, hence such increases cannot take place in most areas.

Danger in increasing beef and sheep numbers.

The numbers of roughage consuming livestock on South Dakota farms January 1, 1943, was higher than for any previous year. The total units of dairy cattle, beef cattle, sheep, and horses on farms January 1, 1943, was 1,987,000 or a five per cent increase over a year earlier and slightly above the 1925-29 period when livestock production was at a high point, table 6. The increase during the past year was due chiefly to a 15 per cent increase in the number of cows and heifers two years and older kept for beef. Dairy cows and heifers stayed about constant and sheep showed a slight increase during the past year.

Any further increase in beef and sheep breeding herds may bring about a serious pasture and roughage shortage. Each farmer should be urged to study his individual problem and to adjust his breeding herds to pasture and roughage supplies available on his farm or ranch. A possible postwar drop in livestock prices will make it desirable that cattlemen plan their marketings in such a manner as not to be caught with an excessive breeding herd when the war is over.

Table 6. Units of roughage consuming livestock on South Dakota farms, January 1, 1943 with comparisons.*

	1925-29 Average	1941	1942	1943
	(000)	(000)	(000)	(000)
Cows and heifers 2 years old and over kept for milk	554	519	545	540
Cows and heifers 2 years old and over kept for beef	284	310	353	408
Other cattle	236	252	277	307
Ewes and rams	139	360	409	421
Horses and mules	637	313	310	311
Total units	1850	1754	1894	1987

*One unit of livestock equals the equivalent of 1 mature horse or cow, 2 yearlings, and 5 mature sheep.

Feed supplies adequate for 1943 production.

Feed supplies for a year are determined by both the quantity of carryover at the beginning of the year and the quantity harvested. The January 1, 1943, carryover of feed grains, excluding wheat, was about 50 per cent greater than for any previous January 1 numbers since 1931, figure 2. On the basis of long-time average yields for 1943, the total feed supply of corn, oats, barley, rye, and grain sorghum are estimated at about the same quantity as for 1942. Wheat storage stocks are much greater than for previous years. This may provide the margin of safety during 1943, however, it is expected that these wheat storage stocks will be kept at a rather high figure.

The maintenance of a high rate of livestock production during the war will make it necessary either to draw heavily on wheat stocks or to make adjustments in the kind of livestock kept. It appears that hog production has been expanded far beyond local feed supplies in some of the western counties. This high rate of production cannot be maintained unless outside feed supplies are shipped in. It is entirely possible that farmers must look for these needed feed supplies either from present storage stocks of wheat or from Canada or other foreign sources. It would be most desirable that a definite policy be adopted on the use of present storage stocks so

that farmers can plan their livestock programs to better advantage during the next few months.

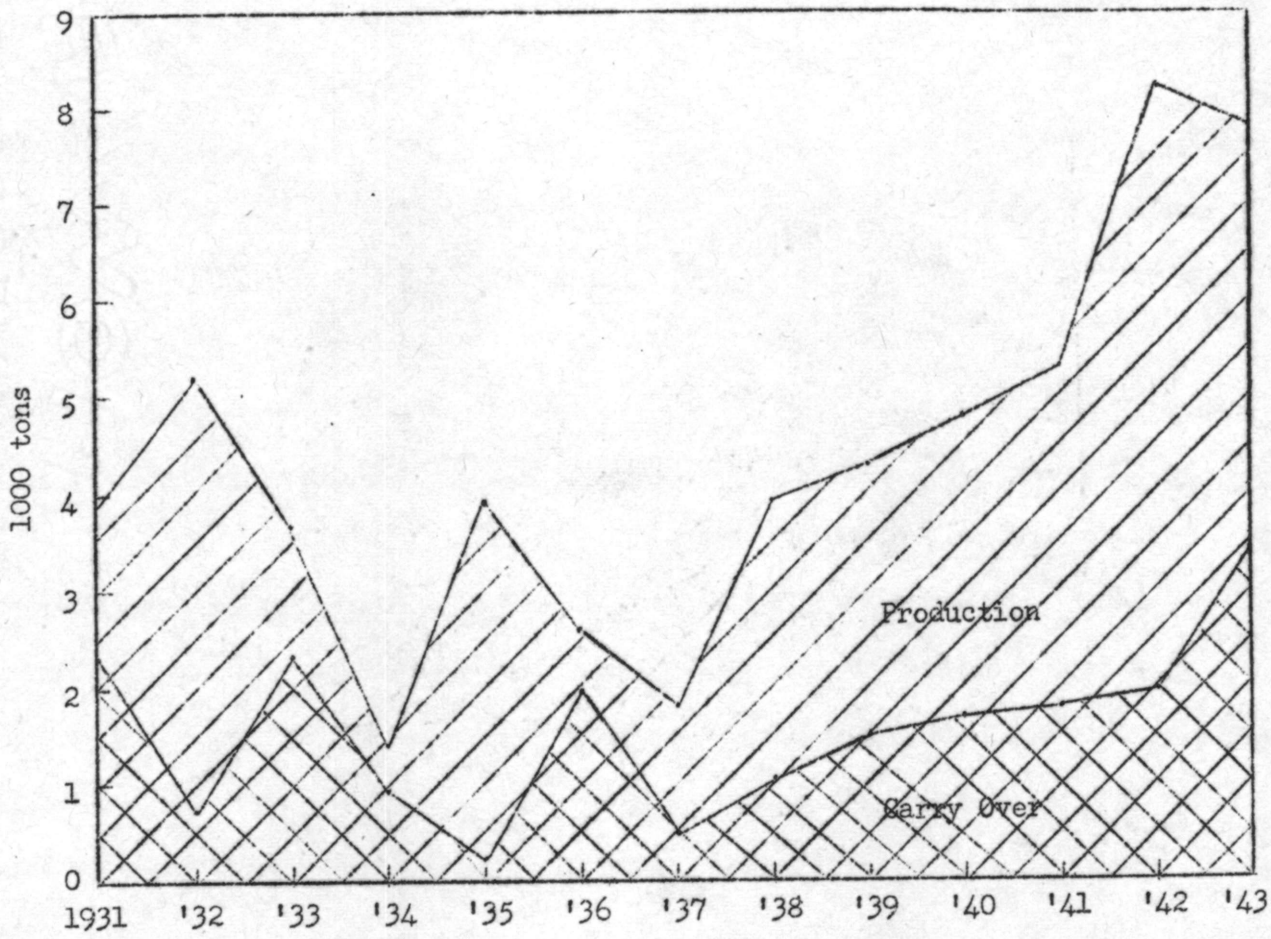

Figure 2. Total supply of five principal feed crops, corn, oats, barley, rye, and sorghum.

Efficient utilization of feed supplies needed.

The high rate of livestock production will require that corn and other feed grains be fed to livestock that utilize them most efficiently in producing human food. Experimental data indicates that dairy cattle are the most efficient livestock in converting both roughage and concentrates into human food when the whole milk is used.[1/] Hogs and poultry are the most efficient concentrate consuming livestock.

1/ W. H. Jordon, "The Feeding of Animals", p. 423.

This does not mean that all South Dakota livestock producers should give priority to the stock which utilize home-grown feeds most efficiently but does suggest some changes in emphasis on increased production. Available livestock pasture, feed, labor, housing, and equipment may determine production and feeding practices on most farms and ranches.

The hog producer is confronted with the question as to what weight to market his hogs. For the most efficient use of feed, hogs should probably be sold when they reach 200-250 pounds. Experimental data on dry lot feeding of hogs show that hogs marketed at 200-250 pounds require about 125 pounds less corn and protein supplement per 100 pounds gain than when they are fed to 300-350 pounds, table 7.[1/] This would suggest the marketing of lighter weight hogs. However, a favorable hog-corn ratio together with a narrow spread in price between heavy and light hogs makes it more profitable per hog to market them at the heavier weights. Farm records data from 169 Iowa farms indicated that hogs marketed at a weight of 300-350 pounds netted about $3. more per hog over feed costs than hogs marketed at a weight of 200 pounds.[2/]

Table 7. Pounds of concentrates required to feed hogs to various market weights.

Average Weight	Pounds concentrate per 100# gain
150-200	435
200-250	475
250-300	535
300-350	600
350-400	675
400-450	775

The decision to feed hogs to medium or heavy weights is an individual farm management problem. The hog producer who has sufficient housing, equipment, and labor to increase the number of sows farrowed should be encouraged to market hogs

1/ Average figures from several state experiment stations.
2/ 1941 Annual Report "Northwest Iowa Farm Business Association."

at 200-250 pound weights. A greater price spread between light and heavy hogs would be necessary to encourage such a practice. The producer who can raise only a limited number of hogs but who has plenty of corn or other feed grains may find it more profitable to feed hogs to heavier weights.

The beef cattle feeder is confronted with the problem as to the finish cattle should be marketed at. The price differential between high finish and less finished cattle has become quite narrow in recent months, and may continue at this relationship unless dollar and cents ceiling prices are determined for each grade of cattle. Experimental data indicates that feed is not efficiently used in feeding cattle to a prime condition. However, results from a recent carcass study would indicate that it might be desirable to feed yearlings and two-year-old steers until they will produce at least a high good (A+) carcass in order to obtain the maximum production of usable meat without producing an excess amount of fat.1/ The per cent of usable meat from 15 low choice carcasses was 73.1 compared with 74.7 per cent from 15 medium grade carcasses. The per cent of excess fat was (weight of fat removed in making wholesale cuts) 9.9 from the low choice, 8.8 from the high good, and 4.2 from medium grade carcasses.

Efficient Combination Of Farm Resources

Maximum efficiency in the combination of available farm resources is especially needed for high production and earnings on the individual farm. The question is often raised as to the reasons for great differences in production and earnings on farms with like resources. Differences also occur in the efficiency of utilization of labor, land, buildings, and other resources on farms of different sizes.

Labor often not fully utilized.

Great differences occur in the amount of work accomplished per farm worker. Farm earnings are closely related to the efficient use of family and hired labor. Farm record data on a group of 33 Wisconsin farms in 1942 showed that operators on

1/ "Yields From Different Grades and Weights of Steer Carcasses", Wilson and Co., April 1943 report. The new OPA meat grades are designated as follows: AA = choice A = good, B = commercial, and C = utility.

farms on whcih the number of productive man-work units per worker averaged 365 obtained earnings of $3200 compared to $1900 for operators on farms on which the productive man-work units per worker averaged only 165.1/

A preliminary study in Brookings County indicates that labor is used less efficiently on the smaller farm. The number of man-work units per worker on farms in the size group 320-399 acres was about 40 per cent greater than for farms in the 160-319 acre group. The labor utilization per man was still less on the farms under 160 acres in size.

What can be done to use labor more effectively and increase earnings on the smaller farms? Family labor is usually not utilized fully on the smaller farm. Poultry is particularly well adapted to small farms where family labor is plentiful. On other farms hog production may be expanded to better advantage. Hiring out or trading work with neighbors may be the best solution on still other farms.

A labor saving practice which has proven successful on many South Dakota farms is the hogging down, cattling off, and lambing off of corn and the harvesting of other crops by turkeys. A considerable saving in labor could be made on many farms by eliminating unnecessary work and steps in doing chores and other farm work. A carefully thought out work plan will reduce labor and make possible a more efficient operation of the farm.

Housing need not be elaborate.

Many farmers will find that straw sheds and temporary frame structures will provide satisfactory quarters, particularly for hogs, beef cattle, and sheep. Extra building space on the farm can often be converted into extra quarters for hogs, cattle, and sheep. Plans for sows to farrow during the summer months may solve housing shortages on some farms. The staggering of farrowings during the year will make it possible to use equipment and buildings to better advantage on other farms.

1/ 1942 Annual Report "Coon Creek Farm Account Work". A productive man-work unit is the average amount of work done by a man in a ten-hour day on crops or productive livestock, or both.

Improved practices decrease production costs.

Opportunities exist on almost every farm and ranch for improvements in farm management practices. Many of these practices can be adopted without great expense or use of critical war material.

Feed is the chief cost in producing livestock, hence any practices that will reduce feed expenses should be considered. Pastures are one of the best sources of summer feed. Every hog producer should provide an acre of good legume or annual pasture for every 20-25 pigs raised. Good pasture will reduce hog feed costs by 12 to 15 per cent. Supplementing the permanent pastures with sudan grass and other annual grasses for dairy cows will keep milk production from slumping during July and August as well as keeping feed costs down.

Summary And Conclusions

Present farm price-cost ratios are high enough to encourage increased production of most South Dakota farm products. This purchasing power of farm commodities is more favorable than it was during a comparable period in World War I. Livestock feeding ratios in April, 1943, were more favorable than they were either during the period 1935-39 or the "parity-period" 1910-14.

The increasing stress on human food production makes it most important that South Dakota farmers utilize each acre to the fullest. This will mean a shift toward the production of more potatoes, cereals and legumes for direct human consumption. These crops produce protein and calories at a greater rate and at a lower labor input per acre than do most feed crops when fed to livestock. Flax and soybean production should be expanded only in the areas well adopted to these crops. It might actually be a detriment to the war effort to expand these crops in other areas as seed and labor would be inefficiently used.

Increasing needs for livestock feed calls for an analysis of crops grown in each area. It may be desirable to shift from one feed crop to another in order to increase the nutrient production per acre. During the 1940-41 period corn was the highest

nutrient yielder in areas I and II, spring wheat in area III, barley in areas IV, V, and VII, and oats in area VI. The fuller use of idle land is also needed for maximum wartime production. Almost a million more acres of land designated as idle and fallow in 1942 could be cropped in the future. The 1943 crop acreage will include much of this previously idle land.

Livestock numbers have been increased at such a rate in South Dakota that there is a possibility that farm feed supplies will be inadequate the latter part of 1943 and during 1944. This situation will be particularly true for hogs which have been increased by 200-300 per cent over 1942 in many counties. The extent to which present storage stocks of wheat will be made available for livestock feed and the prospects for the importation of feed from Canada will determine the shifts needed in livestock production. The high point reached in roughage consuming livestock may suggest that any further increases will bring about a serious pasture and roughage shortage.

An efficient combination of farm resources is needed for maximum wartime food production. This will mean the full utilization of labor, feed, buildings, land, and other resources on each individual farm or ranch.