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AGRICULTURAL PRODUCTIVE CAPACITY OF SOUTH DAKOTA

Output and Possible Uses of South Dakota Crop Land



AGRICULTURAL EXTENSION SERVICE
SOUTH DAKOTA STATE COLLEGE, BROOKINGS
U. S. DEPARTMENT OF AGRICULTURE

AGRICULTURAL PRODUCTIVE CAPACITY OF SOUTH DAKOTA

Importance Of Studying Capacity To Produce

By LYLE M. BENDER*

The importance of proper land use and agriculture's capacity to produce is very real today. A continuous, adequate supply of food is essential to peace-time prosperity and is highly important in our present defense plans. Since South Dakota is a food producing state, it's citizens have a responsibility to the nation, as well as to their children and grandchildren, to use our land resources wisely. If such are our responsibilities does it not require farmers and others to look to the adequacy of our food production? What is good land use and how does it affect agriculture's capacity to produce: In peace time? In a period of defense? What other ways are there to increase production? How important are they?

First, land is used by man to provide for his wants. His purpose is to get from the land the largest amount of production and services he can in return for the labor, man-

agement and capital he finds worthwhile to use.

Second, good land use must be viewed as the means of providing the food, fiber and

Current and Possible Uses of South Dakota Crop Land¹

| Crop | Reported for Estimated for 1951 (000) | Possible for 1952 (000) | Possible for 1955 (000) |
|--|--|-------------------------------|-------------------------------|
| Corn | 4,048 | 4,150 | 4,200 |
| Sorghum all | 231 | 250 | 650 |
| Soybeans | 63 | 70 | 150 |
| Potatoes | 12 | 15 | 20 |
| Other | 20 | 15 | 20 |
| Total intertilled crop land | 4,374 | 4,500 | 5,040 |
| Wheat | 3,989 | 4,056 | 4,150 |
| Oats | 3,231 | 3,255 | 3,000 |
| Barley | 879 | 900 | 1,000 |
| Rye | 533 | 500 | 400 |
| Flax | 565 | 450 | 500 |
| Other | 20 | 18 | 15 |
| Total close growing crops | 9,217 | 9,149 | 9,065 |
| Total all grain crops | 13,591 | 13,649 | 14,105 |
| Total all sod crops | 2,027 | 2,140 | 2,463 |
| Total summer fallow, idle, miscellaneous | 686 | 620 | 285 |
| Total crop land | 16,304 | 16,409 | 16,853 |
| Total pasture and hay (native) | 26,674 | 26,790 | 26,880 |
| Total other land in farms | 1,680 | 1,690 | 1,690 |
| Total land in farms | 44,658 | 44,889 | 45,423 |
| Other land not in farms | 4,325 | 4,094 | 3,560 |
| Total land area | 48,983 | 48,983 | 48,983 |

¹Planted acres. Source, *Agr. Ec. Pamphlet 37*.

**Farm Management Specialist. This pamphlet is in part based on a report "Agricultural Productive Capacity 1955, S.D." Agr. Ec. Pamphlet 37, Nov. 1951.*

services which people desire and which particular lands are best capable of producing.

Third, in appraising our capacity to produce which includes wise use of land and use of production increasing practices, we must consider present needs and situations as well as future needs. Among the factors

that must be continually reappraised are:

- (1) Population growth and location;
- (2) Consumption habits and tastes;
- (3) Foreign demand;
- (4) Changing productivity of land;
- (5) Technological developments;
- (6) Adequate stocks of storable crops;
- (7) Stored up soil fertility for future needs.

Urgent Need for Study of Productive Capacity

Our current mobilization plans, growing population, strong foreign demand, changing food habits and low reserves of feed grains indicate the need for more total farm production. While there is a great need for more farm production there is also a need for maintaining a reserve of soil fertility in case of greater need.

Effective planning of agriculture's part in the defense effort is essential because a high level defense maintained over a period

of years calls for a high and steady level of farm output. The production possibilities indicated in this publication are not forecasts, goals or guides. They are simply "production possibilities" based on a definite set of assumptions. These assumptions are full employment, high level defense economy, favorable cost-price relationships, favorable livestock feed relationships, average weather and less than adequate labor and fertilizers.

Present Land Use Varies Widely

At the present time land use varies widely in the state. A farmer planning for proper land use for any period of time must consider each of the seven factors listed on page 2. It must be recognized that some farms could stand a more depleting cropping system for short periods, while others would need to establish a soil conserving cropping system at once. The current defense effort or some other reason may justify some heavier cropping on some farms. Once the emergency is past a sound plan of land use should be developed for each farm or ranch that is designed to get the long-time high production.

Considering South Dakota as one large

farm and using 1951 as a base year we find that most of the land area is already in farms. The total crop land consists of 16,304,000 acres. Of this acreage 84 percent was devoted to grain crops. All sod crops which include tame hay and rotation pasture, occupied 12 percent of the crop land and idle and fallow and miscellaneous made up 4 percent.

Wheat, corn, oats and barley are the principal users of our crop land. The acreage devoted to all of these crops, except barley, in 1951 was near the peak acreage seeded in the last 10 years. The acreage seeded to barley was considerably less.

Future Land Use

What can be expected in the nature of future shifts in land-use, say for 1952 and for 1955? Under the conditions assumed total crop land could increase less than one percent by 1952 and perhaps a little over 3 percent by 1955.

The percent of land devoted to sod crops could be about 13 percent in 1952 and about 15 percent by 1955. The increase in produc-

tion due to the use of more yield increasing practices would result in a larger production of grain and would allow for an increase of land in sod crops.

The production of different crops in South Dakota can be easily changed by shifting acres from one crop to another. The corn acreage in 1952 could be increased to nearly 3 percent and possibly 4 percent by

1955. The greatest increase is likely in the south central and eastern sections of the state. New varieties of grain sorghum should make more competitive with corn and result in an increased acreage in the central and western sections of the state.

The acreage seeded to barley in 1952 could increase about 3 percent and could reach 1,000,000 acres by 1955 or an increase of about 14 percent. The newer varieties of feed barley should make it more competitive with corn in the central and western sections of the state. A slight decrease in the oat acreage appears possible for 1952 and 1955.

The acreage seeded to wheat may possi-

Possibilities of Increasing Production per Acre

Future increases in crop production are mainly dependent upon the development of improved production practices, the adoption of these practices and weather conditions.

The possibilities of increasing crop production in the future by using known im-

bly increase nearly 2 percent for 1952 and percent in 1955.

Soybean acreage could increase to 70,000 acres in 1952 and 150,000 acres in 1955. Flax on the other hand could decrease to 450,000 acres in 1952 and rise to 500,000 acres by 1955.

Increased crop production can be secured in two ways, (1) shifting acres from one crop to the other and (2) by increasing yield per acre. In the years to come any great increase in production can no longer come from increasing the acres of major crops. Efforts must now be centered upon gaining increased production by increasing yields per acre.

proved production practices was estimated to be very great. The percentage increase in yields shown below is based on conditions where no improved seed, rotations or commercial fertilizers are used. This data is based on state average yields under average or normal weather.

Estimated Effect of Improved Practices on Yield per Acre

| Practice | Corn (percent) | Spring Wheat (percent) | Alfalfa (percent) |
|---|-------------------|---------------------------|----------------------|
| Adapted Seed | 33 | 47 | 55 |
| Adapted Rotation | 87 | 94 | 22 |
| Fertilizer (commercial) | 93 | 104 | 111 |
| Adapted Seed and Rotation | 107 | 125 | 89 |
| Adapted Rotation and Fertilizer | 120 | 141 | 133 |
| Adapted Seed, Rotation and Fertilizer | 133 | 156 | 144 |

The greatest boost in yield is made possible by use of a "bundle" of practices. The full effect of any bundle of practices such as adapted seed, rotation and fertilizers, would be felt after these practices were in opera-

tion for a few years. A large gain could immediately be gotten from better seed and use of fertilizer. Similar yield increases are possible for oats and barley.

Percent of South Dakota Farmers Using Improved Practices 1950

| Practice | Corn (percent) | Spring Wheat (percent) | Alfalfa (percent) |
|--|-------------------|---------------------------|----------------------|
| No major improved practice | 17 | 18 | 25 |
| Improved Seed | 47 | 47 | 41 |
| Improved Rotations | 5 | 5 | 6 |
| Fertilizer, Commercial | 1 | 0 | 1 |
| Improved Rotation and Seed | 27 | 2 | 24 |
| Improved Rotation and Fertilizer | 1 | 1 | 1 |
| Improved Seed, Rotation and Fertilizer | 2 | 2 | 2 |

The second method of increasing total crop production in the state depends upon the rate of use of improved practices. How extensively these practices were used by South Dakota farmers is shown in the table

printed at the bottom of page 4.

It can be concluded from this and the preceding table that wider use of improved practices could greatly increase grain production.

How Much Could Be Produced

How much could be produced on a definite piece of land? What might the production be if all farmers were using the best bundle of known practices? To illustrate the possibilities let us use corn as an example. As a piece of land we will take the suggested corn acreage for South Dakota for 1955. Production on this acreage could vary from 16,800,000 bushels to a little over 151,200,000 bushels, depending upon weather and the use of improved practices.

In 1951 farmers planted 4,048,000 acres in corn. For 1955 it was estimated that 4,200,000 acres might be seeded—up 3.8 percent. Now it looks like this acreage will be needed in 1952 to get production up to at least the long time 1940-49 average of 92,154,000 bushels. By 1955 it is estimated that 105,000,000 bushels could be produced.

Using this 4,200,000 acres what sort of production could have been gotten if all farmers were using certain practices or bundles of practices under an assumption of normal weather conditions.

Case 1 is where all farmers did not use any improved practice. Production would then have been 63,000,000 bushels—68 percent below the 1941-49 average production. Planted yields were estimated at 15 bushels per acre.

But in case 2, which shows the other extreme, production might have been 147,000,000 bushels or nearly 40 percent above 1955 estimated needs. Here all farmers would have been using the best "bundle of practices including improved seed, rotation and commercial fertilizers. The average

yield per planted acre for the state would have been 35 bushels.

Case 3 is one that is close to actual conditions and estimated needs of 1955. Yields are estimated at 25 bushels per planted acre, state average. Weather is assumed about average with 19 inches of rainfall. It is assumed that many improved practices have been adopted. Under this condition production could be 105,000,000 bushels for 1955. This production would be 14 percent above the 1940-49 average production.

Case 4 shows the savings in acres of corn that is possible assuming average weather and all farmers using the best production practices. Under these conditions an average yield of 35 bushels is possible. To produce 105 million bushels at 35 bushels per acre, (state average per planted acre), it would take 3,000,000 acres—a saving of 1,200,000 acres or 28 percent for other uses such as legumes and grass.

In summary crop production in South Dakota can be greatly increased by the use of adapted seed, rotations and commercial fertilizers. By use of these improved practices a higher level of grain production is possible on a smaller acreage than is now planted to grain crops. The adoption of these practices over a period of years will release a considerable acreage of land now used for grain production, for other uses such as grasses and legumes. This advancement in use of technical know-how would enable further increased livestock production which is in much demand and would at the same time maintain a higher level of soil fertility.

Livestock Production Possibilities

Increased livestock production is dependent upon increased feed production (grains, hay and pasture) development of improved livestock production and management practices and the wide adoption of

these practices. Basic to an expansion of livestock production is the increased production of feed which was discussed in the previous section.

The present and future possibilities for

increasing livestock production is shown in the table on page 8.

One of the factors accounting for increased livestock production has been the rapid mechanization of farms. The number of horses has declined greatly in the last few years and may decline as much as 37 percent below 1951 by 1955.

All cattle and calves reached a peak of

2,614,000 head in 1945, and declined to 2,454,000 head in 1951. Some further increase was expected for 1952 and by 1955 numbers may reach the former peak or an increase of about 6 percent above 1951. Cattle feeding operations may increase about 10 percent by 1955—slightly more than the general increase in numbers.

Present and Future South Dakota Livestock Production

| Kind of Livestock | Unit | Reported or Estimated for 1951 (000) | Possible for 1952 (000) | Possible for 1955 (000) |
|------------------------------------|-------------|---|-------------------------------|-------------------------------|
| Horses | No. | 144 | 120 | 90 |
| All cattle and calves | No. | 2,454 | 2,500 | 2,600 |
| Beef cows 2 yrs. | No. | 800 | 805 | 820 |
| Other cattle | No. | 1,286 | 1,325 | 1,402 |
| Cattle on feed | No. | 195 | 200 | 215 |
| Calves born | No. | 1,004 | 1,010 | 1,042 |
| Net production, cattle and calves | Thous. lbs. | 730 | ----- | 775 |
| Milk cows 2 yrs. | No. | 360 | 370 | 378 |
| Milk produced | Thous. lbs. | 1,405 | ----- | 1,560 |
| All sheep and lambs | No. | 893 | 920 | 1,000 |
| Ewes 1 yr. | No. | 608 | 626 | 680 |
| Other sheep and lambs | No. | 285 | 294 | 320 |
| Lambs saved | No. | 559 | 563 | 632 |
| Lambs on feed | No. | 225 | 235 | 270 |
| Wool produced | Lbs. | 6,839 | 5,890 | 6,545 |
| Net production of lambs and mutton | Thous. lbs. | 37.2 | ----- | 39.5 |
| Sows farrowed | No. | 426 | 440 | 470 |
| Pigs saved | No. | 2,650 | 2,772 | 3,055 |
| Net production of hogs | Thous. lbs. | 598 | ----- | 692 |
| Hens and pullets | No. | 8,230 | 9,350 | 10,000 |
| Chickens raised | No. | 14,088 | 14,100 | 15,258 |
| Turkeys raised | No. | 315 | 325 | 385 |
| Eggs produced | No. | 1,113,000 | 1,202,000 | 1,330,000 |

The number of cows kept for milk may increase slightly by 1955. Milk production, on the other hand, may increase as much as 11 percent by 1955.

The net production of sheep and lambs could increase about 6 percent by 1955 and a decrease in wool production is likely. Most of the increase in sheep numbers may come in the eastern half of the state and

would consist mainly of the mutton breeds.

Hog production could increase at least 16 percent or more by 1955. Most of the increase would come in sows farrowed and a larger number of pigs saved per litter.

Hens and pullets by 1955 could be increased 22 percent; eggs 19 percent; chickens raised 18 percent and turkey production 22 percent.

Improved Practices Increases Production

As with grain production the greatest opportunity for increasing livestock production is by development of improved production practices and by a wider adoption of them.

Improvements are expected in feeding practices, breeding and selection, disease and parasite control and other practices that should give more efficient production of cattle and sheep. According to a recent survey for 1950 about half of the beef cattle producers were practicing good pasture and range management, using balanced rations, and controlling external parasites. Only 15 percent of the farmers were using improved practices in silage feeding and producing good quality hay. Sixty percent of the farmers were using purebred sires while only 30 percent were using good selection practices on their breeding herds.

Dairy production could be greatly increased by use of better breeding stock, feeding balanced rations, feeding according to production, making better use of pastures, producing quality hay and other practices. It was estimated in 1950 that 10 percent of the farmers were using improved pasture practices, 20 percent used balanced rations, 30 percent were feeding silage, 15 percent were feeding according to production. Only 7 percent of the farmers were

using purebred sires and only 2 percent were using good selection practices on the breeding herd.

Many improvements are possible in hog production. Increased use of good pastures, balanced rations, antibiotics, internal parasite control and other practices will reduce the amount of concentrates needed per pound of pork production. It was estimated for 1950 that it took 4.75 pounds of concentrates to produce one pound of pork. By 1955 this could be reduced to 4.5 pounds. With very good management farmers could produce a pound of pork with 3.5 pounds of concentrates.

In summary South Dakota has the feed, the facilities, and the experience to greatly increase the production of grain consuming livestock. Such increases in feeding will reduce the amount of feed grains sold out of state. Some increase in cattle and sheep numbers is possible but is currently limited by summer grazing, and hay production. If improved crop production practices are followed by more farmers a considerable acreage now used for grain production would be available for rotation pasture and hay. This would then allow for increased livestock production from an expansion of numbers and more production per unit.

Steps Needed to Achieve Production Increases

Increased agricultural production will not come about by itself. How much South Dakota farmers increase total agricultural production depends on many factors.

Factors that affect agricultural production but cannot be controlled by individual farmers include: Cost-price relationships and relative prices of crops and livestock, supply of machinery, fertilizer, labor etc., and weather.

Looking ahead for the next three years, population will be increasing and relatively high expenditures for defense point to rising incomes. Current trends in the consumption of food indicates continued strong demand for meat and other livestock products. All of these would work toward a

favorable parity ratio of 100 or slightly better, and high relative prices for livestock and livestock products. Because of the defense and other industrial needs supplies of machinery, fertilizer and labor may be short of needs. The weather, always a factor, could change crop and livestock production up or down from the possible levels indicated in spite of better management. Government supports provide a floor under prices for many important crops and livestock products.

There are many factors which will determine the difference between profit and loss that are under control of individual farmers. Among them are the type of farm organization, its size and the rate of use of

new improved production practices.

Will it pay to adopt improved production practices? No hard and fast answer can be given that will fit all situations. Many of the improved production practices will involve little or no great increase in costs and will increase production greatly. Other practices may involve large amounts of additional labor or capital.

The general effect of the adoption of improved practices will be to decrease the cost of producing a particular unit of produc-

tion. On the other hand the amount produced could increase to the point when the supply exceeded the demand and prices would decline. This would not be disastrous to the efficient farmer because by using improved practices he will have lower costs per unit and would still reap a profit.

The best general rule to follow in determining whether a practice will pay is this: "you can afford to use a particular practice where the additional production will cover the added cost."

In summary South Dakota has the lead in the livestock and the expense to greatly increase the production of grain containing livestock. Such increases in feeding will reduce the amount of feed grains and out of state. Some increase in waste and sheep numbers is possible but is currently limited by summer grazing and hay production. It is possible to increase the production of livestock by more farmers a considerable amount of land now used for grain production would be available for rotation pasture and hay. This would then allow for increased livestock production from an expansion of numbers and more production per unit.

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