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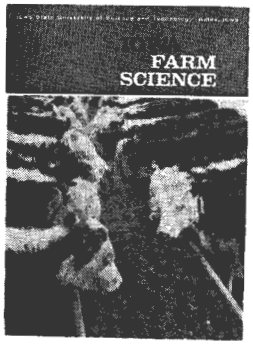
ɔwa State University of Science and Technology/Ames, Iowa

Iowa farms produce a lot more beef and pork than are retailed in the state. Much of the meat produced in Iowa moves into a nationwide market. Where do our meat "exports" go? For an over-all picture, see the article beginning on page 6 of this issue.



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(available about mid-month)

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YES, YOUR ANSWERS HELP!

Remember the questionnaire that came along with your renewal card for Iowa Farm Science last winter? Nearly all who renewed their subscriptions for 1960 completed that questionnaire. A number, however, wrote in a question at the bottom asking why or how in the world the information asked for was useful.

The answer is this: Farm Science is published for you who actually are receiving it. To the extent that we can, we attempt to adapt the content and presentation of Farm Science to your needs, wants and interests as we know them. Those last four words are the key to the purpose of the survey.

We can tell from census figures, for example, that so many Iowa farm families in total farm so many acres and raise certain kinds of crops and livestock. But that doesn't necessarily tell us much about the specific group of Iowa farm families who read Farm Science -- unless we assume that our readers are "just like" the farm families for whom census figures are available. And we haven't found this true in the past.

Thus, to plan Farm Science for you who read it, we need the kind of information that you supplied in filling out the questionnaire. Its only purpose -- to help us serve you better (no ads, no salesmen, no "gimmicks").

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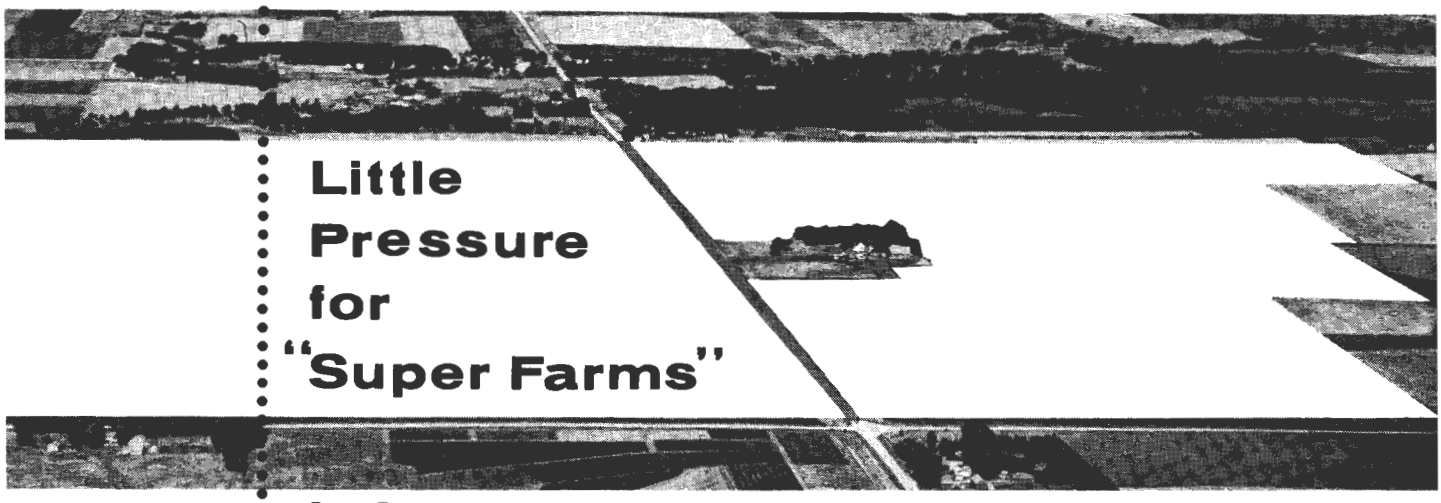


Little Pressure for "Super Farms" in Iowa

Any rapid trend toward "super farms," according to this most recent study, would call for greater cost economies from size than appear to exist at the present time. Most such economies are realized within the 300-acre range.

by Raymond R. Beneke and Jack M. Alexander

WITH AVERAGE farm size still increasing in Iowa, there's some concern that really big "super farms" will crowd in and take over. But the best evidence we have indicates that this just isn't in the cards unless there are striking new developments in machinery designs.

Past studies showed that most of the economies in crop production possible through farm size are realized with about 300 crop acres. They showed that cost advantages with more acres than this were quite small. Yet, there are a number of very large farms—950 crop acres or more—in the state.

Recently we analyzed the costs on some of these very large farms to check for possible economies that might have been overlooked in the earlier studies. Results, however, largely confirm the findings of the past studies — that farms in the 300- to 400-acre range are large enough to achieve most of the economies that can arise from size alone at the present time.

RAYMOND R. BENEKE is professor of agricultural economics, and JACK M. ALEXANDER is manager of the Iowa State University Foundation Farms.

What We Did . . .

First we located all farms within the cash-grain area with 950 or more crop acres. We considered only farms that carried on typical commercial farming operations, supervised by one manager and using labor and machinery interchangeably among units. Thus, if an operator had two units totaling 950 acres but farmed them separately, we didn't study his operation. We found 10 farms meeting all of the characteristics we were looking for. From these, we collected data on machinery and labor use, cropping practices and costs.

For comparisons we needed "benchmarks" against which we could measure the performance of the very large farms. So we selected three groups of 10 farms each with accounting histories suggesting well-managed operations. The first group of 10 ranged from 145-180 acres; the second, from 295-330 acres; the third, from 420-620 acres. For brevity, we'll call these groups 160-, 320- and 500-acre farms, respectively — pretty much the way they actually averaged out — and the very large farms, 1,000-acre farms.

We worked with two measures of machinery efficiency for each farm: (1) the machine and power investment per $100 of crop output and (2) machine and power cost per $100 of crop output. We also estimated labor cost per $100 of output, using an arbitrary charge of $1 per hour for all labor whether operator, family or hired labor. Machinery was valued *at current market prices on the used market* rather than at the operators' inventory values. Changes in machinery prices and differences in depreciation methods used on the farms made accurate cost comparisons on the basis of depreciated "book" values impossible.

What We Found . . .

Machinery Investment: We found two important differences in the machinery arrangement between the very large and the three smaller groups of farms.

(1) The large farms made much greater use of large, high-capacity machines. The makeup of the machinery inventory on a 1,000-acre farm was quite different than you'd find on two 500-acre units. Crawler-type tractors, self-propelled combines and pickers, and 4- and 5-bottom plows weren't often found on the three groups of smaller farms. But they were common on the 1,000-acre units studied.

(2) The machinery used on the 1,000-acre farms was newer than on the smaller farms. Operators of the large farms said they preferred newer machinery because it reduced the risk of delay from breakdowns in field operations. Because of their large acreage, the operators felt the pressure of field work more keenly than the operators of typical smaller farms.

Even with larger and newer machinery, the operators of the 1,000-acre farms were able to keep their machinery investment per $100 of crop output lower than found on the smaller farms (see chart and table). Notice that the 320-acre farms appear to have an advantage over the 500-acre group in this and the several comparisons that follow. But the differences are so small that they could have arisen merely by chance from the farms chosen. Total crop machinery investments for the four size groups averaged as follows: 120 acres, $4,153; 320 acres, $6,372; 500 acres, $10,615; 1,000 acres, $20,039, all on the used market basis.

Machine and Power Cost per $100 of crop output is another measure of efficiency used in the study. Investment per unit indicates the amount of capital tied up. Cost includes yearly depreciation, interest on investment and the taxes and insurance involved in owning and using the machinery in production. We found that the 1,000-acre farms have an advantage in machine and power cost, too. But it's quite small—about 33 cents per $100 of output below the 320-acre farms.

Add Labor Costs: The third efficiency measure we used summed labor and machinery costs. In this case, the 1,000-acre farms didn't show up quite as well. Costs on the 1,000-acre farms per $100 of output were slightly higher than on the 320-acre farms but about $6 lower than the 160-acre group and about $1 less than the 500-acre farms.

This higher cost on the 1,000-acre farms seems to come out of their inability to use labor as efficiently as the 320-acre farms. The time to prepare for and perform crop operations on the 1,000-acre farms per rotated acre averaged 4 man-hours, even with the high-capacity machinery. This compares with 3.7 man-hours on the 320-acre farms and 3.4 on the 500-acre farms.

Our estimates of labor requirements include only the time that could clearly be charged to crop enterprises. They don't include indirect requirements such as fixing fence, repairing machinery and buildings, and getting materials. Any time spent by the operator or manager in supervising hired help on cropping operations, however, is included.

Labor Problems: Operators of the 1,000-acre farms thought that the most difficult problem they faced was in maintaining an adequate labor force — particularly with respect to seasonal changes in labor requirements. Most Corn Belt farm operators have this problem. But when the bulk of the labor is supplied by the operator and his family, most of the seasonal variations can be met by varying the length of the working day.

Operators of the 1,000-acre farms regarded year-around hired help as the most dependable. But they couldn't arrange a farming program to meet peak loads and still keep hired help fully employed at all times. Though most of the operators found hired help willing to lengthen their working day to some extent in pressing seasons, most also found it necessary to depend heavily on day labor and hourly help.

Supervising hired help seemed to be a critical problem on the 1,000-acre farms. Operator time used for supervision ranged from 25-60 percent. And even then, most of the operators felt that machinery repair and maintenance was considerably higher than if they had serviced and operated the machinery themselves. They emphasized that their labor turnover was high, requiring considerable time in hiring new workers. One of the 1,000-acre farm operators reported there had been 10 times in the past 3 years when workers had quit at a critical time.

The 1,000-acre operators have developed several devices for maintaining more stable and effective working forces. Among those mentioned: bonuses, provisions for days off, more extras and better housing than available on other farms, and paying higher-than-average wages.

Field Operations: The fact that the operators of the 1,000-acre farms were farming more land and were more often pressed for time is reflected in several differences in field operations as compared with the three groups of smaller farms:

- The proportion of hay acreage was somewhat lower and the soybean acreage higher. This reflects a shift from a crop where timing is critical and labor requirements high to one where timing is more flexible and labor requirements lower.
- More fertilizer was plowed down rather than used as starter or side-dressing. The plow-down method took less labor and typically shifted the job to a season where competition for labor and managerial supervision was less severe.
- Corn planting was speeded by power checking. On the 1,000-acre farms, 75 percent of the corn acreage was power checked, compared with 40 percent on on the 160-acre farms.
- Hay was less frequently cut a third time. On the smaller farms, 62 percent of the hay acreage was cut three times, compared with 27 percent of the hay acreage on the very large farms.
- Corn was cultivated less often on the 1,000-acre farms. All of the farms typically cultivated corn at least twice. But 60 percent of the corn on the smaller farms was cultivated three times, compared with 35 percent of the corn on the very large farms. The large farms also made greater use of rotary hoes

and chemical spraying for weed control.

Total Output: Because of attempts to "cut corners," crop yields per acre on the 1,000-acre farms averaged slightly lower than on the smaller farms. But the lower yields were offset by some shifting from hay and oats to corn and soybeans on these farms in the cash-grain area.

Several factors probably account for this shift. For one thing, livestock operations on the 1,000-acre farms were limited in relation to total crop acres. The large farms could raise ample hay and pasture with a relatively low percentage of their land in these crops. Less emphasis on hay and pasture meant that a smaller percentage of their land needed to be in oats to serve as a companion crop. Another reason: Corn and soybeans fitted better into large-scale farming where labor is a problem. These two crops lend themselves more fully to mechanization than does hay.

The dollar volume of crop output per crop acre was remarkably similar on all of the farms studied. This is mainly because the lower per-acre yields on the very large farms were offset by more intensive row-cropping.

Other Differences . . .

The comparisons so far among costs, output and practices have been for the averages of the 160-, 320-, 500- and 1,000-acre farms. But there were also some striking differences within the groups—especially within the very large farm group.

The 1,000-acre farms had a much wider range in machine cost, labor requirements and total output per acre than did the other groups. This may have resulted partly from the way in which the farms were chosen. The 1,000-acre farms represented *all* of the farms of this size we could locate in the cash-grain area. The "benchmark" groups of smaller farms were *selections* of efficient farms in the same area.

The 1,000-acre farms as a group showed little advantage in machinery and labor expense per $100 of crop output on the average for the group. But the average for the 1,000-acre group was raised particularly by several of the 10 operators who had very high costs. At the other extreme, the most efficient operations in the 1,000-acre group did show a substantial cost advantage over the best operators in the benchmark groups.

Of the 1,000-acre farms, those that had the highest machinery expense per $100 of crop output also tended to have the highest labor costs. You might expect that more investment in machinery and higher machine costs would permit the operators to reduce their labor costs. But the operators who had difficulty in holding down machine costs seemed also to have difficulty in making efficient use of labor.

Apparently the quality of management becomes more critical as the size of the farming operation increases. Large-scale farming permits a highly skilled manager to fully use his talents. But it also invites more and costlier mistakes if he must spread his management too thinly.

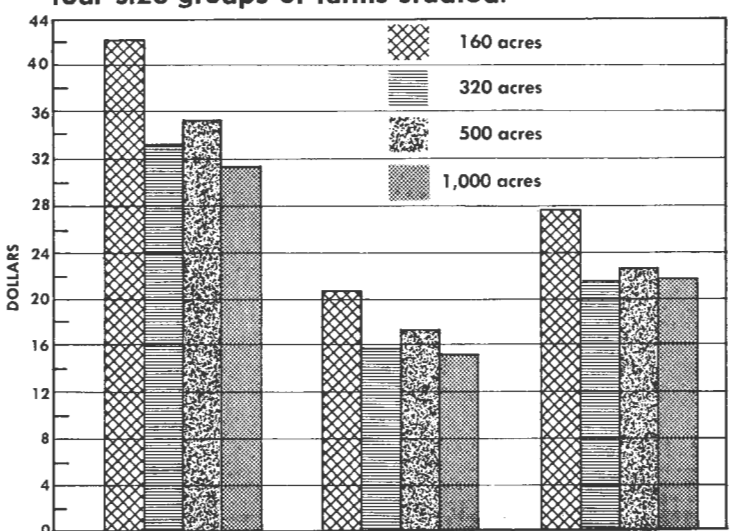
Economies Too Few . . .

On the very large farms that we studied, the economies found are clearly insufficient to exert much pressure to push farm size into the 1,000-acre range. The best operators of the 1,000-acre farms did achieve lower cost than did the best operators among the smaller 160-, 320- and 500-acre farms. But most of the very large units came out no better, and some were considerably less efficient, than the smaller farms.

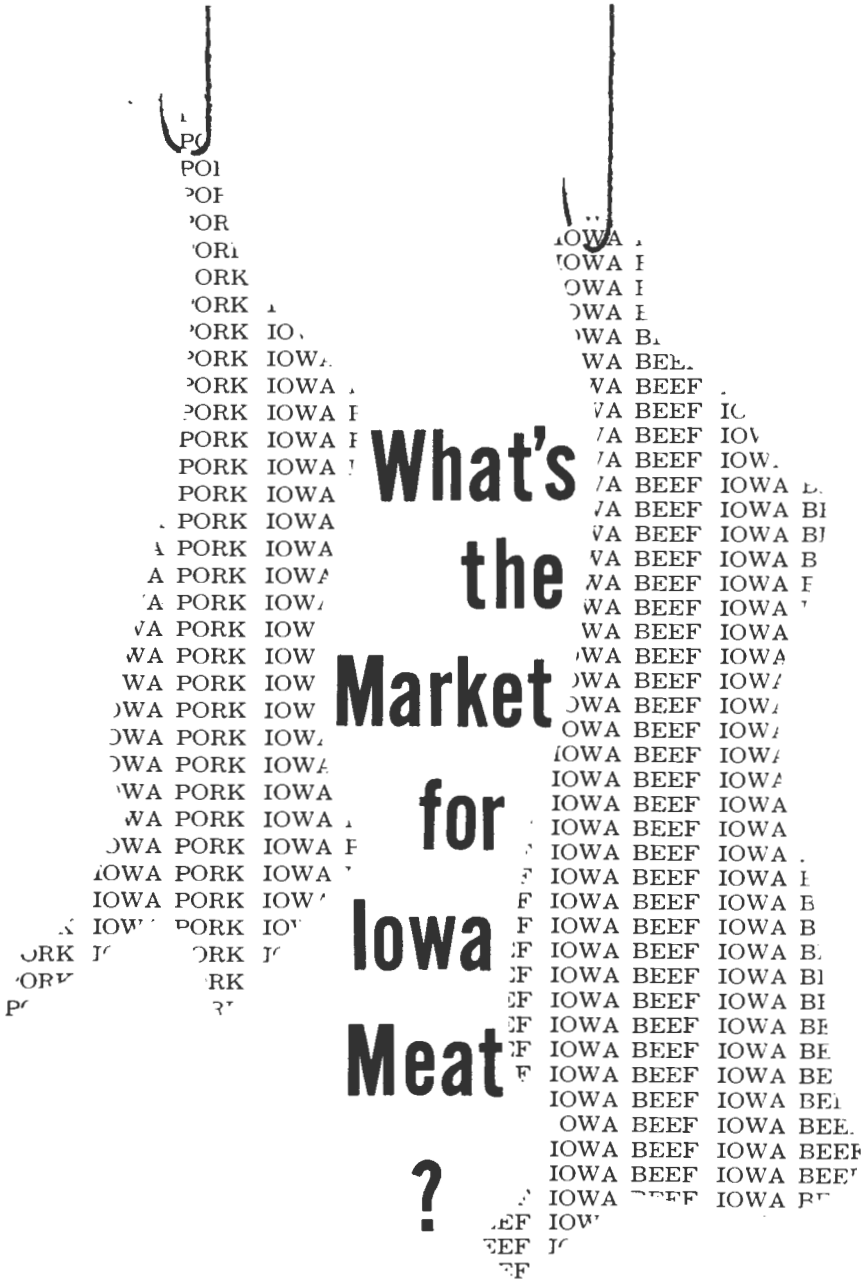
Few individuals can acquire the capital necessary to gain control of enough resources to farm 1,000 acres. Buying or renting this much land all within a reasonable distance presents another problem. And the seasonal nature of farming complicates the maintenance of a dependable labor source.

Thus, any rapid trend toward 1,000-acre farms would call for greater cost economies than appear to exist to overcome the obstacles just mentioned. Changes in machinery design and in methods of financing could change the picture. But both the past studies and this one indicate that farms in the 300- to 400-acre range are large enough to realize most of the economies that can arise through size at the present time.

Average machinery investments and machinery and labor costs per $100 of crop output for the four size groups of farms studied.



Farm size group	Machinery and power investment	Machinery and power cost	Labor and machinery cost
160 acres	$42.28	$20.60	$27.65
320 acres	33.13	15.40	21.36
500 acres	35.00	16.95	22.50
1,000 acres	31.27	15.07	21.49



Iowa farms produce many times more beef and pork than is retailed in the state. Much of our production moves to retail markets outside of Iowa. Where does it go, and how well do we compete with other production areas?

by William C. Motes and Wilbur R. Maki

MOST OF the products of Iowa livestock are sold and consumed in other states. Iowa meat is competing in markets in almost every part of the nation. Iowa farms produce about 9 times as much beef and about 18 times as much pork as Iowa consumers buy each year. So much of our livestock production is slated for retail markets outside of Iowa. And a large and prosperous nationwide market is important for this purpose.

Most folks are familiar with the mechanical steps of processing livestock on the hoof into meat for the table. But the movement of livestock products has been less well publicized than the mechanical steps in the distribution process.

In serving a nationwide market, it's important that perishable meat products move swiftly over long distances without loss in quality. And these services and the final product must be priced to compete with locally produced meat products.

How We Compete . . .

Our livestock products compete favorably in distant markets for several reasons. Our central location gives us access to the population centers of the East as well as to the rapidly growing cities in the West. Iowa's exports move at relatively low costs to a nationwide market.

Most of the feed grains and forage produced in the state are fed to livestock rather than exported. There are abundant feed supplies available for the state's livestock industry. Finally, large, specialized slaughtering and processing plants convert the livestock into a wide variety of meat products at relatively low cost for wholesale and retail outlets throughout the United States.

Where Does It Go?

The total flow of beef and pork in one year of the mid-fifties among the four major census regions—Northeast, North Central, South and West—is shown in the map. Included in the beef and pork shipments from Iowa are carcasses shipped to processing plants elsewhere in the North Central Region. This partly accounts for the relatively high shipments to other states within this region.

Much of the national supply of both beef and pork comes from the North Central Region—made up of the 12 states from Ohio and Michigan westward to the Great Plains. Slaughtering plants in this region handle three or more times

WILLIAM C. MOTES is a graduate assistant in agricultural economics, and WILBUR R. MAKI is associate professor of agricultural economics.

the volume of livestock slaughter of any other region. Even so, more slaughter livestock are sold in the region than are actually slaughtered in the region.

The North Central Region also is the source of practically all slaughter hogs shipped across regional boundaries. Substantial cattle shipments, however, originate in the South—mainly for markets in the Northeast.

Meat shipments from the North Central Region go into each of the other three census regions. Iowa's shipments of beef and pork to all three regions in 1954 totaled 2½ billion pounds. About 1.4 billion pounds went to the Northeast; 660 million pounds to the South and 420 million pounds to the West.

In 1957 Iowa produced slightly more than 1.2 billion pounds of the total national beef output of more than 13.8 billion pounds. Of the 1 billion pounds that moved out of Iowa, about 600 million pounds were shipped to the Northeast — mainly to New York and Boston. About 180 million pounds moved to the West; 190 million pounds went to the South.

Of the national total of 12.8 billion pounds of pork and lard in 1957, 2.1 billion pounds were produced in Iowa. Of this, about 2 billion pounds were exported to other regions—1.2 billion pounds to the Northeast, 360 million to the West and 420 million to the South.

Meat Tastes Vary . . .

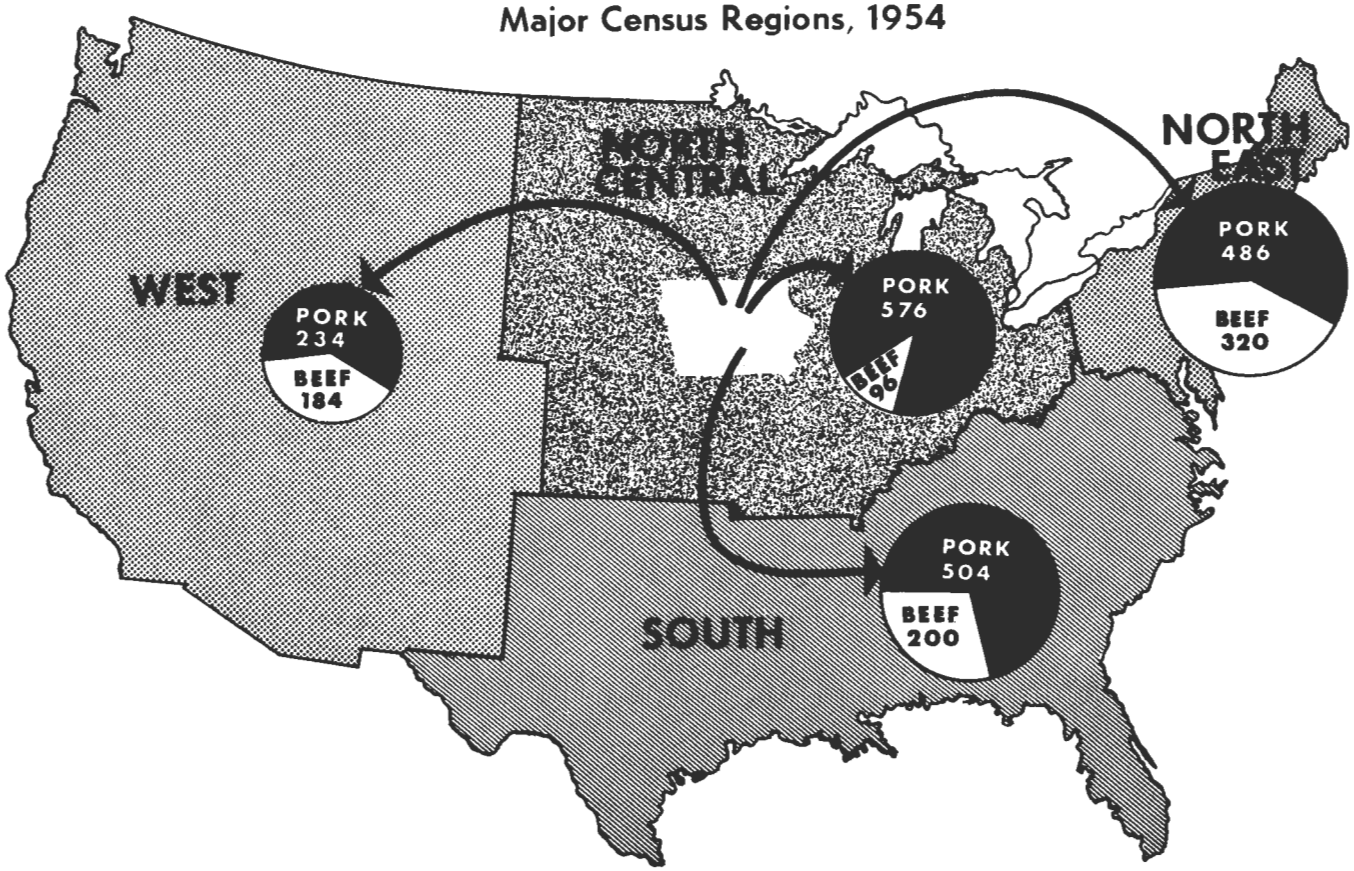
Not all of the regions have the same tastes and meat preferences. Since consumer preferences vary among the regions, shipments of meat vary in make-up from region to region.

Cured and processed cuts of pork are more important in the South and West (see table 1). These cuts make up 70 percent of the pork purchases in these two regions but only 62 percent of the pork purchases in the Northeast and North Central regions. Salt pork is 10 times more important in the South on a per-person basis than it is in any other region. In 1955 salt pork made up 10 percent of all pork purchased in the South.

Bacon is the most important cut in the West—accounting for 22 percent of the pork purchased there. Cured ham, bacon, luncheon meat and fresh chops—all relatively expensive cuts — make up 69 percent of all pork purchases in the West. These cuts make up 68 percent of all pork purchases in the Northeast; 72 percent of all pork purchases in the North Central Region.

For beef, the consumption pattern is much more uniform than for pork. In the South, purchases of steaks and roasts are about 2 and 6 percent less, respectively, than relative purchases in the other regions (see table 1). Consumers in the South use 2-3 percent more beef as stewing meat and 1-2 percent more as luncheon meats. This, plus the use of about 2 percent less beef as luncheon meats in the West, is about the extent of the differences for beef.

Shipments of Beef and Pork, in Millions of Pounds, From Iowa to Major Census Regions, 1954



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Quality, Too . . .

The quality of the cuts of beef and pork also differs among regions. The average price per pound of both beef and pork is relatively high in the Northeast as compared with the other regions (see table 2). The price of meat in the Northeast is higher, partly because of higher transportation costs. But it's also related to the quality of the retail cuts.

Relatively large amounts of low-value beef, for example, are purchased in the South and West. This brings down the average price in these regions. And the large amount of salt pork sold in the South also contributes to the lower average price of pork cuts there.

Slaughter Facilities . . .

A shift of a major part of the meat-packing industry to the areas where livestock production is concentrated has been associated with a corresponding geographical concentration of the livestock industry. About 11 percent of the nation's livestock slaughter occurs in Iowa. Another 15 percent occurs in Minnesota, South Dakota and Nebraska. Much Iowa-produced livestock is slaughtered in these three states, too.

This location of livestock slaughter came about partly because slaughterers want a ready, reliable source of livestock supply. Other factors, such as the relative shipping costs for live and dressed meat also play a part. The westward movement of population has been followed by a similar movement of both slaughter livestock and slaughtering plants.

Much of this westward movement has taken place in the past few years. Before World War II, a large proportion of Iowa's livestock moved into the large terminal markets — from there to the packing plants nearby. But in 1957, 2.2 billion pounds of cattle and calves were slaughtered in Iowa—somewhat less than the 3.2 billion pounds of cattle and calves marketed for slaughter in the state. Of the 3.9 billion pounds of hogs marketed for slaughter in Iowa, 2.8 billion pounds were slaughtered in the state. If we include nearby slaughtering facilities in Minnesota, South Dakota and Nebraska, we find a substantial increase in livestock slaughter in these areas.

Transportation . . .

The total cost of transporting cattle, hogs, beef and pork produced in Iowa was about 80 million dollars in 1957. This cost was divided among: (1) movements of livestock to packing plants, about 30 million dollars; (2) movements of meat in Iowa, about 1 million; and (3) interstate movements of meat, about 49 million.

Meat packers, transportation agencies and livestock producers in Iowa all have a substantial interest in the changing market patterns for Iowa livestock products. Meat packers are well aware of the savings that can be made from a rate reduction of just a few cents per hundredweight on large shipments. Packers are always looking for less expensive routings or consignments as they compare the costs of shipping by rail or truck.

Thus, new methods of transportation—such as faster rail shipments, piggy-back truck and rail shipments, new and faster truck service—are changing the marketing patterns for livestock and meat. These transportation improvements as well as relative shipping costs also affect the location of livestock slaughtering and processing in Iowa.

The Future . . .

New markets are opening in the South and the West. But new production areas are developing in the South and in the Great Plains states. Whether Iowa will be able to maintain its present advantage will depend a lot on the level of livestock production in the state. But improved transportation services will be important, too, in keeping down the cost of the final meat product and keeping it competitive with the other goods and services that consumers purchase.

TABLE 1. Estimated yearly per-capita purchases of selected cuts of pork and beef, by census regions, 1955.[a]

	Average pounds per person				
	North Central	North-east	South	West	United States
PORK:					
Chops	11	9	9	8	10
Fresh ham	2	4	1	2	2
Fresh sausage	5	2	7	4	4
Cured ham	16	12	12	11	13
Bacon	14	9	17	14	13
Luncheon meat	15	12	11	12	13
Other	15	14	19	14	16
TOTAL PORK	78	62	76	65	71
BEEF:					
Steaks	19	23	12	26	19
Roasts	18	20	9	23	16
Stewing	5	6	5	6	5
Ground	18	22	13	24	19
Luncheon meat	8	9	6	7	8
Other	1	2	2	2	1
TOTAL BEEF	69	82	47	88	68
TOTAL PORK AND BEEF	147	144	123	153	139

[a]Retail weight basis.

TABLE 2. Index of estimated value per pound of pork and beef purchased by census regions, April-June 1955. (U. S. average price = 100.)

	North Central	North-east	South	West	United States
Pork	101	109	86	104	100
Beef	98	113	90	99	100

For Your Interest

farm business and management

Co-ops Can Increase Bargaining Power But Can't Fix Prices

FARMERS, through their cooperatives, may legally bargain collectively and increase their bargaining power. But they may not legally enter into agreements with nonfarm groups in fixing prices, says Frank Robotka of the Experiment Station. In general, he says, farmers and their cooperatives are subject to substantially the same restrictions as are firms in other industries.

It has long been recognized, Robotka points out, that the individual farmer has little or no effective bargaining power. By associating himself cooperatively with other farmers, however, he advances his bargaining strength through collective bargaining. His control over farm prices is limited by the inability of voluntary cooperation to control production.

How far can he go? It's possible, Robotka says, that farmers could legally gain 100-percent control of a product through their cooperatives. But the methods used in gaining such control would be subject to judicial scrutiny. If, as a result of their acts, their prices are unduly enhanced, interstate commerce is unduly interfered with or competition is significantly reduced, action could be taken by the Federal Trade Commission or Department of Justice.

But, between the position of little or no bargaining power and the latter extremes, is a broad area within which cooperatives may function legally in improving farmers' bargaining power.

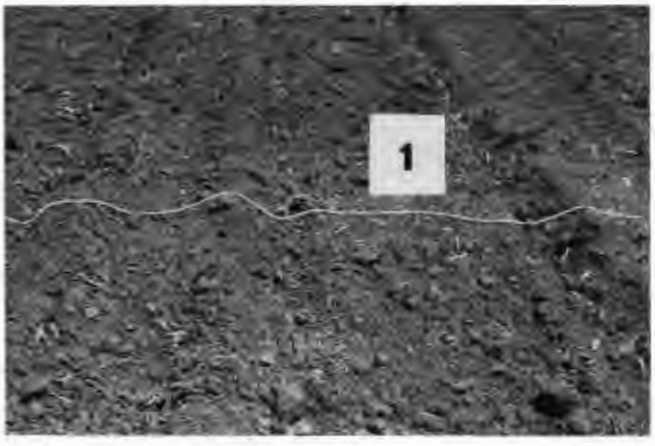
Land Price Rise Slows Down

FARM LAND PRICES in Iowa rose an average of 3 percent in the year ending Nov. 1, 1959—a smaller increase than has taken place each year for some time. Replies to the annual survey of Iowa farm real estate brokers indicated that land values increased slightly in all areas of the state, but there was an evident "softening" over the strong price increases of the year before.

The state average value per acre on Nov. 1 was $252, up $8 from 1958. By areas of the state, average values per acre were as follows: western livestock area, $253, up $7 from 1958; north-central grain area, $306, up $1; northeast dairy area, $244, up $13; eastern livestock area, $290, up $8; southern pasture area, $165, up $7.

Value increases appeared to be fairly uniform by grade of land, report Dwight M. Gadsby, Virgil Hurlburt and W. G. Murray of the Experiment Station. Results of the survey indicated a less active market than in several years past and a particular scarcity of "good" farms offered for sale during the year. Demand generally

Farmers and their cooperatives are subject to substantially the same restrictions as are other firms and industries. But, from a position of little or no bargaining power, there's a broad area within which cooperatives may function legally in improving farm bargaining power.



USDA and Experiment Station agricultural engineers and agronomists have been studying various tillage methods in different areas and on different soils of the state. This group of photos illustrates typical appearances immediately following some of the tillage treatments: (1) conventional tillage, (2) listing, (3) ridge planting, (4) mulch tillage, (5) minimum tillage (such as wheel-track planting).

was greater than the supply of land offered, but prices asked were often termed "excessive" for the demand. Brokers also reported adverse effects of increased interest rates on land values.

soils

Compare Methods of Seedbed Preparation

WHAT METHOD of tillage do you use — mulch, ridge-planting, listing, wheel-track or the conventional method? Soil type, location and moisture conditions will influence your choice, according to W. E. Larson and W. G. Lovely of the Experiment Station and the USDA.

In tests on a Moody soil, the smallest yields resulted from using the conventional method, the greatest from listing. This was probably because less moisture evaporated from the soil under listing, and there was less transpiration (moisture given off by the plant) early in the season. Therefore, more water was available during the tasseling period.

On Galva silt loam, yields were highest under the conventional and wheel-track methods, lowest for the mulch, ridge and listing. This was probably due to soil moisture, since the tested soil had poor drainage and had received more rainfall than had the Moody soil.

On a Grundy soil, yields were highest from the conventional method and lowest from the ridge methods.

There has seemed to be a trend

toward higher yields from wheel-track and conventional planting than from listing and mulch tillage in places where growing conditions are good. The opposite is true in areas where moisture is low.

Yields from listing and mulch tillage have usually compared more favorably to conventional methods when a row fertilizer and adequate nitrogen are applied, rather than at low fertility levels.

Tillage methods such as listing and mulch which sometimes keep the soil cooler and wetter in the spring tend to delay the date corn emerges, delay the date of silking and increase the moisture content of the grain at harvest time. Corn planted on ridges emerges earlier, has an earlier silking date and matures earlier.

These differences in maturity are much greater in northern Iowa than in southern Iowa. Earliness of maturity is probably related to soil temperature in the spring. Tillage methods which keep the soil cool in the spring, such as listing and mulch tillage, slow the development of corn. Soil temperatures are lower in northern Iowa, thus the differences resulting from tillage methods are larger.

Soil Temperature Can Influence Yields

How YOU handle your seedbed can have a real effect on soil temperature early in the season, says W. E. Larson of the Experiment Station and the USDA. If you plant in furrows or under crop residue mulches, the soil temperature in the seed row of corn is usually lower. If you plant on beds or ridges, the temperature usually will be higher.

Where the soil temperature in the root zone isn't much above the minimum for growth early in the season, a mulch will reduce soil temperature by 2° F., may reduce growth early in the season and sometimes result in lower yields.

On the other hand, mulches also reduce evaporation. In dry seasons this may be more important than soil temperature, and the moisture saved may increase yields.

Study Use of Ridges For Growing Field Corn

IN AN EXPERIMENT on continuous corn ground, the use of ridges didn't result in any higher yields than did conventional tillage. There was no difference in yield between turned and unturned ridges on either continuous or rotation corn. Little or no soil working is necessary on unturned ridges if weeds can be controlled.

Researchers also studied the effect of various field layouts and rotations on corn yields and soil erosion. Ridges were most satisfactory when they were made parallel to a contour line at the top of a slope and continued down the slope until the grade within a furrow was greater than 4 percent—then repeating the procedure. Continuous corn on unturned ridges on these steep slopes gives good erosion control and high yields. If the ridges are turned, erosion becomes more of a problem.

Using ridges only during the corn part of the rotation has been highly successful. It's also possible to grow small grains and hay on ridges, though equipment to handle this isn't available now.

Studies are also being conducted by W. G. Lovely of the Experiment Station and the USDA to look into growing corn on two-row beds or "super" ridges. The beds are 65 inches wide and the furrows are 15 inches wide so that tractors, planters and cultivators can operate on top of the ridges. This would be useful on low, wet land where it's hard to prepare a seedbed.

Herbicides May Reduce Tillage Operations

How much seedbed preparation is necessary when weeds are controlled chemically? Researchers under the direction of W. G. Lovely of the Experiment Station and the USDA have studied this question and come up with the following results:

When Simazine was applied at the rate of 3 pounds per acre in early April, weed control was excellent, and it was possible to plant and get a good stand without any seedbed preparation. Neither plowing, plowing and disking nor plowing, disking and harrowing improved weed control or stand.

These results indicate that secondary tillage operations such as disking and harrowing add little to stand. Where weeds are controlled chemically, secondary tillage operations, and in some cases the plowing operation, may not be necessary.

home and family

Study Relationship of Energy Output to Needs For Calories and Proteins

HOW MUCH energy do women use in their daily activities? And how is this energy output related to protein and calorie needs?

Wilma Brewer and co-workers at the Experiment Station are studying these questions. The 35 women who volunteered to help in the study were divided into five equal groups: underweight between 25 and 34 years old, average weight between 25 and 34, overweight between 25 and 34, average weight between 45 and 54 years old and average weight between 65 and 74 years old.

Each woman walked a treadmill for 15 minutes at 2 miles per hour and for 15 minutes at 3 miles per hour. The total amount of air they exhaled was measured and the oxygen and carbon dioxide analyzed. The final results will help tell how much energy is spent during normal activity and how much more energy is spent while walking than during bed-rest.

Additional tests have been made on energy spent while sitting, standing, walking and ironing. The food eaten and the waste excreted by eight women were weighed and analyzed. The results will be used to evaluate daily energy needs to maintain ideal body weight.

In connection with the experiments on energy expenditure, the researchers are also studying protein nutrition. The diets used were those chosen by the volunteer women themselves and these same diets with more and with less nitrogen.

Body composition is also part of this study. Testing is underway to determine the relative amounts of body fat and lean body mass found in women of different ages and weights.

Seek Guides To Choosing and Using Floor Coverings

WHAT DO YOU look for when choosing floor covering? How do you care for it to get the most beauty and durability for your money?

Elizabeth Beveridge and Margaret Liston of the Experiment Station hope to be able to develop scientifically tested guides to help you select, use and care for floor coverings. They are currently working on a way to rate different methods of care in terms of certain standards and cleanliness. They also are planning to question homemakers about the importance of durability, economy and ease of care when choosing a floor covering.

To Borrow or Not to Borrow?

HOW DO Iowa farm families regard credit? How important is financial security to them? Gordon Bivens, Gordon Ball and Margaret Liston hope to find out, for the answers will be a great help to farm families as well as to persons in teaching, extension work, government agencies, financial institutions and welfare organizations.

A study is being made of how farm families use all types of credit—production, consumption and real-estate mortgage. Production credit was examined to see how it was related to certain factors connected with farm families. There *were* associations between the use of production credit and:

Willingness to take on debt—families who were willing to take on uncertainties attached to debt used credit more frequently and in larger amounts.

Education of farm operator—those with high school education or more used credit more than did farm operators with less than a completed high school education.

Farm tenure—renters used production credit more frequently and in larger amounts than part or full owners.

Stage in family cycle — young families used production credit more frequently and in larger amounts than middle aged and older families.

Total assets—farmers with more assets borrowed higher amounts of money (but not necessarily more often).

Years farmed—the longer operators have farmed, the smaller the amounts of production credit they borrowed.

There *weren't* associations between the use of production credit and (1) *knowledge of credit sources,* (2) *socio-economic status,* (3) *farm size and* (4) *net worth*—although there was a tendency for families of low net worth to use production credit more frequently, but in smaller amounts, than families with higher net worth.

Generally, we can say that farm families hesitate to take on debt, but that they are more willing to take on a debt for farm production than for family use. Most families don't seem to realize what credit costs, where you can get it or how its use can contribute to financial security.

Credit may involve a "charge account" (above) or a formal loan (below). Experiment Station studies indicate that farm families hesitate to take on debt but are more willing to use credit or loans for farm production purposes than they are for family living use.

Who Are Our Future Farm Homemakers?

A young woman's future in our society depends a lot on the man she marries and his choice of a career and location. We found the plans of farm girls less definite than those of farm boys, but there are still some implications.

by Lee G. Burchinal

FARMING IS a family enterprise. It has become increasingly complex as have our lives in general in this day and age. But there are few, if any, other enterprises in which the business and household or family living are so closely associated.

In the April issue (see "Who's Going to Farm?" or reprint FS-864), we presented our findings about the characteristics of some Iowa farm boys who plan to farm. The results of a similar study of farm-reared girls furnish tentative indications of the characteristics of some of Iowa's future farm homemakers.

Our preliminary study included 80 farm girls attending high school in a west-central Iowa county. In the absence of more extensive information at this time, let's look at the clues our findings provide.

Of the 80 farm girls, 69 percent said they definitely or probably would become farm wives; 31 percent said they definitely or probably would not. We asked the girls to assume that income prospects would be about the same in either case and to assume that the young man that each might marry —whether planning a farm or nonfarm career — would be of comparable looks, personality, etc. How are the two groups of girls similar or different?

How They Compare . . .

We found no differences between the two groups in scholastic grades. The girls who thought they'd become farm wives were slightly more active in school activities. We found no differences between the two groups when they rated their preferences or dislikes for physical or intellectual work.

Girls who thought they'd become farm wives generally rated farm life as superior to city living, though many in each group rated each way of life as about the same.

Their Future Plans . . .

More than 90 percent of both groups of girls thought they might plan to work for awhile before marriage. As to future educational plans, we found that the girls who thought they'd become farm wives less frequently planned for education beyond high school than did the girls who thought they wouldn't become farm wives. Of those who did have future educational plans for college or noncollege training, the potential farm wives more often than the other group did not plan for college but planned on business, vocational or some other noncollege type of training.

Among the girls who thought they'd become farm wives, the single most important reason given was, "The person I am pretty serious about is going to farm." Other reasons of secondary importance that ranked about the same were: "I wouldn't want to leave the farming way of life"; or put the other way around, "I wouldn't like living in the city"; and "The farm is the best place to raise a family." Several other reasons, barely cited: "My parents want

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me to marry a farmer," and "I don't want to leave my family."

The single most important reason given by the other group was, "I would just dislike being a farm wife." The next most often mentioned reason was, "I just haven't met the type of fellow whom I would think about marrying and who is a farmer." Of third importance: "It takes too much money to get started (in farming)." Other reasons cited less frequently were: "A family can't make a decent living at farming"; "There are little social, recreational and other community activities in farm communities to interest young people even if they want to farm"; and "My children wouldn't have all of the advantages that I want them to have if I stayed on a farm."

Less Certain . . .

We haven't gone into so many details for the farm girls as we did for the farm boys. One reason is that we'll have to regard the preferences and plans of the girls as "less certain" than those of the boys in terms of the possible actual outcomes.

The future of a young woman in our society hinges considerably on the man whom she marries. The husband and his choice of a job or career pretty much determine where she'll live, how much income she'll have available and many other facets of their family living.

In this study we asked high school farm girls to look into their futures and, in effect, judge the likelihood of their becoming or not becoming farm wives and homemakers. This has certain limitations. The majority of the farm girls said they'd prefer to marry a young farmer than a young man engaged in some other occupation "if all things were equal."

Their statements of preference, however, may not coincide with their actual marriages. Some girls who think they might marry a young farmer may not "meet the right guy" who plans to farm. Other girls who think they wouldn't marry a young farmer "if all other things were equal," likewise, may fall in love with and marry a young man who's going to farm. Or if definitely opposed to becoming a farm homemaker, they may avoid serious dating relations with young men who plan to be or are farmers.

We have only the statements of preferences from the girls. We don't know how their marriage plans will actually work out. But let's assume that actual developments will pretty closely follow the girls' preferences and see what clues and possible meanings we can find.

Girls More Alike . . .

We found fewer differences among the girls than we did among the high school boys who planned to farm, to enter nonfarm jobs or were undecided. Whether the girls preferred to marry a young farmer or a young man in some other pursuit, the girls tended to be more alike than the boys.

This is likely because a man's occupation (as a career and source of the family "bread and butter") often is the single most important activity in his life. For women, home and family activities more generally are the most rewarding and satisfying things in their lives. This doesn't mean that the setting, farm or nonfarm, of the home and family activities isn't important to young women. But the actual location of the home may be secondary—with primary importance attached to the personality, earning ability and other characteristics of the future husband.

Why Differences?

The main reason given by the girls who thought they'd become farm wives was that they already were "serious" about a young man planning to farm. All but 10 percent of these girls rated farm living as at least equally or more appealing than life in a city. The combination seemed to be a preference for farm living and the development of a basis for marriage and family life that would be compatible with this preference.

Most of the girls who thought they would *not* marry a young farmer also preferred farm living over city living, but they disliked the idea of being a farm wife. They seemed to be saying that they like rural, but not necessarily farm, living but didn't like some of the conditions attached to managing a farm household. Another reason they gave was that they hadn't met "the right guy" who was both planning to farm and a person with whom they'd consider marriage. This could change. But the fact that they hadn't met the "right guy" may mean that these girls had different ideas than the other girls about the type of man they wanted to marry, when they wanted to marry and the level of living they wanted.

Some clues in our findings have a bearing on this point. More of the girls who said they wouldn't marry a farmer were planning to go to college. And we found in another part of the study that more of the mothers of these girls were definitely encouraging them to go to college. College plans may cause these girls to put marriage plans later in their lives, and marrying a local boy may be less likely whether he is farming or in a nonfarm pursuit.

There's also the possibility that, because some of the farm girls were already in love with a young man who planned to farm, they saw no reason to plan for further education. Their parents may have been less likely to encourage additional education for the same reason. If so, this view tends to assume that a modern young farm homemaker doesn't need the additional education or training that more of her urban counterparts intend to get.

Of the tentative findings in this limited study, the indication of a probable lower educational level of future farm wives compared with the girls who will more likely migrate is the most disturbing. While our study was too limited to permit positive conclusions, the findings suggest the possibility that adequate education for home, family and community life and responsibilities for future farm homemakers may be being "sold short" — to the extent that rural communities need and will continue to need intelligent, educated and responsible women.

Farm Outlook...

by Francis A. Kutish

This could easily be a year of false optimism in the cattle business. We're nearing the time when beef marketings can be expected to move up sharply.

Our beef-producing capacity is at a new high. We now have about 38 beef animals per 100 people in the United States. This compares with 37 in 1956, the last time cattle numbers peaked out.

Beef cow numbers are at an all-time high of 27.3 million head, up 7 percent from 1959. Beef heifer numbers also are up. So our potential production of beef calves is at a new peak. The old record in beef cow numbers was reached in 1955, with 25.7 million head.

The 1960 calf crop will top the record of 42.6 million head set back in 1954. Thus, there'll be a lot of beef for 1962 when the 1960 calf crop reaches slaughter age. By 1963 we could be up to a supply of over 100 pounds of beef and veal per person.

With our population and consumer purchasing power rising at current rates, the American market can absorb a 2-percent increase in the beef supply yearly at stable prices. But the indicated increase in the beef supply in the next few years is several times that.

The first stage of a cattle cycle is to hold back numbers from slaughter while herds are built up; breeding stock is held off the market, too. Not until the increased calf crop from the additional breeding stock held back comes to market does the first big bulge in cattle marketings come. This bulge could come as early as 1961. But it's more likely to come in 1962.

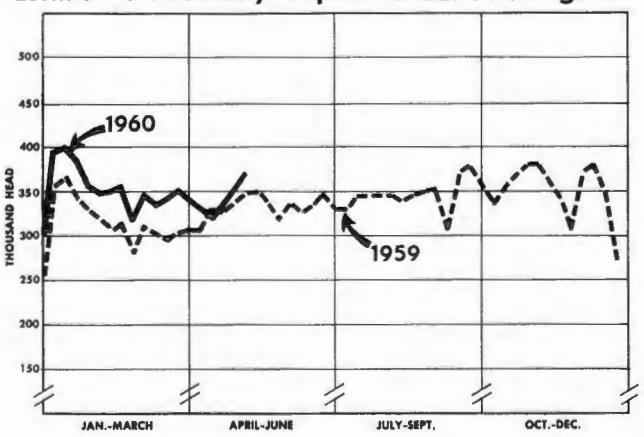
In the early stages of a cattle cycle, we build up liveweight cattle production much faster than slaughter. This comes from increasing cow herds and some inventorying of stocker cattle. After a year or two, cattle slaughter begins to climb slowly. The first sharp pickup in slaughter comes when the increased calf crop hits the packing plants.

This is 18-24 months after the calves are born -- depending on whether the cattle are fed out as calves or yearlings. The second bulge in slaughter comes when a cattle cycle goes over the peak and liquidation begins. The only way you can liquidate is to kill more cattle than you produce.

Much of what happens to cattle production in the current cycle will depend on what happens to cow numbers in the next year or two. The recommendation for culling low-producing cows is a sound one. The market on cows could easily drop a third during the next few years.

So the big problem in the cattle outlook is one of timing. There's a tendency for the outlook specialist to come

Estimated Federally Inspected Cattle Slaughter



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up with his warnings too soon -- so that the effect has worn off by the time it's really important. Until now, warnings have been premature. But now the warnings will be critical for the next year or two. Remember that we need an increase of just about 2 million head of cattle per year to keep pace with our growing population's rising demand.

Our troubles with cattle come because we haven't done a good job in keeping changes in cattle numbers in line with the changes in our population. Back in the early 50's, we pushed numbers up 5 and 6 million head per year. And we were soon in trouble. This past year, however, we added about 5 million head again. If we don't slow down the pace, we'll be in trouble again!

Beef cattle can be expected to go down in price and purchasing power compared with other farm commodities in the next few years. But if we keep the present expansion orderly -- and smooth out some of the cyclical tendencies -- we can avoid too drastic a price decline. At our current level of beef consumption, on the other hand, a further sharp increase in supply will result in larger cattle price declines than have taken place in the past.

Thus, the answer to whether or not cattlemen must take another multi-million dollar rap lies in recognizing that livestock cycles are man-made. And this being true, the cattle industry has it within its own power to control them.

HOGS . . .

Our late-spring hog slaughter ran slightly below last year's levels. For the summer months, it's likely to be about 10 percent smaller than a year ago. This will mean substantially higher prices than prevailed in the July-September period of 1959.

But within this smaller hog slaughter period, there'll still be a pattern of seasonal change. That is, the low spot in slaughter on a weekly basis will be reached in July. Slaughter will be climbing significantly by September. That's why it's important to get as many of the early farrowed pigs as possible off to market before Sept. 1.

Though prices during the rest of the year will average higher than a year ago -- because of the smaller 1960 spring pig crop -- we'll still have a seasonal price decline in the fall. Prices at the fall low probably will be about where they were this past April.

We'll probably get a good winter recovery from the fall low. This should make the outlook for feeder-pig demand next winter a good one. Producers of feeder pigs are likely to find a ready winter outlet early in 1961.

Estimated Federally Inspected Hog Slaughter