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September 1960—Volume 15, No. 3

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ECONOMICS AND  
SOCIOLOGY READING ROOM

# FARM SCIENCE

Iowa State University of Science and Technology / Ames, Iowa



In a quiet way, the photo by Steve Perrin on this month's cover illustrates one of the results of farm mechanization. About the only horses you'll find around the Iowa State campus today are typified by this quarter horse and colt rather than the Clydesdales and work animals of yesteryear. Powering a plow, cultivator, binder or elevator just isn't in the cards for this colt.



# chat with the editors

## THE RAINS DID COME . . .

Most of us can't say that we weren't asking for or didn't want the rains we finally got in early August. In contrast to the month of June, July had been pretty dry. We needed rain.

But, for the record, we still think we ought to register some sort of objection to the form in which some of the first rains were delivered. We saw quite a bit of corn in central Iowa 30-40 degrees from vertical -- not to mention damage to trees and buildings. Boone, Des Moines, Audubon and several other areas seemed especially hard hit.

Antique Hobbyist Walter Crouse, Route 3, Boone, reluctantly canceled plans to thrash 60 acres of oats Aug. 6-7 with an assemblage of antique steam and internal combustion power. Out also went plans to plow with a 1915 Rumley Oil Pull tractor, though visitors from around Iowa and from several other states still dropped by to view some of the equipment assembled at the Crouse farm. They also got to see the tree which, as their host indicated, had blown down on top of the house "to protect it from the wind and to keep it from blowing away."

Anyway, we got our rains, though we really didn't want or need the winds that came, too. (Unanswered question: Do you suppose the Rumley Oil Pull could have plowed that dry ground if it hadn't rained?)

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# Why Families DO or DON'T Leave Farming

More than financial sacrifice or low farm income is involved in a farm family's thinking of a change in occupation or location. Other factors are social, psychological and economic ones other than low farm income.

by Gordon E. Bivens

THE GAP between farm and nonfarm family incomes continues to widen—with nonfarm incomes averaging higher. Thus, some farm families with currently low incomes could expect to receive higher incomes in nonfarm employment. But even though the movement from farm to nonfarm employment has been sizable, it hasn't been as great or as rapid as might be expected on the basis of the income gap. Why hasn't it been greater or more rapid?

There are some definite limitations on the speed with which movement out of agriculture takes place. One of these is that *money income* in itself apparently *isn't* the *most important* thing to *all* farm families. It appears that most additional adjustments will come as people currently established in farming relinquish control of farming operations because of retirement, death or other reasons—and as fewer young people enter farming and more seek nonfarm careers.

The decisions, in each instance, will largely be ones of personal choice—based on many different factors. No individual or group has yet proposed saying this family will “go,” this one will “stay.”

Farm families and young people will make their own choices, based on the factors that are most important to *them*.

## What Factors?

Psychological, social *and* economic factors will affect the decisions or choices of both established farm families and young persons—in turn affecting the rate at which farm people move to nonfarm environments and occupations or stay in farming. Economic considerations will be important, but not necessarily the *most* important, in a family's or young person's decision. Let's look at some of the factors involved. From here on, we'll talk in terms of established farm families. But the same factors, perhaps in different degrees, apply also to young people who may or may not enter farming.

**Psychological Factors:** Uncertainty of the results of a move off the farm is one obstacle to movement. A family's *uncertainty* about their aptitude for unfamiliar work, to find satisfying personal ties in a new community and to adapt to different social conditions may make a family hesitate to move from familiar surroundings. And the relative certainty of the old adds to this effect. More cer-

tainty of personal abilities to meet their present situations, satisfactions from having their “roots” in a community and their degree of social status make for a tendency to stay in familiar surroundings doing familiar work.

**Social Factors:** Family ties, community loyalty and local commitments may tend to keep a family from moving despite possibilities of higher earnings in off-farm employment. Here, as with the psychological factors, monetary and nonmonetary satisfactions vie for consideration and serve as a backdrop against which decisions are made. For example, a family may feel strongly about farming as a way of life—the chance for parents and children to work together, opportunity for sons to receive direct occupational training from their father, etc. If so, financial sacrifices may fade into the background. They may not be ignored, but their place in the family decision may be relatively minor.

**Economic Factors:** A low average farm income isn't the only economic factor that affects choices, either. The costs of moving from the farm to a nonfarm location, uncertainty about economic opportunities in any given location and differences in opportunities at various locations are

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some of the other economic factors involved. Additional ones include costs of training (either new training or "refresher" training) uncertainty about nonfarm family living costs compared with farm living costs and the possibility of unemployment or lack of a steady job. Uncertainty regarding *any* one or more of these may be great enough to prevent movement.

Some of these considerations tend to run at cross currents, creating a paradox for a family. Economic sacrifice or low income may be spurring a family to think of moving. But the costs of movement and adaptation and the uncertainties surrounding these may be having an opposite effect, as may some of the noneconomic factors.

### Must Have "Need"

Before a family will voluntarily move from a farm, it must have what the sociologists call a "felt need." Various forces may give rise to felt needs—such things, for example, as desire for greater money income, regular hours or income and fringe benefits.

One indication of a recognized "felt need" is *consideration* of a change in occupation for the head of the household. This isn't a fool-proof indication; a family might recognize a felt need to do something but may not have thought of a change in occupation as a solution. The family may, instead, have considered only other ways of solving the situation. But a family that *has considered* changing vocations obviously has recognized a felt need of some sort.

### Survey Results . . .

We conducted an interview survey among 203 farm families selected randomly in southern Iowa and northern Missouri in 1957.

Only about 8 percent said at that time that they had seriously considered leaving farming for another occupation. But of these 8 percent, low farm income was the reason most frequently mentioned for *considering* a change in occupation. Other reasons included health, a preference for other work and desire for retirement.

Though they had considered a change in occupation, none of the 8 percent had made a change at the time of the survey. Why?

Most of the reasons given involved the kinds of psychological, social and economic factors (other than low farm income) that we mentioned earlier. Family ties to the farm was mentioned most often as a reason for *not* making a change. Others included lack of training for nonfarm work, waiting to work out arrangements for transferring the family farm, hopefulness about future crop and income prospects, health and social security considerations.

In each case, the latter types of factors were sufficient—at least temporarily—to offset the factor or factors that had prompted a family to consider a change.

We conducted two related surveys in north-central and southern Iowa. We asked randomly selected farm families in both areas to estimate their annual money income for the 2 years preceding 1957. Then we asked them to estimate the income they would have to expect to *consider* moving to nonfarm employment (1) in the same locality, (2) 100 miles away and (3) 300 miles away. The families indicated they'd have to have from 1.5 to 2.7 times their present farm incomes to consider nonfarm employment—with the amount increasing as the probable distance of nonfarm employment increased from their present locality.

The southern Iowa families in-

dicated they'd need 2.3 times their present incomes to consider a change to nonfarm employment in their present locality. The comparable figure for families in north-central Iowa was 1.5 times. With nonfarm location 300 miles away, the figures were 2.7 and 2 times, for southern Iowa and north-central Iowa families, respectively.

### In a Nutshell . . .

The three surveys have tended to confirm that more than financial sacrifice (low farm income) is involved for a farm family to consider or to make a change in occupation. Most of the other factors involved are psychological, social and economic factors other than low farm income.

From these surveys, it appears that farm families in both southern and north-central Iowa are willing to accept money incomes in farming considerably less than they'd have to expect from off-farm employment. But there were some differences between the southern and north-central Iowa families, too.

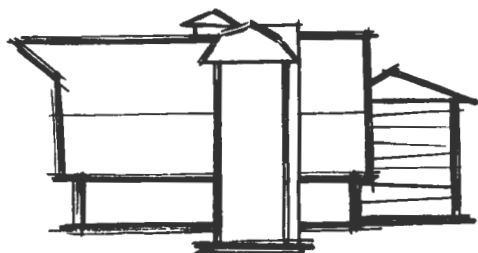
On the basis of incomes required before considering a move to a nonfarm occupation, southern Iowa families appear to be more firmly "committed" to agriculture than north-central Iowa families. On the other hand, southern Iowa families appear to place a smaller dollar premium on having off-farm employment close at hand once expected incomes were high enough for them to seriously consider off-farm employment opportunities.

The combination of low farm incomes and potentially higher money earnings from nonfarm employment undoubtedly is responsible for much of the continuing movement from farm to nonfarm employment. But, as might be expected and as our surveys have tended to confirm, much more than the combination of these two factors is involved in the thinking and decisions of individual families. And it may be more and more important to recognize these other factors as we consider and develop future farm policy.

Estimated average farm income and expected nonfarm income required for families to change to off-farm employment.

	Est. annual net farm income (1955-56)	No. times farm income necessary to change to nonfarm employment		
		Same locality	100 mi. away	300 mi. away
Iowa area				
North-central	\$3,279	1.5	1.8	2.0
Southern	3,143	2.3	2.5	2.7

# What Agriculture Is Up Against . . .



Has agriculture itself built all of its present predicament? With so many proposals being made and the time for action coming closer, here's a review of some of the "outside" forces and their impact on farming.

by Earl O. Heady and John F. Heer

THE MOST apparent symptoms of agriculture's troubles—"the farm problem"—are the farm income and overproduction-surplus situations. "Something needs to be done." But what? The need for developing more effective approaches than have been used in the past now is generally recognized. Many proposals now are being made and will be made toward overcoming our farm problem.

Greatest emphasis in these proposals is on the surplus-overproduction aspects—to adjust farm output downward. This can be approached largely within agriculture. The effects, however, are likely to extend far beyond agriculture, just as changes "outside of" agriculture have had and are having a great impact on our agricultural welfare and economy.

The effects of our farm problem and of the causes that have led to it have been both social and economic. The effects of the solutions, likewise, will be both social and economic. But the forces which have led to agriculture's difficulties and the pressures for solution are mainly economic.

To help in choosing among the different approaches being suggested, we want to review in this and a second article some of the

forces and changes that have been behind the development of agriculture's present state. For these same forces must also serve as a backdrop for our solutions if we're to approach them realistically.

## Not All "Farm" . . .

All of agriculture's predicament hasn't been of its own making. National economic growth and development—and their consequences—are behind much of the present situation. While there may be little that we can do about this side of the picture, it's important to understand its meanings and implications for agriculture. So in this article, we want to look mainly at agriculture in the perspective of this over-all national picture.

Within the framework of national economic growth and development and its effects on agriculture, the other side of the picture—our surplus farm output—takes on added seriousness and impact. Next month, we'll look more closely at the "how and why" of this tremendous growth in output within agriculture. Forces both within and outside of agriculture are reflected in our farm income and surplus situations.

## National Forces . . .

Compared with the rest of the world, we have a wealthy and productive economy. But economic maturity is only relative. Plants

and animals mature at a certain time and stop growing. Economic growth doesn't, and further growth and development lead to still more changes in the shape of things.

Our national economy has grown. In doing so, the relative proportion of agriculture has declined—while the proportion of other goods and services demanded by well-fed and prosperous consumers has grown. The population, labor force and income of agriculture once made up the major part of our economy. But increases in personal income and changes in our wants have spelled agriculture's decline as a *portion* of the national economy.

The *importance* of agriculture hasn't declined. It's still basic to the life of the consumer who now, however, spends a smaller portion of his income for farm products than he used to. Agriculture has declined in the portion of national income it contributes (and receives) and in the proportion of total national resources it employs.

## Why . . . ?

Many of the changes that are affecting agriculture result particularly from the fact that we have a productive and prosperous economy and because income per family and per person continues to rise. National income has gone up about 7 percent each year in the past 10 years. Income per per-

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son has been increasing by about 5 percent a year. Taxes and inflation have left something less than this for consumer spending and saving. But consumers now have more real purchasing power than ever before and prospects for having even more.

This increased purchasing power, especially, causes the shape of the national economy to change. It provides the "votes"—in the form of spending (expressed as payments for products and the use of resources)—that specify the changing shape of the economy.



As the real incomes or purchasing power of consumers has increased, consumers haven't voted for less food. But, already well fed, neither have they voted for more food per person. They've voted for large increases in other goods and services. Consumers do change the proportions of different foods they buy, but the pounds of food bought per person has remained almost constant.

Spending has mushroomed for many other goods and services. Think of your own changes in spending in the past 10-15 years. Are you now eating more pounds of food? Probably not—though you may be eating more frozen vegetables and meat stored in your refrigerator or freezer, fewer canned vegetables and cured meats.

How about your spending for electricity, recreation, health? Or newspapers, magazines, television, travel? Chances are, like other consumers, most of your increases in spending have gone to these latter types of goods and services. And, even as you've switched to more frozen vegetables and meats, you've paid mostly for more containers, processing and refrigeration equipment rather than for more crops and animals.

As our national economy has grown and as the amounts of capital and labor increase, consumers in total have voted for using these resources in the production of non-farm goods and services. Consumers have a limited capacity for food. But their capacity for absorbing many other goods and services, especially personal services, has no comparable limit.

These kinds of shifts in our economic balloting have been going on since World War I, and it's likely that they'll continue. Progress and economic growth seem to be a basic goal of our society. It's unlikely that we'll try a "backswitch" and voluntarily seek out a lower income and standard of living. This would be one way to increase agriculture's proportion of the national economy. And it's probably the *only* way we could return to the day when the population, labor force and income of agriculture would make up the major portion of our economy.

If the "pattern" is set then, why not just ignore it? For one thing, the situation won't just go away or disappear; it's going to stick with us. We could just ignore it and let things happen. This is one choice or alternative. But let's look more closely at some of the changes and their meaning for agriculture.

### Their Meaning . . .

A century ago, agriculture contributed nearly a third of the national income; 50 years ago, the proportion had dropped to about

16 percent. Recently, net income from agriculture has been about 5 percent. And this trend will continue as national and per-capita incomes continue to grow.

With no startling developments in foreign markets, the *demand for food* can grow only at about the rate of our population increase. The *demand for other goods and services* can and will grow at a much faster rate. The demand for



them isn't limited by consumer food capacity, and consumers buy more of them as soon as they have enough income. As a result, more and more resources will be used in producing these other goods and services. This means that more and more capital and labor will be employed to receive income in non-farm industries. And the proportion of national income in these industries will grow much more rapidly than income of the agricultural industry.

Farm income, thus, will grow more slowly than that of the non-farm sector, and its percentage of total income will decline further. The proportion of the nation's resources in agriculture likewise will decline—and at a faster rate than the portion of national income provided by agriculture. There's just no getting around the fact that, once well fed, consumers in a wealthy society and growing economy vote — through their spending — for additions in the supply of capital and labor to be used mainly for nonfood products. At the same time, new forms of capital and technology substitute

for some of the resources in agriculture.

Capital in agriculture has increased in the last 25 years or so, but not as fast as in nonfarm industry. The proportion of the nation's capital used in nonfarm industry has expanded; that in agriculture has declined. With their plentiful supply of food, consumers have demanded through their spending that new additions to the labor force (through population increase) be used to produce the other goods and services they want. And agriculture, meanwhile, has found new forms of capital a rapid substitute for labor. So the portion of the nation's labor force used and needed in agriculture has declined very rapidly.

The labor force in agriculture has been more than halved in the last 40 years. It has declined by at least a third in the last 10 years. Agriculture used well over half of the national labor force 100 years back; even 50 years ago, well over a third. The percentage now is less than 10 percent. It will drop further: (1) partly as some substitution of capital for labor continues in farming; (2) especially as the total labor force continues to grow and is used more and more to produce the nonfarm goods and services demanded by consumers.

Another change, related to the labor force in agriculture, is the number of persons and families in farming. A century back, the majority of the nation's population was in agriculture. In 1910 over a third of the population was on farms; now, only slightly more than 10 percent. And some of these families have only "one foot on the farm" because of the growth of part-time farming.

These changes in relative demand, labor force and population have altered the economic structure in changing the shape of our over-all economy. They'll continue to do so. They're also changing the social and political role and voice of agriculture — perhaps more so in the future than in the past.

All of these changes result naturally from economic growth and national wealth—"naturally" because it's the basic biological and psychological nature of man that dictates that the shape of things will change with economic growth.

### Can't Go Back . . .

We've drawn this picture of the situation partly within but mostly *surrounding* agriculture to set up a perspective before moving on to the situation *within* agriculture in our next article. We've done this because it's so easy to look only at the shape of things in the past—without fully recognizing the possible role and structure of agriculture in the future.

We might regain the past to some extent if we could roll things back in time. But if we could, even those of us with deep roots in agriculture would hardly care for all of the consequences and to pay the costs in terms of other losses.



Current income per person and the returns to resources in agriculture are by no means what we'd like to see. But our real income and standard of living still are much higher than they would be under a "rollback." Living standards for both farm and nonfarm families have benefited and grown because of technological advance and productivity growth in both farm and nonfarm industries.

All consumers, farm and nonfarm, have gained greatly from the progress in agriculture. Food

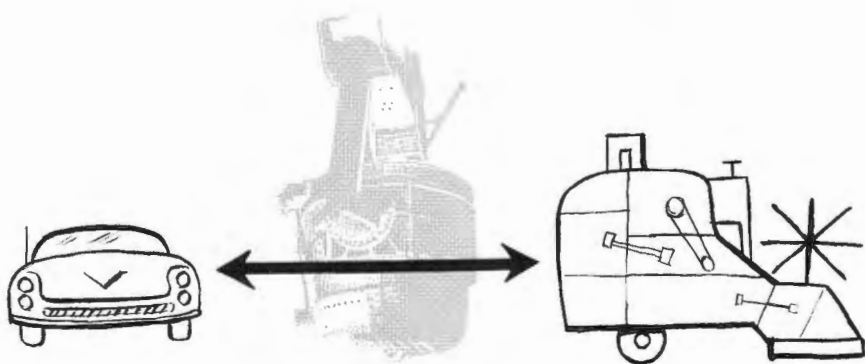
is abundant and at relatively low prices. American consumers needn't spend most of their income for food as is the case in much of the world. Consumers have gained as much or more from the technical advances and productivity gains of nonfarm industries. These have made goods and services available in great quantity and variety at prices that can be paid by the average farm and nonfarm family.

As it now appears, farm families have gained in real income from this general technical advance of all industries more directly than from the technical improvements in farming itself. A "rollback" would mean giving up the gains in the variety and quantity of nonfarm goods and services that we can buy in exchange for our labor and resources invested in agriculture. This, notwithstanding the fact that dollar incomes in farming aren't what we'd like them to be.

We couldn't have achieved our present standard of living if the major portion of our population and capital resources were required to produce food and fiber. Gains in productivity and technology in both agriculture and other industries have freed resources to produce the many other goods and services that we now take for granted.

As a part of this over-all change in the structure of our national economy the nonfarm part has been rising. Agriculture's part, in turn, has been declining—especially as a result of economic growth and increasing per-capita incomes. Agriculture can grow profitably only at about the rate of our population increase. Other industries can grow much faster. The demand for many goods and services isn't limited by the capacity of the human stomach; the demand for them increases both with population increase and as income per person increases. People don't become overweight by buying more travel, medicine, education, books, personal services, household fur-





Part of the cost-price squeeze in farming results from demands for some of the same resources for farming as well as for nonfarm uses.

nishings, appliances and the like.

It wouldn't be quite so rough if changes took place only in the proportion of national income and production generated in agriculture and in the proportion of resources used by it. But the consumer, with his income still increasing and so long as food is plentiful, doesn't attach the same rewards to resources used in agriculture as in other industries. This is particularly true when agriculture's output pushes forward more rapidly than demand—and especially when capital resources are being substituted for labor in agriculture.

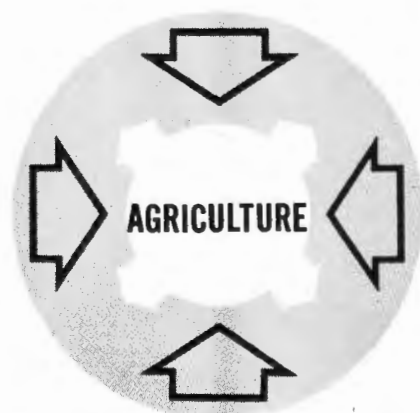
The consumer, in the price he'll pay and the amount he'll buy, passes on a higher return to resources used for the goods and services he wants most as he grows wealthier. He puts a premium on steel, wood, petroleum, chemicals, labor and other resources used to produce the items he wants most with his increased income. But these resources command the same prices—even though they may not give the same return—if used in agricultural production.

This is the basis of the cost-price squeeze that has become more and more critical in agriculture over the past 10 years. It has resulted in lower returns to labor and other resources used in agriculture than these same resources would earn in many other industries. With the wealth and income of the national economy being what they are—and still increasing — and with agriculture

already having a surplus production capacity, both farm and non-farm consumers are using their price votes for more resources to be transferred to the production of other goods and services.

### Making Choices . . .

We need to understand these changes in national economic structure and their implications if we're to devise and select policies and programs that don't cause us to try to "swim upstream" or even further aggravate the symptom problems of farm income and surplus. It's difficult to prescribe even a good painkiller unless we recognize the basic cause of the malady. This is why we've stepped back in this article to take a look at the total picture of our national economic growth and development and its meaning for agriculture. We've pictured this setting to show some of the forces that agri-



The forces that are operating within and outside of agriculture are related, but they are not identical.

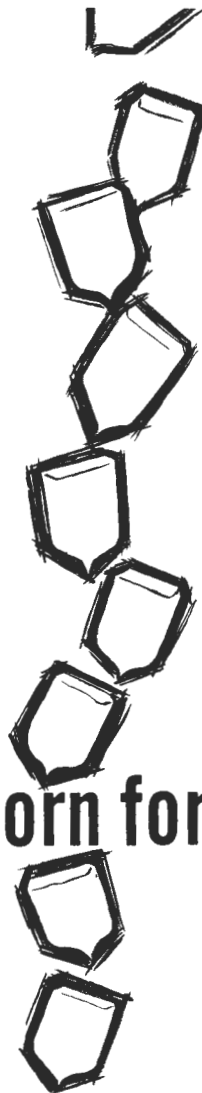
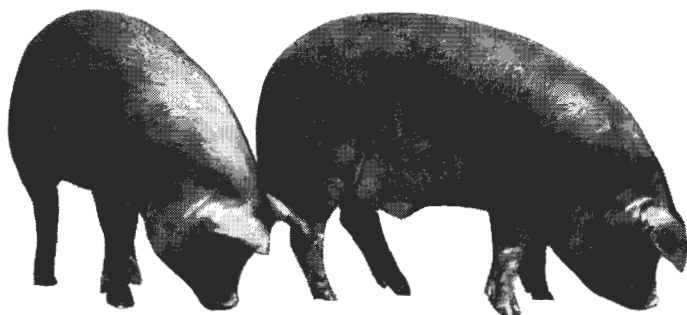
culture faces in realigning future farm policy. These are the forces that are dictating the place and role of agriculture in our present and developing national economy. While there probably isn't much we can do about this part of the picture as it affects agriculture, we must take it into account in the future farm policy approaches that we choose.

The impacts of some of the forces mentioned in this article are heightened by the fact that agriculture is producing a surplus output. The forces operating within and outside of agriculture are related, but they aren't identical.

Most of the farm policy proposals being made at this time emphasize various means of cutting back or using up surplus farm production as the most critical and immediate goal. The proposals include land retirement, increased exports, land-use easements, crop quotas or allotments, income aid and many other possibilities. At the same time, there's increasing recognition of the real forces involved—and, also important, of more of the possible social (as well as economic) consequences of alternative courses of action or inaction.

Making the best choices among the proposals offered calls for a recognition and understanding of the basic forces both within and outside of agriculture that have led to the situation we now have. For if we want the measures we choose to be effective over time, they must be realistic in terms of the fundamental causes—rather than mere treatments of the symptoms alone.

Next month, we'll consider the forces operating mainly *within* agriculture—especially with respect to the surplus production part of the picture. Why and how does agriculture—caught up in the national trend outlined in this article—still tend to use so many resources and produce a surplus output? The reasons aren't as simple as a casual glance indicates.



# What About High-Moisture Corn for Hogs ?

High-moisture corn is a satisfactory feedstuff for growing-finishing hogs, according to the results of a series of tests at Iowa State. But high-moisture corn calls for special storage and handling to maintain quality.

by William M. Hunt, J. D. Jones, Vaughn Speer, Virgil Hays  
and Damon V. Catron

**I**NTEREST in storing high-moisture corn and feeding it to livestock has been growing. Rigid requirements for storage and the cost of drying corn have given push to the search for ways to preserve corn with excess moisture without great loss of nutrients and spoilage.

Successful storage of corn harvested at an early date allows livestock producers to use cornstalks, either as silage or pasture, at a time when they have a greater nutritive value than later. Harvesting losses also are minimized when corn is removed from the field before stalks become brittle and blown over. An additional advantage of high-moisture corn could be a superior nutritive value.

## Feed to Swine?

A series of tests over an 18-month period has shown that high-moisture corn is a satisfactory feedstuff for growing-finishing swine. It's highly palatable. To maintain quality, however, it requires special storage and handling, especially in warm seasons.

Pigs fed high-moisture corn in our tests made equal, and sometimes superior, gains to pigs fed dry corn. But more feed per pound of gain was required on a high-moisture corn diet when the pigs were offered corn and protein supplement free-choice. Pigs offered high-moisture corn and protein supplement free-choice tended to eat a higher proportion of corn than comparable pigs offered dry corn and supplement free-choice. When we limited protein intake in a complete ration, however, less feed was required per pound of

gain by pigs fed high-moisture corn than those fed dry corn.

*High-moisture corn* has received a variety of definitions. But all agree in one respect—that the corn contains enough moisture to promote some degree of fermentation during storage. The preferred method is to harvest the corn when it still contains a high level of moisture, usually more than 20 percent. Another method is to add water during or after placement in the storage structure. Our tests were with corn harvested and stored when it contained the desired amount of moisture.

*Preserving high-moisture corn* as a feedstuff with maximum nutritional value involves several factors. Air-tight storage is needed if the corn is to be preserved for feeding in the spring and summer months. Respiration of the corn

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in an air-tight structure increases the concentration of carbon dioxide at the expense of oxygen so that molds and aerobic bacteria can no longer grow. If outside air containing oxygen is allowed to enter, microbial growth can flourish and feed upon the nutrients.

Temperature and humidity also affect microbial growth but aren't as critical in a high concentration of carbon dioxide as when high levels of oxygen are present. Various insects and mites can cause damage to stored grain, but, without oxygen, these organisms are no problem. The amount of infection by microorganisms before harvesting also has an effect on the keeping quality of the corn.

### Our Tests . . .

We conducted a series of experiments over an 18-month period to evaluate the nutritive value of high-moisture corn for growing-finishing swine. We also used corn

of different moisture levels to determine whether there was a "best" moisture at which to harvest and ensile corn to maintain top nutrient qualities as a feed-stuff for growing-finishing swine. Two different types of structures were tested as storage facilities for high-moisture corn in conjunction with the feeding trials since the type of storage is so critical.

Corn for each test in the series was of the same variety and came from the same field in such a way that a representative sample of the entire field was available for each experimental ration.

**Storage Facilities:** The two types of storage structures used were corrugated steel bins—sealed with mastic at all joints—and air-tight silos.

**Steel bins:** Three of the five bins used were also fitted with a polyethylene liner as an additional test facility for storing high-mois-

ture corn. The bins were 6 feet in diameter, with a capacity of about 300 bushels. Corn at moisture levels of 37.3, 29.3 and 21 percent was stored in the bins. Extreme care was used to prevent puncturing the polyethylene liners. Immediately after filling, the tops of the liners were sealed with plastic tape.

A fourth bin, with no liner, was made as air-tight as possible and was filled with corn containing 29.3 percent moisture. The fifth bin was used for corn to be used as the control ration; the corn was dried, with air heated to 160°F., to a moisture content of 15.5 percent.

These facilities proved unsatisfactory since it wasn't possible to secure an air-tight seal. In all of the bins containing high-moisture corn, microbial growth had flourished by 50 days after filling. When temperature dropped below 32°, the corn began to freeze and continued to do so to a distance of about 2 feet within the bins.

High-moisture and low-moisture corn for growing-finishing swine.

Exp. no.	Corn moisture	No. of pigs	Av. initial weight	Av. final weight	Av. daily gain	Feed per pound of gain <sup>a</sup>	Feeding method
1958-59							
I <sup>b</sup>	37.3% <sup>c</sup>	4	53.2	136.8	1.02	4.65	Complete ration, hand-fed
	29.3% <sup>c</sup>	4	49.2	134.8	1.04	4.34	Complete ration, hand-fed
	29.3% <sup>d</sup>	4	48.2	130.0	1.00	4.39	Complete ration, hand-fed
	21.0% <sup>c</sup>	3	49.0	140.7	1.12	4.08	Complete ration, hand-fed
	15.5% <sup>e</sup>	4	48.8	136.8	1.07	4.32	Complete ration, hand-fed
II <sup>f</sup>	29.3% <sup>g</sup>	30	78.7	161.4	1.65	3.63	Corn and supplement, free-choice
	14.4%	29	73.6	155.4	1.64	3.52	Corn and supplement, free-choice
III <sup>f</sup>	25.3% <sup>g</sup>	40	62.1	205.8	1.87	3.91	Corn and supplement, free-choice
	14.4%	40	62.1	193.6	1.70	3.73	Corn and supplement, free-choice
IV <sup>f</sup>	26.7% <sup>g</sup>	15	51.8	198.3	1.53	3.75	Corn and supplement, free-choice
	14.4%	15	51.9	198.3	1.53	3.52	Corn and supplement, free-choice
1959-60							
V <sup>h</sup>	31.9% <sup>g</sup>	6	30.7	190.2	1.53	3.18	Complete ration, hand-fed
	24.7% <sup>g</sup>	6	31.0	189.0	1.50	3.44	Complete ration, hand-fed
	19.8% <sup>g</sup>	5	31.4	197.4	1.54	3.65	Complete ration, hand-fed
	12.0% <sup>e</sup>	6	30.5	189.8	1.54	3.31	Complete ration, hand-fed
VI <sup>f</sup>	31.9% <sup>g</sup>	19	33.1	190.0	1.43	3.96	Mixed corn and supplement, self-fed
	24.7% <sup>g</sup>	17	33.6	198.2	1.55	3.98	Mixed corn and supplement, self-fed
	19.8% <sup>g</sup>	19	33.1	199.4	1.55	3.96	Mixed corn and supplement, self-fed
	12.0% <sup>e</sup>	18	32.9	181.7	1.30	4.10	Mixed corn and supplement, self-fed

<sup>a</sup>Feed adjusted to an equivalent dry-matter basis.

<sup>b</sup>Individually fed.

<sup>c</sup>Stored in 300-bushel corrugated steel bin with polyethylene liner.

<sup>d</sup>Stored in 300-bushel corrugated steel bin without polyethylene liner.

<sup>e</sup>Corn dried with air heated to 160°F.

<sup>f</sup>Group fed.

<sup>g</sup>Stored in glass-lined, air-tight silo.

There were no obvious toxic effects from feeding the moldy corn. But because of poor growth and great variability of all pigs fed either high-moisture or dry corn in this experiment, we could make no valid conclusions as to feeding value. The results of this test (experiment I) and others are summarized in the table.

*Air-tight silos:* These proved to be satisfactory for storing high-moisture shelled corn. It was possible to maintain a sufficient concentration of carbon dioxide to prevent undesirable microbial growth.

**Feeding Tests:** We conducted another series of tests in 1958-59 to compare high-moisture (25.3 percent) corn with dry corn self-fed to pigs that also had access to a 33-percent protein supplement. Two tests were run during the winter months and a third during the summer (experiments II, III and IV in the table).

High-moisture corn was added to self feeders at 5-7 day intervals in the winter and daily during the summer. There were no feeding problems of either freezing or spoiling under these conditions. Both the high- and low-moisture corn and the protein supplement were offered free-choice from self feeders.

In one of the winter tests and the summer test, average daily gains were nearly the same for both low- and high-moisture corn. In the other winter experiment, pigs offered the high-moisture corn gained 10 percent faster than the pigs offered dry corn.

In all three tests, pigs fed high-moisture corn required more feed per pound of gain, on an equivalent dry-matter basis, than did pigs fed dry corn. But at the same time, pigs fed the high-moisture corn consumed less protein supplement per pound of gain. Also the protein level of the ration selected by the pigs offered high-moisture corn consistently was below the protein level of the ration

selected by pigs offered regular corn.

Of the pigs involved in two of these three tests, 110 were live probed to see if there might be an influence on depth of backfat from using high-moisture corn. Also, 25 pigs were slaughtered at market weights to find any effect of high-moisture corn on carcass quality. We noted no differences in backfat by live probe, in depth of carcass backfat or in dressing percentage.

*1959-60 tests:* The next winter, corn at four different moisture levels—12, 19.8, 24.7 and 31.9 percent—was ground and mixed with soybean meal and fortified with minerals and vitamins to form a complete feed for growing-finishing pigs. Grinding and mixing were necessary at weekly intervals to avoid spoilage, even though the feed was stored at relatively low temperatures. No antibiotics, sources of unidentified growth factors or feed additives were included in the ration. This was so that any unidentified beneficial factors in the ensiled corn would have an opportunity to exert their influence.

Average daily gains for all four moisture-level treatments were nearly identical (experiment V in the table). Growth wasn't as rapid as might have been expected, but this may have been due to exclusion of antibiotics and sources of unidentified growth factors in the rations.

There were differences in the feed-conversion rates for the corn at different moisture levels. On an actual feed or equivalent dry-matter basis, pigs receiving the dry corn in their ration required 4.7 percent more feed than pigs receiving the ration including corn at 31.9 percent moisture. Pigs fed the rations containing corn at 19.8 and 24.7 percent moisture required 11.4 and 8.2 percent more actual feed, respectively, than those fed the ration containing corn at 31.9 percent moisture.

Our final experiment (VI) was

conducted to see if pigs fed a low-protein, high-moisture corn ration grew as rapidly and were as efficient in feed conversion as pigs fed a low-protein ration containing dry corn. Corn from the same storage units used in the previous experiment (V) was used.

Soybean meal pellets fortified with vitamins and minerals were added to the shelled corn containing 12, 19.8, 24.7 and 31.9 percent moisture. Pigs averaging 33 pounds were started on a ration containing 14 percent protein and were shifted to a 12-percent protein ration at 50 pounds of body weight. At 125 pounds, the ration was changed to include 10 percent protein until the pigs reached 200 pounds. No antibiotics, feed additives or sources of unidentified growth factors were added.

Pigs fed the rations containing corn at 19.8 and 24.7 percent moisture made identical average daily gains. Pigs fed the ration containing corn at 31.9 percent moisture gained at a 7.7-percent slower rate, while those fed the dry-corn ration gained the slowest—16.1 percent less rapidly than those making the fastest gains.

The amount of feed required per pound of gain for all pigs receiving the rations containing high-moisture corn was nearly the same. Pigs fed the ration containing dry corn required 3.5 percent more feed per pound of gain. (We noted in this experiment that the pigs fed the dry-corn rations had a greater tendency to sort the protein supplement pellets from the shelled corn.)

## Summing Up . . .

Based on this series of tests, high-moisture corn is a satisfactory feedstuff for growing-finishing pigs. Thus, this offers an additional use for your high-moisture corn. But remember, to maintain its quality and nutritional value, high-moisture corn requires air-tight storage and, particularly in warm seasons, frequent removal from storage for feeding.



# Adjust Farm Production by Regions ?

by Earl O. Heady and Alvin C. Egbert

SEVERAL THINGS became clear about American agriculture during the 50's. Its surplus problems aren't of the type that turn up in one year and are somehow magically solved the next. The over-all problem has been approached in the past as if this were true. Various kinds of help have been provided. But they haven't solved our real farm problem.

The problem is more permanent than implied by the solutions attempted over the past 25 years. We had the beginnings of a surplus problem back in the 1920's—just the infant of the one we now have. World War II and Korean conflict needs “alleviated” the situation temporarily. But afterwards the problem kept right on growing, even faster than before.

In contrast to much of the rest of the world, American agriculture can produce and is producing more than our population needs. And this situation is more or less permanent — certainly for the

next 15 years or more. How can this be true? We have almost the same amount of land (and even fewer people on farms) than when production was just keeping pace with demand earlier.

A big part of the answer is addition and substitution—of “non-farm” resources such as fertilizer, insecticides, tractor fuel and other materials for both land and labor. From the standpoint of effectiveness, we now have a much larger supply of land than we had 75 years ago. And on this basis, our land supply can grow even larger.

Growth in the use of capital resources in agriculture has put it in a position more like other industries that aren't limited by space or land expanse. Space doesn't necessarily limit the number of retail stores, repair shops, etc. We could have a mammoth number of them if we tried to use all building sites available for them.

Once, we needed about all of the land space we had (and now have) for producing our own food requirements and exports. We don't need this much at present because our exports have decreased and because we've increased the effectiveness of our land supply by adding and sub-

stituting other resources. At the same time, these capital or non-farm resources also have been substituting effectively for labor. And since they're priced “cheaper” than labor, they're being substituted rapidly—with an equally rapid movement of labor out of agriculture.

These substitutions take place as farm operators look at the prices and prospective returns from fertilizer, insecticides, petroleum and other nonfarm resources and decide to put them to use—substituting them, in effect, for labor and land. These things have made it possible (1) to produce more on each acre, (2) for each man to handle more acres and (3) in many cases, to enjoy more leisure.

## What Can We Do?

In this article, we want to look particularly at the land part of the production and adjustment problem. The “labor side” is partly the same problem, but it also has some different aspects. And we have two somewhat different surplus problems. One is a short-run problem; the other, a long-run problem. The solution of one is partly a solution of the other, but not a total solution. So we may need to tackle each separately.

**Short Run:** There are only about two broad alternatives for the immediate short-run years ahead: (1) Keep on building up surpluses at present rates—an alternative that the public may not allow. (2) Figure out some way of producing only our annual needs or perhaps even less than these amounts until surplus stocks are whittled down.

The short-run calendar is one that must be worked out soon. There are, of course, many methods that could be used to check the annual additions to surplus. The *big* question is the *acceptability* of them. One of the most popular and frequently suggested methods is to rapidly expand demand so that we wouldn't have to worry about the supply side. But little short of a miracle or another major war could cause

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demand to expand so that we could use up our present surplus plus all of the output that we now can produce.

Another possibility is to expand the present soil-bank or conservation-reserve framework to a much larger scale. This would tend to take land out of production all over the country, regardless of its long-run comparative advantage. But a program of this nature could cost considerably less than our current total program which includes carrying large stocks at heavy costs.

This isn't the type of land retirement or adjustment program needed for the long run. But it might serve best in the short run to stop the addition to stocks while using various methods to cut down the stocks—unless we can find better alternatives that are legislatively possible and consistent with public values. At worst, it could serve to “mark time” until an acceptable and feasible long-run program can be worked out.

A land-retirement program of today's soil bank or conservation reserve nature—with some land taken out of both high and low productivities regardless of its comparative advantage for crops now in surplus—is for the short run. It doesn't really solve the surplus capacity now existing in agriculture.

Contracts could be made for 5 years or so. But at the end of the contract, chances are that the land would go right back into production much as it was before. Even if the owner had retired in the meantime, taken a nonfarm job or sold his farm, a neighbor might take over the unit and farm it successfully with his existing supply of capital and labor. Lift the program—even if it were on a large enough scale to curtail the current surplus buildup—and, in a few years, we'd be right back with the surplus stocks situation if the price-support program were sufficiently favorable.

Agriculture's capacity to produce is simply so great that we can't close our eyes to this real picture. The same would be true of output or marketing quotas. Lift the program, and, if com-

penensation is enough, the output race would continue right back down the surplus track.

At the other extreme is the suggestion that the problem be handled by turning prices loose in the market. Production adjustments would undoubtedly take place under free-market prices in the long run. The adjustments would be concentrated in areas of low comparative advantage — areas with low-yielding climates and soils or where the distance to market is great. Production in these areas merely would become unprofitable. Land would have to be shifted to less intensive use, with some less intensive use coming about in areas retained in the production of crops now in surplus.

In theory, this method has some merit. But the difficulty of using the free market to bring about this type of adjustment is that the financial burden would be concentrated mostly on farmers and townspeople in the regions that would have to shift from crops such as corn, wheat and other small grains to grass, forestry, etc. This probably is the main reason that the method hasn't found wide geographic support. The persons in the areas affected would have to bear the brunt of the burden of getting out from under our present surpluses.

Thus, we have a dilemma. If all resources were used most effectively—considering the products consumers want and the productivity of resources in different agricultural areas and in different industries—some areas would produce as much or more than now of basic crops. But this pattern still would place the burden of shifting from our heavy stocks of surpluses on the families living in certain rural areas or regions.

**Long Run:** Are there any methods of adjustment that would allow long-run shifts in line with consumer wants and the relative productivity of resources that wouldn't place the whole burden on the people in regions faced with the major shifts? Such a program would still have to take

land out of production in regions where it has a low comparative advantage. But it would have to compensate the people making widespread adjustments so that they'd be as well or better off than now. Further, it would have to be *acceptable* and *workable* for the people closely involved.

Usually, the land would have to be shifted to other types of farming—such as from grains to grass and livestock or to trees. It would involve a “waiting period” until stands could be established and stocked and until income started flowing at potential levels. It would undoubtedly call for larger units to be efficient under less intensive operation. It would require capital (and sources for obtaining it) to make these kinds of shifts. But it could be a long-run type of shift if prices were geared accordingly for later years.

Any adjustment to a more efficient production pattern by regions, however, wouldn't come without widespread costs to many people. Some people leaving agriculture—a necessary condition for regional adjustments—might not be able to find suitable employment without first acquiring new skills. These people would be subject to unemployment and educational expense unless they can gain the skills while still employed in agriculture during a transition period.

The shifting of farmland in entire regions to less intensive uses—or, in some cases, to none at all—could have serious effects on communities. It could disrupt community life, established businesses, educational systems and the political structure in many areas. The costs could be very real—economically, socially and politically.

So, to consider any farm adjustment program realistically, we must take these kinds of consequences and costs into account. The long-run farm adjustment problem extends far beyond the farm—to community life, community businesses and the industrial sector as well.

## The Possibilities . . .

A number of different assist-

ance or compensation programs might be used to encourage regional adjustments. And it looks as if three distinct kinds of programs would be called for: (1) programs to shift land to other uses, (2) programs to aid people to relocate in other areas or occupations and (3) programs for community reorganization and development.

It's helpful to think in terms of these three types. But it's still essential to view them as related parts of the whole, to be carried out as a whole. Otherwise, the job would be only partly done—with the prospect of a situation developing that would be even more undesirable than the current farm surpluses.

Various methods might be used to encourage the shift of land from surplus crops to alternative uses on an area or regional basis. Each would have to be judged on its own merits for a particular region. A program effective and suitable for one area might not be for another. Combination programs might be needed in some areas.

Three of the possibilities to assist in shifting land from surplus crops to lower alternative uses are: (1) direct payments of the conservation reserve type but extended for longer than the present limit, (2) public purchase of land-use easements under which farm operators would "sell" their rights to grow certain crops and (3) public purchase of whole farms. The public would have to decide which of these, or other possible alternatives, would be the most preferable and acceptable.

*Conservation reserve* or soil bank types of payments to aid regional adjustments would need to be extended beyond the present limit in many areas. Some of the needs and possibilities of this kind of program have been outlined earlier in *IOWA FARM SCIENCE* (see, for example, the article on land retirement in the April issue or reprint FS-862).

*Land easements* are another possible means of encouraging necessary adjustments (see article by Melvin G. Blase in the August

issue or reprint FS-876). Through easements, a farm operator could sell his right to grow a specific crop for a definite period or for all time. He'd receive a lump-sum payment for giving up this right. Since the payment would be "once and for all," it wouldn't be capitalized into land values as is the tendency for continuing payments or the promise of continuing price supports.

*Purchase of whole farms* within regions with a low economic advantage for crop production is another possibility for eliminating surplus production. It may have considerable merit in areas where farms are small and shifting to nonsurplus crops requires a much larger unit for profitable production. The government, for example, might purchase farms at current prices and resell them later at prices more in line with alternative uses for those families in the area who wish to and can remain in agriculture. It would probably be necessary to restrict the use of this land to prevent future surpluses.

This also is a method that could be used to expand public and private recreational facilities — a much needed development in many areas. Selected sites, developed and undeveloped, could be resold to the public. In the TVA area, for instance, there are many former farm operators who are now the operators of motels, fishing camps, etc.

These may be only a few of the possible methods that could be used to assist in the shift of land from surplus crops to other uses. There may be other means more acceptable to farm families and the general public. The main thing is that the means should be realistic in terms of bringing an end to the farm surplus.

### **Sidelights, Too . . .**

An over-all adjustment program would also require many related and supplementary aids; for example, educational and job information aids to help people in the rural communities of specific regions to find alternative employment. Such programs would need

to provide: (1) vocational guidance, especially for younger people in deciding on occupations; (2) centers for vocational education to provide skills for a wide variety of jobs; (3) assistance for farm youth who have the desire and ability to attend college; (4) up-to-date information on jobs available and on jobs in prospect; (5) information on jobs that require no previous training or for which training is provided by the employer.

The last information would be useful to many established farmers who, because of limited opportunities in farming, might wish to move to nonfarm jobs. Information would be needed on the locations of these jobs and on the community life, customs and job stability at various locations.

Credit facilities to encourage creation of more economic farm units could be used in many areas. Shifts to crops such as grass and livestock would require larger farms than many of current size if incomes are to be satisfactory in terms of today's standards in the United States.

Finally aid would be needed as part of the over-all adjustment program to assist community reorganization and development in areas of declining agriculture. Federal funds might be used to buy up small farm-service businesses and to promote feasible industrial development in these areas. Both federal and state aid might be necessary for school reorganization where industrial development isn't practical.

### **In Brief . . .**

A realistic farm adjustment program on a regional basis to bring farm output back into balance with demand offers one feasible and positive solution to the farm problem. It should be considered as a possible and important alternative along with others.

A following article will deal specifically with the feed-grain and wheat surplus. It's based on an analysis designed to pin down regions in the United States that aren't in a competitive position in grain production, given the present surplus stocks.

# Farm Outlook...

Three characteristics point up the current cattle situation. Marketings for slaughter are increasing. Cattle numbers still are building up. Cattle prices are drifting downward.

Steer and heifer slaughter for the first half of

the year was up 12 percent over the first 6 months of 1959. Cow kill was up 10 percent. Calf slaughter increased about 4 percent.

Considering the rate of slaughter for the first half of the year, it would appear that total slaughter for 1960 would be

about 3 million head above that of 1959. But this is still about 3 million head short of enough to check the expansion of cattle numbers. It's probable that the year will end with total cattle and calf numbers in the neighborhood of 105 million head.

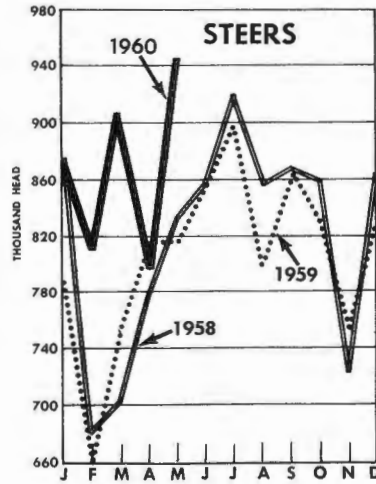
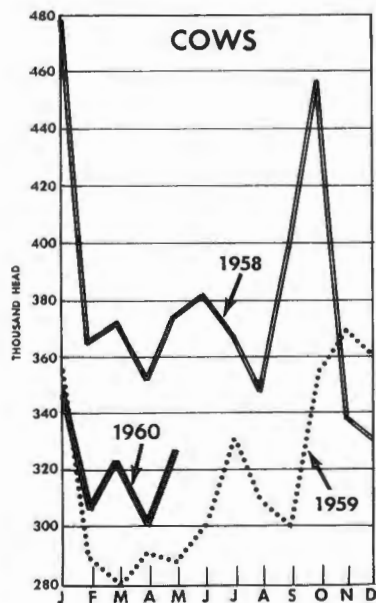
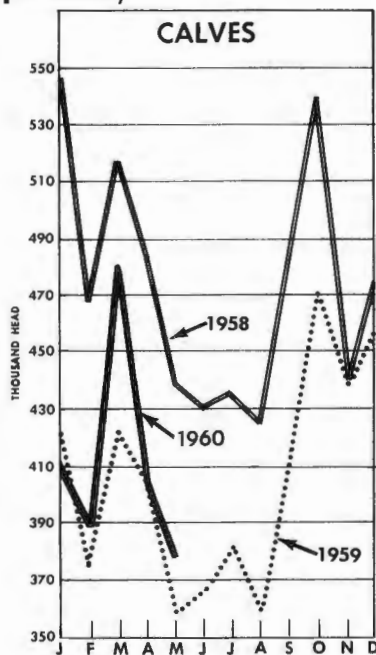
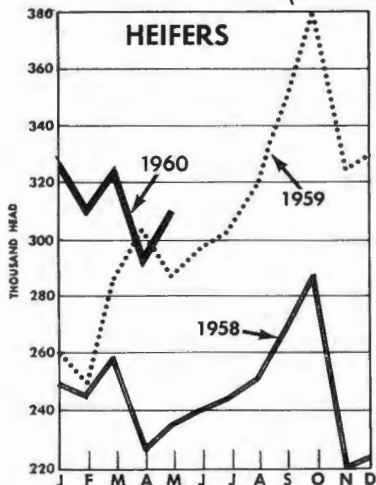
Choice fed slaughter steers and heifers at Sioux City and Omaha in the last week in July were averaging about \$3 below prices received a year earlier. This is a decline of about 11 percent. Feeder cattle were \$5-\$6 (about 18 percent) lower; calves were about \$9 (or about 25 percent) lower than for the same week a year ago.

Thus, the percentage drop in slaughter cattle prices has been about equal to the percentage increase in supply. As marketings increase over the next few years, it's inevitable that prices decline further. Whether the relationship of a 1-percent price drop for each percent increase in slaughter prices continues to hold depends on what happens to consumer incomes and on how rapidly slaughter marketings build up.

Feeder cattle went up faster and farther in the last few years than have slaughter cattle. This is characteristic of the first stages of a buildup in a cattle cycle. And now, as prices are in the declining phase of the cattle cycle, it's characteristic that they fall farther and faster than do slaughter prices.

In each of the last 2

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years, producers held back about 800,000 head of steers to grow out to heavier weights and to ride up with the rise in cattle value. The cattle held back in 1958 are coming to market this year, and those held back in 1959 will be coming to market next year. If the movement of 1960 calves into feedlots this fall is stepped up, it could result in bunched marketings of fed cattle next year and price weakness.

One of the features of the present cycle has been the heavy slaughter of heifers. Most of the heifers held back in the past 2 years will be needed as replacements for aged beef cows. So, unless cow numbers are cut back in the next few years, we can have hopes for little further increase in heifer slaughter above current levels. But heifer numbers are ample to afford abundant numbers of stockers and feeders -- even if more heifers are moved into cow herds.

The most likely result is a further increase in fed cattle slaughter of 5-10 percent in 1961 over 1960. Choice steers averaged about \$28 at Chicago in

1959, so their 1960 average will be about \$25.75 or \$26. A further decline of \$1-\$3 is likely in 1961, depending on whether marketings bunch up and on what happens to business next year.

There has been a sharp drop in the number of heifer calves fed out in the last few years and a corresponding increase in the slaughter of fed yearling heifers. This is typical of the early stages of a cattle cycle, and it parallels the shift from steer calves to steer yearlings going into feedlots.

Another feature of this cycle has been the sharp reduction in cow slaughter. Culling has been reduced as cows were kept for another calf. Some estimates put the number of cows in beef herds that normally would have been culled at about 5 million head as of last Jan. 1 -- or about 20 percent of total beef cow numbers. This aging of beef cow herds can't continue forever.

If these 5 million old cows are worked off in the next few years, it will substantially increase cow slaughter -- and, in turn, take utility cow prices down a couple of dollars more.

Some further decline in feeder cattle and in beef breeding cows can be expected during the next few years. And with ranges and pastures more fully stocked, there'll be some lessening in demand for cattle from the "country."

This doesn't spell panic in the cattle business. But it does mean that we're at the stage of the cattle cycle where cattle prices will inevitably drift lower.

-- Francis A. Kutish

**Federally Inspected Cattle Slaughter by Classes**

