

**AUTHOR'S NOTE**

A major focus of agricultural economics throughout my career was on price, production, and income programs of the federal government. Program focus was on some concept of social justice generally tied to the family farm. There were continuous attempts to adjust agricultural production and prices in ways that were "fair" to agricultural producers. These inevitably flew in the face of market forces and the dynamics of farm organization, technology, and markets. They were attempts to deny the realities of the market forces. An invitation to speak at an American Farm Bureau Convention provided an opportunity to describe the real world within which social problems had to be addressed. The statement is long, tedious, and saturated with numbers. It was a statement about the inevitability of markets. It may or may not have had an impact.

## THE FEED GRAIN PROBLEM

### CHAPTER 11

This paper is an attempt to review the feed grain problem as it currently exists in American agriculture. Four questions appear to be pertinent:

1. What is the nature of the problem?
2. How did it develop?
3. How does it relate to the total agricultural problem?
4. What are the guideposts to solution?

### THE NATURE OF THE PROBLEM

The current problem has two principal parts: There are substantial carryover stocks of feed grains, largely owned by the Commodity Credit Corporation, and current rates of production of feed grains are greater than current use. The second of these two parts is more significant than the first. Not only is there a large stock with which we must deal, but this stock appears to be getting larger each year. If the inventory buildup can be stopped, the problem of liquidation can be undertaken. The urgency of the situation is imparted by the chronic buildup. Liquidation of stocks is less urgent. The price effects of a large inventory that is static are not known. But the downward effects of a chronically increasing inventory are undoubtedly more serious than those of a static inventory.

The carryover of feed grains at the beginning of the current crop year was estimated at 47.1 million tons. It consisted of 1,356,652,000 bushels of corn, 238,542,000 bushels of oats, 126,710,000 bushels of barley, and 45,158,000 hundredweight of grain sorghums. Percentagewise, these are corn, 81; oats, 8; barley, 6; and grain sorghums, 5. As is usual, the bulk of the accumulation is corn.

It is difficult to say what a normal carryover of feed grains is. As production and utilization both increase, the carryover is also expected to increase. Starting with 1926 and eliminating the years in which price-support programs appear to have been a factor in the carryover, the carryover has averaged 10.2 percent of production. Production in the past three years has averaged 133.1 million tons, and 10.2 percent of this amount is 13.6 million tons, the indicated normal carryover. Eighty percent

---

T. A. Hieronymus is associate professor of agricultural marketing, University of Illinois. Paper delivered at the American Farm Bureau Convention, Chicago, December 9, 1957.

of this normal carryover is 388 million bushels as a normal carryover of corn. On this basis, the indicated normal carryovers of the other feed grains are oats, 136 million bushels; barley, 41 million bushels; and grain sorghums, 18 million hundredweight.

Comparing these normal carryovers with current ones, we find that the surplus amounts to 969 million bushels of corn, 102 million bushels of oats, 85 million bushels of barley, and 27 million hundredweight of grain sorghums, which is a total of 33.5 million tons. This amount of grain is equal to 25 percent of the average production in the past three years.

Because of the 1947 drought, inventories at the start of the 1948 crop year were unusually small. Starting with the 1948 crop, accumulation by years, in millions of tons, has been as follows:

1948	+ 22.6	1949	+ 00.1	1950	- 1.9
1951	- 8.5	1952	+ 6.9	1953	+ 4.7
1954	+ 7.4	1955	+ 4.2	1956	+ 3.8

The algebraic sum of these figures is 39.3 million. This is 5.8 million tons greater than the 33.5-million-ton surplus indicated above, which is the amount allocated to bring the carryover at the start of the 1948 season up to normal. The average accumulation, 1948 to 1952, was 1.6 million tons a year, or 1.3 percent of production. Beginning with 1952, the accumulation has amounted to an average of 5.4 million tons a year, which is 4.4 percent of production.

These data indicate that the feed grain surplus problem is most properly dated from the fall of 1952. No single accumulation is alarming in proportion. It is the regularity of the accumulation that has given rise to what is now a troublesome carryover, and that indicates the need for corrective action. USDA estimates indicate an increase in carryover during the current crop year, of 9.9 million tons.<sup>1</sup> The problem appears to have become chronic and is not becoming any less severe. In looking at these data, the one encouraging thing we find is that the annual accumulation rate is not great. Accordingly, corrective action need not be especially violent.

#### DEVELOPMENT OF THE PROBLEM

What caused the development of this problem of chronically accumulating inventory of feed grains? Obviously, production is greater than use—which is precisely the same as saying that use is smaller than production.

---

<sup>1</sup> U.S. Department of Agriculture, *Feed Situation*, October 1957.

Examination of annual totals of feed grain production for the past 32 years reveals an interesting pattern. Production in the past four years has averaged 131 million tons compared with a 1926–30 average of 97 million tons. This is an increase of 35 percent, or about 1.23 million tons a year. But the rate of increase has not been regular. Production was essentially stable from 1926 to 1940, not counting the drought years of 1934 and 1936. The average in 1926–30 was 96.7 million tons, compared with 97.8 million tons in 1937–40. The 1941–45 production was 113.7 million tons, 16 percent above the prewar level, and was rather stable at this figure. From 1946 through 1953, production was relatively stable at an average of 118.1 million tons; the 1947 total was quite low and the 1948 total quite large. Production totaled 123 million tons in 1946 and 118 million tons in 1953. Since 1953 it has averaged 131 million tons, but this average is not significant because production has been increasing rapidly.

Thus, there have been two periods of major increase in feed grain production: from the prewar to the postwar period and during the past four years. The prewar to postwar increase amounted to 20 million tons, or 20 percent. The increase from 1953 to 1957 was 21 million tons greater and that of the past four years—13 million tons greater than the average of the first eight postwar years.

The accumulation of inventory noted on the preceding page, which is causing the feed grain problem, is associated primarily with the increases in production of the past four years.

Increases in production of the different feed grains have not been uniform. Production of each of the four feed grains was essentially stable during the 15 prewar years. Seventy-three percent of the total was corn, 19 percent was oats, 6 percent was barley, and 2 percent was grain sorghums. Prewar to postwar changes in the relative importance of the different feed grains were not large. Corn went up 1.4 percent, and oats went down 1.3. Barley and grain sorghum changes also offset each other, with barley down 1 percent and grain sorghums up 1 percent. What this means is that increases in production were not concentrated in any one feed grain. Grain sorghum production about doubled from prewar to postwar; but because it was small in comparison with other grains, the share held by each feed grain was not importantly affected.

Changes in the relative importance of the different feed grains have been substantial during the past four years. The share of the total represented by corn decreased from 74.4 percent during the first eight postwar years to an average of 69.8 percent the past four years. During this same period the relative importance of oats decreased from 17.4 to 16.6 percent, barley increased from 5.3 to 7.3 percent, and grain sorghums increased from 3.1 to 6.4 percent.

From 1953 to 1957, feed grain production increased by 21.1 million tons. Of this increase, 2.6 million tons was corn; 2.9 million tons, oats; 4.4 million tons, barley; and 11.2 million tons, grain sorghums. Corn, which normally makes up about three-quarters of the total production, contributed 12 percent of the increase; barley, with a normal share of 6 percent, contributed 21 percent; and grain sorghums, with a normal 3 percent, contributed 53 percent.

We can now further tie the increase in feed grain carryover down to increases in barley and grain sorghum production during the past four years.

Part of this change in production is the result of increased yield, and part is the result of changes in acreage. Corn acreage in 1957, currently estimated at 72.3 million, is the lowest of any time since the last century. Acres in corn gradually increased from 1900 to a peak of 111 million in 1932. They then declined to 85 million in 1941. The wartime peak was 94 million acres in 1944. Prior to acreage allotments in 1950, about 85 million acres were planted in corn. The 1950–53 acreage was about 81 million. There have been acreage reductions in each of the past four years.

Corn yields have increased gradually since the beginning of the use of hybrid corn in the 1930s. Recent increases have been associated with the advancement in fertilizer use and selection of the best land for corn. Increases in yield have slightly more than offset acreage decreases.

Acres planted in oats reached their highest level, 45.5 million, in 1921 and gradually declined to 33 million in 1939. From a peak of 43 million in 1946, acreage has again declined to about 34 million at the present time. There appears to be substantial substitution of soybeans for oats, particularly in northern Iowa and Minnesota.

Oat yields are now higher than before World War II but have shown no discernible trend during the past 10 to 15 years.

Barley acreage is now at about the same level as the World War II peak. From a wartime peak of 17 million acres, barley acreage declined to a low of 8 million in 1952 and subsequently increased to 15 million acres in 1957. Years of sharpest increase were 1950 and 1954 through 1957.

There has been a trend for barley yields to increase about 15 percent during the past 10 to 15 years.

Before the war about 4 million acres of grain sorghums were harvested. The wartime peak was 9 million acres in 1944. The 1949 acreage totaled 6.6 million and the 1950 acreage 10.3 million. The 1951–53 average was 6.7 million. Since 1953, annual acreages have been successively 11.7 million, 12.9 million, 9.3 million, and 18 million.

Grain sorghum yields are sharply higher now than the prewar level. It is difficult to detect any important trends at the present time, although 1957 yields are unusually large.

The expansion in feed grain acreage and feed grain production is due to a considerable extent to the expansion in barley and grain sorghum acreage and production during the past four years. Without these increases in grain sorghums and barley production, the accumulation of feed grains would have totaled 8 million tons instead of the 25 million tons currently estimated. About two-thirds of the accumulation of feed grains is associated with increases in barley and grain sorghum production.

Increased acreage of feed grains has been closely associated with production controls imposed on other crops. Since World War II, marketing quotas and acreage allotments have been in effect in 1950 and 1954 through 1957. Since 1953, harvested acres of wheat, cotton, and rice have decreased by 36 million. Corn acreage harvested has decreased by 8 million. During the same period, barley acreage has increased by 6 million, grain sorghums by 12 million, and soybeans by 7 million. Land has been taken out of allotment crops and put into feed grains and soybeans.

Cotton and wheat production and disappearance have been about brought into balance during the past two years. But the problem has popped out elsewhere. From this, one important lesson should finally have been learned; that is, if controls are imposed, they must be imposed on an across-the-board basis.

Production is greater than use. But also, use is smaller than production. Is the current difficulty the result of overproduction or underconsumption?

Feed grains are used for feed. For the crop years 1952 through 1957, feed grain disappearance will have averaged (if all goes as forecast) 122 million tons. Of this total, 103 million tons (84.5 percent) is for feed; 12.4 million tons (10.2 percent) for seed, human food, and industrial use; and 6.5 million tons (5.3 percent) for export.

Domestic use of feed grains for nonfeed uses not only is rather small but is also quite stable. There is a tendency for it to increase by a *small* amount each year. Nonfeed uses of feed grains have extremely limited expansion possibilities. They are expanding with population and increases in acreage of barley and grain sorghums. If seed requirements are subtracted to obtain a net production, the most important use of feed grains for nonfeed purposes is the wet milling of corn, which takes about 4 million tons. The requirements for corn oil, corn starch, and corn syrup are not appreciably expandible per capita. The same is true of breakfast food and hominy grits. Feed grains are used for alcohol for liquor. This use takes about 1 percent of corn production.

There is no nonseed, nonfeed, domestic use of feed grains except wet milling of corn that takes a significant amount, nor is there any such industrial use that holds promise of requiring a significant quantity in the future.

Exports of feed grains have been pushed vigorously in recent years. There is a long list of programs that foster exports. In the crop year beginning October 1, 1952, feed grain exports totaled 5.1 million tons. In the year beginning October 1, 1956, they were 7.3 million. Not much is known about the amount of feed grains consumed by the various kinds of livestock. From the 1949 crop the percentages of feed grains consumed by the various classes of livestock were dairy cattle, 16; beef cattle, 9; hogs, 46; poultry, 20; and other (mostly horses), 9.

Year-to-year comparisons of livestock numbers and feed grain supplies show very little relation except for hogs. The numbers of poultry, dairy cattle, and beef cattle appear to be unaffected on a year-to-year basis by the amount of feed grains available. These kinds of livestock are fed sparingly when feed is scarce and liberally when feed is abundant.

There is, however, a close relation between the available supply of feed grains and the number of hogs raised when prices of feed grains are allowed to fluctuate freely. Historically, feed grain production and use have been kept in balance in the short run by adjusting hog numbers.

Long-run and short-run effects of changes in feed grain supplies on livestock numbers are different. The initial impact of a feed grain supply increase is on the hog population, but as the increase persists it becomes distributed over the entire livestock population through the interworking of the various livestock-feed price ratios; that is, increases in hog numbers result in less favorable hog-feed ratios than egg-feed ratios, milk-feed ratios, etc. This in turn results in shifts from hogs to poultry, dairy, etc., and brings the livestock population into balance at the higher level.

Disappearance of feed grains for livestock feed has not increased so rapidly as production. During the period 1946–51, feed grain production and use were essentially in balance. The very large 1948 corn crop had not been completely liquidated by the close of the 1951 feeding season (October 1, 1952), but the carryover was not large and it was declining. As noted above, the surplus problem is most properly dated from the fall of 1952. Feed grain use by livestock has increased gradually since the 1952–53 feeding year. The 1946–51 average used was 99.2 million tons. In the 1952–53 season it was 96.7 million tons, and it has increased every year since then to an estimated 108.7 million tons in the year ending next October 1.

From the 1946–51 average to the 1956 amount, feed grain production increased by 12.2 million tons a year. Use of feed grains for livestock feeds increased by 7.8

million tons during the same period. Use of feed by livestock has increased significantly, but at a slower rate than production.

Production of feed grains increased 6.0 million tons from 1951 to 1952. Use of feed grains for livestock feed decreased by 9.5 million tons during the corresponding feeding seasons. Beginning with the 1953 crops and extending through the 1956 crops, production increased at the rate of 2.5 million tons a year, and use by livestock at the rate of 2.25 million tons a year. Accordingly, had the use of feed grains by livestock expanded in the 1952–53 feeding season in line with production, and had the rate of increase in feed use held at the rate that has actually existed during the past four years, there would not be any appreciable surplus of feed grains. In fact, the result would have been a carryover of minus 3 million tons in the fall of 1957. The expansion in rate of use that has existed in the past four years could not have been sustained had a substantial imbalance not developed in the 1952–53 feeding season.

What caused this imbalance? Decreased use in a year of increased production? In the year beginning October 1, 1951, a total of 167.3 million units of grain-consuming livestock was fed. In the next crop year, that of the 1952 crops, 158.8 million units were fed. Dairy and beef cattle units were up moderately. Hog units were down 14 percent. In spite of an increase in feed grain supplies, there was a sharp reduction in number of pigs farrowed in the spring of 1953.

The hog-corn ratio (Chicago basis) in November and December 1952 was 10.6. With this ratio in the breeding season, pig farrowings can be expected to decline—and they did. A ratio of 12.5 would probably have called out the needed increase. The price of hogs (barrows and gilts, Chicago) was \$16.97 in November–December. With corn at \$1.36 at Chicago, hog numbers would have increased. With corn at \$1.48 to farmers and \$1.60 at Chicago, hog numbers decreased. The loan rate that year was \$1.60.

And so this is how the surplus feed grain problem started and has since developed. From all of this, one lesson stands out with absolute clarity: if feed grains are to be used, they must be priced at levels that will return profits to feeders.

#### **RELATION TO THE TOTAL AGRICULTURAL PROBLEM**

The problem of agricultural surplus production has by now quite logically backed into the area of feed grains. A relative increase in the production of feed concentrates and livestock has long characterized American agriculture. It is characteristic of any agriculturally wealthy nation. Every nation or area harvests its lands that are fit only for grazing with animals cattle, sheep, goats, and reindeer. It puts its croppable lands into food crops, such as wheat, rice, rye, oilseeds, vegetables,

etc. As production from these crop lands increases past minimum caloric requirements, crop land is diverted to the production of feed, particularly feed grains. Feeding livestock from the products of croppable lands reduces the total volume of production to requirements on a caloric basis. Only a few areas of the world can afford this relatively expensive type of feed production. Approximately three-fourths of the products of U.S. crop land are used for feeding livestock.

For some time agricultural production has been expanding faster than population. Diversion of land from food to feed is to be expected in this circumstance. How much of the diversion described above, which has caused feed grain production to increase rapidly in the past four years, would have occurred without the impetus of price programs for cotton, wheat, and rice is impossible to say. Probably the rate of diversion would have been slower. The diversion to soybeans would probably have had the same effects but would have occurred more slowly.

The diversion of acreage by price programs has regional repercussions. Production of feed grains and soybeans, outside the Corn Belt, on land diverted from cotton, wheat, and rice aggravates the problem in the Corn Belt states. For example, in 1957 almost as many acres of grain sorghums were planted in Kansas as acres of corn in Iowa, and nearly as many acres of grain sorghums in Texas as corn in Illinois. Even allowing for the normal shifting of land from food to feed, one cannot but wonder whether the Corn Belt has not been forced to carry a disproportionate share of the load.

A more subtle repercussion is being felt within the Corn Belt. A substantially larger share of corn (including corn forfeited under the loan) has been sold off farms in the years since price supports have become operative. This increase in sales has been quite large in the western part of the Belt and quite small in the eastern part. Corn taken over by CCC is subsequently sold, primarily into commercial channels. These sales compete for markets with the normal sales by cash-grain farmers east of the Mississippi river. During the past two or three years, these cash-grain farmers have found their markets flooded with CCC corn—a lot of it from the West—and soybeans from an expanded production area.

#### **GUIDEPOSTS TO SOLUTION**

As we contemplate the problem, the first question that occurs to us is what would have happened had there been no price programs since the Korean War. The question has two parts: what would have happened to production, and what would have happened to use? While we cannot turn back events, an answer to this question would be helpful in correcting mistakes and guiding future programs. Unfortunately, we can only conjecture.

Less feed grain would likely have been produced. Land would have been diverted from wheat, cotton, and rice at a slower rate, although probably not much slower because wheat, cotton, and rice have limited markets that are difficult to expand. More likely, about the same amounts of each of these allotment crops would have been produced on more acres with less intensive cultivation.

It is doubtful that price programs for feed grains have had much direct effect on production. Possibly some land in grain sorghums and barley would have reverted to grass. Compliance with corn acreage allotments has not been great. Some land has been diverted from corn to soybeans, but soybeans are 80 percent (by weight) feed. Corn production practices have been intensified.

The fact is that it is difficult to find any very productive land that has been taken out of production in recent years. When food and fiber needs are met, land produces feed.

The real difference that the absence of programs would have made is in the utilization of feed. One thing is certain: *feed production and utilization would have been in balance*. Feed would have sold at prices that would have made possible an increase in livestock production. No one but the U.S. government would have accumulated the inventory that now exists.

Unanswered is the question about the prices that would have prevailed. To answer this question we need to make certain assumptions: first, that production would have been the same as it has been; and, second, that all of the adjustment would have been made in hog production.

Feed grain disappearance for feed the five crop years 1952–56 totaled 102 million tons. The best guess is that 47 million tons went to hogs. The average accumulation was 5.4 million tons a year. Accordingly, feed for hogs should have totaled 52.4 million tons a year, or 11.5 percent more than actual use.

During the five years 1952–1956, pork consumption averaged 66.4 pounds per capita; 11.5 percent more is 74.0 pounds. Total meat consumption averaged 157.1 pounds per capita. Adding the increase in pork to this total makes 164.7 pounds, or a 4.8 percent overall increase. This is not more meat than we could have used. Per-capita use in 1956 was 166.8 pounds, or 2.1 pounds larger than the figure postulated here.

The price effects of additional meat production are uncertain. The general thought is that a small increase in hog production has a decidedly depressing effect on price. In the short run this is true. As hog marketings increase from summer lows to winter highs, prices decrease much more than proportionately. Similarly, year-to-year changes in hog prices are proportionately greater than year-to-year changes

in supply. But these two facts are not closely related to the question at hand. They have to do with the short run, and this with the long run. They have to do with live animals, and this with meat consumption. Given the long run, in which consumers have an opportunity to adjust to the larger supplies and the effects of consumer reaction work themselves through the marketing system, the relation of quantity and price becomes quite different.

E.J. Working, after a very thorough study of the question, concluded, "In the short-run the demand for meat at retail is somewhat inelastic. However, if the supply of meat is decreased and the supply is maintained at that lower level over a period of years, the price will, after its initial rise, gradually fall until it stabilizes at a point where the increase is less than proportional to the decrease in supplies. In other words, in the long run demand for meat at retail is elastic, and a decrease in supplies will result in a smaller aggregate retail value than will the larger supply." From this result, and given time for adjustments between retail meat prices and live animal prices, we can logically argue that hog prices would have averaged 4.8 percent lower than they actually did during the five years in question. During these five years the average price was \$18.46 per hundredweight for barrows and gilts at Chicago. Correction for a 4.8 percent increase in meat supply would give \$17.61 as the average at the higher production rate.

A hog-corn ratio of about 12 to 1 is approximately equilibrium—the amount that will keep production and use of feed in balance. A per-hundredweight price of \$17.61 divided by 12 is \$1.47, the indicated five-year average price of No. 3 corn at Chicago. The price of No. 3 yellow corn over the past five seasons has averaged \$1.47 a bushel. This is not a provable figure, but the method is logical and the figure reasonable. The size of the accumulation has not been great in individual years. One would therefore expect that the effects of not accumulating would not have been great.

The pattern of prices during the five-year period would have been different. Prices would have been lower at the beginning and higher at the end. There can be little doubt that without price programs, the price of corn would now be higher than it is and there would be a normal carryover of feed grains.

As we look at the feed grain problem, several things appear to be reasonably clear.

First, the present program is untenable. Inventory increases are being accumulated each year. At some point this buildup must be stopped.

Too much money is going into costs of programs and handling of inventories. We can reasonably calculate that some of the corn now being sold by CCC below the current market has cost \$2.60 or more a bushel. Part of this cost is for administering the programs, part for interest, and a large share for storage. These are monies that do not get back to farmers.

Second, it is doubtful that the answer to the problem lies in the direction of production controls. There is nothing in the record to indicate that they have worked in the past. Reaction to the soil bank seems to indicate that the cost of getting productive land out of production of feed grains in sufficient volume to importantly affect the balance of production and use would be prohibitive.

Third, the answer also does not lie in the direction of increased nonfeed use. There are no new industrial uses with expansible markets. The logical destination for exports of feed grains is North Europe, where livestock populations are large. But throughout this area there is a problem of lower-than-desired farm prices. Most of these countries have schemes for protecting domestic prices. As the United States lowers export prices, this protection is increased. The most prosperous consumer market, and hence the best market for feedstuffs, is in the United States.

Fourth, in designing price programs, interregional effects must be taken into account. If areas that specialize in particular commodities elect to build programs on production controls, they must go the whole control route and actually reduce overall agricultural production.

Fifth, there appears to be no method of bringing feed grain production and use into balance except by pricing feed grains so that they can be profitably fed to livestock. This is the scheme that will inevitably be followed, whether now or later. The longer this solution is postponed, the more serious the problem will become.

Sixth, the principal feed grain producers of the United States would have been very much better off had prices been reduced five years ago. Very little has been gained and a great deal has been lost. Consumption potential has been forgone. The money consumers would have paid for meat is lost and cannot be recovered. A mistake was made in 1952 when production and consumption were allowed to get out of balance. The consequences of this mistake are now apparent. Because of the size of the carryover inventory, these consequences will be with us for some time to come.

Seventh, the imbalance between feed grain production and use is not great. Accordingly, the effects of reducing or eliminating feed grain price supports will not be great. It appears that the negative effects of price programs are strong enough to make it possible for feed grain prices to reach higher than current levels after the immediate shock of removal of supports is passed.

These seven considerations do not present a solution to the problem. They do establish a framework within which a solution must be developed. Attempts in the past to work out solutions without recognizing these fundamentals is what has led to our present difficulty.