

AUTHOR'S NOTE

Through 1954 there had been a rapid increase in soybean acreage and production. Questions were raised about the future, particularly in the context of price and income support programs for U.S. agricultural crops; that is, market growth was a policy issue. This article was replete with tables and charts, here deleted, to support the factual statements.

PROSPECTS FOR FURTHER INCREASE IN SOYBEAN PRODUCTION

CHAPTER 6

Soybean production has increased rapidly during the past twenty years. It is desirable to occasionally pause to look at possibilities for the future. Are we overexpanded now? Is there room for further expansion?

New varieties of soybeans have been continually developed so that the crop is now adapted to a wide geographic area. From an agronomic point of view, it appears that soybeans can continue to expand so long as they can displace crops that compete with them for the use of land.

Soybeans compete primarily with corn, cotton, and wheat. In the original soybean belt of Iowa, Illinois, Indiana, and Ohio, competition is mainly with corn. Acreage in this area appears to have reached a plateau. Both north and south of this core area in the corn belt, soybean acreage is still expanding. Southern Illinois, Minnesota, northern Iowa, and Missouri are the corn belt areas of most rapid expansion. Other areas of rapid expansion are Arkansas, Kansas, Kentucky, and the Mississippi delta. In these latter regions, contraction of cotton and wheat acreages are an important factor.

To get land space, soybeans must sell for enough to hold a comparative advantage over competing crops, all cost differences taken into account. So long as they continue to hold an advantage, they will continue to expand.

Comparative advantage is mainly a function of relative prices, and prices in turn are a function of the strength of markets. Accordingly, any further expansion of the soybean crops depends mainly upon the capacity of the markets for soybean oil and soybean meal to absorb additional products at prices that will enable soybeans to compete successfully with other crops.

THE MARKET FOR MEAL

Soybean meal is a high-protein concentrate of excellent quality. Most of it is used as livestock feed.

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For the past twenty years, soybean meal has had a rapidly expanding market. We now use nearly twice as much high-protein concentrate¹ per grain-consuming annual unit as we did in the crop year 1935–36.

Most of the increase in the production of high-protein concentrates has been the result of expansion of soybean meal production. Increases in production of high-protein concentrates other than soybean meal have been small, and production per grain-consuming unit has declined slightly.

With the exception of soybean meal, our high-protein concentrates are by-products of the production of other crops: cotton, coconut oil, meats, etc. It is not feasible to expand these crops to get livestock feed. Accordingly, the expansion of the use of high protein that we have had has been possible only through expansion of soybean production.

Through the years of rapid expansion in the use of soybean meal, its price has not changed appreciably in relation to feed grain prices—that is, the livestock industry has absorbed rapidly increasing amounts of high protein without any offsetting decrease in price. This can have only been the result of a rapidly increasing evaluation of high proteins as livestock feed. It indicates that there has been a basic need for more high protein and a growing awareness of this need.

Have the requirements for high-protein concentrates per grain-consuming annual unit been satisfied? Apparently not. R. D. Jennings concluded that the protein shortage for the years 1942–49 was the equivalent of about 6 million tons of soybean meal.² This is slightly more meal than we now produce—that is, on the basis of current livestock numbers there is a basic market for about twice as much soybean meal production.

It is not likely that the market would immediately increase an additional 6 million tons of soybean meal without severe price declines, but there appears to be good reason to expect that the demand for high protein will continue to expand.

Recently, urea has been introduced into the feeding picture on a commercial scale. Urea is a synthetic chemical product that is converted into protein by combination with starch and bacteria in the digestive tract of ruminants. One pound of urea plus 7 pounds of grain will replace about 7 pounds of soybean meal.

¹ The high proteins included in this tabulation are cottonseed, soybean, peanut, linseed, copra meals, tankage, meat scrap, and fishmeal.

² R. D. Jennings, "A Look at the Protein Situation for Livestock," USDA, processed report, March 1950.

Recent experiments indicate that a very high proportion of nitrogen can be supplied with urea.

The use of urea does not appear to be a very serious detriment to further expansion of the market for soybean meal. The use of urea is as yet limited to ruminants, while the bulk of soybean meal is consumed by hogs and poultry. It has been mainly the rapid expansion of poultry and hog protein consumption that has been responsible for the increase in soymeal use. Further, the greatest protein deficiency appears to be in hogs. Second, soymeal has certain characteristics, as yet not fully explained, that make it a highly desirable supplement beyond its use as a protein.

Third, the main effect of urea will be to put a price ceiling on the premium that soybean meal can carry over feed grains. Obviously with corn and soybean meal at the same price, users cannot buy urea to convert corn to soymeal equivalent. At some differential, the substitution can be made, putting an effective ceiling on the differential.

ADDITIONAL LIVESTOCK POPULATION

We have an erratically increasing livestock production, while the U.S. population is growing at an increasing rate.

Livestock production per capita is below the 1926–32 level. If we even out the low production of 1933–38 and the high production of 1941–46, we find that for the twenty-seven year period, there is no discernible trend in livestock production per capita.

Three conclusions are warranted: one, our livestock production is not now keeping pace with our population growth; two, we have at times in the past, other than war years, absorbed more livestock production per capita than we are now absorbing; three, our population is expanding at an increasing rate, and accordingly we must expand livestock production at an increasing rate to maintain our dietary standard.

CONCLUSIONS

The foregoing discussion indicates that the growth trends of soybean meal utilization have not stopped, that from a nutritional standpoint soybean meal is in short supply, and that increasing amounts of soybean meal will be required to maintain existing livestock nutritional standards. The market for soybean meal will not become saturated short of a vastly larger production than we now have.

THE MARKET FOR SOYBEAN OIL

Our domestic situation in food fats and oils is in sharp contrast to our protein

situation. We produce about 20 percent more edible fat than we need. The key market for soybean oil is exports.

Our production of food fats has increased about 4 billion pounds, or 75 to 80 percent, since the middle 1930s. Some 60 percent of the increase has resulted from increases in soybean oil production.

Fat is a basic dietary requirement and is low in price. Accordingly, the demand is extremely inelastic. Consumption is not responsive to the changes in supply and price. We cannot push our surplus production into domestic edible use.

Since 1935 we have shifted from a deficit to a surplus situation. In 1935, 1936, and 1937, production was less than domestic disappearance. Currently, production is about 1.5 billion pounds over domestic appearance. The shift from deficit to surplus generally parallels the increase in soybean oil production. However, the increase in domestic surplus is not as great as the increase in soybean oil production. Without the increase our deficit would be about one billion pounds. The production of food fats and oils other than soybean oil has not kept pace with population growth.

We have shifted from an import to an export nation. In 1952 and 1953, our exports were below the level required to dispose of our surplus production, and huge stocks were built up in the United States.

It is clear that we must either export substantial quantities of edible fats and oils or curtail production. Soybean oil is the only edible fat of which the supply is readily adjustable, and we need the meal.

By 1951, world fats and oil production per capita had regained its 1938 level. Increases since 1951 have been at about the same rate as population increases.

Is the export market large enough to absorb current or a larger quantity of American fats and oils? Likely so. There are several reasons for being optimistic about fat exports over the next decade.

First, fat production outside the United States is not increasing as rapidly as is the population outside the United States. It can be made to increase more rapidly. The supply of fats and oils in the United States is largely from by-products, such as cottonseed oil and lard, and is therefore inelastic. The supply of much of the world's fats and oils is elastic. Peanut oil, palm oil, copra, and whale oil have considerable elasticity of supply.

Second, the world's population is increasing at a rapid rate. Because fats are basic dietary requirements, an increasing population means a higher level of demand.

Third, the level of productivity is increasing in many parts of the world. Through the production of more goods and services, the fat-short areas gain purchasing power with which to buy. There are many areas of the world in which fat intake is below levels desired by consumers. With increasing productivity, they will buy increasing quantities of fat per person.

Fourth, large areas of the world are basically undersupplied with fats, and the peoples of these areas are bringing great pressure to get a higher dietary standard. Fats have a very high priority. In this connection East Europe, Russia, China, India, and likely most of Africa are particularly worthy of mention.

Pre-war U.S. exports were very small. U.S. exports are now nearly one-fourth of the world's total. About one-third of U.S. exports are inedible tallow. Some of this tallow finds its way into edible uses, but in the main it is used for soap.

Other American countries except Argentina and Uruguay ship less than they did pre-war. The bulk of the decline is in Mexican cottonseed oil. The Philippine copra industry has expanded by about 35 percent from pre-World War II. Exports from Africa have expanded sharply. This is primarily peanut oil from a belt across Central Africa. Argentina and Uruguay exports have declined sharply. This is mainly the result of a decrease in flaxseed production. Indian exports have dropped very sharply from their pre-war level. This represents decreases in cottonseed, rapeseed, and peanut oils. Indonesian exports are down by 30 percent. Australian exports are down.

The biggest decrease in fats and oils exports has been from China and Indo-China. This is a decline in soybeans, cottonseed oil, and peanut oil. It appears that Chinese production is about the same size as it was pre-war. What has happened to the oil formerly shipped to Europe and Japan is not clear. Some of it likely goes to Russia. But it is thought that the bulk of it moves from sparsely settled North China and Indochina into the more heavily populated regions to the south.

Other countries fall into the same pattern of decline.

Whale oil is about the pre-war volume.

Before World War II, Africa, India, China, and Manchuria were the great suppliers of fats and oils other than copra. The main movement was to Europe with a secondary movement to Japan. India, China, and Manchuria have been replaced by the United States. African importance has increased.

Reduced to its bare essentials, the great shift in edible fats has been from Manchurian soybeans and Indian and Chinese cottonseed and peanut oil to American soybeans and soybean oil. (As a result of U.S. price support systems, soybean oil has been replaced by cottonseed oil since March 1954.)

The major shift in export pattern is the result of two big changes: it has been made possible by increased U.S. production, and it is the result of increased pressure to consume in Asia. This pressure will likely continue. It is difficult to foresee the return of China and India to the ranks of major exporters. It is reasonable to expect that our large Japanese market for soybeans will go back to Manchuria in the not-too-distant future.

The substitution of U.S. for Asiatic fat in world trade is partly the substitution of inedible tallow for edible fats. The total world exports of edible fats are down from pre-war exports.

The two big competitors for our exportable surplus are copra from the Philippines and Indonesia and peanut oil from Africa. These are both primary oils with an adjustable production and so can be priced out of the market.

The future of African exports is questionable. So long as Africa remains essentially colonial, it is likely that the exportable surplus of peanuts can be increased. However, once Africa starts to increase its overall productivity, all possible increases in fats and oils production will be needed for dietary improvement. If Africa follows the trend of Asia, this will be the case.

Importing countries have increased fats and oils production. This was first a wartime measure and has been continued to make up deficits and in the interests of self-sufficiency. Likely a lot of this production costs more than imports would cost. In the long run, assuming a more peaceful world and freer trade, some of this production will be discontinued.

SUMMARY

These several things point to an increasing market for surplus fats from the United States. We should recognize and remember that we are the sellers, that we must service our export market.

The first requirement of a broad export market is a proper price policy. We must sell at prices that are low enough so that people can buy, and that are low enough so that they will not encourage competing production of copra and peanuts.

The second requirement is that we sell the products that the market wants. We are currently selling refined cottonseed oil. We sell our lowest quality soybeans for export and without a reliable grading system.

The third requirement is that we trade. We require payment for most of our fats in dollars. We need to take what we can get—what customers have to offer. This means accepting payment in other currencies and in goods.

The burden of trading rests on the seller. We need to recognize this principle much more than we have in the past.

There is an adequate market for more soybean oil than we now produce. To a large degree, the future of the soybean industry rests on our success in properly servicing the export market for oil.