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Cotton seed

# Cottonseed and Cottonseed Based Industries

## Their Place in the Economy of Texas

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Cotton Economic Research • The University of Texas

*In Cooperation with*

The Cotton Research Committee of Texas

*Austin, Texas • 1959*

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## INTRODUCTION

In presenting in perspective the importance of cottonseed and cottonseed based industries and trades in the economy of Texas, this report has been divided into four parts as follows.

1. A brief summary of the basic resources and conditions which provide for the continued growth and expansion of the economy of Texas.
2. Importance of cottonseed and cottonseed based industries in the development of Texas economy.
3. A basis for understanding price determining forces and procedures for cottonseed products and cottonseed.
4. A program for collecting and distributing data at opportune times to promote the best uses and value distribution of cottonseed and cottonseed products.

Cotton Economic Research

June 1959

COTTONSEED AND COTTONSEED BASED INDUSTRIES  
THEIR PLACE IN THE ECONOMY OF TEXAS

PART I

Material Resources for Development of the Economy of Texas

This economic analysis of cottonseed and cottonseed based industries is designed to portray their importance in the economy of Texas, especially the cotton economy, and to emphasize the importance of giving them adequate consideration in formulating a cotton policy for Texas.

In order to present cottonseed and cottonseed based industries in proper perspective in the economy of Texas, it is necessary to present in brief the fundamental resource bases of Texas economy and the unfolding of their development.

Texas occupies the strategic location in one of the great subtropical, subhumid agricultural and mineral regions of the world. Climatic conditions, soil and topography of Texas make it ideally adapted to large scale operations in the production of such agricultural products as livestock, cotton, grain sorghums, wheat and rice. In addition Texas has a substantial portion of one of the great humid forest regions of the world.

This great region of which Texas is the geographic and economic center is also one of the great mineral producing regions of the world. Most abundant of Texas mineral resources lend themselves to large scale production at low cost. It is especially significant that the energy resources, basic chemicals, light metals and abundant construction materials which constitute the core of modern industrial development are the very ones in greatest abundance in Texas.

Texas is Now a Colonial Economy

On the basis of its capacity to produce both agricultural and mineral products Texas has easily become the greatest raw material producing state in the Union. It is unique in that it ranks first in production of minerals and one of the top three states in agricultural production.

Up to this point in its economic development, Texas has become merely a great colonial economy in that it is primarily a producer and exporter of raw materials and an importer of finished consumption goods.

In order for Texas to balance and stabilize its economy, it will be necessary for it to develop an industrial economy based on its abundant raw materials and potential markets.

What are the prospects for markets? Here again nature has provided the basic conditions to give perfect access to markets. The smooth topography gives easy access to huge markets on the land side and its long coast line and good harbors on the Gulf of Mexico make Texas ports the gateway to world markets not only for Texas but the land-locked areas behind Texas.

In addition to all this, the Gulf of Mexico is the geographic center of a vast underdeveloped region similar to but exceeding in potentialities the area surrounding the Mediterranean Sea in terms of varieties and quantities of material resources. Texas has a key location on the gulf and can and should participate in this great potential development.

### Texas Can Have a Strong, Balanced Economy

The vital question now confronting Texas is: how can it use its strategic location and material resources to advance from a raw material producing and processing colonial economy, with its dependence on other regions, to an economy of relative independence by balancing its raw material production by developing more finished goods producing industries?

There are two types of productive enterprises from the standpoint of economic development and stability of a region or state. They are best designated as "population-building" enterprises and "population-serving" enterprises.

### Population-Building Enterprises

Population-building enterprises constitute the foundation of the economy of a state or region. They are those which are attracted to the state or region to utilize the material resources and natural advantages which adhere in the land and the location. For example, all types of agriculture and mining enterprises and port facilities are population-building. In addition, most first processing industries such as cotton ginning, cottonseed crushing, meat packing, petroleum refining, saw-milling and rice-milling, to prepare raw products for use in consumer goods manufactures, are also population-building. They are population-building industries primarily because they are weight reducing industries, that is, removing waste to reduce freight or to separate the raw products into its major component parts which go to different markets such as products of cottonseed crushers.

Manufacturing in Texas up to this time is predominantly concerned with processing raw materials to be shipped out as raw material to manufacturers of finished consumption goods outside of Texas. About

80 percent of the value of Texas manufactures are products of processing industries rather than finished consumption goods manufactures.

Heretofore, great industrial areas of the world have been built around an effective combination of population-building enterprises such as the "coal-iron-ore-limestone combination", a mechanical energy metal combination. Texas has a different, but an effective combination of basic resources for industrial development. It is centered around oil, gas, lignite, basic chemicals and light metals, and is supplemented by a wide variety of cheaply produced agricultural raw materials in large surpluses.

#### Population-Following Enterprises

Population-following enterprises may be described broadly as those which move into or develop in an area to serve population-building enterprises and the people who are there because of them. These activities cover a very wide range of enterprises. Manufacturers of finished consumption goods are especially important because many of them become strongly population-building, especially if they find special advantages in the type of energy resources available, such as natural gas in the ceramic industry and many plastic products made from chemical raw materials.

To further illustrate the importance of population following enterprises it is sufficient to mention such classes of enterprises as wholesaling, retailing, financial institutions, all sorts of repair and service enterprises, scientific equipment and building.

#### Lump Sum and Renewable Aspects of Resources

Another aspect of resources needs to be described here to provide a sound base for evaluating specific industries in the long range development of the economy of Texas. Some resources have the characteristic of periodic occurrence such as rain, sunshine, seasons, and soil rejuvenation, that is, agricultural resources. These are properly called renewable. Other resources are in the nature of lump sums or deposits; these are relatively fixed in amounts and more or less exhaustible. Minerals are generally of this nature. In formulating a long-time policy renewable resources should certainly play as important role as possible. It is equally as important to develop a conservation policy to make the best uses of the lump sum resources.

What has all this to do with cottonseed and cottonseed based industries in Texas? Very much indeed. It furnishes some necessary background for a better understanding and appreciation of the great importance of certain types of resources and industries in Texas such as cottonseed and cottonseed based industries.

## PART II

### Cottonseed and Cottonseed Industries in Texas, Present and Potential

The primary purposes of the data and analyses to follow are (1) to summarize the significance of cottonseed and cottonseed based industries in the economy of Texas as population-building industries to Texas, and (2) to set up a series of reports and analyses to be issued at scheduled times to help provide factual, economic data to promote economic growth and stability of cottonseed, and cottonseed based industries.

#### Value of Cottonseed as a Crop

The average cash income of cottonseed per planted acre in Texas during the five years ending 1957-58 was \$9.78, for corn it was \$8.62, for oats \$4.21, and for wheat \$11.43. This means that cottonseed apart from lint ranks second in cash income per acre along with other major crops grown in Texas. As a source of cash farm income during the five years ending 1957-58, cottonseed ranked next to cotton lint as a crop in Texas. It brought an average yearly cash income of \$78,399,000, corn \$16,105,000, oats \$9,827,000, and wheat \$49,839,000.

Cash value does not always indicate the full value of a crop because of the use of certain crops on the farm itself. The United States Department of Agriculture makes annual estimates of the value of crops based on total production times price. Average values of major crops in Texas during the five years ending 1957-58, as estimated on this base, were: cotton lint \$627,945,000, cottonseed \$100,696,000, lint and seed combined \$728,641,000, corn \$18,692,600, grain sorghums \$90,774,200, wheat \$47,695,200, and oats \$10,688,400.

#### Cottonseed Based Industries and Their Importance in Texas Economy

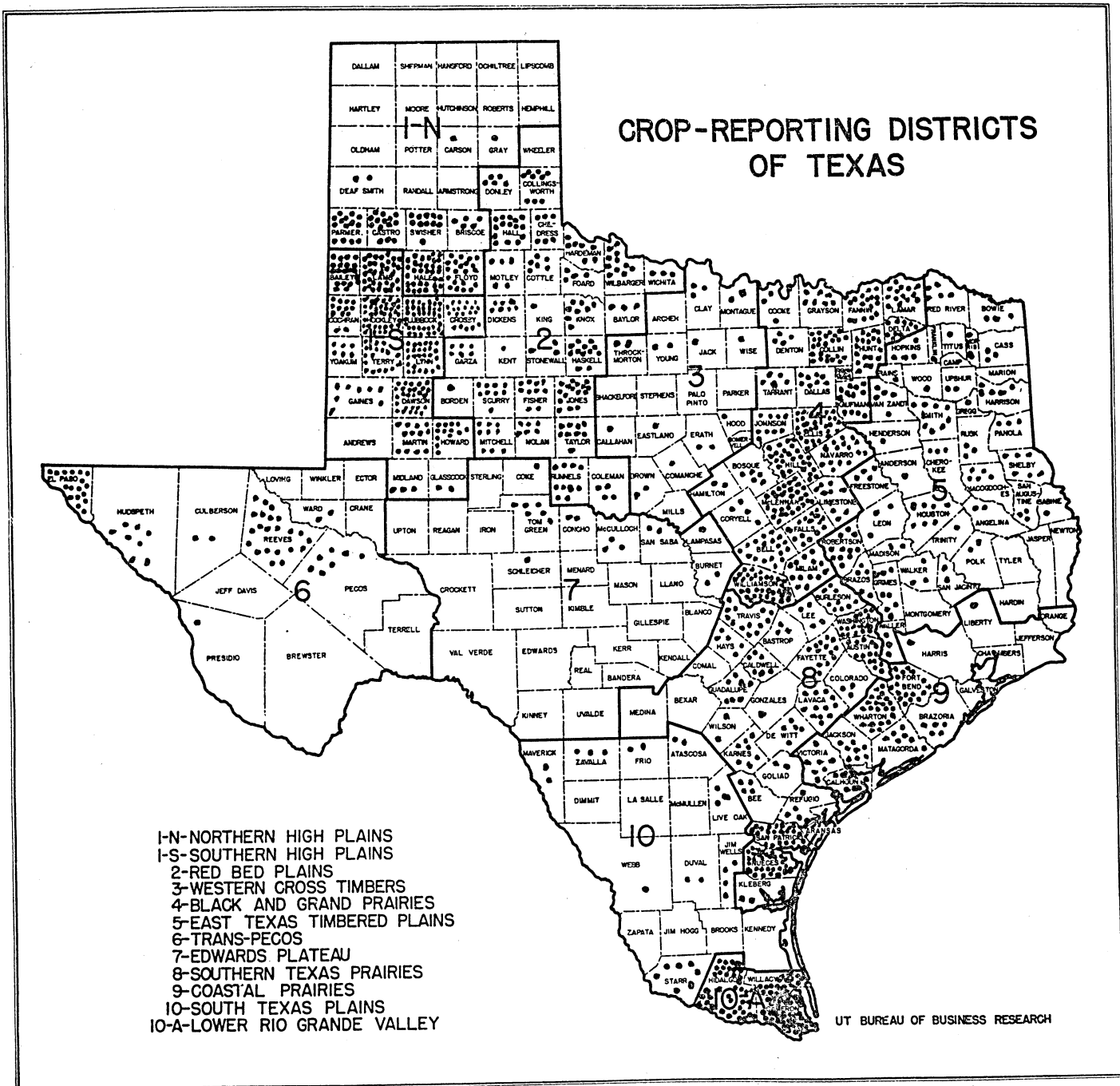
Cotton ginning is the first of a long series of important industries based directly and indirectly on cottonseed and cottonseed products as raw materials. Ginning has come to be a multipurpose operation but the one which is the reason for its being in Texas is the separation of lint cotton from cottonseed and thus creates a distinct industrial raw material.

#### Cotton Gins

Cottonseed as a separate product begins at the gin. Cotton ginning is one of the most important and widespread industries in Texas. According to latest count available, there were 1505 gins reported as active in Texas during the 1958-59 crop year, distributed as shown in Figure 1. The value of a modern gin in Texas frequently exceeds \$100,000. It employs from five to ten men, or more in season. The gin is the center and major enterprise in hundreds of rural communities in Texas.



Figure 1. LOCATION OF COTTON GINS IN TEXAS



One dot represents one gin.

Source: Texas Cotton Ginners' Association, 1959.

TABLE 1.

## COTTONSEED PRODUCTION IN TEXAS BY CROP REPORTING DISTRICTS

(In Tons)

District	1947	1948	1949	1950	1951	
1-N	43,813	43,276	114,448	37,080	147,748	
1-S	385,183	277,322	639,416	302,820	395,140	
2	205,333	196,623	460,280	229,896	206,160	
3	6,402	5,261	29,856	6,180	13,744	
4	336,960	311,880	435,400	234,840	257,700	
5	77,092	104,578	141,816	53,148	85,900	
6	47,175	53,102	79,616	59,328	80,746	
7	13,104	5,460	37,320	19,776	10,308	
8	131,237	109,341	206,504	95,172	120,260	
9	53,523	64,451	87,080	50,676	108,234	
10	121,646	90,146	256,264	147,084	292,060	
Total	1,421,468	1,261,440	2,488,000	1,236,000	1,718,000	
Dist.	1952	1953	1954	1955	1956	1957
1-N	198,896	229,435	215,315	159,254	210,560	151,831
1-S	423,456	349,486	460,917	429,936	481,280	479,220
2	101,052	178,992	168,148	225,568	114,304	192,591
3	4,812	16,272	8,772	9,837	3,911	6,696
4	256,640	461,040	187,677	269,494	150,400	169,881
5	80,200	108,480	63,386	100,403	65,875	56,918
6	101,052	106,130	109,561	112,954	120,320	109,033
7	8,020	16,453	10,768	13,568	4,662	8,443
8	176,440	121,678	150,771	97,520	90,841	92,583
9	97,844	99,440	80,598	100,064	75,200	62,304
10	155,588	120,594	199,087	177,402	186,647	126,210
Total	1,604,000	1,808,000	1,655,000	1,696,000	1,504,000	1,455,710

Source: U. S. Department of Agriculture, Agricultural Marketing Service.

Cottonseed is Preeminently  
an Industrial Raw Material

Quantity and location are major factors determining value of cottonseed as raw material for industrial uses. Cotton gins create cottonseed as a commercial product and pinpoint the primary location of the supply of seed. The size of gins varies considerably, but the location of 1505 gins as shown in Figure 1, together with Table 1 showing cottonseed production by crop reporting districts, give a fair picture of the regional location of the source of supply of cottonseed for industrial purposes.

Uses for Cottonseed

There are three important uses for cottonseed. They are (1) for planting seed, (2) for cow feed and fertilizer by cotton growers and (3) raw material for cottonseed crushing mills. The average percentage going to each market is shown in Table 2. The highest priced but smallest of the markets is for planting seed. The main market is the cottonseed crushing mill which normally buys an average of above 90 percent of production.

Table 2. COTTONSEED PRODUCTION AND FARM DISPOSITION, IN TONS  
AND PERCENTAGES, UNITED STATES, 1945 - 1956  
(In 1,000 of Tons)

Crop Year Beginning August 1	Production	Used on Farms for Feed and Seed	Percent- age	Total Deliv- ered to Mills	Percent- age Crushed	Average Farm Price Per Ton
1945	3,664	502	13.7	3,162	86.3	\$ 51.10
1946	3,514	443	12.6	3,071	87.4	71.90
1947	4,682	611	13.0	4,071	87.0	85.90
1948	5,945	563	9.5	5,382	90.5	67.20
1949	6,559	691	10.5	5,868	89.5	43.40
1950	4,105	603	14.7	3,502	85.3	86.40
1951	6,286	740	11.8	5,546	88.2	69.30
1952	6,190	609	9.8	5,581	90.2	69.60
1953	6,748	418	6.2	6,330	93.8	52.60
1954	5,708	480	8.4	6,229	91.6	60.30
1955	6,043	487	8.1	5,556	91.9	44.60
1956 <sup>1</sup>	5,423	408	7.5	5,015	92.5	53.40

<sup>1</sup> Preliminary.

Source: Agricultural Statistics, U.S.D.A.

## Marketing Cottonseed and Cottonseed Products

Marketing cottonseed and cottonseed products involves a series of closely integrated merchandising and processing operations more or less peculiar to the industry. Price bargaining procedures in particular are somewhat complicated and are often misunderstood.

### Farmers' Markets for Cottonseed

Farmers' markets for cottonseed are predominantly ginners who gin their cotton. Figure 1, page 5, presents a fair picture of the location of farmers' markets for cottonseed. Prices for seed are posted at the gin. Farmers make disposition of the seed prior to ginning so that the ginner may know how to handle the seed economically during and after the ginning process. Unless otherwise arranged, the proceeds are applied first in paying for ginning and the remainder is paid in cash to the farmer.

Cotton ginners are middlemen in buying and handling cottonseed. Cotton growers sell to ginners and ginners sell mostly to cottonseed crushers. Ginners and cottonseed crushers make arrangements concerning services to be performed, price quotations, etc., before the ginning season begins. A ginner may make such an arrangement with two or even more crushers.

It is desirable for farmers to sell cottonseed at time and place of ginning to avoid problems of costs and problems of storage, shrinkage and spoilage. The ginner accepts the best price and conditions offered by crushers and ships the seed as fast as supplies accumulate. Most ginners buy cottonseed and even lint cotton to attract more ginning.

The ginner market for cottonseed is a highly competitive market in most cases because the price paid is used to attract farmer patronage, and the ginner seeks the crusher offering the best price for seed which he posts at the gin. In the main, ginners plan to make the returns for their work out of the volume of ginning and not out of handling cottonseed.

### Cottonseed Crusher Market for Cottonseed and Cottonseed Products

The market for cottonseed products is an outstanding example of a man-made market. It was made by cottonseed crushers by their effective use of scientific and technological research done by governmental and private research organizations to effectively separate cottonseed into its major components and then to sell these products through aggressive, scientific marketing.

The cottonseed crusher market is the key market for cottonseed in terms of price bargaining for they separate out the four major raw materials in cottonseed into marketable commodities. Cottonseed crushers as such are primarily middlemen processors. They operate around a cost margin, the upper limit being the combined prices they can get for their products. Beginning with their estimate of obtainable value of products, they estimate and try to deduct their costs and bargain for cottonseed from ginners on what is left.

The area of the market for cottonseed of any particular crushing mill fluctuates from year to year and is determined by such major forces and conditions as the intensity of fluctuations of annual volume of cotton production in their respective territories and fluctuations in time of harvest.

#### Buying Territory Affected by Size and Type of Mills

In addition to the above determinants of market areas, there are some very important determinants associated with the size of the mill, the number of its activities and its location with reference to markets for all its products. On the conditions just suggested, the crushing industry recognizes two major types of mills. One is known as the "cotton patch mill". It is typically a small mill built to buy and press the seed in a restricted area. It sells its crude oil direct or through a broker to refiners. It may sell its cottonseed cake, meal and hulls locally at retail or through dealers and brokers to feed dealers and manufacturers and it disposes of its linters to dealers and brokers.

The other type is known as terminal mills. These are large mills located in population centers where there are markets for all cottonseed products. These mills in addition to crushing cottonseed perform such operations as oil refining, mixed feed or formula feed manufacturing, and making many other products under brand names. Since they are located in large deficit centers and central markets for all the products of cottonseed, they can and do draw seed from a wide area without loss in freight since cottonseed is only about 5 to 6 percent weight losing as shown in Table 3, on the following page.

The net result is that without exception, buying territories of cottonseed crushers overlap. Crushers compete for seed not only in price but in services rendered ginners, such as financing and in delivery terms. Prices of cottonseed are made in dollars and cents per ton of 2000 pounds and paid in cash at time of delivery.

Table 3. YIELD OF PRODUCTS AND LOSS PER TON OF COTTONSEED  
CRUSHED IN THE UNITED STATES

Year Beginning August 1	In Pounds				
	Oil	Meal	Linters	Hulls	Residual
1940-44 Av.	314	899	176	483	128
1945	312	879	182	480	147
1946	315	882	191	471	141
1947	313	930	186	452	119
1948	320	897	183	463	137
1949	323	895	176	469	137
1950	321	896	185	461	137
1951	320	930	185	451	114
1952	328	961	184	431	95
1953	332	946	184	444	94
1954	331	976	188	434	71
1955	339	941	177	447	95
1956	340	964	180	433	83
1957	339	922	176	450	113

Source: Commodity Year Book, 1957, page 140.  
Fats and Oils Situation, 1958.

#### Location of Cottonseed Crushing Mill Markets

The location of the cottonseed crusher markets for cottonseed is shown graphically by Figure 2. In the region itself the industry tends to be as widely distributed as cotton growing and ginning. In the main, the mills are located in small to medium sized towns and cities. There were 84 cottonseed crushing mills operating in Texas in 1957. Some 46 of these were in towns under 10,000 population, 22 in towns and cities with 10,000 to 100,000 population and 16 in cities with over 100,000 population.

#### Importance of Cottonseed Crushing to Texas

How important is the cottonseed crushing industry to Texas? The cottonseed crushing plants, and associated enterprises such as feed manufacturers, distributors of planting seed and fertilizers are the mainstays of the towns and small cities in which they are located. These mills are generally the most important tax payers in supporting local government and institutions. Their purchases of cottonseed, peanuts, etc., and other supplies help not only agriculture but in doing so release buying power that helps other enterprises in the area of their location.

It is customary to measure the value of manufacturing enterprises by value added by manufacturing and the number of people employed. In 1939 cottonseed crushing ranked 9th among all Texas manufacturers in value added by manufacturing with \$9,400,000 and 8th in number of people employed with 4,800. It paid out \$35,000,000 for materials. Table 4 is one indicator of the economic importance of cottonseed crushing in Texas.

Figure 2. COTTONSEED CRUSHING PLANTS IN TEXAS

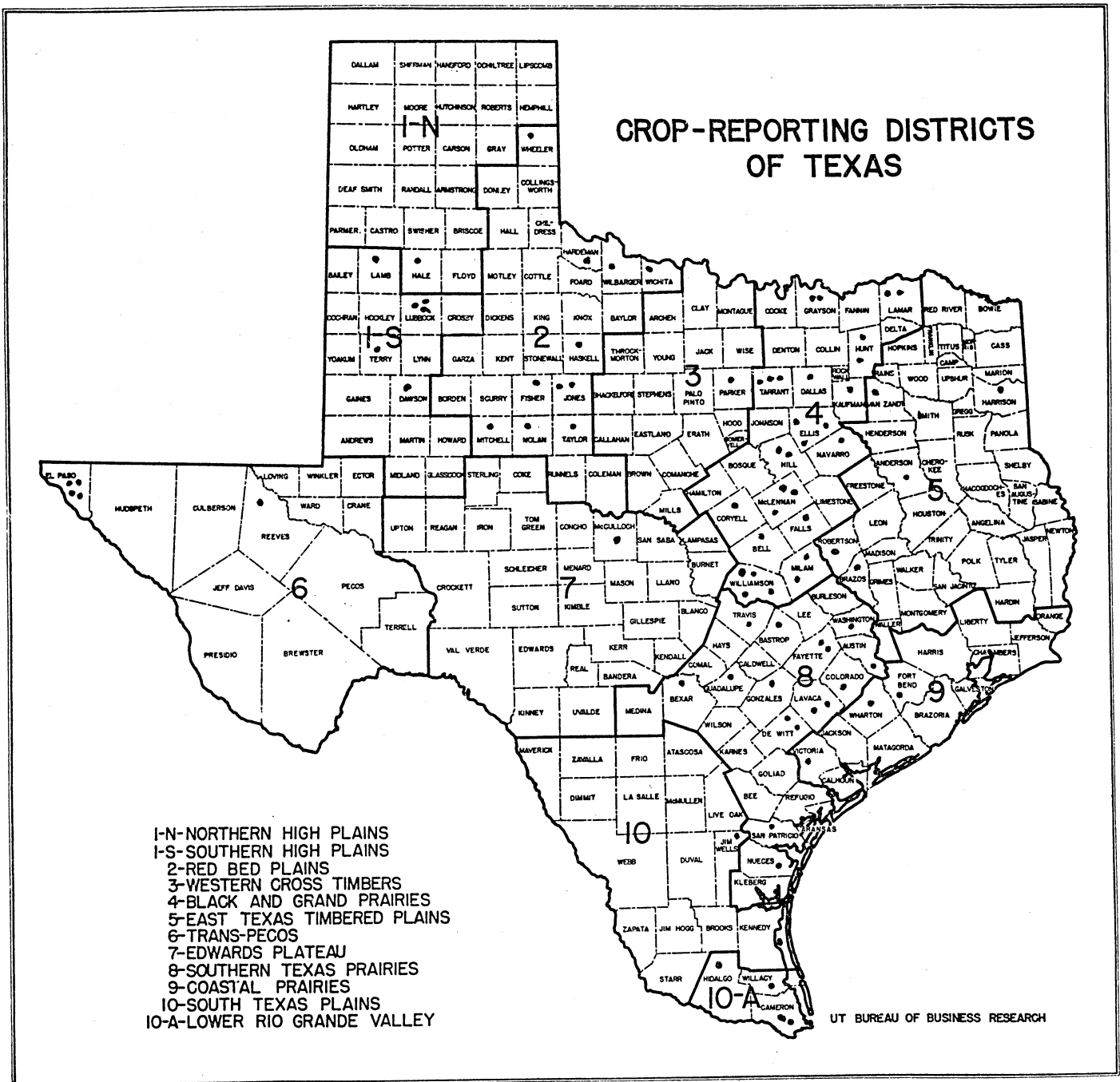


TABLE 4

THE IMPORTANCE OF THE COTTONSEED CRUSHING INDUSTRIES TO  
TEXAS AND THE UNITED STATES - 1899 - 1954

Year	Number of Establishments	Total Persons Employed in Manufacturing	Total Salaries and Wages	Costs of Material, Supplies, Fuel, Purchased Electric Energy and Contract Work	Value of Products	Value Added by Manufacture
<u>Texas</u>						
1954	84	3,385	\$10,856,000	\$138,747,000	\$164,000,000	\$ 25,252,000
1947	95	3,717	8,016,000	104,941,000	131,093,000	26,152,000
1939	144	4,774	4,040,115	35,052,317	44,406,882	9,354,565
1929	176	5,441	5,575,127	79,254,707	95,351,198	16,096,491
1919	200	5,577	5,133,380	87,132,988	102,111,850	14,978,862
1909	194	3,884	2,175,000	23,439,000	29,916,000	6,477,000
1899	103	2,854	1,206,000	10,373,000	14,005,000	3,632,000
<u>United States</u>						
1954	286	13,665	43,103,000	445,265,000	546,430,000	101,164,000
1947	315	14,398	31,419,000	413,488,000	518,091,000	104,603,000
1939	447	18,519	14,880,908	138,764,149	171,476,253	32,712,104
1929	553	19,005	17,935,834	249,019,800	298,376,039	49,356,239
1919	711	32,048	30,550,910	495,192,294	581,244,798	86,052,504
1909	817	21,163	10,130,000	119,833,475	147,867,894	28,034,419
1899	369	12,576	4,722,000	45,165,823	58,726,632	13,560,809

Source: U. S. Census of Manufactures.



Cottonseed crushing mills are good examples of population building industries because they are an essential part of the value-creating process in cotton production. Cottonseed crushing mills are also population building industries because their products are raw materials which form, or help to form, the bases for other industries drawn to Texas to utilize them. Finally, the whole complex of gins, cottonseed oil mills and industries utilizing cottonseed cake, oil, hulls and linters draws a wide range of other industries which are attracted to the cotton growing region to manufacture equipment and supplies for gins, oil mills and other population building industries with other services.

#### Cottonseed Products--Their Importance To the Economy of Texas

Cottonseed crushers produce four raw products--crude cottonseed oil, cake, hulls and linters--each of which is important as a foundation for many industries and trades in Texas. The relative quantitative importance of these raw products is shown in Table 3, page 10, which gives the pounds of each produced from the average ton of seed by years during the ten years ending 1956. The average number of tons of seed crushed annually in Texas during that same period was 1,480,602.

Up to this point attention has been called to the importance of cottonseed as a farm crop and as a basic raw material for attracting population building industries such as cotton ginning, cottonseed crushing and enterprises attracted to Texas because of them. Important as these are, they are the beginning of even greater things. As already pointed out cottonseed crushers produce four highly important raw materials which have and do attract many important industries to Texas. The section to follow will point out the importance of these raw materials to Texas.

#### Some Major Industries and Trades Built on Raw Products Produced by Crushers from Cottonseed

The order of description of industries and trades based on cottonseed products is their relative importance to Texas and not their value as raw products to crushers.

#### Cottonseed Cake, Meal and Hulls

Cottonseed cake, meal and hulls are used in Texas as feed products. They will be treated together. Manufacturing and distribution of scientifically mixed feeds for specific animals have rapidly become major enterprises in Texas. The growing interest in scientific feeding for high quality products at low cost has led to greater appreciation and use of high protein feeds in Texas. This growing interest is due in large measure to research by experiment stations and promotion of extension services, the Research and Educational Division of the National Cottonseed Products Association, Inc., and now especially by private feed manufacturers.

It is significant because Texas is the leading livestock state based on native forage. Excellent as this forage is, it needs a protein supplement. The cottonseed cake and meal produced by crushers in all parts of the state furnish most of this vital protein supplement so essential, especially to the rapidly growing dairy industry.

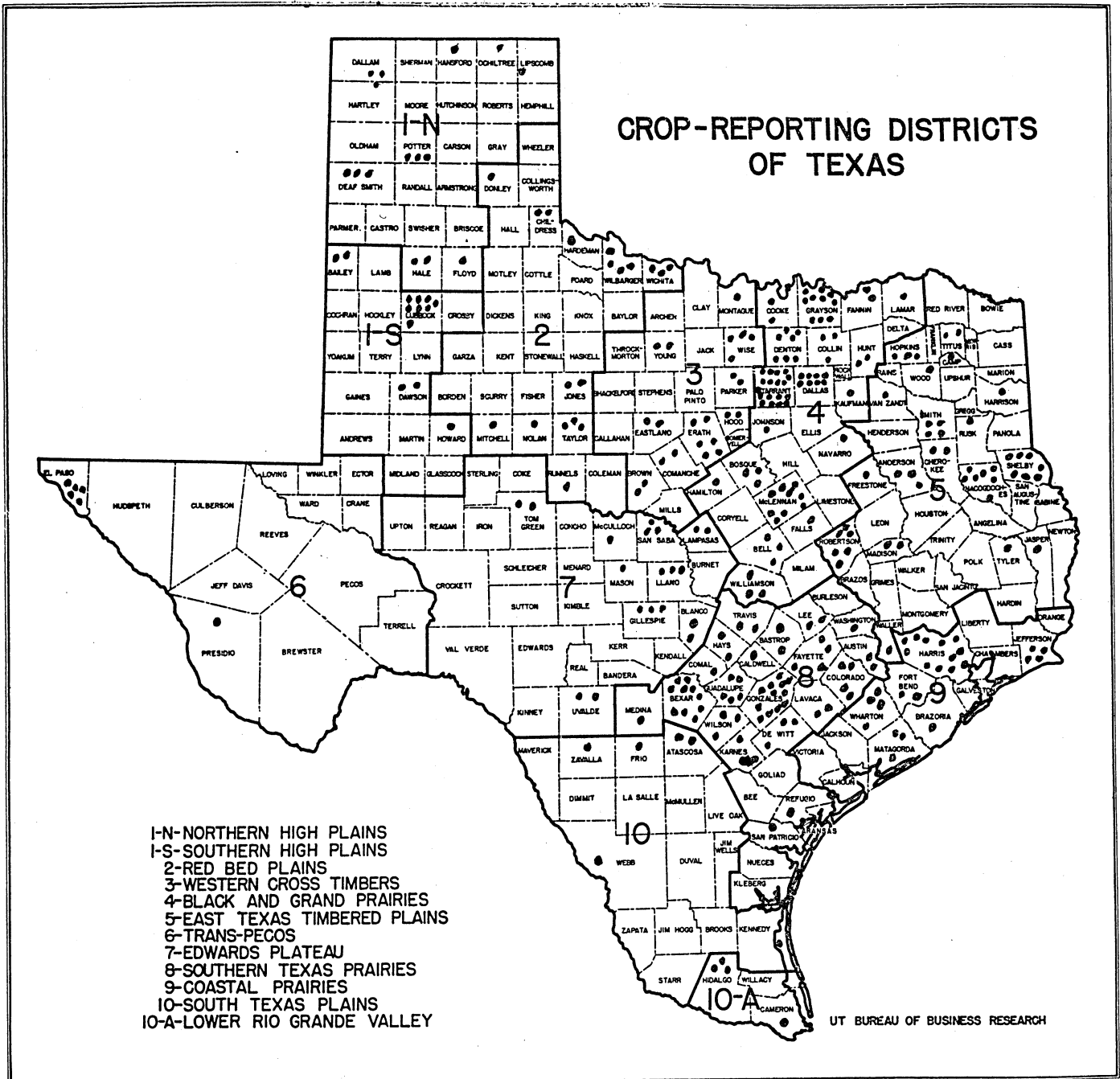
There is no substitute for protein, and there is no substitute in sight for cottonseed in Texas for supplying this growing demand. Already most of the big feed manufacturers have been drawn into Texas, but more importance still is the fact that almost 100 percent of the cottonseed crushing mills are now in the business of preparing and selling feeds, many of which are making a full line of feeds. The protein in cottonseed they crush is the key product around which this very important industry is built. Figure 3 and Table 5 locate and indicate the importance of the prepared feeds industries to Texas.

In order to further visualize the importance of cottonseed to Texas, let us trace the feed business one step further. Feeds and feeding are not ends in themselves but are means to ends. When fed to dairy cows it means more dairy products to be processed and delivered. It means more and better beef cattle, poultry, and processing industries built on them. Furthermore, these developments make possible a diversified, permanent agriculture in Texas and enriches the standards of living and lowers costs of living in Texas.

It is not contended at all that cottonseed cake, meal and hulls alone are responsible for all these vital developments in Texas economy, but the facts are that they are the key products. How can that be? Digestible protein in proportions to what is known as the correct nutritive ratio is highly important in feed for livestock. The required ratio of pounds of protein to other feeds in the diet varies from one kind and type of animal to another but on an average it is estimated to be 14.3 percent or in ratio of 1 to 7.

In 1949 Cotton Economic Research at The University of Texas made an economic analysis of the feed situation in Texas. It showed clearly the importance of the protein in cottonseed to balance the ration for livestock in Texas. It was found in this study that protein content of major feeds produced in Texas including corn, grain sorghums, oats, hulls, Sudan and Johnson grass hay, all sorghum for forage and wild hay, etc., showed a deficit of digestible protein of 448,567,000 pounds. This study also showed clearly that even though Texas had numbers of feed products which produce digestible proteins above the nutritive ratio, such as peanuts, alfalfa hay, peas, etc., they were minor in amount compared with the amount produced by cottonseed, and that there was no prospect of making up the deficit if cottonseed were eliminated. The surplus protein produced by these products including cottonseed in 1948 amounted to an estimated 333,309,000 pounds and of this cottonseed furnished 276,000,000 pounds.

Figure 3. LOCATION OF FEED MANUFACTURERS IN TEXAS



Source: Directory of Texas Manufacturers, 1959.

TABLE 5

## GROWTH AND IMPORTANCE OF PREPARED FEED MANUFACTURING IN TEXAS AND THE UNITED STATES FOR ANIMALS AND FOWLS, 1930, 1940, 1954

Year	Number of Establishments	Total Persons Employed in Manufacturing	Total Salaries and Wages	Cost of Material, Supplies, Fuel, Purchased Electric Energy and Contract Work	Value of Products	Value Added by Manufacture
Texas						
1954	131	4,183	\$ 14,101,000	\$ N.A.	\$ 148,110,000	\$ 31,589,000
1940	59	984	1,020,943	\$ 9,573,936	12,601,582	3,027,646
1930	43	540	777,624	10,962,794	13,905,079	2,942,285
U. S.						
1954	2,292	59,890	225,199,000	N.A.	2,702,267,000	584,135,000
1940	1,383	24,177	31,803,464	302,640,178	401,880,238	99,240,060
1930	750	14,384	22,400,452	327,919,743	402,752,534	74,832,791

Source: United States Census of Manufactures, 1930, 1940, 1954.

Note: This industry was not given a separate classification in previous census reports.

The above figures do not include byproduct mill feeds which contain surplus protein but not enough to overcome the then overall deficit of 115,000,000 pounds.

In summary, it may be said there are four vitally important facts which show most conclusively the importance of cottonseed meal and hulls in the economy of Texas. The first is that cottonseed meal supplied the bulk of protein needed to make up the deficit of 449,000,000 pounds in the major forage and feeds produced in Texas in 1948, as listed in Table 79, page 241, in the "Cottonseed Crushing Industry of Texas in Its National Setting", published by Cotton Economic Research, The University of Texas.

The second fact which emphasizes the key position and value of the large amount of protein furnished by cottonseed to the livestock industries of Texas is that one pound of cottonseed meal when fed to cattle as a supplement to provide the proper nutritive ratio is worth up to two pounds of corn. (Morrison's Feeds and Feeding, page 669, 20th edition).

The third fact is that including cottonseed meal there is still a large deficit of digestible protein in the overall feed supply produced in Texas, and that Texas could produce an additional two million bales of cotton without over-producing the demand for cottonseed meal and hulls.

The fourth fact is that there is no substitute for protein in the diet of an animal, and equally important, there is no substitute now available or in prospect for cottonseed in Texas for producing the essential protein needed in large quantities in Texas.

Dairy cattle alone could profitably furnish a market for all the cottonseed meal and hulls produced in Texas. Figure 4 shows the location of dairy cattle in Texas. Figure 3, page 15, and Table 5, page 16, show the feed manufacturing plants of Texas.

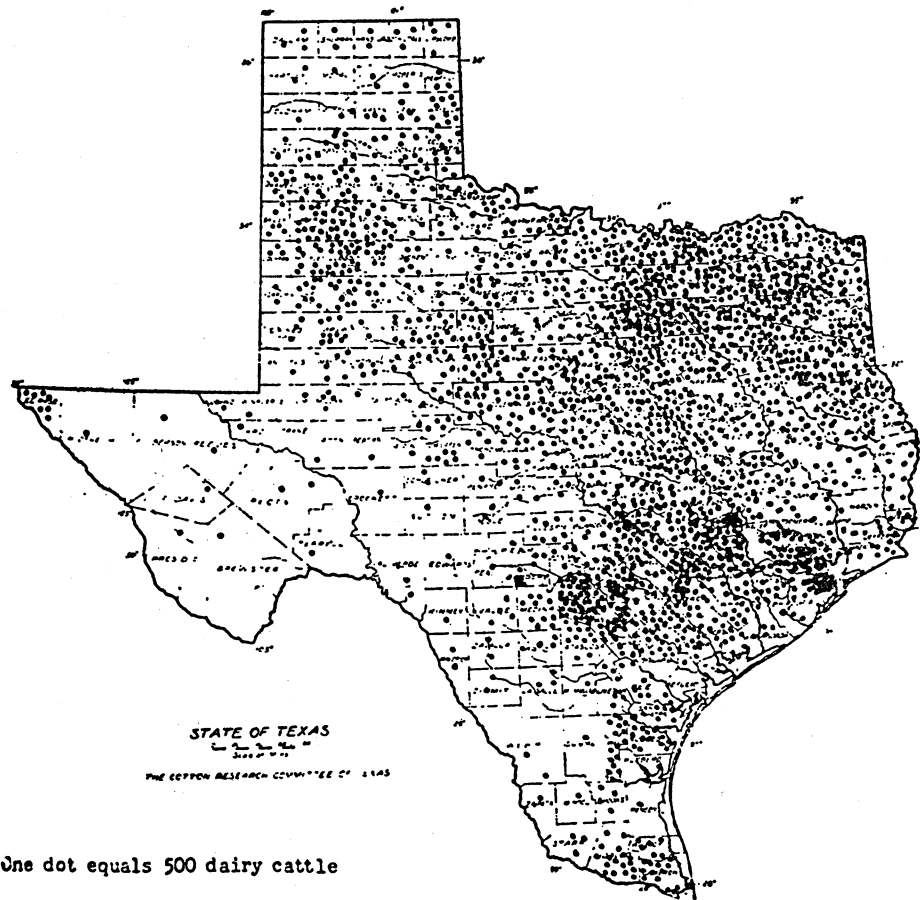
Both cottonseed cake and hulls have other uses such as high protein flour and candy from cottonseed meal, and stuffing for furniture and manufacture of chemicals from hulls. It will be wise for Texas to re-evaluate the importance of the cotton industry in all its aspects to the economy of Texas.

#### Industries in Texas Based on Cottonseed Oil

Crude cottonseed oil, the major raw material in value produced by cottonseed crushers, furnishes the raw material which has made possible and profitable the development of a substantial number of food manufacturing industries in Texas. The large volume of oil available has enabled Texas to rank high among the states in their manufacture.

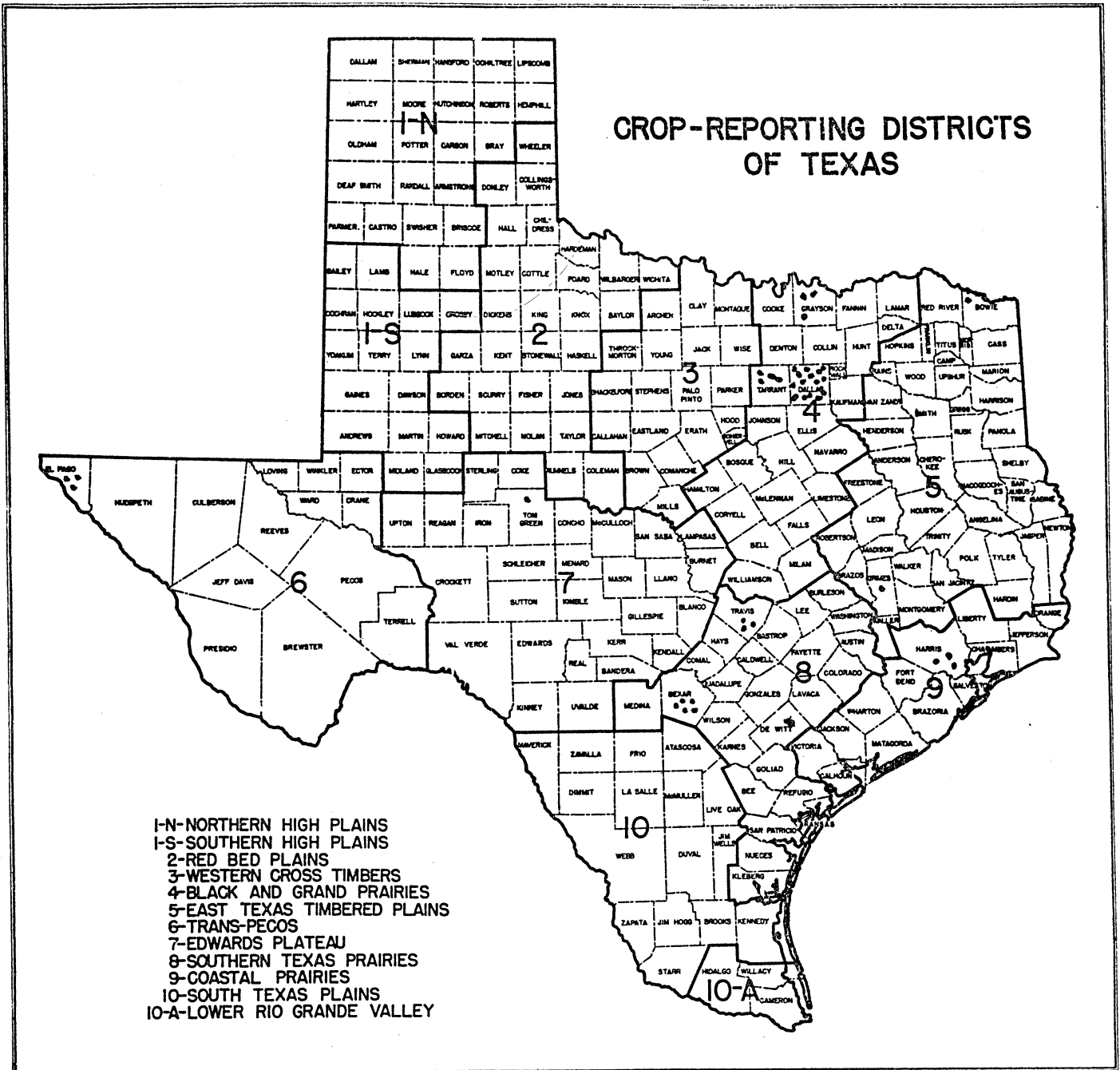
Figure 5 shows the location of the principal plants in Texas which refine vegetable oils and manufacture shortening, cooking oils, salad dressing, margarine, mayonnaise and similar food products containing vegetable oils. See Table 6.

FIGURE 4. DISTRIBUTION OF DAIRY CATTLE IN TEXAS, 1940



Source: U. S. Census, 1940

Figure 5. SHORTENING, COOKING OILS AND MARGARINE PLANTS IN TEXAS



One dot represents one plant.

Source: Directory of Texas Manufacturers, 1959.  
 The International Green Book, 1957-58.

TABLE 6  
 TEXAS AND THE UNITED STATES RATE OF GROWTH FOR SHORTENING AND VEGETABLE COOKING OILS  
 1930, 1940, 1954

Part A						
Year	Number of Establishments	Total Persons Employed in Manufacturing	Total Salaries and Wages	Costs of Material, Supplies, Fuel, Purchased Electric Energy and Contract Work	Value of Products	Value Added by Manufacture
Texas						
1954	7	1,007	\$ 4,606,000	\$ 86,296,000	\$104,441,000	\$ 18,145,000
1940	10	884	1,039,906	15,390,346	18,733,914	3,343,568
1930	8	416	598,299	14,982,001	17,709,031	2,727,030
U. S.						
1954	102	9,393	42,414,000	759,347,000	935,338,000	175,988,000
1940	56	6,407	9,088,273	154,357,703	186,252,453	31,894,750
1930	40	3,487	4,723,942	139,030,964	154,553,197	15,522,233

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Part B  
 VEGETABLE OIL REFINERS AND MANUFACTURERS OF SHORTENING AND COOKING OILS, MARGARINE,  
 SALAD DRESSING AND SALAD OILS, 1954 - TEXAS

Vegetable Oil Refineries	Shortening and Cooking Oil Manufacturers	Margarine Manufacturers	Salad Dressing and Salad Oil Manufacturers
14	9	8	6

Note - There is substantial duplication in numbers of plants.

Source: Part A - U. S. Census of Manufactures.  
 Part B - The International Green Book.



## Cotton Linters Used in Texas Industries

Cotton linters constitute a raw material devoted to many uses. In Texas so far its major use has been in the bedding industry. Figure 6 shows the location of mattress factories in Texas. Linters form the major source of relatively pure, high quality cellulose for man-made fiber and plastic industries. It is also highly important in the manufacture of explosives.

### PART III

#### Summary of the Price Structure for Cottonseed and Cottonseed Products

The price structure for cottonseed and cottonseed products is based primarily on prices obtained for the finished consumer goods made from those products such as milk from feed, shortening from oil, medical gauze from linters, etc. Thus a ton of cottonseed is worth what its constituent parts are worth in the form of consumer products less all costs involved. Basically, then cottonseed is a residual claimant for a share of the consumer's dollar spent for consumer products made from cottonseed.

Price determining forces of demand for and supplies of cottonseed products are equated in central consumer markets. Prices determined in these markets for refined oil, meal, linters and hulls are used in combination by cottonseed crushers in bargaining with ginners for cottonseed.

Major reasons for the above pricing system may be summarized as follows:

1. Adequate substitutes in great supply are available for each of the products of cottonseed in consumer's markets.
2. Most finished consumer products are of the nature of refined raw material.
3. Cottonseed crushers are processors; they are middlemen concerned primarily with operating costs margins.
4. Ginners are essentially buying brokers for crushers.
5. The decline in the supply of cottonseed products relative to substitutes is shifting price determining power away even from cottonseed products and cottonseed to substitutes, especially soybean products.

More detailed explanations will be given of the above stated facts in the discussions to follow.

Figure 6. LOCATION OF MATTRESS FACTORIES IN TEXAS



One dot represents one plant.

Source: The Directory of Texas Manufacturers.

Price Determining Factors and  
Forces for Cottonseed Cake and Meal

Cottonseed meal has many potential uses but it is predominantly a feed product. It is therefore a means to ends, which are primarily production of dairy products and meat, especially beef. Prices of these products are the major factors in determining the feed value of cottonseed cake and meal. The relations between the prices of products and cottonseed meal are the most accurate and easily understood indicators of the price of cottonseed meal.

Table 7 gives the milk-feed ratio of the wholesale price of milk and the farm price of cottonseed meal and hulls.

TABLE 7.

THE AVERAGE NUMBER OF POUNDS OF COTTONSEED MEAL WHICH COULD BE BOUGHT IN FT. WORTH AT WHOLESALE PRICE BY THE WHOLESALE PRICE OF 100 LBS. OF MILK SOLD BY FARMERS IN TEXAS EACH MONTH FROM 1948 TO 1957

Year	Average Annual Price of 100 Lbs. of Milk Received by Texas Farmers	Average Annual Price of 100 Lbs. of Cottonseed Meal at Ft. Worth	Number of Lbs. of Meal Which Can Be Bought by Price of 100 Lbs. of Milk
1947	\$ 5.87	\$ 3.40	173
1948	6.11	3.17	193
1949	5.67	3.16	179
1950	5.26	3.50	150
1951	6.18	4.20	147
1952	6.89	3.20	215
1953	6.10	3.70	165
1954	5.46	3.70	148
1955	5.64	3.40	166
1956	5.75	3.20	180
1957	5.56	3.00	185

Source: Agricultural Statistics.

The ratio of the wholesale price of a gallon of milk in Texas to the price of three pounds of cottonseed meal in 100-pound bags plus four pounds of hulls in Fort Worth is one check or indicator of the use value of these products, especially of comparative values as shown in Table 8.

TABLE 8

RATIO OF THE RETAIL PRICE OF A UNIT OF 3 POUNDS OF COTTONSEED MEAL AT FORT WORTH PLUS 4 POUNDS OF COTTONSEED HULLS (THE AMOUNT CALCULATED TO PRODUCE A GALLON OF MILK) TO THE WHOLESALE PRICE OF MILK RECEIVED BY TEXAS FARMERS

Year	Price of a Unit of Feed 3 Lbs. of Cottonseed Meal Plus 4 Lbs. of Hulls			Price per Gallon of Milk Wholesale Received by Farmers (Cents)	Cents Spread in Price Be- tween Meal- Hulls Feed and Milk	Ratio of the Price of Meal and Hulls to Milk or Percent of Meal and Hulls of Price of Milk
	Meal Cents	Hulls Cents	Total Cents			
1947	15.06	4.00	19.06	50.60	31.54	37.67
1948	9.51	1.31	10.82	52.55	41.73	20.59
1949	9.48	1.40	10.88	48.76	37.88	22.31
1950	10.59	2.68	13.27	50.18	36.91	26.44
1951	12.72	4.52	17.24	57.12	49.88	30.18
1952	13.86	6.38	20.24	52.81	31.57	38.33
1953	11.49	5.20	16.69	48.41	31.72	34.48
1954	11.04	3.70	14.74	48.02	33.28	30.70
1955	10.29	4.19	14.48	49.13	34.65	29.47
1956	9.66	3.97	13.63	48.88	35.25	27.88

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Source: Western Feeders Supply Company, Fort Worth, Texas.  
U. S. Department of Agriculture.

Combinations of cottonseed meal and hulls are extensively used in the cotton growing region for fattening beef cattle. The ratio of the price of beef to the wholesale price of cottonseed meal serves as a valuable indicator to the feeder of cottonseed meal as measured by past experience, as shown in Table 9 that follows.

TABLE 9. THE AVERAGE COST OF COTTONSEED MEAL, PLUS HULLS TO PRODUCE 100 LBS. OF PRIME BEEF STEERS, THE AVERAGE ANNUAL PRICE OF PRIME BEEF STEERS IN CHICAGO AND THE RATIO OF COST OF FEED TO BEEF FOR THE YEARS 1947 THROUGH 1957

Year	Average Cost of 612 Lbs. of Cottonseed Meal <sup>1</sup> and 578 Lbs. Hulls <sup>2</sup> to Produce 100 Lbs. of Live Prime Beef Steer Wholesale at Fort Worth, Texas	Average Price of Prime Beef Steers in Chicago Per 100 Pounds	Differences Between Costs of Feed and 85% of Price of Beef Steer	Percentage Cost Feed is of the Price of 100 Lbs. of Beef Steer Column 1 Divided by Column 2
1947	\$ 30.83	\$ 45.61	\$ 7.74	68
1948	21.26	53.76	24.44	40
1949	21.60	46.17	17.64	47
1950	29.01	50.53	14.03	57
1951	30.68	58.66	19.18	52
1952	28.77	55.34	18.27	52
1953	23.24	42.92	13.24	54
1954	24.51	43.60	12.55	56
1955	18.38	42.91	18.09	43
1956	18.66	40.93	16.13	46

Source: Agricultural Statistics, U.S.D.A.

<sup>1</sup> On basis of 41% protein, bagged, carlots, Memphis.

<sup>2</sup> Bulk carlots, Atlanta, through Sept. 1944, Southeast mills, October 1944, October 1947, f.o.b. mills, Memphis, November 1947 to date.

It is especially important for feeders to observe and take advantage of the wide fluctuations in the price of cottonseed meal both by years and especially by months as indicated in Table 10 by the prices farmers get for cottonseed. While it is not shown in this table, it is equally important to follow the very wide variations of production of cottonseed by regions as shown by Table 11. Cotton Economic Research has set up a schedule of reports showing these changes beginning in August with the new crop. These reports will be issued each month during the harvesting season. See tables 18 and 19.

TABLE 10

COTTONSEED MONTHLY AND AVERAGE ANNUAL PRICES RECEIVED BY FARMERS, 1948 - 1957 IN THE UNITED STATES AS OF 15th OF THE MONTH IN DOLLARS PER TON

Crop Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly Average
1948	95.10	88.60	87.90	89.40	90.70	92.20	<u>96.00</u>	76.60	68.10	<u>63.70</u>	69.00	68.80	67.20
1949	<u>65.70</u>	53.40	51.40	50.30	50.40	46.70	<u>37.50</u>	44.40	43.50	41.90	42.30	43.30	43.40
1950	43.60	43.60	<u>43.00</u>	44.40	45.20	46.20	52.00	70.90	78.80	81.50	98.40	<u>102.00</u>	86.60
1951	101.00	100.00	<u>103.00</u>	103.00	101.00	95.60	78.00	69.10	<u>66.10</u>	69.90	72.70	71.50	69.30
1952	70.10	67.10	61.50	<u>60.80</u>	60.80	61.90	<u>71.00</u>	69.80	69.60	70.70	69.70	68.50	69.60
1953	<u>65.30</u>	64.50	63.60	63.10	61.80	61.20	59.00	56.70	<u>51.50</u>	52.40	53.30	53.00	52.70
1954	52.00	51.40	<u>50.50</u>	50.80	51.40	51.40	54.00	61.30	<u>61.60</u>	60.20	59.40	59.60	60.30
1955	<u>56.80</u>	55.20	53.40	53.40	53.10	52.00	54.00	50.10	43.70	<u>43.50</u>	44.30	45.00	44.60
1956	<u>45.50</u>	46.20	46.80	46.90	47.30	47.40	49.00	51.00	47.70	54.10	<u>59.20</u>	39.90	53.50
1957	60.40	58.60	<u>60.60</u>	54.76	54.76	54.76	54.76	55.00	53.20	<u>49.80</u>	50.00	50.50	54.76

Note: Underscored figures represent the lowest and the highest prices for the year.

Source: U. S. Department of Agriculture.

TABLE 11

DOLLAR VALUE OF COTTON AND COTTONSEED BY CROP REPORTING  
DISTRICTS FOR YEARS 1953 THROUGH 1957 AND THE PERCENT THEY  
FURNISH OF TOTAL CASH FARM INCOME IN EACH DISTRICT IN TEXAS  
(In Thousands of Dollars)

Year	1-N	1-S	2	3	4	5	6
1953	\$ 75,338	\$ 144,460	\$ 70,283	\$ 3,483	\$ 175,128	\$ 37,157	\$ 41,187
1954	94,363	237,260	77,460	1,086	89,168	26,440	48,615
1955	103,960	222,875	81,328	4,078	90,924	30,228	52,939
1956	90,384	231,738	51,649	679	68,638	27,184	74,581
1957	89,678	213,198	49,389	1,949	64,334	28,593	51,987
Five Yr. Average	90,745	209,906	66,013	2,255	97,638	29,921	53,862
Total Farm Cash In- come	\$1,215,506	\$1,288,768	\$741,558	\$487,958	\$1,261,288	\$739,660	\$387,628

Percent Value of cotton and cottonseed are of total farm cash income by  
districts for 1953 through 1957

37.33	81.44	44.52	23.11	38.71	20.23	69.48
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Year	7	8	9	10	10-A	State Total
1953	\$ 4,917	\$ 54,901	\$ 36,749	\$ 5,191	\$ 43,236	\$ 683,028
1954	2,404	69,085	35,978	11,476	82,035	775,370
1955	5,118	73,012	39,025	13,595	82,608	799,690
1956	679	41,453	29,223	6,795	77,473	700,476
1957	1,949	38,340	29,243	9,748	71,483	649,891
Five Yr. Average	3,013	53,558	34,043	9,361	71,367	721,691
Total Farm Cash In- come	\$456,435	\$1,079,550	\$ 708,649	\$383,181	\$583,138	\$9,333,319

Percent Value of cotton and cottonseed are of total farm cash income by  
districts for 1953 through 1957

33.01	24.81	24.02	12.21	61.19	39.00
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Cottonseed meal is growing rapidly in importance in the livestock phase of agriculture in the cotton growing region, especially because of the growing recognition of the importance of protein in all animal production and the rapid development of formula feeds, especially for dairy cattle and poultry.

#### Price Determination of Cottonseed Hulls

Cottonseed hulls are a raw material adapted to a number of uses, but as already described, the dominant use in the cotton growing area is as a roughage for feeding cattle and the hulls are best used as a carrier in a mixture with cottonseed meal to prevent waste and aid digestion. The nutritive content is that of prairie hay. One hundred pounds of cottonseed hulls have the feeding value of about 200 pounds of sorghum silage.

The special uses of cottonseed hulls in feeding cottonseed meal and pellets make the volume of production in Texas the dominant force in price making in Texas. This means that estimation of cotton production in Texas is normally a sound base for estimating the supply and price of cottonseed hulls. Since there are wide fluctuations in the annual volume of cotton production in Texas by crop reporting districts, there is a corresponding fluctuation in the price of hulls by districts which buyers need to watch.

#### Price Determining Forces for Cottonseed Oil

Crude cottonseed oil as it leaves the crusher is highly perishable so that it moves rapidly from the cottonseed crushers to the cottonseed oil refiners, and when refined, cottonseed oil keeps indefinitely. Surplus stocks of cottonseed oil are carried as refined oil by refiners. Prices of crude cottonseed oil parallel closely prices of refined oil as shown by Table 12. Price bargaining in central markets are based on refined oil.

TABLE 12. PRICES OF CRUDE COTTONSEED OIL AND REFINED COTTONSEED OIL FOR YEARS 1947 - 1956

Year Beginning <u>August 1</u>	Price of Oil Per Pound	
	<u>Crude</u>	<u>Refined</u>
	(In Cents per Pound)	
1947	26.25	27.75
1948	15.25	17.23
1949	12.51	14.66
1950	20.39	22.87
1951	12.98	15.38
1952	14.25	16.24
1953	13.56	15.61
1954	13.39	15.26
1955	13.13	15.15
1956	13.39	15.54

Source: Agricultural Statistics, USDA



Cottonseed oil refiners reduce their risks by selling contracts for delivery in the futures markets. The comparatively few refiners thus sell most of the contracts on the supply side of the futures market as hedges. The buyers are the large number of users of the refined oil including makers of cooking oil, shortening, salad oils and dressing, mayonnaise, margarine, etc. They buy the contracts to hedge against their sales of finished products for forward delivery. Most of the buyers of these futures contracts actually buy the oil they use directly from refiners because they require further treatment such as deodorization, clarification, etc. They settle their long hedges by offset sales of their futures contracts, and the refiners at the same time buy futures contracts to offset their short hedges. The futures price is the most representative price of the value of cottonseed oil--crude as well as refined.

#### Supply of Food Fats and Oils in Price Determinations

Cottonseed oil and its by-products have a wide range of uses but for every use of significance there are adequate and abundant substitutes. Its supply then is not the dominant factor even on the supply side in determining its price. The elements in supply to be considered in estimating cottonseed oil prices are annual carryover of food fats and oils, their production and imports into the United States, plus food uses of other fats and oils.

Table 13 gives the carryover of food fats and oils, their annual production, their imports into the United States and food uses of other fats and oils. Table 13 also shows the estimated production of butter, lard, cottonseed oil and soybean oil and their totals separately. The four items listed separately constitute most of the total annual accretion to supply and that, plus the fact that the organized markets are built around them, make them the dominant forces in price determination on the supply side. The analyses to follow center around these four items of supply.

As shown by Part B of Table 13, the total volume of production of butter, lard, cottonseed oil and soybean oil is increasing faster than domestic consumption. It is perhaps of even greater interest that the increase is not uniform as between the four items. To what extent has government controls been a factor in causing these changes? Is it wise?

Average production of cottonseed oil during the five years ending 1956 exceeded the average production for the previous five years by 13.8 percent as shown by Part B, Table 13. In the case of soybean oil the increase was 33.5 percent, for butter 3.9 percent, and for lard only 1.7 percent. Table 13 also indicates that production of vegetable oils in the United States is definitely outrunning production of animal fats and oils. The growths of vegetable oil production compared with animal

TABLE 13

PART A. ANNUAL SUPPLIES OF FOOD FATS AND OILS IN THE UNITED STATES BY YEARS, 1947-1956.  
 PART B. ANNUAL PRODUCTION OF BUTTER, LARD, COTTONSEED OIL AND SOYBEAN OIL, 1947-1956.

Part A. Annual Supplies of All Food Fats and Oils:						Part B. Annual Production of Butter, Lard, Cottonseed Oil and Soybean Oil				
Year	Stocks	Production	Imports	Food Uses of Other Fats and Oils	Total Supply	Creamery Butter Churned on Farms	Lard	Cottonseed Oil (Crude)	Soybean Oil (Crude)	Total
(In Millions of Pounds)										
1947	717	7,057	22	130	7,926	1,640	2,402	1,276	1,534	6,852
1948	740	7,339	45	167	8,291	1,504	2,321	1,704	1,807	7,336
1949	910	8,486	21	149	9,566	1,688	2,534	1,847	1,937	8,006
1950	1,035	8,426	80	193	9,734	1,648	2,631	1,197	2,454	7,930
1951	895	8,743	41	188	9,867	1,443	2,863	1,751	2,444	8,501
1952	1,144	8,968	53	218	10,383	1,402	2,881	1,825	2,536	8,644
1953	1,518	9,038	47	203	10,806	1,607	2,355	2,074	2,350	8,386
1954	2,032	9,136	69	252	11,489	1,628	2,330	1,735	2,711	8,404
1955	1,707	9,858	85	226	11,876	1,568	2,660	1,894	3,143	9,246
1956	1,405	10,437	48	268	12,158	1,549	2,624	1,626	3,431	9,938

Supplement to Table 12. Production of Fats and Oils in the United States, 1957 and 1958.

1957	1,540	2,440	1,440	3,800	9,905*
1958	1,550	2,725	1,575	5,900	12,500*

\* Includes "Other" fats and oils.

Source: Agricultural Statistics and The Fats and Oils Situation.

fats is even more striking than is shown by Table 13. Preliminary figures recently issued and added as a supplement to Table 13 show that soybean oil production in 1958 was 5.9 billion pounds or an increase of over 80 percent above the 1956 production, whereas, cottonseed oil production declined 3.2 percent and butter and lard made little change. The outstanding fact presented by the supplementary data to Table 13 is, of course, the tremendous increase in production of soybean oil, and its growing power in price determination.

#### Demand for Food Fats and Oils

Cottonseed oil is strictly a food except for its by-products. The price determining forces on the demand side of the market come from its use in major foods. It will suffice here to analyze major uses of food fats and oils and the competition of butter, lard, cottonseed oil and soybean oil for these uses.

There are many food uses for food fats and oils but there are three major groups of uses generally known as: (1) spreads including butter and margarine, (b) cooking fats and oils composed of lard and shortening, and a group of uses dominated by salad oils, mayonnaise and salad dressing. Butter, lard, cottonseed oil and soybean oil supply above 90 percent of these uses.

Relative consumption of food fats and oils is the underlying force on the demand side indicating the outcome of the struggle between the major food fats and oils for predominance in the United States. Table 14 shows the total annual supply of food fats and oils in the United States for the ten years 1947-56 along with their annual disposition. The important fact illustrated by Table 14 is that consumption of food fats and oils in the United States is falling behind production. The lag in consumption is primarily in animal fats.

TABLE 14. DISPOSITION OF UNITED STATES SUPPLIES OF FOOD FATS AND OILS ANNUALLY FOR THE YEARS 1947 THROUGH 1956  
(Millions of pounds)

Year	Total Supply	Exports	Food Uses	Non-Food Uses	Estimated Carryover
1947	7,926	720	5,986	418	802
1948	8,291	714	6,183	413	981
1949	9,566	1,663	6,287	528	1,088
1950	9,734	1,279	6,890	585	980
1951	9,867	1,696	6,366	496	1,309
1952	10,383	1,373	6,765	579	1,666
1953	10,806	1,221	6,876	535	2,174
1954	11,489	1,936	7,230	496	1,827
1955	11,876	2,403	7,388	552	1,533
1956	12,158	2,987	7,343	573	1,255

Source: Agricultural Statistics, U.S.D.A., 1957

Table 15 which shows the annual civilian consumption of food fats and oils for major classified uses in the United States for 1946-57 gives a clear picture of competitive conditions in the food fats and oils market.

Consumption of butter and margarine during the five years ending with 1956 averaged 2,692 million pounds compared with 2,405 million pounds during the previous five years. Average per capita consumption for the two items increased from 16.3 pounds in the first five years to 16.9 pounds for the five years ending with 1956. The outstanding fact revealed in this part of Table 15 is the loss of the butter market both in total consumption and per capita to margarine.

Consumption of lard and shortening in total pounds gained slightly during the five years ending 1956 over the average of the five years ending 1951, but average per capita consumption lost from 24.2 pounds in the first period to 21.6 pounds in the five years ending 1956. The most significant fact was a substantial gain in shortening and a loss in lard.

The overall gain in consumption of food fats and oils from 1947-56 was due to increases in salad oils, salad dressings, etc. The increases in this field of uses accounts for most of the overall increase in pounds from 42.1 pounds in 1951 to 44.4 pounds for the five years ending 1956.

The most outstanding fact presented in Table 15 is the expanding use of vegetable oils at the expense of animal fats. The consumption of both butter and lard have gone down in total and per capita and at about the same rate. Total consumption of butter during the five years ending 1956 was down 3.9 percent from the five years ending 1951 and per capita was down 16.8 percent. In the case of lard total consumption in the last period was down from the first by 8.2 percent and per capita consumption was down about 13.9 percent.

The second fact of major importance revealed in Table 15 is the rapid increase in consumption of vegetable oils, and especially in soybean oil. Available figures indicate that about 95 percent of the total fats and oils used in making shortening, margarine and other food uses such as salad oils, dressing, mayonnaise, etc., are vegetable oils and above 90 percent are cottonseed and soybean oils. The two major oils are essentially interchangeable in use and changes in consumption are the result and will tend to be greatly influenced by relative prices.

The third fact of major significance revealed in this brief analysis of major food fats and oils is the rapid increase of soybean oil compared with cottonseed oil in production of margarine. In 1947 there were 323 million pounds of cottonseed used in the manufacture of margarine and 228 million pounds of soybean oil. In 1956 there were 281 million pounds of cottonseed oil used in the manufacture of margarine and 751 million pounds of soybean oil. It is noteworthy that for each of the two major uses of fats and oils, animal fats and vegetable oils are on a substitutable basis, that is, butter and margarine and lard and shortening.

TABLE 15

FATS AND OILS USED IN PRODUCTS FOR CIVILIAN CONSUMPTION, UNITED STATES 1947 - 1956  
GROUPED UNDER MAJOR USES

Year	Spreads				Cooking				Other Oils Food Uses		All Food Uses	
	Butter		Margarine		Lard		Shortening		Total	Per Capita	Total	Per Capita
	Total	Per Capita	Total	Per Capita	Total	Per Capita	Total	Per Capita				
	Mil. Lbs.	Lbs.	Mil. Lbs.	Lbs.	Mil. Lbs.	Lbs.	Mil. Lbs.	Lbs.	Mil. Lbs.	Lbs.	Mil. Lbs.	Lbs.
1947	1,600	11.2	713	5.0	1,792	12.6	1,338	9.4	998	6.9	5,986	42.0
1948	1,450	10.0	887	6.1	1,850	12.7	1,410	9.7	1,037	7.1	6,183	42.6
1949	1,549	10.5	851	5.8	1,744	11.8	1,435	9.7	1,163	7.9	6,287	42.6
1950	1,614	10.7	918	6.1	1,891	12.6	1,656	11.0	1,297	8.6	6,890	45.9
1951	1,445	9.6	996	6.6	1,855	12.3	1,365	9.0	1,168	7.7	6,366	42.1
1952	1,316	8.6	1,219	7.9	1,817	11.8	1,562	10.2	1,339	8.7	6,765	44.1
1953	1,329	8.5	1,256	8.1	1,772	11.4	1,597	10.2	1,415	9.1	6,876	44.1
1954	1,411	8.9	1,346	8.5	1,627	10.2	1,870	11.8	1,505	9.5	7,230	45.4
1955	1,465	9.0	1,322	8.1	1,639	10.1	1,863	11.5	1,641	10.1	7,388	45.5
1956	1,443	8.7	1,353	8.2	1,645	9.9	1,797	10.9	1,645	10.0	7,343	44.4

Source: Agricultural Statistics, U.S.D.A., 1957.

## Prices of Food Fats and Oils

In a free market prices of food fats and oils are a result of supply and demand forces. These same prices will in the long run have a strong influence in directing both production and consumption. In a free market such prices are the best indicators of trends of both volume and quality of production as well as consumption. Because of Federal production controls, price supports and export subsidies, there is not a free market in the economic sense in the United States. Substitutability of margarine for butter and shortening for lard, as well as one major food oil for another, is the dominant force making possible basic changes taking place in the edible fats and oils industries. The significance of substitutabilities lies in the fact that basically competition for use is being more and more put on a price basis engendered largely by government control policies.

Table 16 shows the prices of the four dominant fats and oils produced and consumed in the United States. Many factors and forces enter into the determination not only of the amounts consumed but their relative prices in the United States. Butter, lard, and cottonseed oil, especially and soybeans in crop rotation, are by-products of basic industries which give character to United States agricultural regions such as the cotton belt, the dairy belt and the corn-hog belt. It is highly important that comprehensive analyses be made of the government's controls of production and price supports to determine their long run effects on the efficiency of specialized regional production in the United States.

TABLE 16. WHOLESALE PRICE PER POUND OF BUTTER, LARD, COTTON-SEED OIL AND SOYBEAN OIL, 1947 - 1956

Year	Butter <sup>1</sup>	Lard <sup>2</sup>	Cottonseed Oil <sup>3</sup>	Soybean Oil <sup>4</sup>
(In Cents Per Pound)				
1947	68.0	25.6	33.0	29.1
1948	73.3	24.4	33.5	28.3
1949	59.9	15.1	18.2	15.8
1950	59.9	15.7	22.1	18.5
1951	68.1	20.4	26.4	22.8
1952	71.0	14.5	19.5	16.0
1953	64.3	16.2	22.0	19.4
1954	58.1	20.8	20.9	19.9
1955	56.4	15.2	20.1	18.4
1956	58.2	15.9	20.5	18.9

<sup>1</sup> Butter, creamery, Grade B (90 score), bulk, Chicago.

<sup>2</sup> Lard, refined, 1-pound cartons, Chicago.

<sup>3</sup> Cottonseed oil, refined, drums, New York.

<sup>4</sup> Soybean oil, refined, drums, New York.

Source: Agricultural Statistics, U.S.D.A.

## Procedures in Price Determination of Cottonseed Products and Cottonseed

The object here is to describe the basic set-up and trading procedures in the economics of price determination without going into detail. In the case of major fats and oils where each is characterized by a great number of producers and qualities of products and a wide range of uses and a large number of consumers, the following conditions are essential for satisfactory price determination.

1. Standardization of qualities of the product, quick, accurate, cheap methods of checking commercial qualities of products against the standards.
2. An organized central association of traders with strict rules governing such matters as a representative quality on which to base trading, a standard quantity, time, place and terms of delivery.
3. A comprehensive, reliable system of gathering and publishing statistical data pertaining to supplies such as production, carryover, sales uses and prices.
4. A satisfactory system for settling disputes.

Each of the four products of cottonseed as made by crushers are traded on in different markets and will be described separately and in order of their importance in determining prices of cottonseed.

Table 17 which shows the average dollar value of each product obtained from a ton of cottonseed is the basic data for determining the value of cottonseed to cottonseed crushers. Under the wide range of special conditions which enter into actual price-making in trades of particular mills at particular times makes it impossible for each mill to use the industry-wide average as its base for calculating the value of cotton. Table 17 explains the procedure to follow, but each mill will need to keep its own record, especially of yields of products from a ton of seed, together with the prices it is able to obtain, and its costs.

### Cottonseed Oil

Normally, cottonseed oil furnishes over half of the value of products obtained by crushers from a ton of cottonseed. The oil is more important than this percentage in determining the price of cottonseed because it has the most responsive, reliable and usable market for price protection.

TABLE 17

THE AVERAGE DOLLAR VALUE OF PRODUCTS OBTAINED BY CRUSHERS  
FROM A TON OF COTTONSEED BY YEARS 1947 THROUGH 1957

Year	Average Dollar Value in a Ton of Cottonseed					Average Farm Price of a Ton of Seed
	Oil (Crude)	Cake or Meal	Linters	Hulls	Total	
1947	\$82.16	\$40.36	\$12.46	\$3.53	\$138.51	\$85.90
1948	49.34	28.39	7.21	1.52	86.46	67.20
1949	40.41	28.33	9.87	1.64	80.25	43.40
1950	65.45	34.81	29.99	4.15	134.40	86.40
1951	41.54	38.99	16.06	3.93	100.52	69.30
1952	46.74	37.33	10.95	3.72	98.74	69.60
1953	45.02	30.70	8.43	2.59	86.74	52.60
1954	44.32	32.48	7.25	3.11	87.16	60.30
1955	44.51	25.78	6.30	1.24	77.83	44.60
1956	45.53	27.76	4.58	1.52	79.39	53.40
1957	46.10	27.20	7.85	1.58	81.15	51.10

Source: Agricultural Statistics, 1947 - 1957.  
Fats and Oils Situation, 1957.

The major or central market for trading in cottonseed oil is in the futures market in the New York Produce Exchange. This is a highly standardized market with adequate rules approved by the Commodity Exchange Administration in the U. S. Department of Agriculture and operations are supervised by it.

The futures contract used specified 60,000 pounds of a specifically described refined oil which includes a very large percent of total production. The contract calls for delivery in tank cars in New York. However, deliveries may be made at a wide range of other designated places by agreement and adjustment of costs. Prices are quoted in cents and hundredths of a cent per pound (13.25 cents). Buying and selling is for specified months of delivery. At the time the trade is made each buyer and seller puts up a margin payment of 7.1 percent of the price with the Exchange which must be kept good. The annual volume of trading amounts to between \$800 and \$900 million dollars which is sufficient to provide cover for reasonable hedge facilities for spot buyers and sellers.

Only members of the Exchange can trade on their own account. The Provisions for non-members to trade through members by employing them as brokers makes possible a very broad and relatively inexpensive market in which to trade.



### Cottonseed Meal

Cottonseed meal contributes from 30 to 36 percent of the value of products obtained by crushers from a ton of seed. The cottonseed meal market prices are not as valuable to the crusher as oil for indicating prices he can pay for cottonseed because of the nature of the product and varying nature of regional demand and supply conditions.

The one fully organized central futures market for cottonseed meal is in the Memphis Merchants Exchange and Clearing Association, Memphis, Tenn. The trading contract calls for 200,000 pounds (100 tons) in 2,000 bags of 100 pounds net each of prime 41 percent protein cottonseed meal produced in the United States, delivered in the switching district of any city designated as a delivery point.

Prices are quoted in multiples of dollars and five cents a ton. The minimum fluctuation is five cents a ton and thus \$5.00 a contract. For example, if meal is presently quoted at \$50.00 a ton the next highest price quotable would be \$50.05 and the next lowest price would be \$49.95. This means that the minimum fluctuation in price on a futures contract is \$5.00.

The values shown in Table 16 indicate that cottonseed meal is increasing in importance in determining the value of products from a ton of cottonseed and the value of cottonseed. The average contribution of oil to the value of products received from a ton of cottonseed during the five years ending 1951 was 51.7 percent, meal 31.6 percent, linters 14.0 percent and hulls 2.7 percent. During the next five years ending with 1956 oil contributed 52.1 percent, meal 35.3 percent, linters 9.8 percent and hulls 2.8 percent.

### Cotton Linters

Wide fluctuations in prices and the lack of organized markets for price bargaining make hazardous the inclusion of linters at average values in a formula for estimating the price cottonseed crushers can plan to pay for cottonseed to crush.

There is a wide range of uses for cotton linters and products made from them depending on grades. However, in the past linters have been especially in demand at high prices in times of war for manufacturing explosives. Linters are also an important source of cellulose in the manufacture of man-made fibers and plastics but these uses have been declining in the face of competition from other materials. The net result is that linters are more in the nature of a source of unpredictable income to the cottonseed crushers.

## Cottonseed Hulls

The value to be set on cottonseed hulls as an item to be used by crushers in estimating the price they can pay for cottonseed is even more undependable than linters. Price fluctuations in Table 16 show very wide changes even in the overall average. Hull prices are dominated especially by local and regional conditions of demand and supply.

### PART IV

#### Release Dates for Current Economic Data With Suggested Content and Uses

Economic research data may be classified as historical and current. Historical data deal with past records and are valuable for many purposes such as calculating trends, analyses of cause and effect relations and bases for long time planning.

Current economic data deal with indicators of currently unfolding economic conditions and for which there are sufficient known facts to give reasonable assurance of their maturity in time. In cotton and cottonseed enterprises these anticipatory data are the ones on which current business planning is based and which trigger current buying and selling. These data thus play a significant role in the distribution of income from cottonseed and cottonseed products, particularly at the farm level.

By the use of the United States Department of Agriculture estimates of cotton production in Texas by crop reporting districts, Cotton Economic Research plans to calculate and report currently evolving data indicating cottonseed production by districts. Table 18 shows the release dates on the U. S. Department of Agriculture estimates of cotton production and also release dates for Cotton Economic Research calculations on cottonseed production by crop reporting districts based on the estimates of cotton production.

The United States census reports on the number of bales of cotton ginned by states and counties beginning as of August first and twice a month thereafter through December.

Cotton Economic Research plans releases based on these data to show the current supplies of cottonseed as they are ginned by districts.

Table 19 gives the approximate release dates on these reports. Beginning with this crop, Cotton Economic Research plans to gather samples of cottonseed from ginners as it gathers samples on cotton lint on qualities of lint cotton being ginned. By cooperative agreement these seed

TABLE 18

IMPORTANT DATES OF U. S. DEPARTMENT OF AGRICULTURE IN ESTIMATING PRODUCTION OF COTTON IN TEXAS FOR THE CROP YEAR 1959-60, AND RELEASE DATES ON ESTIMATES OF COTTONSEED PRODUCTION BY COTTON ECONOMIC RESEARCH, THE UNIVERSITY OF TEXAS IN TONS BASED ON GOVERNMENT ESTIMATE OF COTTON PRODUCTION

<u>Government Estimate of Cotton Production as of -</u>	<u>Release Dates of Government Estimate</u>	<u>Release Dates on Cottonseed Production</u>
1959		
August 1	August 10	August 13
September 1	September 8	September 11
October 1	October 8	October 12
November 1	November 9	November 13
December 1	December 8	December 11

TABLE 19

SCHEDULE FOR THE RELEASE OF GOVERNMENT REPORTS ON COTTON GINNED AND REPORTS OF COTTON ECONOMIC RESEARCH, THE UNIVERSITY OF TEXAS ON ESTIMATED COTTONSEED GINNED BY CROP REPORTING DISTRICTS

<u>Cotton Ginned as of Close of Business -</u>	<u>Dates of Government Releases on Cotton Ginned</u>	<u>Approximate Release Dates of Cotton Economic Research and Cottonseed Ginned</u>
1959		
July 31	August 10	August 14
August 31	September 8	September 14
September 30	October 8	October 14
October 31	November 9	November 13
November 30	December 8	December 14
1960		
January 15	January 21	January 29
End of Season	March 21	March 25

samples will be sent to the Cottonseed Products Research Laboratories at A. and M. College, College Station, Texas, where analyses of the content of the cottonseed will be made.

The seed samples collected by Cotton Economic Research will be used by Cotton seed Products Research Laboratory to analyze qualities of cottonseed being ginned and to inform crushers and others of these qualities. The data will be sent to Cotton Economic Research for its use in analyzing economic values of cottonseed and cottonseed products, especially at the farm and gin level.

