AN ANALYSIS OF SOME ECONOMIC FACTORS AFFECTING THE MARKETING OF OKLAHOMA PECANS

By

Joe Senter Chappell

Bachelor of Science

North Carolina State College

Raleigh, North Carolina

1957

Submitted to the faculty of the Graduate School of the
Oklahoma State University of Agriculture and
Applied Science in partial fulfillment
of the requirements for the degree of
MASTER OF SCIENCE
May, 1959

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THE MARKETING OF OKLAHOMA PECANS

Thesis Approved:

Mark L. Fowler
Thesis Adviser

W B Back

Dean of the Graduate School

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CHAPTER I

INTRODUCTION

The over-all objectives of the marketing system for agricultural products have been well formulated by several writers.[1] They may be summarized as follows: (1) through the establishment of an effective and efficient pricing system, to transmit the decisions of consumers, marketing agencies and producers to each other with a minimum of lag, imperfections and distortions, in order to facilitate adjustments in the movement of products and services to consumers; (2) to provide for the movement of products from the farm to the consumer changing them in time, form, place and ownership utility through the co-ordination of marketing and transportation agencies to meet the demands of consumers.

The role of research in agricultural marketing is interpreted to be one of providing a better understanding of the marketing system, both as it now operates and to alternative lines of action, with the ultimate objectives of increasing the efficiency of the system in attaining its objectives.

In an attempt to achieve the over-all objectives of the marketing system, specific marketing research studies may be developed within the

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[1]For example see R. G. Bressler, Jr., "Agricultural Marketing Research", Journal of Farm Economics, Volume XXXI, No. 1, Part 2 (Feb. 1949), pp. 553-562 and Geoffrey S. Shepherd, "The Field of Agricultural Marketing Research: Objectives, Definition, Content, Criteria", Journal of Farm Economics, Volume XXXI, No. 3, (August, 1949), pp. 445-455.

following trichotomy: description, analysis and appraisal. The present study falls largely within the first phase of this threefold division.

Objectives of the Study

The general purpose of this study is to describe and analyze some of the economic factors and forces affecting the economic status of the Oklahoma pecan industry. Emphasis in this study will be directed toward those factors affecting the marketing of Oklahoma pecans.

The specific major objectives are to (1) review some of the trends in the pecan industry, as well as in the domestic edible tree nut industry, (2) provide a description of the trends and characteristics of the pecan industry in Oklahoma, and (3) ascertain and describe some production and marketing practices of a sample of pecan growers in Lincoln County, Oklahoma.

Present Situation

The pecan industry is an important segment of the agricultural economy of Oklahoma. In terms of farm value, the pecan is the most important single horticultural crop produced in the State. For the ten year period 1948-1957, average annual production of all pecans in Oklahoma was 18.6 million pounds, with an average annual farm value of production of nearly 4 million dollars and an average annual value of sales amounting to 3.8 million dollars.[2]

Pecan production in Oklahoma accounts for a substantial proportion of the total production of all pecans in the United States in most years.

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[2] Appendix Table B-II.

During the same period (1948-1957), the production of all pecans in Oklahoma accounted for an average of 13 per cent of the production of all pecans in the United States.

The importance of Oklahoma as a major pecan producing State is more relevant when one considers the relative proportion of "seedling or native" pecan production.[3] The production of seedling type pecans in Oklahoma during this period accounted for nearly 21 per cent of the production of pecans of this type in the United States.

The Census of Agriculture of 1950 reported 13,357 farms in Oklahoma with a total of 1,312,208 seedling pecan trees of all ages. In addition to the above farms, 4,698 farms were reported to have had a total of 181,704 improved trees of all ages. In comparison with these figures, the Census of Agriculture of 1954 reported only 7,441 farms in Oklahoma with a total of 1,108,530 seedling pecan trees of all ages and 2,084 farms with 133,231 improved pecan trees of all ages.[4]

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[3]The terms "seedling or natives" will be used interchangeably throughout the remainder of this study. Seedling pecans are defined for the purpose of this study as those pecans originating from unimproved pecan trees. Likewise the term improved pecans is defined for the purpose of this study as those pecans originating from pecan trees that have been budded, grafted or top-worked.

[4]Direct comparison of tree numbers as well as comparison of number of farms is hindered greatly by the change in definition and sampling procedure encountered during the two census years. The 1950 Census data included pecan trees on those farms having one-half acre or more fruit and nut trees. However, the 1954 Census data included only those trees on farms having twenty or more fruit and nut trees and/or grapevines. In addition, the accuracy of tree numbers in the "seedling" area may be questionable due to the scattered nature of tree growth along creek and river basins. Many of the trees in Oklahoma are situated such that an accurate count of tree numbers is almost impossible.

Although the average annual production of pecans in Oklahoma is substantial, production varies widely from year to year. The extreme nature of annual fluctuation in production is well illustrated by a comparison of the pecan crops for the last three years for which data are available. Pecan production in Oklahoma was estimated at 33 million pounds in 1955. In 1956 production decreased to 7.1 million pounds and then increased in 1957 to an estimated 31 million pounds.

Annual farm value of the Oklahoma pecan crop has varied greatly also during these past three years. Value of production was estimated at $10,032,000 in 1955, $1,388,000 in 1956 and $6,863,000 for the 1957 crop of Oklahoma pecans.

The major pecan producing area of Oklahoma lies in a diagonal belt approximately 75 miles in width running Northeast to Southwest across the State. Pecan shelling plants are located in Carter, Creek, Garvin, Muskogee, Oklahoma and Tulsa counties.

Need and Usefulness of the Study

No systematic research has been conducted either at this institution or elsewhere on the marketing of pecans. At the present time no single source of information is available which contains a review of trends and characteristics of the pecan industry. The descriptive information will provide information necessary in understanding the over-all pecan marketing system. Also, as is the case with much descriptive research, it may serve as a basis for further research. This study is an attempt to give statistical and descriptive information to those interested persons on the organization and marketing practices of pecan growers and to review

trends relevant to the over-all understanding of the status of the pecan industry in Oklahoma.

Procedure and Organization

Chapter II is devoted to a review and analysis of the recent trends in the pecan industry of the United States. References will be directed toward production, prices and values of sales of both the pecan industry and the edible tree nut industry of which it is a part. The variability of production and prices will be discussed as well as an analysis of the geographical shifts in the production of pecans.

A description of the pecan industry in Oklahoma with special reference to the trends and location of pecan production within the State is contained in Chapter III. Included also, is a discussion of the characteristics of the producing segment of the Oklahoma pecan industry.

A description of some of the production and marketing practices of a sample of pecan producers in Lincoln County, Oklahoma, is contained in Chapter IV. Lincoln County was selected as the setting for the pecan producers survey. The personal interview method was used to obtain data for the purpose of describing some production and marketing practices of the sample of pecan producers.

The summary and major conclusion of the study are included in Chapter V.

Appendix A is devoted to an analysis and appraisal of the alleged error in the forecasts of pecan production when compared with the final estimated production of pecans in Oklahoma and the United States. Statistical procedures were employed to appraise the accuracy of these

forecasts as indicators of the size of the pecan crop in the current year and also to indicate the year-to-year changes in the annual production of pecans.

Data from Census of Agriculture for 1950 to 1954 were used as the base for the discussion of the characteristics of pecan production within the Oklahoma pecan industry. Time series data published by the United States Department of Agriculture, Agricultural Marketing Service were used in computing the trends in the production of pecans by types, prices received by farmers and as the basis of the discussion of quantities of pecans produced, shelled and marketed.

Mr. D. D. Pittman, Agricultural Statistician, AMS, USDA at Oklahoma City provided the data on monthly forecasts of pecan production for both Oklahoma and the United States.

CHAPTER II

PRODUCTION, PRICE AND CONSUMPTION TRENDS FOR PECANS IN THE UNITED STATES

In this chapter, a description of recent trends in the supply, utilization and price of pecans is presented. In addition, data relating to the supply and utilization of the other domestic edible tree nuts and the nature of their competition with pecans are presented. Some characteristics of demand and supply of pecans will be discussed. The data used to reflect these trends and characteristics were obtained from available material published by various agencies of the United States Government.

Production and Supply Relations

Production of Pecans in the United States

The production of all pecans in the United States increased more than threefold during the period 1919-57. Although annual production has fluctuated sharply, the trend in pecan production has been steadily upward throughout this period. The centered 6-year moving average production of all pecans increased from 49,673,000 pounds in 1924 to 154,968,000 pounds in 1954 (Figure 1). The production of improved pecans has increased at a more rapid rate than has the production of all pecans (Figure 2). The centered 6-year moving average production of improved pecans increased from 9,936,000 pounds in 1924 to 73,275,000 pounds in 1954. The degree of annual variations in the production of improved

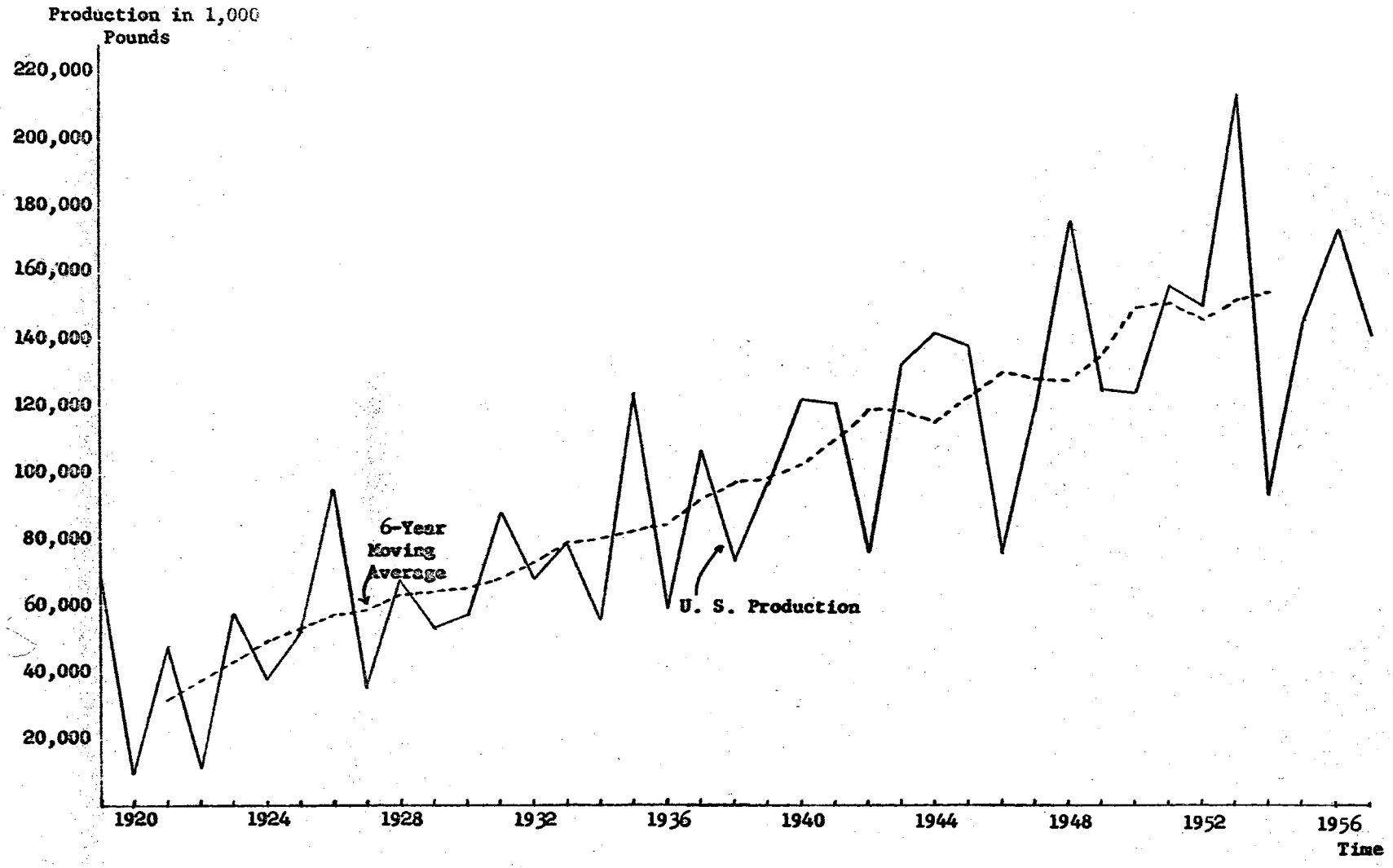

Figure 1. Pecan Production: Annual and Centered 6-Year Moving Average, All Pecans, United States, 1919-1957

Source: Appendix Tables B-I and B-III.

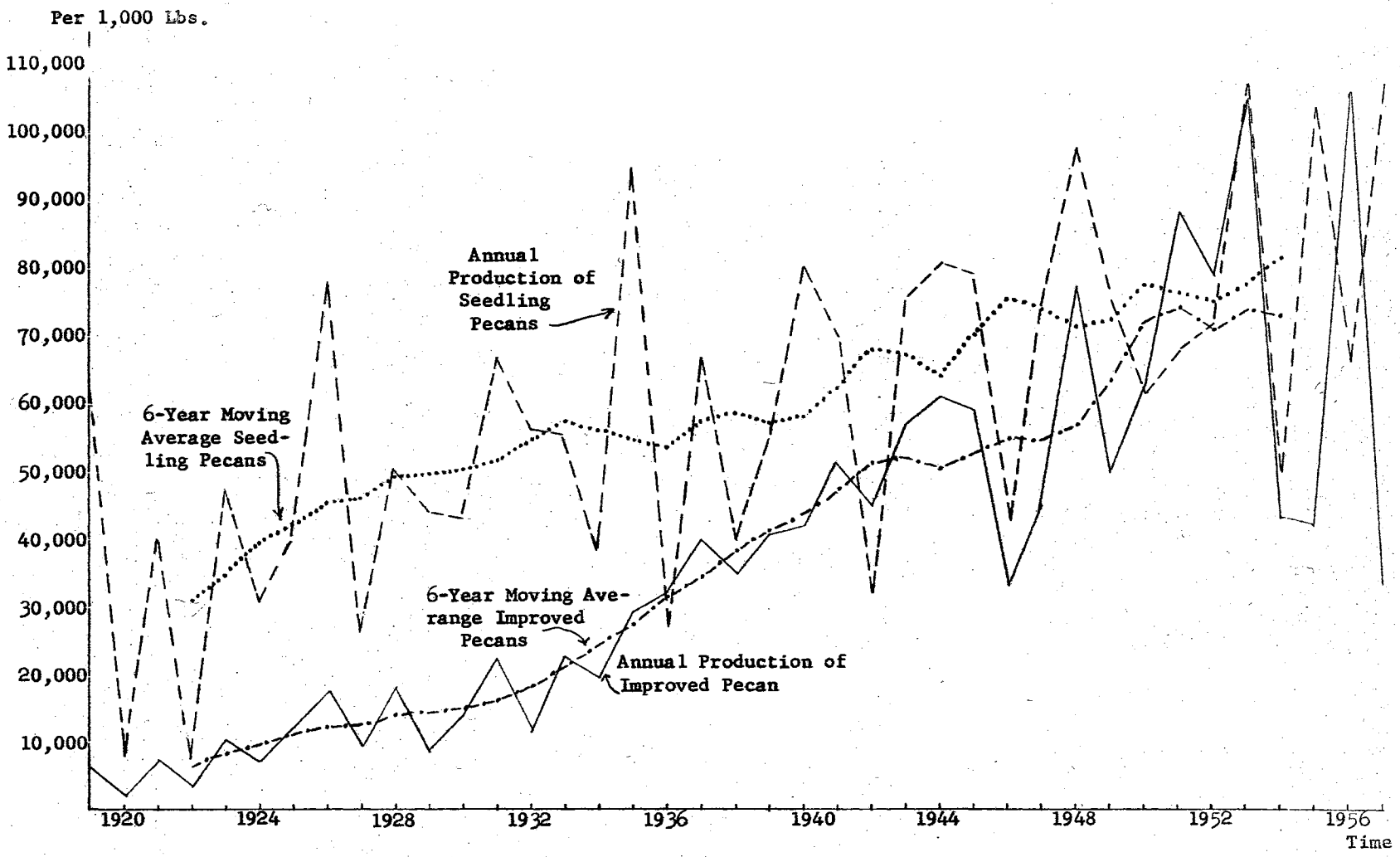

Figure 2. Pecan Production: Annual and Centered 6-Year Moving Average, By Types, United States, 1919-1957

Source: Appendix Tables B-I and B-III.

pecans may be illustrated by production in the last three years: the 1955 crop of improved pecans in the United States was estimated at 42,400,000 pounds, but production increased sharply to 106,310,000 pounds in 1956, and then fell to 34,110,000 pounds in 1957.

The production of seedling type pecans has not increased as rapidly as has the production of the improved type. The centered 6-year moving average production of seedling pecans in the United States increased from 39,737,000 pounds in 1924 to 81,693,000 pounds in 1954. The production of seedling pecans was estimated at 104,460,000 pounds in 1955, 67,390,000 pounds in 1956, and 107,240,000 pounds in 1957.

Changing Production Relations

Total pecan production was three times larger in 1954 than in 1924 (Figure 3). During this period, however, the production of improved pecans increased sevenfold, while the production of seedling pecans only doubled. Improved pecans accounted for approximately 25 per cent of the total production of all pecans from 1919 to 1935. From 1935 to 1957 the proportion of total pecan production represented by the improved type has been approximately 43 per cent. Improved pecan production exceeded seedling pecan production in the United States only during the following years: 1936, 1942, 1950, 1951, 1952 and 1956.

The average production of all pecans increased approximately 52 per cent between the periods 1935-40 and 1950-55 (Table I). The production of improved pecans increased more than 92 per cent while seedling pecan production increased only 27 per cent between these periods. The production of all pecans accounted for 28 per cent of total production of

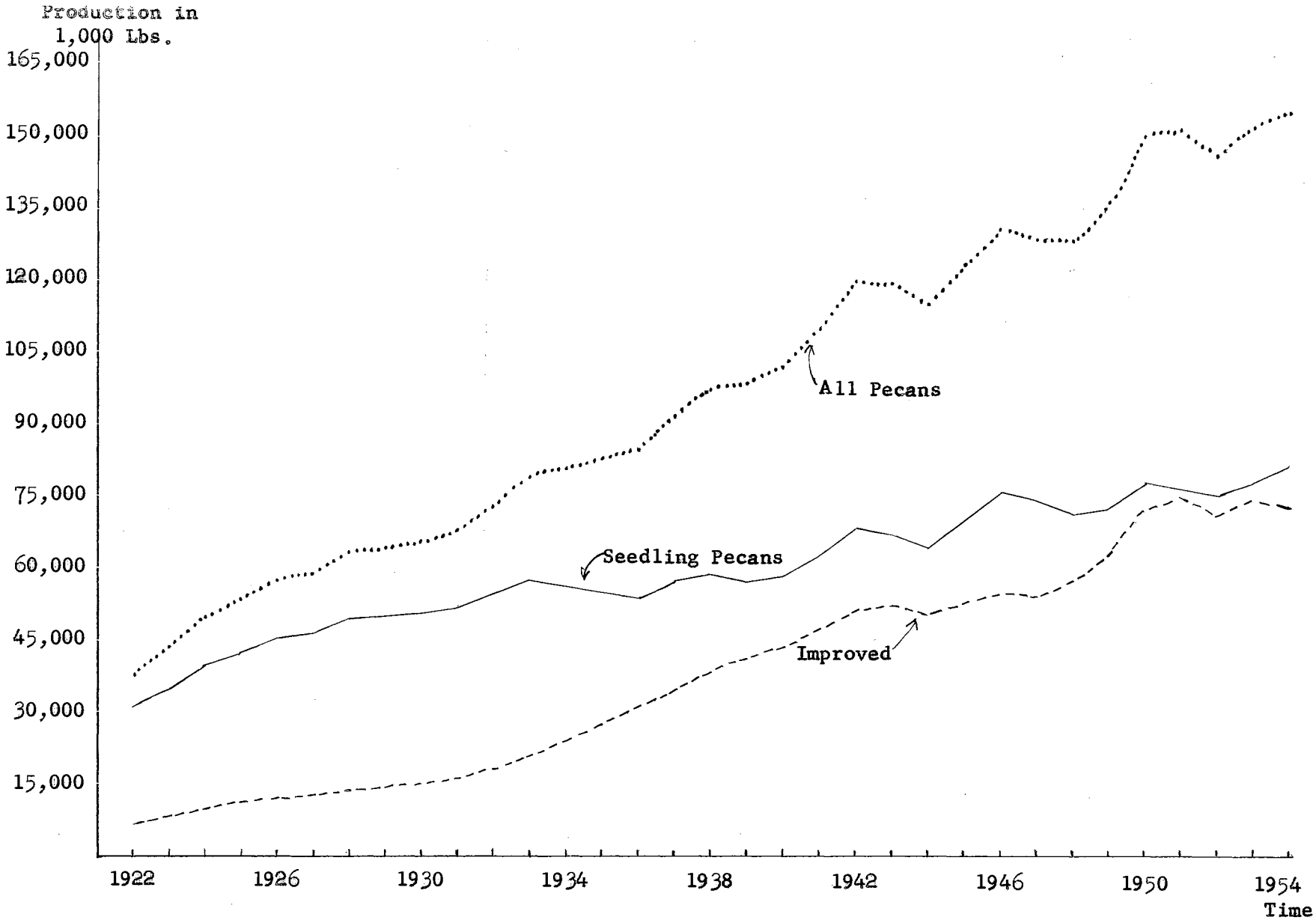

Figure 3. Pecan Production: Centered 6-Year Moving Average, All and by Types, United States, 1922-1954

Source: Appendix Table B-III.

all domestic edible tree nuts in the 1935-40 period and slightly less than 28 per cent in the 1950-55 period. The average total production of all domestic tree nuts increased 54 per cent between the periods. Thus pecan production as a percentage of all domestic tree nut production remained practically unchanged between the periods. The production of improved pecans accounted for 11 per cent of the total production of all domestic edible tree nuts in 1935-40 and 13 per cent of the total in 1950-55. Seedling pecans accounted for 17 per cent of the total production of all domestic edible tree nuts in 1935-40 and 14 per cent in 1950-55.

Table I

United States Production of Pecans and Competing Nuts, Percentage Change and Percentage of Totals

Nuts	United States Production in 1935-40 and 1950-55				
	Average 1935-40 (tons)	Per Cent of Total (per cent)	Average 1950-55 (tons)	Per Cent of Total (per cent)	Percentage Change for 1935-40 (per cent)
Pecans					
All	48,811	28.00	74,036	27.61	51.68
Improved	18,342	10.53	35,281	13.15	92.35
Seedling	30,468	17.49	38,755	14.45	27.20
Walnuts	55,700	31.97	72,917	27.19	30.91
Almonds	18,350	10.53	39,483	14.72	115.17
Filberts	2,575	1.48	7,722	2.88	199.88
Total					
Production	174,246		268,194		53.92
Per Cent		100.00		100.00	

Source: Computed from Appendix Table B-1 and Table IV.

The production of pecans has increased more than has the production of walnuts during these two time periods, but not as rapidly as the production of almonds and filberts. The average production of almonds increased more than 115 per cent between the period 1935-40 and 1950-55. The production of almonds constituted about 11 per cent of the total edible tree nut production in the United States in 1935-40 and nearly 15 per cent in the 1950-55 period. The average production of filberts increased almost 200 per cent in this same period. The production of filberts amounted to less than 2 per cent of the total production of domestic edible tree nuts in 1935-40 and 3 per cent of the total in the 1950-55 period. The domestic production of walnuts constituted approximately 32 per cent of the total domestic edible tree nut production in the period 1935-40 and 27 per cent in the period 1950-55. Although walnut production decreased relative to total domestic edible tree nut production, the average production of walnuts actually increased 31 per cent between the period 1935-40 and 1950-55. The production of almonds, filberts and pecans has increased relative to the production of walnuts. The domestic production of all edible tree nuts increased approximately 54 per cent between these periods.

Geographical Location of and Shifts in Production of Pecans

The Southeastern States of Alabama, Georgia, Florida, Mississippi, North Carolina and South Carolina, plus New Mexico in the Southwest, lead in the production of improved pecans. The Southcentral part of the United States, including Arkansas, Louisiana, Oklahoma and Texas is the principal seedling or native pecan producing area. Some improved pecans

are produced in the native area, and some seedling pecans are grown in the areas of improved production.

Georgia, Oklahoma and Texas are the three leading pecan producing States. On the average, these three States combined accounted for approximately 60 per cent of the annual production of all pecans in the United States during the period 1919-57. The proportion of the total production of all pecans in the United States produced in Oklahoma has varied considerably during the period under study, due both to annual variations and trends in production in Oklahoma relative to national production. Oklahoma's production varied from a low of 2 per cent of national production in 1952 to a high of almost 37 per cent in 1947. Oklahoma had its highest production on record in 1947 and led the nation in the production of all pecans in that year.

Louisiana, Oklahoma and Texas are the leading states in the production of seedling pecans. During the period 1919-57, these three States have accounted for approximately 75 per cent of the total annual production of seedling pecans in the United States. Again, the proportion of total production represented by Oklahoma varied widely from year to year. Oklahoma production accounted for only 4 per cent of total production of seedling pecans in the United States in 1952, but represented 55 per cent of total production in 1947.

Georgia is the major improved pecan producing State. This State accounts for approximately 45 per cent of the total production of improved pecans annually in the United States.

The average production of all pecans in the United States increased nearly 52 per cent between 1935-40 and 1950-55 (Table II). Georgia,

Table II

Changes in Production of All Pecans in Major Pecan Producing States Between 1935-40 and 1950-55

State	1935-40 Average		1950-55 Average		Percentage Change from 1935-40 to 1950-55
	Production	Per Cent of United States	Production	Per Cent of United States	
	(1,000 pounds)	(per cent)	(1,000 pounds)	(per cent)	(per cent)
Alabama	6,668	6.8	16,350	11.0	145.2
Florida	2,953	3.0	5,748	3.9	94.7
Georgia	20,027	20.5	38,267	25.8	91.1
Mississippi	5,907	6.1	9,225	6.2	56.2
North Carolina	2,359	2.4	1,958	1.3	-17.0
South Carolina	2,102	2.2	3,418	2.3	62.6
Arkansas	3,498	3.1	5,308	3.6	51.7
Louisiana	8,284	8.5	16,300	11.0	96.8
Oklahoma	16,250	16.6	18,350	12.4	12.9
Texas	28,400	29.1	30,317	20.4	6.8
United States	97,622	--	148,072	--	51.7

Source: Tree Nuts, Acreage, Production, Farm Disposition, Value and Utilization of Sales, 1909-45, USDA, BAE, CRB, Washington, D. C. (October, 1947), pp. 12, 25.

Tree Nuts, Production, Farm Disposition, Value and Utilization of Sales, 1944-51, USDA, BAE, CRB, Washington, C. D., (August, 1954), pp. 7-10.

Tree Nuts by States, 1949-55, Revised Estimates, Statistical Bulletin No. 195, USDA, AMS, CRB, Washington, D. C., (October, 1956), pp. 12, 13.

Office of Agricultural Statistician, USDA, AMS, Oklahoma City, Oklahoma, personal correspondence from D. D. Pittman, State Statistician.

Oklahoma and Texas were the leading States in the production of all pecans in both periods. Georgia, with an average production of all pecans of 20,027,000 pounds, accounted for 21 per cent of the average production of all pecans in the United States in the period 1935-40 and 26 per cent of the average production in the United States in the period 1950-55. The average production of all pecans in Oklahoma amounted to 16,250,000 pounds or 17 per cent of the average production of all pecans in 1935-40 and 18,350,000 pounds or 12 per cent of the average production of the United States in the period 1950-55. Texas, with an average production of all pecans of 28,400,000 pounds in the period 1935-40 and 30,317,000 pounds in 1950-55 accounted for 29 and 20 per cent, respectively, of the average production of all pecans in the United States.

In general, the average production of all pecans increased more in the States in the improved area than in the native or seedling area between these two periods. For example, the average production of all pecans in Alabama, Florida, Georgia and Louisiana increased more than 90 per cent. On the other hand, production in Oklahoma increased only 13 per cent, and production in Texas increased only 7 per cent.

The production of improved pecans in New Mexico was omitted from Table II because of the recent nature of pecan production in that State. Pecan production data for the period 1935-40 were not available; although, improved pecans in New Mexico accounted for nearly 14 per cent of the total production of improved pecans in the United States in 1954.

Per Capita Production of All Pecans

The per capita production of all pecans, in-shell basis, has varied considerably during the period 1919-56 (Figure 4). The production of all

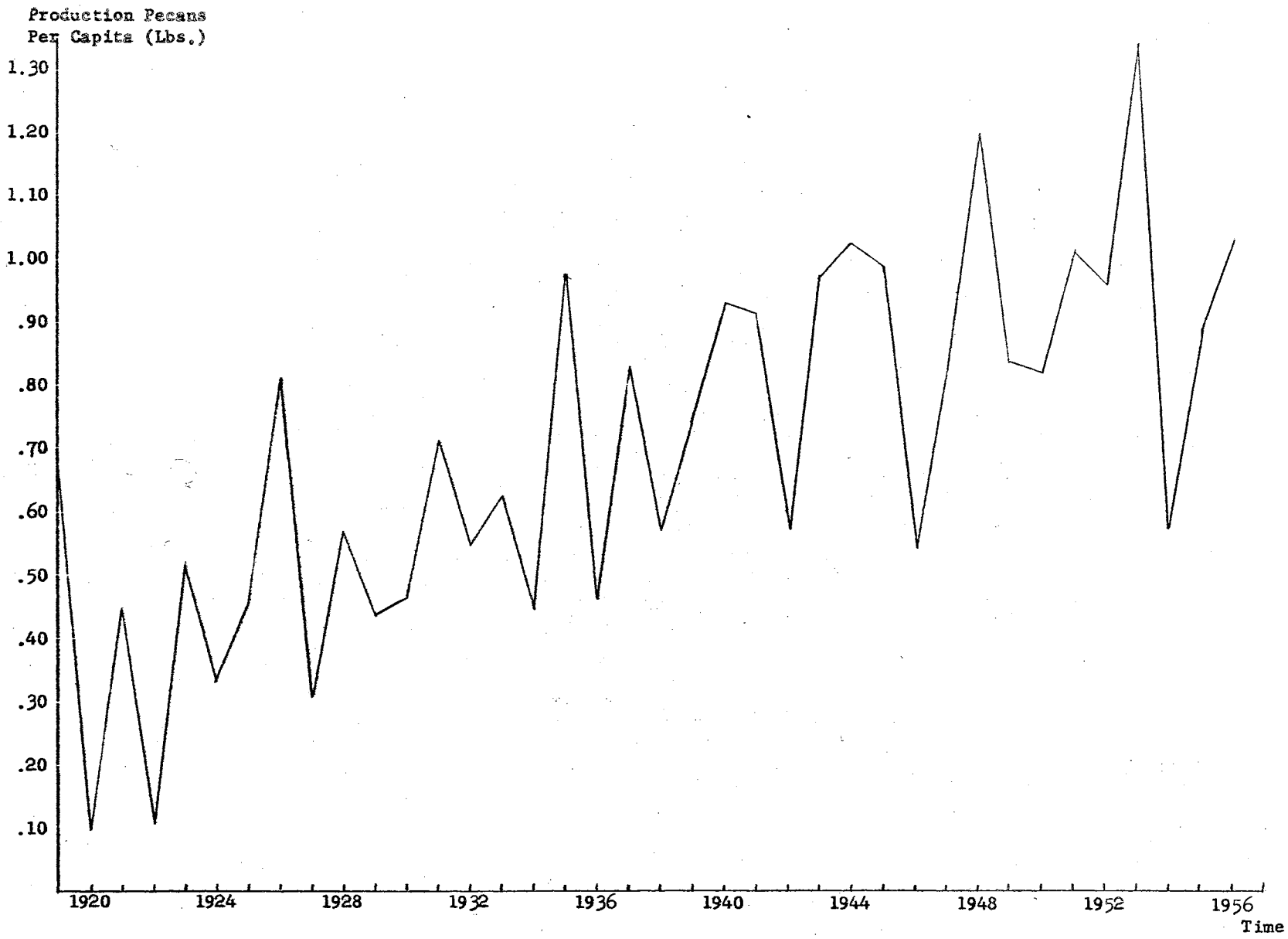

Figure 4. Per Capita Consumption of All Pecans, United States, 1919-1956

Source: Appendix Table B-I.

pecans per capita has varied from a low of about 0.10 pounds in 1920 to a high of 1.34 pounds in 1953. Despite wide annual fluctuations, however, a pronounced upward trend in the per capita production of all pecans is noted. Thus the production of all pecans in the United States has increased at a more rapid rate than has population since 1919.

International Trade in Pecans

Pecans are imported and exported from the United States both in-shell and shelled. The exports of pecans exceeded imports in 14 years of the period 1940-54. An average net balance of 712 tons of pecans were exported from the United States each fiscal year from 1940 to 1954 (Table III). Imports of pecans varied from a low of 2 tons in 1941 to a high of 736 tons in 1951. In 1941 and 1942 imports of pecans constituted less than 0.05 per cent of domestic production. Imports exceeded 1 per cent of domestic production in only three years, namely, 1947, 1950 and 1951. Exports of pecans has varied from a low of 38 tons in 1942 to a high of 2,104 tons in 1945. The exports of pecans have averaged about 1.7 per cent of domestic production during the period 1940 to 1954. They have varied from less than 0.05 per cent in 1942 to 3.9 per cent in 1946.

Competition and Utilization of Pecans and Other Tree Nuts

Production and International Trade in Other Nuts

The domestic production of almonds, filberts, and walnuts has approximately doubled since 1927 (Table IV). On a percentage basis, the increase in production was largest for filberts, followed by almonds and walnuts in that order. During the period 1929 to 1957, the production

Table III

Exports and Imports of Edible Tree Nuts and Percentages of Production, United States, 1940 to 1954[a]

Year	Almonds				Filberts			
	Exports[b]	Imports	Exports as a Per Cent of Production	Imports as a Per Cent of Production	Exports[b]	Imports	Exports as a Per Cent of Production	Imports as a Per Cent of Production
	(tons)	(tons)	(Per Cent)	(Per Cent)	(tons)	(tons)	(Per Cent)	(Per Cent)
1940	-	3,309	-	22.1	-	1,672	-	52.1
1941	-	6,205	-	65.3	-	92	-	1.6
1942	27	1,686	0.1	5.4	11	66	0.3	1.5
1943	82	18,876	.4	92.1	215	1,173	3.1	16.7
1944	148	37,577	.5	118.5	249	8,072	3.8	123.8
1945	160	30,465	.5	95.2	158	11,089	3.0	208.4
1946	552	15,082	1.2	32.0	232	13,451	2.7	159.2
1947	378	19,714	1.1	55.2	522	4,664	5.9	53.0
1948	103	17,156	.3	47.0	195	8,627	3.1	135.2
1949	210	2,428	.5	5.6	235	7,217	2.1	65.5
1950	110	20,854	.3	55.3	339	6,190	5.1	92.7
1951	876	6,054	2.1	14.2	359	8,814	5.2	127.4
1952	2,594	11,260	7.1	30.9	487	6,591	4.0	53.8
1953	6,799	11,528	17.6	29.9	250	6,894	5.8	160.3
1954	8,624	2,204	20.0	5.1	950	8,684	11.0	100.2
Average	1,590	13,627	4.0	44.9	323	6,220	4.2	90.1
			Pecans				Walnuts	
1940	506	179	0.8	0.3	1,948	5,447	3.8	10.7
1941	282	2	.5	*	2,006	3,322	2.9	4.7
1942	38	4	*	*	360	302	.6	.5
1943	603	419	.9	.6	1,174	2	1.8	*
1944	1,976	216	2.8	.3	1,990	26	2.8	*
1945	2,104	425	3.0	.6	3,502	455	4.9	.6
1946	1,501	330	3.9	.9	2,826	998	3.9	1.4
1947	300	692	.5	1.2	2,706	716	4.2	1.1
1948	826	238	.9	.3	1,377	3,088	1.9	4.3
1949	1,704	136	2.7	.2	2,063	7,514	2.3	8.5
1950	880	661	1.4	1.1	1,911	7,726	3.0	12.0
1951	909	736	1.2	1.0	1,499	8,175	1.9	10.6
1952	1,150	471	1.6	.6	1,628	8,030	1.9	9.6
1953	1,486	290	1.4	.3	1,680	8,682	2.8	14.7
1954	1,630	420	3.6	.9	5,147	9,509	6.8	12.6
Average	1,060	348	1.7	.6	2,121	4,266	3.3	6.1

[a]Production, crop year; foreign trade, year beginning July 1. Figures on an unshelled basis; shelled converted to unshelled basis at ratios of:
Almonds: 1 to 3.33
Filberts: 1 to 2.22 through 1949; in subsequent years at 1 to 2.5
Pecans: exports at 1 to 2.5; imports at 1 to 2.63
Walnuts: 1 to 2.38.

[b]Separately classified into exports and imports basis on following dates:
Almonds: January 1, 1942
Filberts: January 1, 1943
Pecans: 1935
Walnuts: July 1, 1935.

*Less than 0.05 per cent.

Source: Foreign Agricultural Trade, Statistical Handbook, FAS, USDA, Statistical Bulletin No. 179, (Washington: Government Printing Office, August 1956) pp. 130-137.

Table IV

Tree Nuts: United States Production, by Kinds, 1919-57

Year	Walnuts	Almonds	Filberts
	(tons)	(tons)	(tons)
1919	30,230	7,900	N.A.
1920	22,950	6,000	N.A.
1921	23,350	6,200	N.A.
1922	29,400	9,000	N.A.
1923	26,950	11,000	N.A.
1924	24,650	8,000	N.A.
1925	36,550	7,500	N.A.
1926	16,200	16,000	N.A.
1927	52,100	12,000	60
1928	27,400	14,000	200
1929	43,400	4,700	200
1930	30,300	13,500	300
1931	34,200	14,800	420
1932	49,100	14,000	490
1933	34,000	12,900	1,070
1934	47,100	12,000	1,210
1935	57,400	12,700	1,240
1936	45,800	10,700	2,100
1937	62,400	24,600	2,570
1938	55,300	18,400	2,440
1939	62,500	28,700	3,890
1940	50,800	15,000	3,210
1941	70,000	9,500	5,750
1942	61,200	31,500	4,270
1943	63,800	20,500	7,030
1944	71,800	31,700	6,520
1945	70,900	32,000	5,320
1946	71,900	47,200	8,450
1947	64,600	35,700	8,800
1948	71,100	36,500	6,380
1949	88,100	43,300	10,800
1950	64,300	37,700	6,570
1951	77,400	42,700	6,740
1952	83,800	36,400	11,790
1953	59,200	38,600	4,900
1954	75,400	43,200	8,620
1955	77,400	38,300	7,710
1956	71,800	58,600	3,040
1957	67,300	38,000	12,350

(N.A.) Not Available.

Source: 1919-33; Tree Nuts, 1909-45, USDA, Bureau of Agricultural Economics, Crop Reporting Board, Washington, D. C., October 1947.
1934-54; Tree Nuts by States, 1949-55, Revised Estimates, Statistical Bulletin No. 195 USDA, AMS, Crop Reporting Board, Washington, D. C., October 1956.
1955-56; Tree Nuts by States, 1955-56, USDA, AMS, Crop Reporting Board,Washington, D. C., August 1957.
1957; Office of Agricultural Statistician, Crop and Livestock Reporting Board, AMS, USDA, Oklahoma City, Oklahoma.

of almonds varied from a low of 4,700 to a high of 58,600 tons. The production of filberts varied from a low of 200 to a high of 12,350 tons. The production of walnuts varied from a low of 30,300 to a high of 88,100 tons.

Almonds, filberts, and walnuts are exported and imported into the United States both shelled and in-shell. During the period 1940 to 1954, an average net balance of 12,249 tons of almonds were imported each year into the United States (Table III). Imports of almonds have averaged approximately 45 per cent of the domestic production of almonds in this period. An average net balance of 5,940 tons of filberts were imported into the United States annually during this period which represented approximately 90 per cent of the domestic production of filberts. An average net balance of 2,145 tons of walnuts representing approximately 6 per cent of the domestic production were imported each year during the period 1940 to 1954.

Per Capita Consumption

Apparent per capita consumption of pecans has trended upward steadily during the period from 1919 to 1957 (Figure 5). Per capita consumption of pecans has varied from a low of 0.04 pounds in 1920 to a high of 0.50 pounds in 1953. Approximately 0.26 pounds of pecans were consumed per capita annually between 1919-57. The consumption of pecans as a percentage of all tree nuts has varied from a low of 4 per cent in 1920 to a high of 35 per cent in 1943.

Apparent per capita consumption of all tree nuts on a shelled basis has fluctuated widely during the period 1919-57 (Table V). Year-to-year

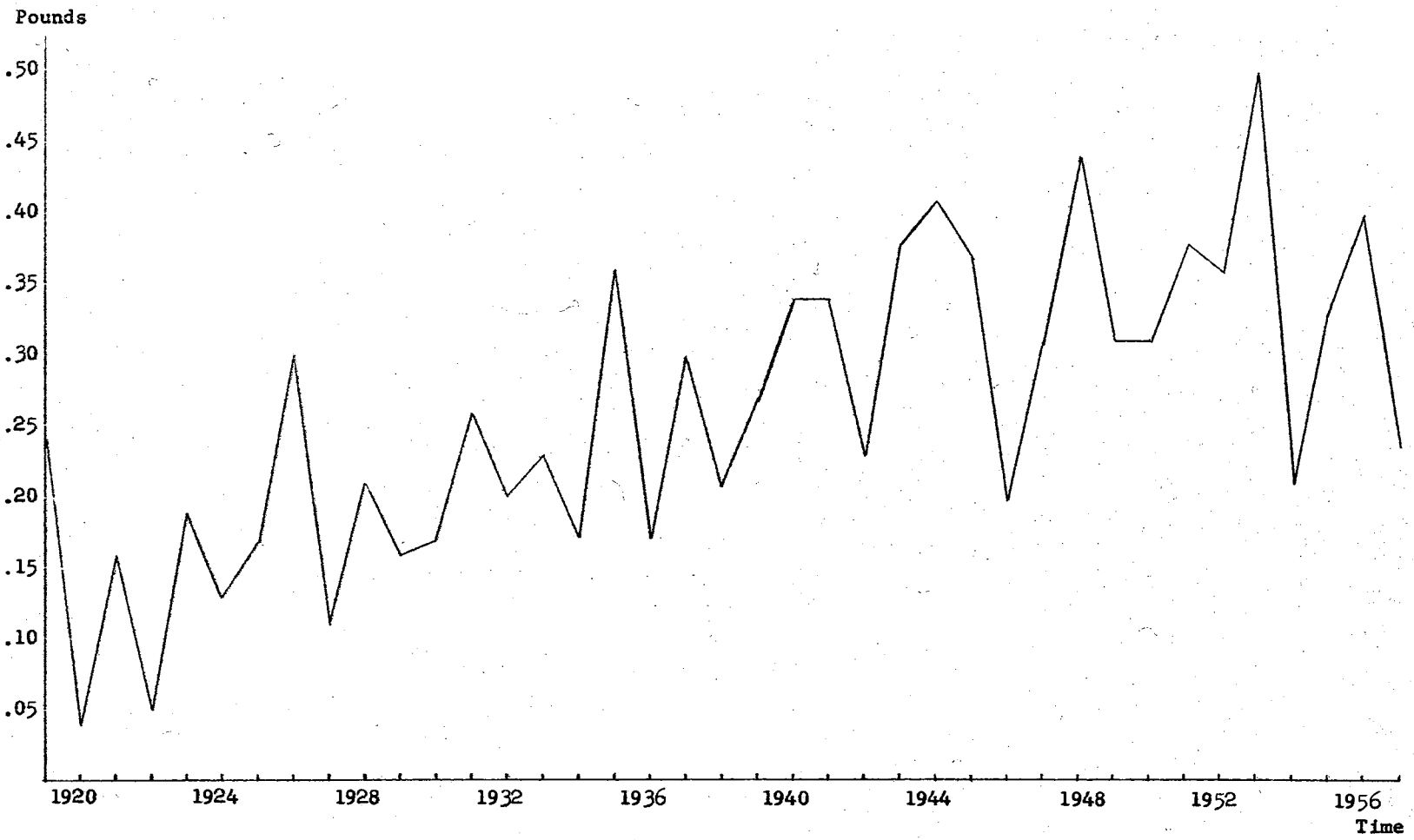

Figure 5. Per Capita Consumption of All Pecans, United States, 1919-1957

Source: Table V.

Table V

Apparent Per Capita Consumption of Tree Nuts (Shelled) Basis), United States, Crop Years, 1919-57[a]

Crop Year	Almonds	Filberts	Pecans	Walnuts	Other[b]	Total	Pecans as a Per Cent of Total
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Per Cent
1919	.33	.15	.24	.49	.23	1.4	17.14
1920	.20	.07	.04	.31	.36	1.0	4.00
1921	.31	.11	.16	.49	.36	1.4	11.43
1922	.29	.11	.05	.44	.34	1.2	4.17
1923	.30	.12	.19	.42	.39	1.4	13.57
1924	.26	.07	.13	.48	.35	1.3	10.00
1925	.23	.10	.17	.51	.29	1.3	13.08
1926	.26	.08	.30	.37	.35	1.4	21.43
1927	.24	.10	.11	.51	.14	1.1	10.00
1928	.26	.09	.21	.38	.30	1.2	17.50
1929	.20	.06	.16	.44	.23	1.1	14.55
1930	.21	.06	.17	.33	.29	1.1	15.45
1931	.17	.04	.26	.32	.33	1.1	23.64
1932	.14	.05	.20	.36	.27	1.0	20.00
1933	.12	.03	.23	.26	.25	.9	25.56
1934	.11	.03	.17	.33	.35	1.0	17.00
1935	.17	.04	.36	.34	.44	1.4	25.71
1936	.16	.05	.17	.28	.47	1.1	15.45
1937	.19	.03	.30	.38	.46	1.4	21.43
1938	.14	.03	.21	.32	.49	1.2	17.50
1939	.21	.05	.27	.38	.46	1.4	19.29
1940	.12	.03	.34	.32	.54	1.4	24.29
1941	.09	.04	.34	.44	.40	1.3	26.15
1942	.22	.03	.23	.35	.14	1.0	23.00
1943	.23	.05	.38	.37	.07	1.1	34.55
1944	.36	.10	.41	.41	.16	1.4	29.29
1945	.34	.10	.37	.38	.24	1.4	26.43
1946	.36	.13	.20	.38	.40	1.5	13.33
1947	.30	.08	.31	.33	.45	1.5	20.67
1948	.29	.09	.44	.38	.49	1.7	25.88
1949	.27	.10	.31	.41	.53	1.6	19.38
1950	.33	.06	.31	.36	.56	1.6	19.38
1951	.29	.08	.38	.42	.48	1.7	22.35
1952	.26	.09	.36	.42	.49	1.6	22.50
1953	.24	.06	.50	.32	.49	1.6	31.25
1954	.22	.08	.21	.38	.57	1.5	14.00
1955	.20	.07	.33	.42	.58	1.6	20.63
1956	.26	.04	.40	.35	.49	1.5	26.67
1957	.19	.09	.24	.31	.56	1.4	17.14

[a]Crop year beginning July of year indicated for tree nuts. Civilian per capita consumption beginning 1941.

[b]Includes the following nuts: Brazil, pignolia, pistache, chestnuts, cashews, and miscellaneous tree nuts.

Source: 1919-55: Supplement for 1956 to Consumption of Food in the United States, 1909-56, Agriculture Handbook No. 62, USDA, AMS, Washington, D. C., September 1957, p. 30.
1956-57: Supplement for 1957 to Consumption of Food in the United States, 1909-52; Supplement for 1957 to Agriculture Handbook No. 62, USDA, AMS, Washington, D. C., August 1958, p. 9.

variations have occurred but no apparent upward or downward trend was noted during the period. Per capita consumption of tree nuts also varied among the different kinds of nuts. Consumption of almonds varied from a low of 0.09 pounds in 1941 to a high of 0.36 pounds in 1944 and 1946. Average per capita consumption of almonds amounted to 0.23 pounds per crop year. Per capita consumption of filberts varied from a high of 0.15 pounds to a low of 0.03 pounds. An average of 0.07 pounds of filberts were consumed each crop year. Per capita consumption of walnuts varied from a low of 0.07 pounds in 1943 to a high of 0.58 pounds in 1955. Average per capita consumption of walnuts amounted to 0.38 pounds per crop year.

As mentioned previously, imports of tree nuts other than of the kinds produced in the United States have increased during the period under review. The per capita consumption of these nuts has also increased slightly during the period. Average per capita consumption of these other nuts was 0.38 pounds per crop year for the entire period. As expected, per capita consumption of these imported nuts decreased sharply during the war years (1942-45). Since 1946, average per capita consumption of these other nuts has been approximately 0.51 pounds per crop year.

Shelled and In-Shell Utilization

The percentage of pecans marketed in the shelled form has tended to increase during the period 1948-56, the only years for which data are available. Approximately 84 per cent of the sales of pecans in this period were made in the shelled form (Table VI). The quantity of pecans

Table VI

Production, Quantity Shelled, Quantity Marketed In-Shell and Total Sales of Pecans, 11 Principal Producing States, 1948-56

Year	Production	Quantity Shelled	Quantity Marketed In-Shell	Total Sales	Percent of Production: Quantity Shelled	Percent of Production: Sales	Quantity Shelled as Per Cent of Sales
	1,000 pounds[a]	1,000 pounds[a]	1,000 pounds[a]	1,000 pounds[a]	Per Cent	Per Cent	Per Cent
1948	176,043	134,500	29,653	164,153	76.4	93.2	81.9
1949	125,690	100,350	15,780	116,130	79.8	92.4	86.4
1950	124,630	93,740	21,168	114,908	75.2	92.2	81.6
1951	156,735	114,790	30,985	145,775	73.2	93.0	78.7
1952	151,436	118,420	23,456	141,876	78.2	93.9	83.4
1953	214,170	170,450	32,170	202,620	79.6	94.6	84.1
1954	94,600	74,220	12,640	86,860	78.5	91.8	85.4
1955	146,860	121,400	18,480	139,880	82.7	95.2	86.8
1956	173,700	143,800	20,360	164,160	82.8	94.5	87.6
Average	151,540.44	119,074.44	22,743.55	141,818.00	78.5	93.4	84.0

[a]Unshelled basis.

Source: Tree Nuts by States 1949-55 Revised Estimates, USDA, AMS, CRB, Statistical Bulletin No. 195, (Washington, D. C., October 1956) pp. 6-12.
Tree Nuts by States, 1955-56, USDA, AMS, CRB, (Washington, D. C., August 1957) pp. 6-8.

shelled as a per cent of total sales of pecans has varied from 78.8 to 87.6 per cent. The quantity of pecans shelled has varied from 74,220,000 pounds in 1954 to 170,450,000 pounds in 1953. An average of 119,074,000 pounds of pecans were shelled annually during the 1948-56 period. The annual quantity of pecans marketed in-shell has remained about constant during the period 1948 to 1956. The quantity marketed in-shell averaged 22,743,550 pounds a year during this period. Thus, the quantity of pecans shelled varied directly with year-to-year production.

Data are not available on the percentages of improved and seedling pecans going into "trade" channels by shelled or in-shell uses. However, it is expected that a much larger percentage of seedling pecans are shelled than are improved pecans due primarily to the characteristics of the two types of pecans.

Powell and Berberich, in a recent marketing research report, estimated that for the period 1950-52 about 75 per cent of the total quantity of pecans distributed were shelled before reaching the housewife, confectionery or baking and ice cream manufacturer.[1] For the same period about 89 per cent of the total supply of almonds were for the shelled market. About 64 per cent of the total supply of filberts were for the shelled market, and 47 per cent of the total supply of walnuts are shelled prior to distribution.

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[1] Jules V. Powell and Richard S. Berberich, Marketing Tree Nuts Trends and Prospects, Marketing Research Report No. 139, (Washington, D. C., October, 1956), pp. 14-15.

Distribution

Major outlets used for shelled tree nuts vary among the nuts (Table VII). Candy manufacturers are the principal outlet for shelled almonds. The principal outlet for shelled filberts is the salting trade. Bakers and households are the main outlets for shelled walnuts. Approximately 44 per cent of the shelled pecans were used by bakers while about 20 per cent moved through confectionary manufacturers in the 1950-52 period. Nearly all of the in-shell pecans were sold through grocery stores.

Table VII

Shelled Tree Nuts--Estimated Sales Through Various Outlets, By Kinds, United States, Three-Year Average October 1, 1950--September 30, 1952

Outlet	Almonds		Filberts		Pecans		Walnuts		Total	
	Million Pounds	Per Cent	Million Pounds	Per Cent	Million Pounds	Per Cent	Million Pounds	Per Cent	Million Pounds	Per Cent
Confectionery	25	64	2	28.5	8	20	3	11	38	33
Salting	5	13	3	43.0	3	7	-	-	11	10
Baking	3	8	2	28.5	18	44	11	39	34	30
Households (unsalted)	4	10	-	-	5	12	11	39	20	17
Ice Cream	2	5	-	-	5	12	1	4	8	7
Other	-	-	-	-	2	5	2	7	4	3
Total	39	100	7	100	41	100	28	100	115	100

Source: Powell, p. 12.

About 60 per cent of the in-shell pecans were sold in straight packs and the balance was sold in nut mixtures.[2] In-shell distribution of competing tree nuts between straight packs and mixtures varies among the different nuts. Approximately 64 per cent of the almonds and 36 per cent of the filberts sold in-shell were in straight packs. Almost 80 per cent of the in-shell walnuts were sold in straight packs during the period 1950-52.

In a recent study, Weidenhamer[3] reported homemakers uses and opinions of tree nuts (Table VIII). All nuts were used more frequently for baking and snacks than for other uses. Filberts were used much less frequently for uses other than baking and snacks than any of the other nuts.

Table VIII

Way in Which Nuts Were Used by Users of Nuts

Ways	Nuts			
	Almonds	Walnuts	Pecans	Filberts
	(Per Cent)	(Per Cent)	(Per Cent)	(Per Cent)
Snacks	68[a]	61[a]	69[a]	85[a]
Salads	18	40	34	6
Toppings	15	22	25	5
Making Candy	20	42	42	8
Baking	54	77	74	25
Other Cooking	15	15	15	6
Total Users	1,059	2,138	1,690	638

[a]Percentages add to more than 100 because some respondents gave more than one use for nuts.

Source: Weidenhamer, pp. 46-51.

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[2]Ibid. pp. 12-15.

[3]Margaret Weidenhamer, Homemakers Use of and Opinions About Peanuts and Tree Nuts, Marketing Research Report No. 203, USDA, AMS, Marketing Research Division, (Washington, D. C., November, 1957).

Prices

All Pecans

Prices received by growers for pecans in the United States varied from a low of 120 dollars to a high of 674 dollars per ton in the period 1919-56 (Figure 6). During this period the general level of prices received by growers for pecans followed closely changes in the general level of all prices. However, when the effects of changes in the general price level are removed, the "real" price of pecans followed a definite downward trend through 1937. Since 1937 the "real" price has fluctuated around a level that exhibits no apparent trend. The index of prices received by farmers for all farm products was used as the deflator.

Table IX shows the price ratios of pecans to the other domestic edible tree nuts from 1919 to 1956. No appreciable trend was evidenced in the ratio of pecan prices to walnut prices. Despite wide variations, a definite upward trend existed in the ratio of pecan prices to filbert prices. Ratios of pecan prices to almond prices have shown a downward trend, i.e., almond prices have increased relative to pecan prices during the period 1919-56.

Types of Pecans

The once wide disparity in prices received by pecan growers between improved and seedling pecans has diminished over time (Figure 7). Although the prices of improved pecans have exceeded the prices of seedling pecans in every year since 1922, the difference has decreased from 26 cents in 1922 to 2 cents in 1956. The margin between improved and

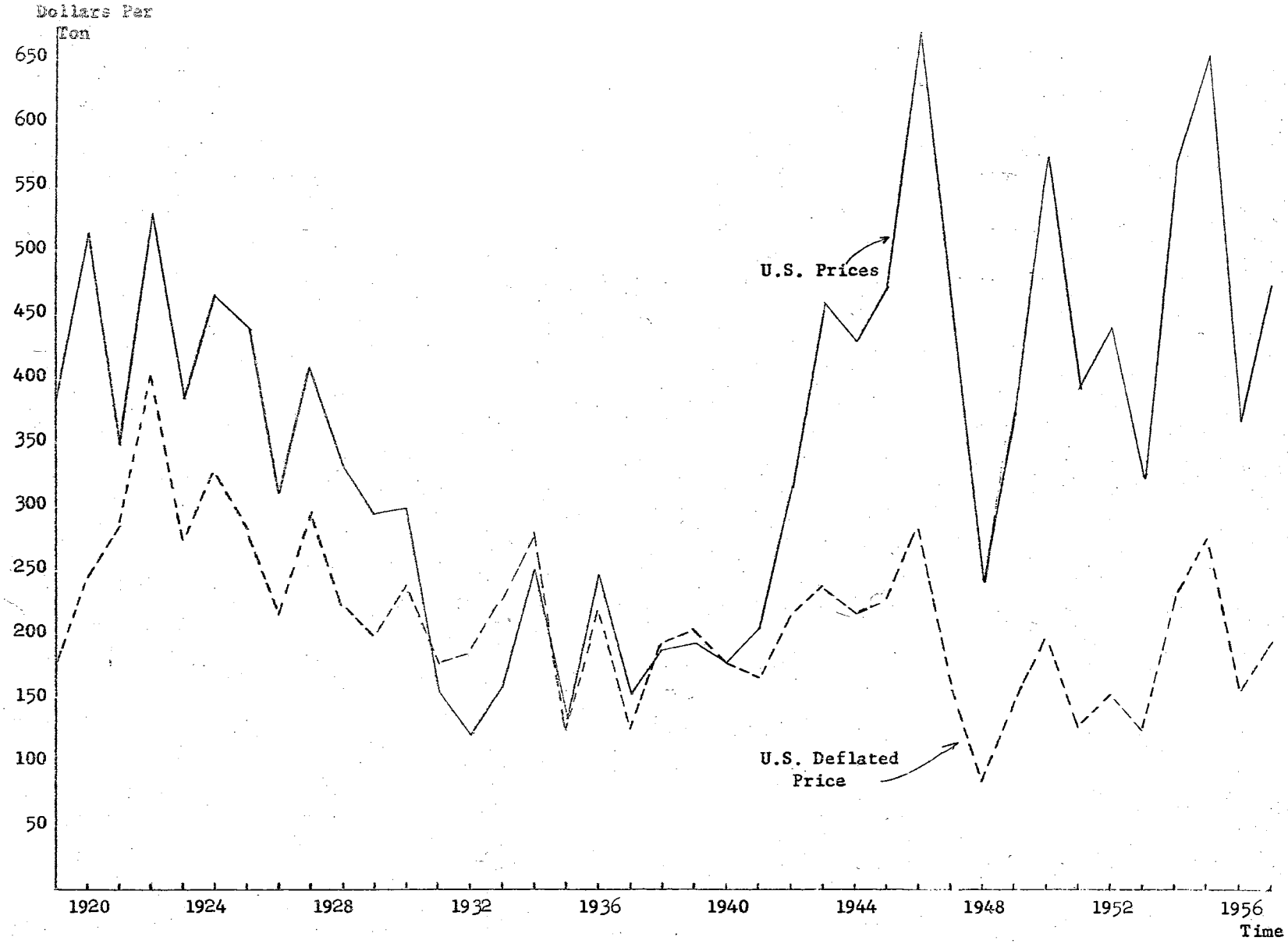

Figure 6. Actual and Deflated Average Prices Received by Farmers for All Pecans, United States, 1919-1957

Table IX

Seasons Average Price Per Ton Received by Growers and Price Ratios, of Domestic Tree Nuts, 1919-56

Year	Walnuts	Filberts[a]	Almonds	Pecans	$\frac{P_p}{P_w} \times 100$	$\frac{P_p}{P_f} \times 100$	$\frac{P_p}{P_a} \times 100$
	(Dollars)	(Dollars)	(Dollars)	(Dollars)			
1919	550	-	440	390	70.9	-	88.6
1920	400	-	360	514	128.5	-	142.8
1921	400	-	320	352	88.0	-	110.0
1922	360	-	290	530	147.2	-	182.8
1923	400	-	260	386	96.5	-	148.5
1924	460	-	300	468	101.7	-	156.0
1925	441	-	400	442	100.4	-	110.5
1926	481	-	300	312	64.9	-	104.0
1927	331	320	320	412	124.5	128.8	128.8
1928	421	380	340	332	78.9	87.4	97.6
1929	321	300	480	294	91.6	98.0	61.3
1930	410	340	200	298	72.7	87.6	149.0
1931	223	250	176	156	70.0	62.4	88.6
1932	179	200	165	120	67.0	60.0	72.7
1933	224	300	186	160	71.4	53.3	86.0
1934	191	202	180	252	131.9	124.8	140.0
1935	203	263	280	136	67.0	51.7	48.6
1936	217	270	402	248	114.3	91.9	61.7
1937	181	217	275	154	85.1	71.0	56.0
1938	221	225	258	188	85.1	83.6	72.9
1939	168	226	209	194	115.5	85.8	92.8
1940	230	250	324	178	77.4	71.2	54.9
1941	252	306	704	206	81.7	67.3	29.3
1942	307	352	442	342	111.4	97.2	77.4
1943	478	499	732	460	96.2	92.2	62.8
1944	446	540	744	430	96.4	79.6	57.8
1945	509	551	720	476	93.5	86.4	66.1
1946	555	384	486	674	121.4	175.5	138.7
1947	382	252	558	446	116.8	177.0	79.9
1948	419	259	422	244	58.2	94.2	57.8
1949	351	219	330	376	107.1	171.7	113.9
1950	385	350	546	576	149.6	164.6	105.5
1951	429	351	472	394	91.8	112.3	83.5
1952	396	298	464	442	111.6	148.3	95.3
1953	412	344	476	326	79.1	94.8	68.5
1954	350	320	498	572	163.4	178.8	114.9
1955	550	420	861	656	119.3	156.2	76.2
1956	441	520	790	370	83.9	71.2	46.8

[a] Data prior to 1927 Not Available.

Source: 1909-33: Tree Nuts Acreage, Production, Farm Disposition, Value and Utilization of Sales, 1909-45, USDA, BAE, CRB, Washington, D. C., October, 1947.

1934-55: Tree Nuts by States, 1949-55, Revised Estimates, Statistical Bulletin No. 195, USDA, AMS, CRB, Washington, D. C., October, 1956.

1956: Tree Nuts by States, 1955 and 1956, USDA, AMS, CRB, Washington, D. C., August, 1957.

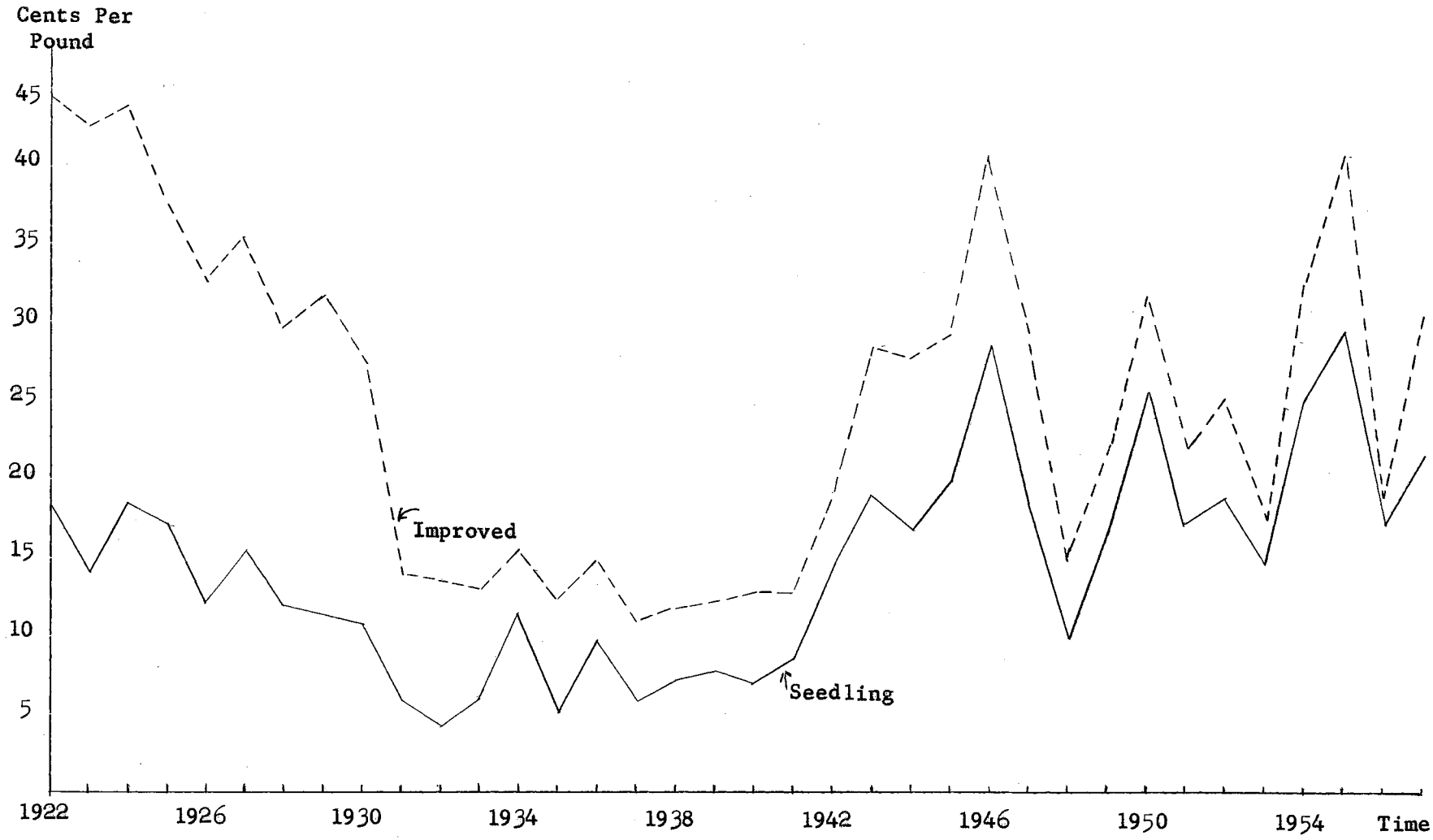

Figure 7. Prices Received by Farmers for Pecans, by Types, United States, 1922-1957

Source: Appendix Table B-IV.

seedling pecans was 9 cents per pound in 1957. Prices of improved pecans have diminished somewhat over time and the prices of seedling pecans have increased.

Changing Price Relationships

The average price of improved pecans as a per cent of the average price of seedling pecans decreased from 177 per cent in 1935-40 to 130 per cent in 1950-55 (Table X). The average price received by growers for all pecans increased from 183 dollars per ton in 1935-40 to 494 dollars in 1950-55. The price received for improved pecans has increased from 249 dollars per ton in 1935-40 to 567 dollars in 1950-55. Seedling pecan prices during the same periods have increased from 141 dollars to 437 dollars per ton.

The average prices received by growers of pecans have increased relative to the prices of the other tree nuts between the periods 1935-40 and 1950-55. The average price of all pecans as a per cent of the average price of walnuts increased from 90 per cent in 1935-40 to 118 per cent in 1950-55. The prices of pecans relative to the prices of almonds increased from 63 per cent in 1935-40 to 89 percent in 1950-55. The prices of pecans relative to the prices of filberts have almost doubled between the two periods, or from 76 per cent in 1935-40 to 142 per cent in 1950-55.

Relationship of Farm Prices and Wholesale Prices of Shelled Pecans

The wholesale marketing margin for pecans was computed for the period 1934-55 by subtracting the prices received by farmers from the wholesale prices of shelled pecan halves (Table XI). This margin as computed includes those costs associated with assembling and processing the pecans,

transportation charges and whatever profits are associated with the pecan processing industry. Although the actual margin has increased steadily during this period, the "deflated" margin has not. The "deflated" margin increased sharply during the war years but decreased to pre-war levels in 1947. Price ceilings imposed by the Office of Price Stabilization during World War II may partially account for the sudden increase and decrease in the margin during that time period.

Table X

Average Prices Received by Growers for Domestic Edible Tree Nuts and Some Percentage Comparisons

Nuts	Prices Received by Growers		Percentage Comparisons			
			Per Cent of All Pecans		Improved Pecans Per Cent of Seedling	
	Average 1935-40	Average 1950-55	1935-40	1950-55	1953-40	1950-55
	(dollars per ton)		(per cent)		(per cent)	
Pecans						
All	183.00	494.33				
Improved	249.33	567.00				
Seedling	141.00	437.33			176.83	129.65
Walnuts	203.33	420.33	90.00	117.60		
Almonds	291.33	552.83	62.82	89.42		
Filberts	241.83	347.17	75.67	142.39		

Source: Computed from Appendix Table B-IV and Table IX.

Summary

During the period 1919-57 the production of all pecans in the United States increased about threefold despite declining "real" prices. During this period per capita consumption of all pecans has more than doubled.

Table XI

Wholesale Prices, Prices Received by Farmers, Actual Marketing Margin and Marketing Margin Relative to Wholesale Price Index of All Commodities (1947-49 = 100), United States, 1934 to 1955

Year	Price Medium Pecan Halves at New York	Prices Received by Farmers All Pecans	Marketing Margin $P_w - P_f$	Deflated Marketing Margin
	(cents per pound)[a]	(cents per pound)[b]	(cents per pound)	(cents per pound)[c]
1934	54	12.6	41.4	85.0
1935	35	6.8	28.2	54.2
1936	44	12.4	31.6	60.2
1937	40	7.7	32.3	57.6
1938	43	9.4	33.6	65.8
1939	46	9.7	36.3	72.5
1940	40	8.9	31.1	60.9
1941	41	10.3	30.7	54.0
1942	85	17.1	67.9	105.8
1943	89	23.0	66.0	98.5
1944	88	21.5	66.5	98.4
1945	93	23.8	69.2	100.6
1946	125	33.7	91.3	116.0
1947	75	22.3	52.7	54.7
1948	67	12.2	54.8	52.5
1949	89	18.8	70.2	70.8
1950	109	28.8	80.2	77.8
1951	80	19.7	60.3	52.5
1952	85	22.o	62.9	56.4
1953	76	16.3	59.7	54.2
1954	140	28.6	111.4	101.0
1955	150	32.8	117.2	105.9

[a] Powell, p. 36.

[b] Appendix Table B-I.

[c] Deflated by the BLS Wholesale Price Index of All Commodities (1947-49 = 100).

Production of improved pecans increased faster than the production of seedlings, although the price of improved pecans relative to the price of seedlings decreased. Improved pecans accounted for approximately 25 per cent of total production in the 1920's but almost 50 per cent in the 1950's.

Grower prices for pecans have remained essentially unchanged relative to grower prices for walnuts, increased relative to filberts and decreased relative to almonds. Domestic production of almonds and filberts has increased more rapidly than has production of either pecans or walnuts. However, international trade is an important factor in the domestic supply of walnuts, almonds and filberts, but is of little consequence in the supply of pecans.

CHAPTER III

DESCRIPTION OF THE PECAN INDUSTRY IN OKLAHOMA: TRENDS AND CHARACTERISTICS

The purpose of this chapter is to consolidate and review some of the more important trends and characteristics of pecan production in Oklahoma. Oklahoma is exceeded only by Texas in the production of seedling pecans, and, in the production of all pecans, Oklahoma is normally exceeded only by Texas and Georgia.

Sources and Limitations of the Data

The Census of Agriculture of 1950 and 1954 served as the major source of information for this chapter. Other data were obtained from various United States Department of Agriculture publications, primarily of the Agricultural Marketing Service.

It should be pointed out at the outset, however, that estimates of tree numbers in Oklahoma, especially of seedling trees, are of questionable validity. Also, the change in definition and sampling procedures employed by the Bureau of Census in conducting the 1954 Census of Agriculture detracts somewhat from the validity of direct comparisons of tree numbers and production by farms with those of previous census years. For example, in 1954 only those pecan trees on farms with 20 or more fruit and nut trees and/or grapevines were included in county or state totals. The question arises as to whether this was intended to include those farms with 19 grapevines and only one pecan tree but to omit those farms with 19 pecan trees and no other fruit trees or grapevines. If the

latter interpretation is correct, and if a substantial number of farms in the state fell in this category, then a definite underestimate of pecan trees in the state occurred in 1954.

Another questionable feature of the data on pecan tree numbers is in the classification of trees by age. Pecan trees of all ages were separated into 2 classifications, trees of bearing age and trees not of bearing age. The questionable feature is whether the farmers reporting trees not of bearing age reported all trees that did not produce pecans that year or whether trees not of bearing age included only those pecan trees that had not reached bearing age (normally 7-10 years).

Moreover, the Crop Reporting Board estimated pecan production in 1954 at 14,500,000 pounds which was almost 500 per cent larger than the 2,502,862 pounds reported by the Census of Agriculture. The 1954 Census of Agriculture, however, was taken during the harvesting season and before harvest was completed. Prior to 1954, the Census of Agriculture was taken during the spring following the calendar year for which the data were applicable, and Census estimates and Crop Reporting Board estimates agree quite closely. In 1949, for example, the Census of Agriculture estimate of production exceeded the Crop Reporting Board estimate by less than 10 per cent. The above considerations should be kept clearly in mind as Census data relating to production and tree numbers are analyzed.

Production

Trends

Total Pecan Production. Annual production data and the centered 6-year moving average production of all pecans indicate an upward trend in

production of all pecans in Oklahoma during 1920-57 (Figure 8). The centered 6-year moving average production of all pecans was 12.1 million pounds in 1924, 15.2 million pounds in 1934, 19.1 million pounds in 1944, and 18.9 million pounds in 1954. Thus between the mid-1920's and mid-1950's the production of all pecans in Oklahoma has increased about 50 per cent. The extreme fluctuations in annual production may be depicted by a comparison of production in the last 3 years for which data are available. Production was 33.0 million pounds in 1955, 7.1 million pounds in 1956, and 31.0 million pounds in 1957 (Appendix Table B-II).

In terms of the centered 6-year moving average production of all pecans, the percentage of national production produced in Oklahoma declined from about 23 per cent in 1925 to about 12 per cent in recent years. However, Oklahoma now produces about 21 per cent of the total United States production of seedling pecans, although this, too, is a smaller proportion than in earlier years (Table XII).

Table XII

Pecan Production: Total and Seedling, U.S. and Oklahoma, Centered Six-Year Moving Average, With Some Percentage Comparisons, Selected Years

Period	Total			Seedling		
	Centered 6-Year moving average		Oklahoma as a per cent of U.S.	Centered 6-Year moving average		Oklahoma as a per cent of U.S.
	Oklahoma	U.S.	Per Cent	Oklahoma	U.S.	Per Cent
	(1,000 pounds)			(1,000 pounds)		
1925	12,583	53,468	23.5	12,432	42,171	29.5
1935	13,825	82,954	16.7	13,315	55,003	24.2
1945	21,000	123,329	17.0	19,450	70,354	27.7
1950	18,133	150,237	12.1	16,823	77,853	21.6
1954	18,867	154,968	12.2	17,335	81,693	21.2

Source: Appendix Table B-III.

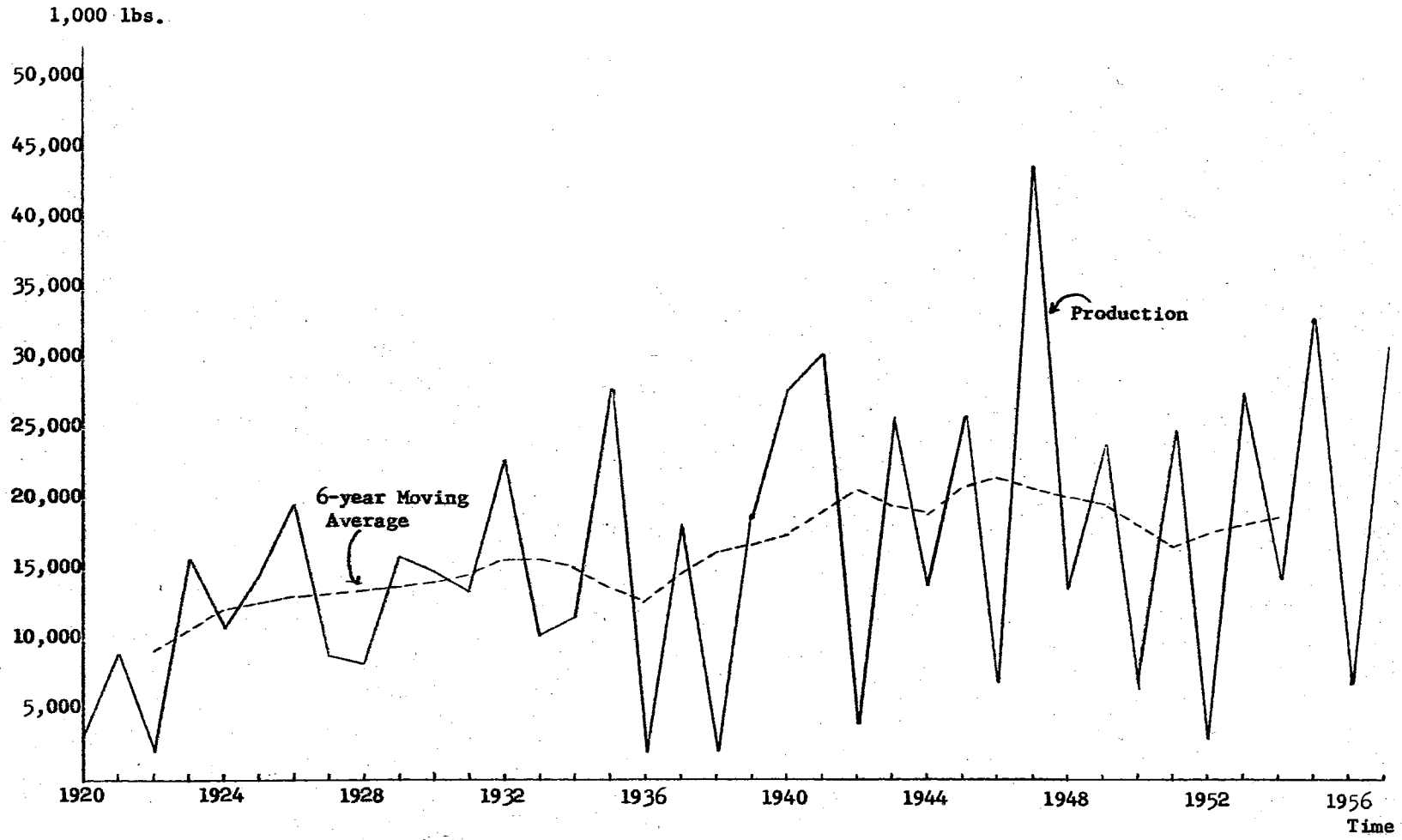

Figure 8. Pecan Production: Annual and Centered 6-Year Moving Average, All Pecans, Oklahoma, 1920-1957

Source: Appendix Tables B-II and B-III.

Production by Types. The average annual production of improved pecans in Oklahoma has increased from less than 50 thousand pounds in the 1920's to more than one million pounds in the 1950's. However, improved pecans did not represent as much as 5 per cent of total production in any year until 1937, and on the average for the entire period have accounted for only about 8 per cent of annual production. The trend in improved pecan production in Oklahoma increased rapidly until 1946. Since then, however, the trend has apparently about leveled off (Figure 9). Average production of improved pecans was 56.7 thousand pounds in 1924, 452.1 thousand pounds in 1954, 1.3 million pounds in 1944, and 1.5 million pounds in 1954. Annual production of improved pecans has varied from 10,000 pounds in 1920 to 3,300,000 pounds in 1955. The extreme year-to-year variations are depicted by production in the last 3 years as follows: 3,300,000 pounds in 1955, 600,000 pounds in 1956, and 2,200,000 pounds in 1957 (Appendix Table B-II).

The production of seedling pecans since 1919 has increased approximately 50 per cent (Figure 10). The centered 6-year moving average of seedling pecan production in Oklahoma was 11.9 million pounds in 1924, 14.7 million pounds in 1934, 17.7 million pounds in 1944, and 17.3 million pounds in 1954. Annual production varied from a low of 1,910,000 pounds in 1936 to a high of 40,900,000 pounds in 1947. Annual production in Oklahoma during the 3 most recent years was 29.7 million pounds in 1955, 6.5 million pounds in 1956 and 28.8 million pounds in 1957 (Appendix Table B-II).

In the period from 1919 to 1957, average annual production of all pecans in Oklahoma was 16,645,000 pounds. Production varied from a low

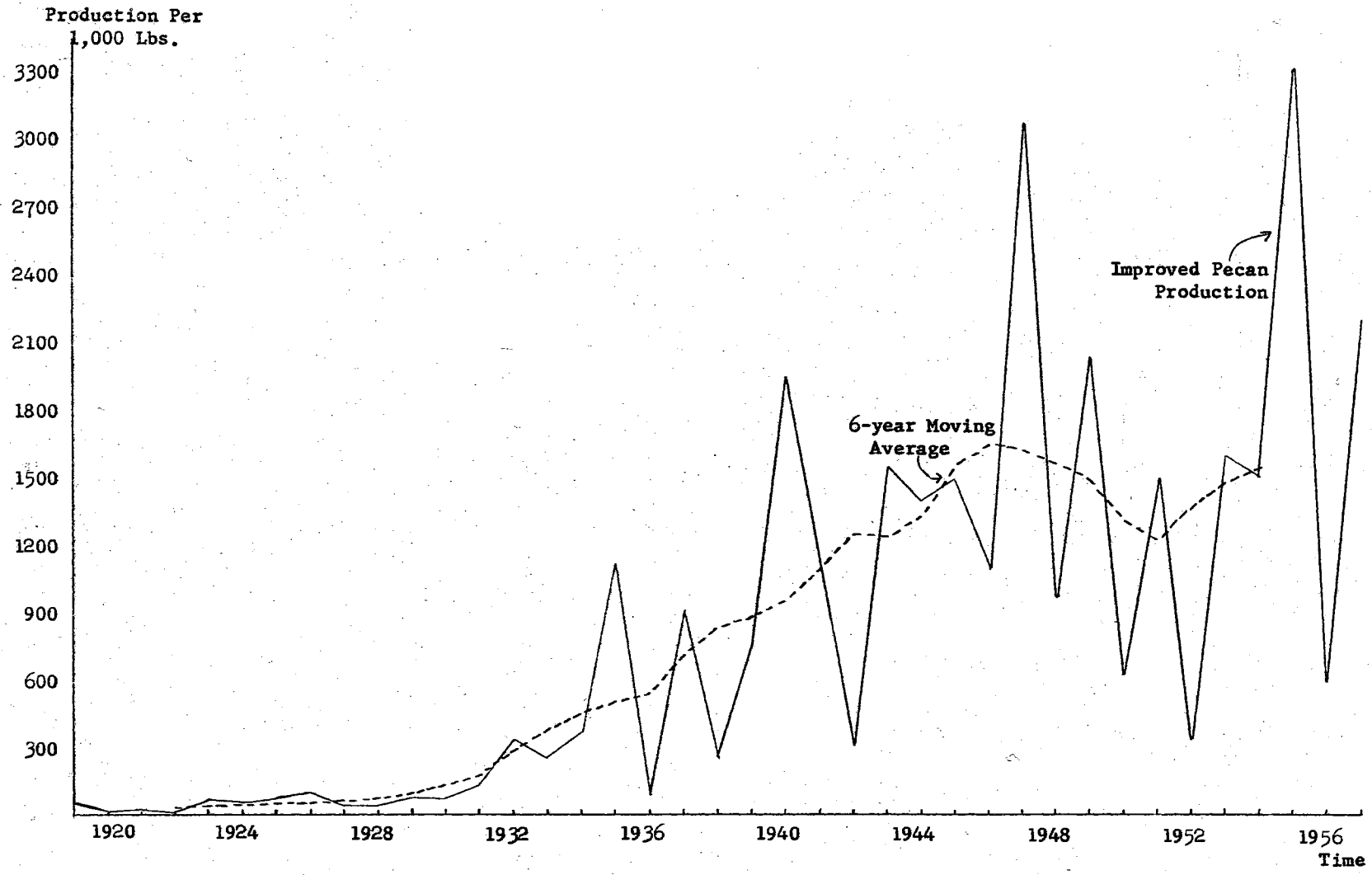

Figure 9. Pecan Production: Annual and Centered 6-Year Moving Average, Improved Pecans, Oklahoma, 1919-1957

Source: Appendix Tables B-II and B-III.

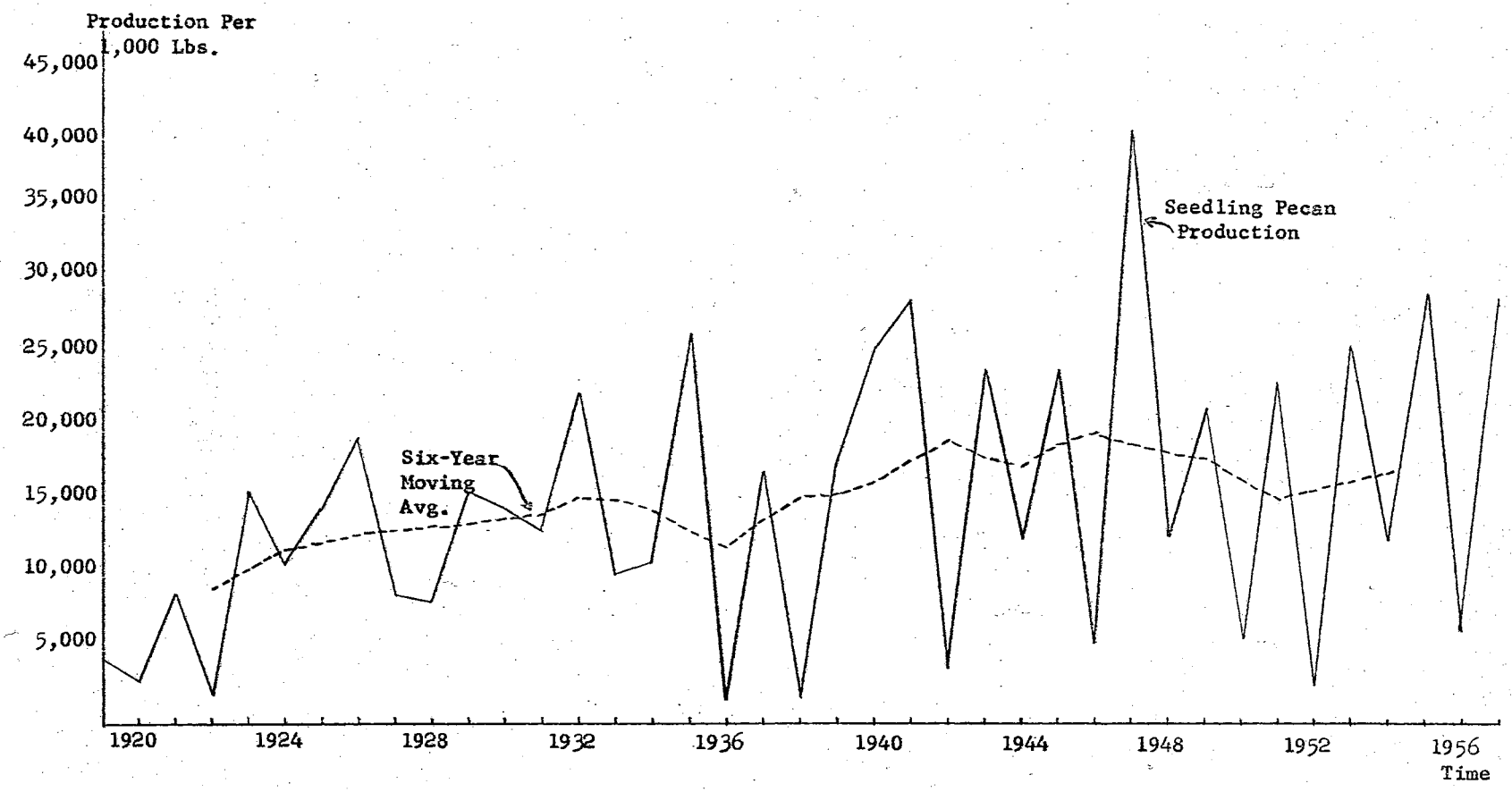

Figure 10. Pecan Production: Annual and Centered 6-Year Moving Average, Seedling Pecans, Oklahoma, 1919-1957

Source: Appendix Tables B-II and B-III.

of 2 million pounds in 1936 to a high of 44 million pounds in 1944. The extent of this variation may be indicated in two ways: (1) the standard deviation of the changes from year-to-year expressed as a per cent of the mean of the original data, and (2) the average percentage change from preceding year. The first may be contrasted with the coefficient of variation which measures the variation not from year-to-year but about the mean of the series. (2) The second considers the average percentage changes from the previous year with the sign disregarded.

The average percentage change from the previous year for production was 177 per cent, for value of sales 174 per cent, and for prices 36 per cent (Table XIII). The standard deviation of the first differences as a per cent of the mean of the original series was 124 per cent for value of sales, 98 per cent for production and 37 per cent for prices received by farmers. Thus, by both measures, production and value of sales varied more than did prices.

In 31 of the 38 years during the period 1919-57 prices differed by less than 50 per cent from prices in the previous year, while production and value of sales each differed by as little as 50 per cent from the previous year in only 12 years (Table XIII). Production in 8 years exceeded the previous year's production by more than 200 per cent and in 11 years was less than previous year's production by more than 50 per cent. Price was less than the previous year's price by more than 50 per cent in only one year and did not exceed the previous year's price by 200 per cent in any years.

Table XIII

Frequency Distribution of Year-to-Year Changes in Production, Value of Sales, and Prices Received by Farmers, and Some Measures of Variation, Oklahoma, 1919-1957

Percentage Change	Production 1,000 lbs.	Value of Sales $1,000	Prices Cents per Pounds
		(Number of Years)	
-100 to -50.01	11	11	1
-50 to -25.01	3	2	10
0 ± 25.00	6	7	15
25.01 to 50.00	3	3	6
50.01 to 100.00	4	2	4
100.01 to 200.00	3	6	2
200.01 to 400.00	2	1	0
400.01 to 600.00	2	2	0
600.01 to 800.00	1	3	0
800.01 to 1000.01	3	0	0
1000.01 to 1200.00	0	1	0
Mean of Series	16,645	2,351	14.9
Average change from year-to-year[a]	13,650	2,047.3	4.6
Average percentage change from year-to-year[a]	177.0 percent	174.5 percent	36.2 percent
Standard deviation of the first differences as a per cent of the mean of the series	98.2 percent	124.2 percent	37.5 percent

[a]Sign disregarded.

Number of Trees by Age and Type

The number of pecan trees of all ages as reported by the Census of Agriculture decreased nearly 17 per cent between 1949 and 1954 (Table XIV). In 1949, the Census of Agriculture reported 1,493,912 pecan trees of all ages and of both types in Oklahoma. This number had decreased to 1,241,761 trees by 1954. In each year almost 90 per cent of all trees were of the seedling type. In 1949 an estimated 75 per cent of all trees were of bearing age and the percentage increased slightly to 79 per cent in 1954.

Table XIV

Pecan Trees in Oklahoma: Number and Per Cent by Age and Type, 1949 and 1954, and Percentage Change Between 1949 and 1954

Tree Type	1949 Number	1949 Per Cent	1949 Per Cent	1954 Number	1954 Per Cent	1954 Per Cent	Percentage Change 1949 to 1954
Total trees	1,493,912	100	100	1,241,761	100	100	-16.9
Bearing	1,125,354		75.3	971,802		78.3	-13.6
Non-bearing	368,558		24.7	269,959		27.7	-26.8
Total seedling trees	1,312,208	87.8	100	1,108,530	89.3	100	-15.5
Bearing	988,790	66.2	75.4	871,906	70.2	78.6	-11.8
Non-bearing	323,418	21.6	24.7	236,624	19.1	21.4	-26.8
Total improved trees	181,704	12.2	100	133,231	10.7	100	-26.7
Bearing	136,564	9.1	75.2	99,896	8.0	74.9	-26.9
Non-bearing	45,140	3.0	24.8	33,335	2.7	25.0	-26.2

Source: U.S. Bureau of the Census, Census of Agriculture 1954, Vol. 1 Part 25 (Washington: Government Printing Office, 1954) pp. 154-155.

Location of Commercial Production

Number of Trees by Crop Reporting Districts. The major pecan producing area in Oklahoma lies in a diagonal belt of approximately 75 miles in width running northeast to southwest across the state. Crop reporting districts III, V, and VIII contained the major proportions of pecan trees in 1949 (Table XV). Crop reporting district VIII, located in the south central part of Oklahoma, was the leading district in tree numbers of all ages in all categories shown in the table. Crop reporting districts III, V, and VIII combined accounted for 77 per cent or more of all trees in all categories in 1949 as reported by the Census of Agriculture.

The distribution of the number of pecan trees by type and age in the crop reporting districts in Oklahoma in 1954 is shown in Table XVI. Again the three crop reporting districts, III, V, VIII, were the major areas of pecan tree concentration, accounting for 79 per cent or more of all trees in all classifications in 1954 as reported by the Census of Agriculture. The location of trees by crop reporting districts and the number of farms reporting pecan trees and the number of trees of all ages by counties in Oklahoma in 1954 are shown for seedling and improved pecans in Appendix Figures B-1 and B-2, respectively.

Production by Crop Reporting Districts. Crop reporting districts III, V, and VIII combined accounted for 84 per cent of the estimated 7,698,301 pounds of all pecans harvested in Oklahoma in 1949 (Table XVII). Almost 88 per cent of the improved pecans harvested in Oklahoma in 1949 were harvested in these 3 crop reporting districts. More than 83 per cent of the 6,797,588 pounds of seedling pecans harvested in Oklahoma in 1949 were harvested in these 3 crop reporting districts.

Table XV

Number of Pecan Trees, by Type, and Ages, Crop Reporting Districts, Oklahoma, 1949

Crop Reporting District	Trees of All Ages	All		Improved		Seedling	
		Bearing	Non-bearing	Bearing	Non-bearing	Bearing	Non-bearing
	No.	No.	No.	No.	No.	No.	No.
I	148	38	110	28	73	10	37
II	14,927	9,268	5,659	811	1,468	8,457	4,191
III	285,935	209,448	76,487	25,394	12,949	184,054	63,538
IV	1,780	1,099	681	788	411	311	270
V	427,162	324,798	102,364	39,522	8,465	285,276	93,899
VI	128,180	93,212	34,968	10,557	4,250	82,655	30,718
VII	55,849	44,572	11,277	2,219	1,434	42,353	9,843
VIII	556,195*	431,857*	124,338*	53,470*	13,246*	378,387*	11,092*
IX	23,736	11,062	12,674	3,775	2,844	7,287	9,830
State	1,493,912	1,125,354	368,558	136,564	45,140	988,790	323,418

*Indicates leading district in state by category.

Source: U.S. Bureau of the Census, Census of Agriculture, 1954, Vol. 1 Part 25. (Washington: Government Printing Office, 1954) pp. 154-155.

Table XVI

Number of Pecan Trees, by Type, and Ages, Crop Reporting Districts, Oklahoma, 1954

Crop Reporting District	Trees of All Ages	All		Improved		Seedling	
		Bearing	Non-bearing	Bearing	Non-bearing	Bearing	Non-bearing
		No.	No.	No.	No.	No.	No.
I	49	33	16			33	16
II	15,238	13,462	1,776	472	207	12,990	1,569
III	258,629	184,633	73,996	19,703	11,493*	164,930	62,503
IV	2,470	1,365	1,105	62	56	1,303	1,409
V	273,664	222,575	51,089	25,125	8,963	197,450	42,126
VI	173,530	128,516	45,014	6,483	2,948	122,033	42,066
VII	41,661	36,709	4,952	6,217	547	30,492	4,405
VIII	460,373*	372,447*	87,926*	38,688*	6,599	333,759*	81,327*
IX	16,147	12,062	4,085	3,146	2,522	8,916	1,563
State	1,241,761	971,802	269,959	99,896	33,335	871,906	236,624

*Indicates leading district in state by category.

Source: U.S. Bureau of the Census, Census of Agriculture, 1954, Vol. 1 Part 25. (Washington: Government Printing Office, 1954) pp. 154-155.

Table XVII

Quantity of Pecans Harvested, by Type and Percentages of State Totals, Crop Reporting Districts, Oklahoma, 1949

Crop Reporting District	Quantity Harvested					
	All		Improved		Seedlings	
	Pounds	Percent	Pounds	Percent	Pounds	Percent
I	100	*	0	0	100	*
II	144,657	1.9	10,868	1.2	133,789	2.0
III	1,621,866	21.1	201,538	22.4	1,420,328	20.9
IV	3,417	*	2,015	0.2	1,402	*
V	2,032,550	26.4	120,427	13.4	1,912,123	28.1
VI	612,697	8.0	60,149	6.7	552,548	8.1
VII	395,712	5.1	23,674	2.6	372,027	5.5
VIII	2,809,521	36.5	466,531	51.8	2,342,990	34.5
IX	77,792	1.0	15,511	1.7	62,281	0.9
State	7,698,301	100	900,713	100	6,797,588	100

*Less than 0.05 per cent.

Source: U.S. Bureau of the Census, Census of Agriculture, 1954, Vol. 1 Part 25. (Washington: Government Printing Office, 1954) pp. 154-155.

Crop reporting districts III, V, and VIII combined accounted for almost 84 per cent of total production of all pecans in the state (Table XVIII). These 3 districts accounted for 86 per cent of improved pecan production and 83 percent of seedling production.

Table XVIII

Quantity of Pecans Harvested, by Type and Percentages of State Totals, Crop Reporting Districts, Oklahoma, 1954

Crop-Reporting District	Quantity Harvested					
	All		Improved		Seedlings	
	Pounds	Percent	Pounds	Percent	Pounds	Percent
I	0	0	0	0	0	0
II	11,300	0.5	1,315	0.3	9,985	0.5
III	209,182	8.4	32,500	7.3	176,682	8.6
IV	202	*	2		200	*
V	336,299	13.4	96,519	21.6	239,780	11.7
VI	183,039	7.3	16,946	3.8	166,093	8.1
VII	59,230	2.4	9,733	2.2	49,497	2.4
VIII	1,539,159	61.5	255,042	57.1	1,284,117	62.4
IX	164,451	6.5	34,744	7.7	129,707	6.3
State	2,502,862	100	446,801	100	2,056,061	100

*Less than 0.05 per cent.

Source: U.S. Bureau of the Census, Census of Agriculture, 1954, Vol. 1 Part 25. (Washington: Government Printing Office, 1954) pp. 154-155.

Size of the Pecan Enterprise

Distribution of Farms by Tree Numbers. The Census of Agriculture of 1954 reported 8,339 farms in Oklahoma as having pecan trees of bearing age (Table XIX). Nearly two-fifths of these farms reported 25 trees or less per farm. Only nine farms in the state reported a tree population of bearing age in excess of 5,000 trees. Almost 95 per cent of all the farms had less than 500 trees per farm.

Table XIX

Farms Reporting Pecan Trees of Bearing Age, All Pecans, by Number of Trees Per Farm, Oklahoma, 1954

Number of Trees	Number of Farms	Per Cent of Total
Under 25	3,236	38.67
25-49	1,552	18.54
50-99	1,316	15.72
100-499	1,805	21.57
500-999	222	2.65
1000-1499	103	1.23
1500-1999	21	.25
2000-2999	54	.65
3000-4999	21	.25
Over 5000	9	.11
Total	8,339	

Source: United States Bureau of the Census, Census of Agriculture, 1954, Vol. II Chapter VIII, (Washington: Government Printing Office 1954) pp. 886-887.

About 6,700 farms reported seedling trees of bearing age (Table XX). Nearly one-third of these farms had less than 25 trees per farm. One-fourth had between 100 and 499 trees per farm. Almost 98 per cent of the farms had less than 500 trees per farm.

Table XX

Farms Reporting Seedling Pecan Trees of Bearing Age, Oklahoma, 1954

Number of Trees	Number of Trees	Per Cent of Total
Under 25	2,212	32.99
25-49	1,320	19.69
50-99	1,142	17.03
100-499	1,634	24.37
500-999	202	3.01
1000-1499	97	1.45
1500-1999	21	.31
2000-2999	49	.73
3000-4999	20	.29
Over 5000	7	.10
Total	6,704	

Source: U. S. Bureau of the Census, Census of Agriculture, 1954, Vol. II Chapter VIII, (Washington: Government Printing Office, 1954) pp. 886-887.

Improved trees of bearing age were reported on 1,635 farms in Oklahoma during 1954 (Table XXI). Nearly two-thirds of these farms had a tree population of less than 25 trees per farm. Slightly over 10 per cent of the farms had between 100 and 499 trees per farm. Approximately 94 per cent of all the farms had less than 500 trees per farm. Only 14 farms in Oklahoma reported 1000 or more improved trees per farm.

The distribution of pecan trees of non-bearing age is also of a dispersed nature. One-third of the 2,621 farms in Oklahoma reporting seedling pecan trees of non-bearing age in 1954 had less than 25 trees of this type per farm. Almost 21 per cent of the farms had between 100 and 499 trees per farm. Some 96 per cent of all the farms had less than 500 trees per farm.

Table XXI

Farms Reporting Improved Pecan Trees of Bearing Age, Oklahoma, 1954

Number of Trees	Number of Trees	Per Cent of Total
Under 25	1,024	62.63
25-49	232	14.19
50-99	174	10.64
100-499	171	10.46
500-999	20	1.22
1000-1499	6	.37
1500-1999	0	0
2000-2999	5	.31
3000-4999	1	.06
Over 5000	2	.06
Total	1,635	

Source: U.S. Bureau of the Census, Census of Agriculture, 1954, Vol. II Chapter VIII, (Washington: Government Printing Office, 1954) pp. 886-887.

The 677 farms in Oklahoma reporting improved trees of non-bearing age reported 33,335 trees in 1954. Over two-thirds of these farms reported less than 25 trees per farm. Only eight farms in the state reported 1,000 or more improved trees of non-bearing age in 1954.

Distribution of Farms by Production. Quantity harvested per farm may be a better indicator of the predominantly small-scale nature of pecan production in Oklahoma than is number of trees per farm. Nearly 37 per cent of the farms reporting a harvest of improved pecans in 1954 reported a harvest between 100 and 499 pounds per farm (Table XXII). Almost 70 per cent of the 681 farms reporting had a harvest of less than 500 pounds per farm.

Table XXII

Farms Reporting by Quantity Harvested Per Farm, Improved Pecans, Oklahoma, 1954

Number of Pounds	Number of Farms	Per Cent of Total
Under 25	92	13.51
25-49	45	6.61
50-99	89	13.07
100-499	250	36.71
500-999	95	13.95
1000-1499	50	7.34
1500-1999	12	1.76
2000-2999	23	3.38
3000-4999	15	2.20
5000-9999	4	.59
Over 10,000	6	.88
Total	681	

Source: United States Bureau of the Census, Census of Agriculture, 1954 Vol. II Chapter VIII, (Washington: Government Printing Office, 1954) pp. 886-887.

Of the 2,763 farms reporting a harvest of seedling pecans in 1954, some 45 per cent reported a harvest of between 100 and 499 pounds per farm (Table XXIII). Nearly 59 per cent of the farms harvested less than 500 pounds per farm.

Trends in Prices

All Pecans

Annual prices received by growers for pecans are characterized by wide annual variations (Figure 11). Over time, the level of actual pecan prices have moved up and down with the general level of all prices. The "real" price received by farmers for pecans in Oklahoma, however, has

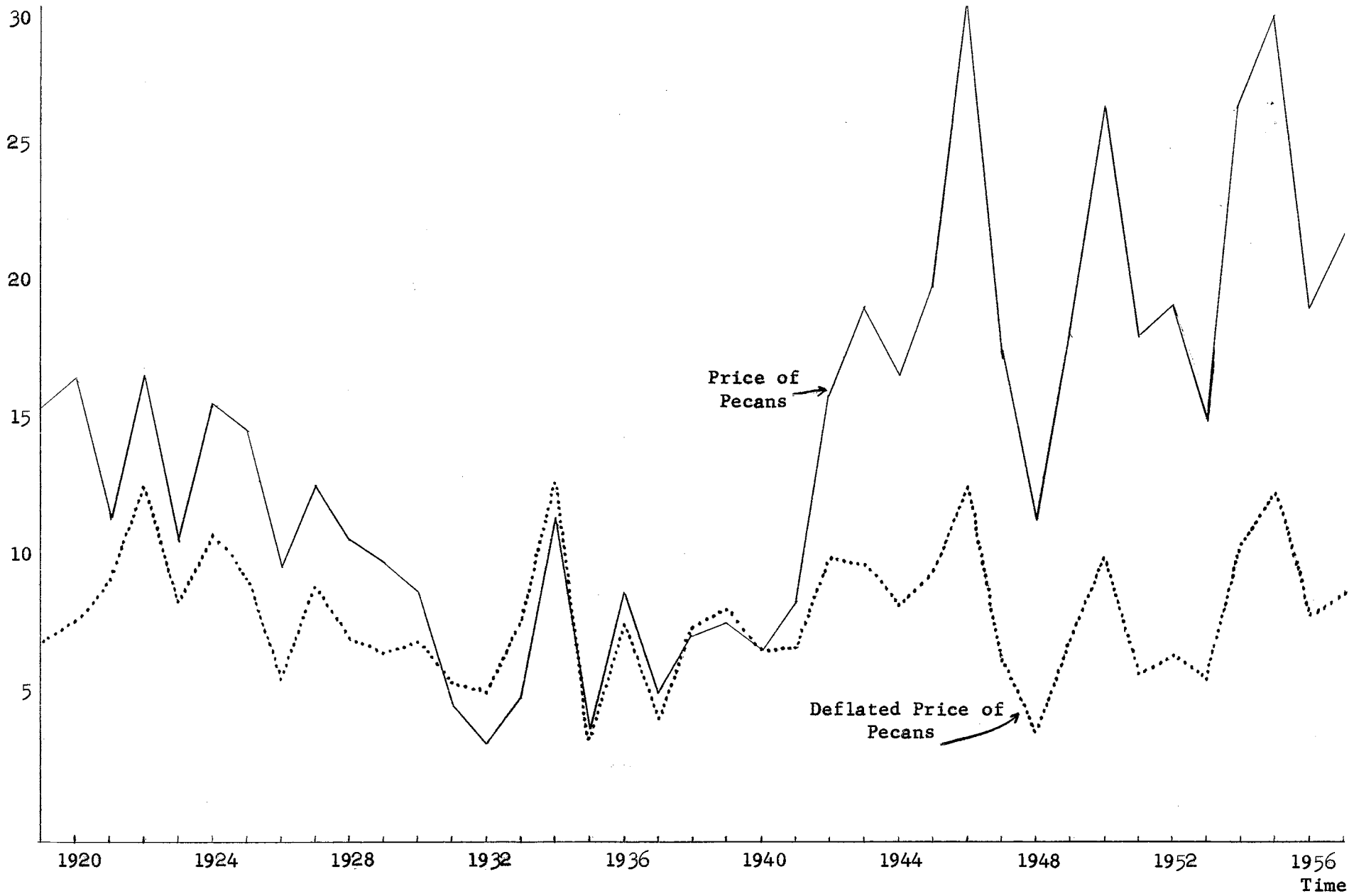

Figure 11. Actual and Deflated Average Prices Received by Farmers for all Pecans, Oklahoma, 1919-1957

Source: Appendix Table B-II.

fluctuated around a level which shows no apparent trend during the period 1919-57.

Table XXIII

Farms Reporting by Quantity Harvested Per Farm
Seedling Pecans, Oklahoma, 1954

No. of Pounds	Number of Farms	Per Cent of Total
Under 25	111	4.02
25-49	82	2.97
50-99	182	6.59
100-499	1252	45.31
500-999	526	19.04
1000-1499	286	10.35
1500-1999	67	2.42
2000-2999	121	4.38
3000-4999	79	2.86
5000-999	40	1.45
Over 10,000	17	.62
Total	2763	

Source: U. S. Bureau of the Census, Census of Agriculture, 1954, Vol. II Chapter VIII, (Washington: Government Printing Office, 1954) pp. 886-887.

The average price received by farmers for all pecans in Oklahoma has been less than the average price received for all pecans by farmers in the United States. This is due primarily to the fact that the production of seedlings in Oklahoma is larger relative to the production of improved pecans than is the nation at large.

Prices by Types

A comparison of prices received by farmers by type of pecan during the period 1922-1956 shows that the once wide disparity between prices

received for improved and seedling pecans has diminished substantially. Although improved pecan prices still exceed the prices received for seedling pecans, the difference has decreased from 23 cents per pound in 1922 to 11.5 cents per pound in 1956 (Figure 12). During this same period, prices received by farmers for pecans by type in Oklahoma have been approximately equal to the average price received for the corresponding type in the United States.

Summary

Although the census data on numbers of pecan trees per farm and in the various crop reporting districts may be of questionable nature, at the present time they are the only data available. Also since future pecan production in Oklahoma can only occur through the maturing of trees now of non-bearing age or through the adoption of improved cultural practices, a presentation of these facts seems desirable.

The production of improved pecans increased rapidly in Oklahoma during the period 1919-1957 but the production of seedling pecans increased less rapidly. However, the production of seedling pecans accounts for more than 90 per cent of all pecan production in Oklahoma. The proportion of national production produced in Oklahoma decreased nearly 50 per cent although the average production of all pecans increased nearly 50 per cent in Oklahoma between 1925 and 1954. "Real" prices received by growers for pecans in Oklahoma in the early 1950's were approximately equal to those of the mid-1920's.

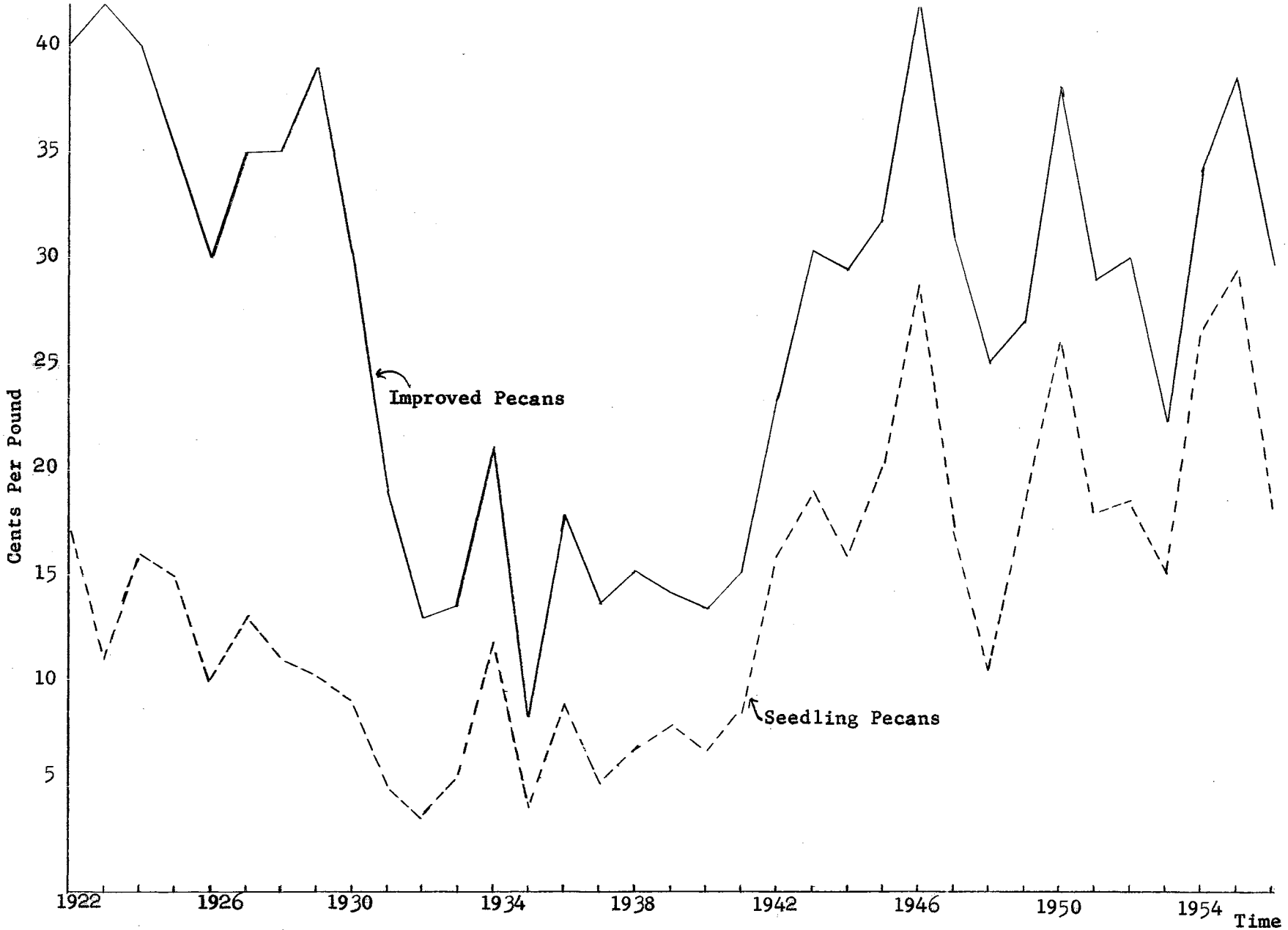

Figure 12. Prices Received by Farmers for Pecans, by Types, Oklahoma, 1922-1956

Source: Appendix Table B-IV.

CHAPTER IV

PRODUCTION AND MARKETING PRACTICES OF PECAN PRODUCERS IN LINCOLN COUNTY

This chapter contains a description of production and marketing of pecans in Lincoln County, Oklahoma. The descriptive results reported herein are based on a survey of pecan growers in Lincoln County conducted in the summer of 1958. The objective of this chapter is to point up certain production characteristics, production and marketing practices of growers, and the institutional environment within which pecans are marketed in this particular area.

Location and Importance of Lincoln County

Lincoln County is located in central Oklahoma. It is contiguously located to three counties in which commercial pecan shelling plants were operating in 1957. Lincoln County is located on the west central perimeter of the main production belt in Oklahoma.

The 1950 Census of Agriculture reported a total of 74,859 pecan trees of all ages and both major types in Lincoln County in 1949 (Table XXIV). Classified by type, the total number of trees consisted of 72,019 seedlings and 2,840 improved pecan trees. This represented 96.2 per cent and 3.8 per cent of the total, respectively. According to age, 60,521 trees, or 80.8 per cent of the total, were classiried as bearing, while 14,338 trees, or 19.2 per cent, were classified as non-bearing. Nearly 96 per cent of the trees of bearing age were of the seedling type and slightly over 4 per cent were improved pecan trees.

Table XXIV

Number and Per Cent of Pecan Trees in Lincoln County, Oklahoma, by Type and Age, 1949[a]

Age Type	Bearing		Non-Bearing		Total	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Seedling:						
Number	58,093	96.0	13,926	97.1	72,019	96.2
Per Cent	80.7		19.3		100	
Improved:						
Number	2,428	4.0	412	2.9	2,840	3.8
Per Cent	85.5		14.5		100	
Total:						
Number	60,521	100	14,338	100	74,859	
Per Cent	80.8		19.2			100

[a]United States Bureau of the Census, Census of Agriculture, 1954, Vol. 1 Part 25, (Washington: Government Printing Office, 1954), pp. 154-155.

The relative percentage distribution of pecan trees in Lincoln County was practically unchanged from 1944 to 1954 (Table XXV). The 1954 Census of Agriculture reported a total of 64,607 pecan trees of all ages and types in Lincoln County in 1954. Seedling trees represented 96.5 per cent and improved trees 3.5 per cent of the total. According to age, 81.2 per cent of the seedling pecan trees were of bearing age, while 18.8 per cent were of non-bearing age. Almost 97 per cent of all trees of bearing age were seedlings.

Lincoln County ranked sixth in the state in 1954 in terms of the number of trees of all ages. However, the county accounted for only 5 per cent of all trees in the State. The 50,659 seedling trees of bearing age located in Lincoln County in 1954 accounted for 11 per cent of the total of 871,906 seedling trees of bearing age in Oklahoma in 1954.

Table XXV

Number and Per Cent of Pecan Trees in Lincoln County, Oklahoma, by Type and Age, 1954[a]

Age / Type	Bearing		Non-Bearing		Total	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Seedling:						
Number	50,659	96.8	11,699	95.2	62,358	96.5
Per Cent	81.2		18.8		100	
Improved:						
Number	1,654	3.2	595	4.8	2,249	3.5
Per Cent	73.5		26.5		100	
Total:						
Number	52,313	100	12,294	100	64,607	
Per Cent	81.0		19.0			100

[a]United States Bureau of the Census, Census of Agriculture, 1954, Vol. 1, Part 25, (Washington: Government Printing Office, 1954), pp. 154-155.

The Sample

An area sampling procedure was used in this study for two main reasons: (1) a complete list of pecan growers was not available, and (2) geographic coverage of the county was considered desirable. Land sections within the county were used as the primary sampling units, and they were selected by the systematic sampling technique. The secondary sampling units consisted of all pecan growers located in the sample land sections. The original sample of primary units consisted of 49 land sections, which represented a sampling rate of approximately 5 per cent.

The field procedure used in identifying the secondary sampling units and obtaining schedules was as follows: (1) all residences in each sample section were contacted and schedules were obtained by personal interviews

if the occupant of the household had (a) any pecan trees on land in the sample section or (b) any pecan trees in any other section in the county under his management or ownership; (2) one call back was made to households missed in the initial survey, and (3) only those individuals that harvested pecans for sale during 1957 were included in the sample.

In addition to the above procedure it became necessary to supplement the original sample to obtain the desired number of schedules. This was made necessary primarily by the tendency of pecan trees to adhere closely to creek bottoms within the county. Another factor necessitating this supplementary sample was the high proportion of the secondary sampling units disqualified by the third criterion of selection. Only 8 completed and usable schedules from 7 sample sections were obtained in the original sample.

The County Agent of Lincoln County provided the author with a list of 167 pecan producers. This list was compiled from grower attendance of shows and meetings, and from personal contacts the County Agent had developed with pecan growers during past years. The names of 25 growers were selected at random from the list and these producers were contacted and interviewed. Again, one call back was made in an effort to obtain a completed schedule. However, only 14 schedules were obtained from the 25 producers in the supplementary sample.

Survey Results

The completed survey consisted of 22 usable schedules taken by personal interview during the summer of 1958. Eight of the schedules were

obtained from the original sample of land sections, while 14 were obtained from the supplementary sample drawn from the list of known pecan growers.

Tree Numbers

The 22 pecan growers included in the sample reported a total of 7,588 bearing pecan trees of all kinds.[1] By type, the total of 7,588 trees of bearing age in the sample consisted of 94 per cent seedling trees and 6 per cent improved trees. The total number of bearing trees in the sample represented 15 per cent and 13 per cent of the corresponding totals in Lincoln County as estimated by the Census of Agriculture in 1954 and 1949, respectively. Seedling trees of bearing age in the sample represented 14 per cent and 12 per cent and improved trees of bearing age represented 26 per cent and 18 per cent of the census estimates of corresponding county totals in 1954 and 1949, respectively. Classified by type the total of 8,967 trees of all ages in the sample consisted of 7,821 seedling and 1,146 improved trees (Table XXVI).

Production and Sales

Production of all pecans on sample farms in 1957 was 124,326 pounds. Thus, total production on sample farms represented 26 per cent of county production in 1949 as reported in the 1950 Census of Agriculture. Because of the wide disparity between the Census estimates and the Crop Reporting Board estimates for total State production in 1954, a direct

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[1] One producer did not estimate the number of trees located on his farm, therefore data on tree numbers refer to only 21 producers.

comparison of sample and county totals for 1954 would perhaps be misleading. However, if Lincoln County pecan production in 1954 as reported by the Census is adjusted upward in the same ratio as the State total as reported by the Crop Reporting Board is to the State total as estimated by the Bureau of the Census, the adjusted estimate for the County in 1954 is 231,045 pounds of all pecans.[2] Then, production on sample farms in 1957 represented 54 per cent of the "adjusted" county production in 1954. Off-farm sales of pecans amounted to 120,926 pounds of 97 per cent of total production on sample farms. The remaining 3 per cent of the total production was used at home or sold at the farm.

Table XXVI

Number and Per Cent of Pecan Trees on Survey Farms, Lincoln County, Oklahoma, by Type and Age, 1957

Age / Type	Bearing		Non-Bearing		Total	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Seedling:						
Number	7,163	94.4	658[a]	47.7	7,821	87.2
Per Cent	91.6		8.4		100	
Improved:						
Number	425	5.6	721	52.3	1,146	12.8
Per Cent	37.1		62.9		100	
Total						
Number	7,588	100	1,379	100	8,967[b]	
Per Cent	84.6		15.4			100

[a]Only 6 producers estimated the number of seedling trees of non-bearing age.

[b]One producer failed to estimate the number of trees on his farm. Therefore, data refer to only 21 producers.

[2]Adjusted estimate for pecan production in Lincoln County in 1954 was computed as follows: production in Lincoln County (Census of Agriculture, 1954) time ratio of State pecan production as estimated by the Crop Reporting Board in 1954 to State pecan production as estimated by Census of Agriculture in 1954. $231,045 = 39,881 \times \frac{14,500,000}{2,502,862}$.

Farm Characteristics

The pecan growers in the survey were classified into three groups based on ownership status. The classification and distribution by ownership were as follows: (1) fifteen or 68 per cent were owners; (2) four or 18 per cent were part-owners; and (3) three or 14 per cent were renters.

For the entire sample, average farm size was 395 acres (Table XXVII). Individual farm sizes varied from 65 acres to 2,200 acres. Average size of owner-operated farms was 376 acres. The average farm size of part-owners was 578 acres, and the farm size of renter-operated farms averaged 247 acres.

Table XXVII

Average Total Acreage, Total Number of Pecan Trees by Type, Total Production, and Value of Pecan Sales on Survey Farms, 1957

Group	Average Acres	Number of Trees (Bearing Age) Improved	Seedling	Total	Production	Value of Sales
Owners	375.87	287	5570[a]	5857[a]	104,226	$21,595
Part-owners	578.00	133	1128	1261	10,100	2,275
Renters	246.67	5	465	470	10,000	1,893
Total Sample	395.00	425	7163[a]	7588[a]	124,326	$25,763

[a]No estimate given on number of seedling trees grown on one farm. Therefore data refer to only 21 producers.

The 15 farms classified as owner-operated farms reported a total of 5,857 trees, or 77 per cent of the total number of trees of all ages in the sample. The 4 farms classified as part-owner farms had 1,261 trees and the

3 farms classified as renter farms had 470 trees, representing 17 per cent and 6 per cent, respectively, of the total number of trees of all ages in the sample.

The 15 owner-operated farms reported a total production of 104,226 pounds of pecans, or 84 per cent of the survey total of 124,326 pounds. Slightly over 8 per cent of the total production, or 10,100 pounds, was produced on the 4 farms classified as part-owners; and 10,000 pounds, or 8 per cent of total sample production, was produced on the 3 farms classified as renters.

An average of 466 trees of all ages was located on the 14 owner-operated farms.[3] On the average, sixty-four of these trees were of the improved type and 402 were of the seedling type (Table XXVIII). An average of 4,996 pounds of pecans representing an average value of sales of 1,058 dollars was sold per survey farm in 1957.

Table XXVIII

Average Number of Trees Per Farm, Quantity of Pecans Sold and Value of Sales by Ownership Groups on Survey Farms, 1957

Group	Number of Producers	Average Number of Trees Per Farm			Average Quantity Sales Total	Average Value of Sales All Types
		Improved	Seedling	Total		
					(pounds)	
Owners	14	64	402	466	6,109	$1,289
Part-owners	4	52	432	484	2,475	569
Renters	3	2	155	157	3,167	631
Total Sample	21[a]	53	372	425	4,996	1,058

[a]No estimate given on number of pecan trees grown on one farm.

[3]No estimate given on the number of pecan trees on one owner-operated farm. Therefore data refer to only 21 producers in sample.

Some of the typical characteristics of the pecan enterprise are illustrated in Table XXIX. For example, over 50 per cent of the farms had only 100 or fewer pecan trees and accounted for only about 25 per cent of the quantity of pecans sold. On the other hand, one producer with over 2,000 trees accounted for about 26 per cent of the total quantity sold. About 33 per cent of the farms in the survey reported between 101 and 500 pecan trees of bearing age per farm, and accounted for about 40 per cent of the total quantity of sales in the survey.

Table XXIX

Number of Growers, Average and Total Quantity Sold and Value of Sales, by Tree Numbers, 1957

Number of Trees Bearing Age Average Per Farm	Number of Farms	Quantity Sold		Value of Sales	
		Total	Average	Total	Average
		Pounds		Dollars	
0-25	3	4,200	1,400	950	317
26-49	4	9,200	2,300	1,975	494
50-100	4	13,000	3,250	2,500	625
101-500	7	41,826	5,975	8,763	1,252
501-2000	2	6,700	3,350	1,425	713
> 2000	1	30,000	30,000	6,600	6,600
Total[a]	21	104,926	4,996	$22,213	$1,057.76

[a]One producer in the sample failed to estimate number of trees on his farm, therefore table totals do not equal sample totals.

Livestock enterprises, including both beef and dairy operations, were the major source of cash farm income on 10 farms or 46 per cent of the survey farms. Cash crops were the major source of cash farm income on 9 farms, or 41 per cent of the survey farms. Pecans were the major source

of cash farm income on 2 farms, or 9 per cent of the survey farms; and one farm derived its major source of cash farm income from rental of pasture. Pecans accounted for 30 per cent or more of the cash farm income on 7 of the 15 farms for which respondents replied to the question concerning the importance of pecans in cash farm income.

Production Practices

Respondents in the survey were asked to specify the number of pecan trees located in cultivatable orchards.[4] The 22 producers in the survey reported that a total of 5,809 trees, or 65 per cent of all trees reported in the survey, were located in cultivatable orchards. An additional 1,533 trees, or 17 per cent, were located in orchards that could become cultivatable if thinning and brush clearing practices were adopted. Almost 18 per cent, or 1,635 of the 8,967 trees of all ages reported by the 22 producers, was located along creek banks, fence rows, and muck land, such that it would be practically impossible to convert the land into cultivatable orchards.

Fertilization and land use of cultivatable pecan orchards varied widely among the producers in this survey. Five producers, or 23 per cent of the sample total, reported fertilization practices of some type were followed in 1957. Four of these 5 producers applied the fertilizer for direct benefit of the pecan trees. The other producer applied the fertilizer to a cash crop interplanted in the pecan orchard.

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[4]A cultivatable orchard is defined for the purpose of this study as one in which the trees have been thinned, brush removed, and it is possible to cultivate, whether the practice is actually performed or not.

Respondents were also questioned on the use of cultivatable pecan orchards for other crops in 1957. Four producers, or 18 per cent, planted cover crops; thirteen producers, or 59 per cent, planted cash crops; five producers, or 23 per cent, harvested hay; and 10 producers, or 45 per cent, reported they used cultivatable orchards for pasture.[5] Of the 13 producers who planted cash crops in their cultivatable pecan groves in 1957, nine seeded wheat, 7 seeded oats, and 3 planted corn.

Producers in the sample were questioned as to whether spraying practices were followed for disease or insect control. None of the 22 producers in the survey had ever sprayed for diseases and/or insects. In nearly every case, the producers in the sample replied that they realized spraying and other cultural practices such as thinning, top-working trees, and fertilization of pecan trees would be profitable.

Yields

In view of the wide range of production estimates given by the producers in the sample, considerable variation in yield per tree of bearing age occurred on the sample farms. Yields varied from 1.66 pounds per tree on a farm with 725 trees of bearing age to a yield of 111 pounds per tree on a farm with 50 trees of bearing age. Average yield per tree of bearing age for the entire sample was 14.3 pounds. Six of the 21 producers in the sample reported an average yield in excess of 50 pounds per tree of

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[5]The total number adds to more than 22 and the percentages add to more than 100 per cent because some producers reported more than one use for cultivatable pecan land.

bearing age (Table XXX). Five of the 21 sample producers reported a yield of less than 10 pounds per tree in 1957.

Table XXX

Range in Yield Per Tree by Number of Producers in Sample, 1957

Number of Producers in Survey	Range in Average Yields Per Tree (pounds)
5	1.7 - 10.0
7	14.0 - 22.2
3	40.0 - 50.0
3	52.0 - 75.0
3	80.0 - 111.1
Sample Total 21[a]	

[a]No estimate on number of pecan trees on one farm.

The "alternate year bearing" characteristic of pecans was well illustrated by the survey data, since only 9 producers, or 41 per cent of the 22 producers in the sample, reported a harvest of any pecans during 1956.

Average yields per tree were also classified according to the number of pecan trees per farm (Table XXXI). Two producers in the 0-25 trees per farm classification reported an average yield of 88 pounds per tree. Four producers in the 50-100 trees per farm category reported a yield of approximate16 47 pounds per tree. Three producers in the 26-49 tree per farm category and 4 producers in the 501-2000 tree per farm category reported yields of less then 7 pounds per tree.

Table XXXI

Average Yield Per Tree by Number of Trees Per Farm, Survey Farm, Lincoln County, 1957

Number of Trees Per Farm	Number of Producers	Average Yield Per Tree
0-25	2	88.0
26-49	3	6.9
50-100	4	46.9
101-500	7	15.7
501-2000	4	3.9
> 2000	1	14.0

Harvesting Methods

The 22 producers in the sample were questioned about methods used in harvesting their pecan crop in 1957. Eleven producers, or 50 per cent of the 22 producers in the sample, harvested one-half or more of their crop with family labor.

Individuals generally familiar with the industry report that pecan harvesting on a share basis is a common practice in Oklahoma. Although share arrangements may vary in different localities and between different parties, the normal share arrangements between owners and harvesters seems to be one-half of the pecans to the harvester in non-cultivatable orchards and in those years in which there is a "low" density of production. Normal share arrangements are usually one-third to harvesters and two-thirds to the owner in cultivatable orchards and in "high" density

orchards. Seven producers, or 32 per cent of the sample, reported 50 per cent or more of their pecan crop in 1957 was harvested on a share basis.

Four producers, or 18 per cent of the sample, reported 50 per cent or more of their pecan crop in 1957 was harvested on a cost per pound basis. An average of 8 cents per pound harvesting cost was reported by the 4 producers who used this method of harvesting.

Total Sales

Total sales of the 22 sample producers amounted to 120,926 pounds of which 119,186 pounds, or 98.6 per cent, were sold through commercial sales outlets in 1957. Two producers reported a total of 1,740 pounds, or 1.4 per cent of the total volume of sales, were sold at home. Volume of sales per sample producer varied from 200 pounds to 30,000 pounds, with an average of 5,497 pounds per producer. Three producers in the 10-30,000 pound classification accounted for 50 per cent of the total sales in the sample and 51 per cent of the value of sales in the sample. Value of sales of the 22 producers in the sample totaled $25,763 (Table XXXII).

Three producers in the 10,000-30,000 pound category reported a total value of sales of $13,195, representing 51 per cent of the total value of sales in the sample (Figure 13). The four producers with an average production less than 1,000 pounds per producer reported a combined value of sales of $625 or slightly more than 2 per cent of the total value of sales reported in the sample. The 11 producers in the 1,001-5,000 pound category represented 50 per cent of the total producers in the sample; however, the sales of these 11 producers accounted for only 27 per cent of the total value of sales in the sample.

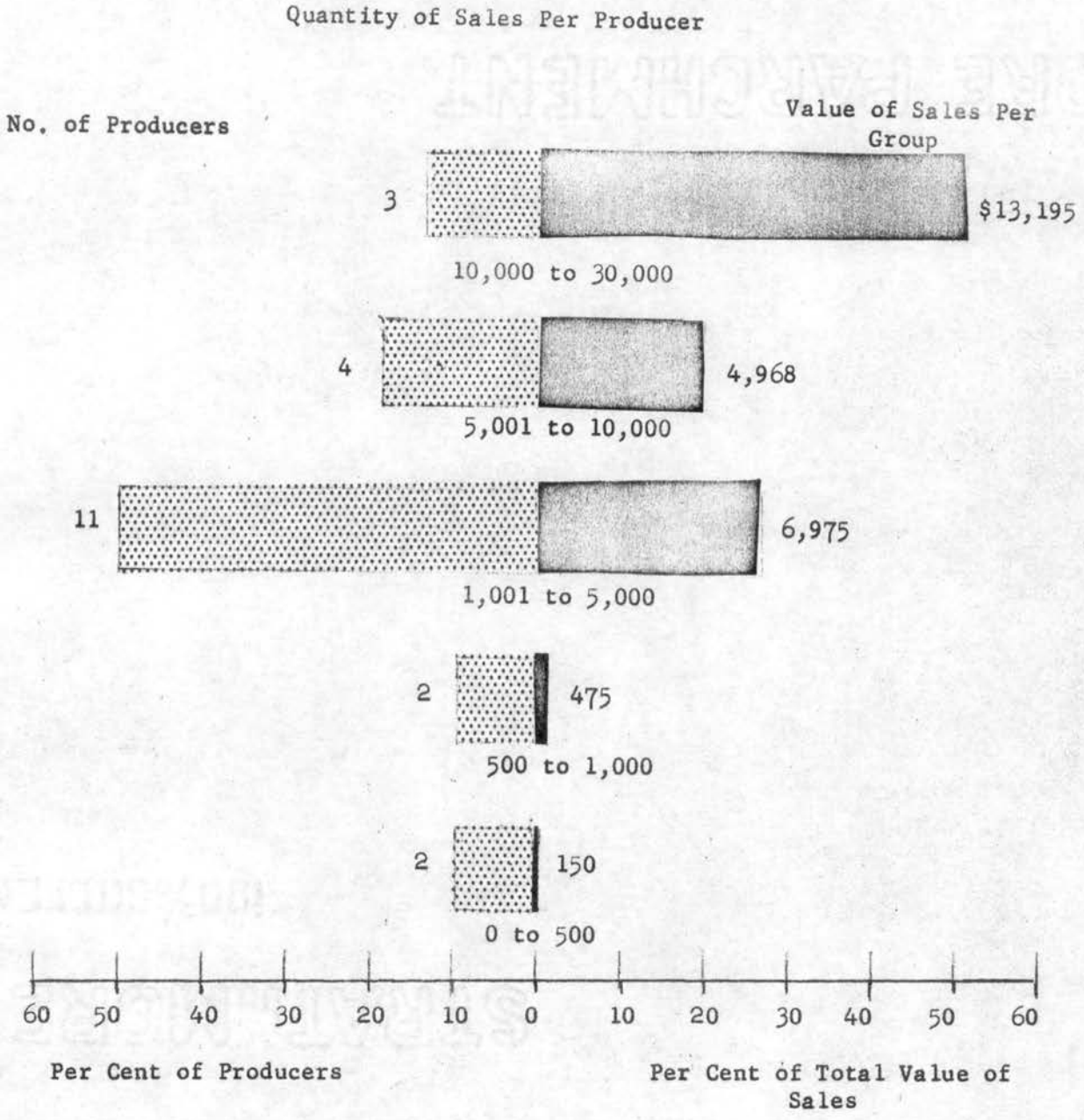

Figure 13. Percentage Distribution of Value of Sales and Number of Producers, by Quantity of Sales per Producer, Sample Producers, 1957

Table XXXII

Quantity and Value of Sales of the Sample of Pecan Producers, by Quantity Sold Per Producer

Quantity Sold Per Producer	Total Sales	Total Value Sales	Per Cent of Total Sales	Per Cent of Total Value of Sales
(Pounds)	(Pounds)	(Dollars)	(Per Cent)	(Per Cent)
Less than 500	700	150.00	0.58	0.58
501-5,000	35,726	7,450.00	29.54	28.92
5,001-10,000	24,000	4,968.00	19.85	19.28
10,001-30,000	60,500	13,195.00	50.03	51.22
Total	120,926	25,763.00	100.00	100.00

Frequency of Sales

Twelve producers, or 50 per cent of the sample total, reported they sold their pecans in 1957 whenever a specified given quantity was accumulated (Table XXXIII). This specified quantity varied from less than 500 pounds on four farms to between 1,001 and 5,000 pounds on three farms. Five of these 12 producers specified that 501-1,000 pound sales were usually made. Four producers, or 17 per cent of the sample total, reported the sale of their entire crop at one time. Sales were made weekly by five producers or 21 per cent of the producers in the sample. Three producers, or 13 per cent of the sample total, sold their pecans in 1957 after each "flailing."

Table XXXIII

Frequency of Sales of the Sample Producers in Lincoln County, Oklahoma

	0 to 500 pounds	501 to 1,000 pounds	1,001 to 5,000 pounds	After Each Flailing	Every Week	Whole Crop at Once
Number of Producers[a]	4	5	3	3	5	4
Per Cent of Total[b]	16.7	20.8	12.5	12.5	20.8	16.7

[a]Total exceeds 22 because some producers specified sales in more than one classification.

[b]Percentages computed on basis of 24 answers.

Number of Sales Outlets Available and Used

Respondents were questioned on the number of sales outlets available and the number of outlets actually used during 1957. Only 18 producers answered this question. Seven, or 39 per cent of the 18 producers replying to this question, reported only one sales outlet was available to them at the time they made sales in 1957. Four producers, or 22 per cent of the respondents answering this question, reported two sales outlets were available to them at the time sales were made in 1957. Four or more sales outlets were available at time of sales to five producers, or 28 per cent of the 18 producers replying to this question (Table XXXIV).

All 22 producers in the sample reported 50 per cent or more of their sales were made to one outlet (Table XXXV). Thirteen producers, or 59 per cent of the sample total, reported 90 per cent or more of their sales were sold through one sales outlet. Two producers, or 9 per cent of the

Table XXXIV

Number of Outlets Available to Pecan Growers, Survey Producers

	Total	One	Two	Three	Four or More
Number of Producers	18[a]	7	4	2	5
Per Cent of Total	100	38.9	22.2	11.1	27.8

[a]Only 18 producers responded to this question.

Table XXXV

Number and Per Cent of Producers Selling Selected Percentages of Their Crop to Only One Sales Outlet

	Percentages			
	50-100	50-69	70-89	90-100
Number of Producers	22	7	2	13
Per Cent of Total	100	32	9	59

sample total, sold 70-89 per cent of their 1957 sales to one outlet. Seven producers, or 32 per cent of the 22 respondents, reported 50-69 per cent of their sales were made through one outlet.

Type of Sales Outlets Used

The 22 producers in the sample were questioned on the distribution of pecan sales among various outlets. Ten sample producers reported a total of 58,676 pounds of pecans, or 49 per cent of the total 119,186 pounds sold through commercial sales outlets by the 22 producers in the

sample, sold to general stores. Six producers in the sample sold 12,850 pounds of pecans, or 11 per cent of the sample total, through feed stores. Some 43,185 pounds, or 36 per cent of the total, were sold through produce stores. The remaining 4,475 pounds, or 4 per cent of the sample total, were sold by three sample producers through creamery and grocery stores (Table XXXVI).

Table XXXVI

Percentages of Sales, by Type Outlet and by Number of Producers

Type Outlet	Pounds Sold	Number of Producers	Per Cent of Total	
			Pounds	Producers
Feed Store	12,850	6	10.78	18.18
General Store	58,676	10	49.23	30.30
Produce Store	43,185	14	36.23	42.42
Grocery	2,850	2	2.39	6.06
Creamery	1,625	1	1.36	3.03
Total	119,186	33[a]	99.99	99.99

[a]Number of producers exceeds 22 because some producers reported more than one sales outlet was used in 1957.

Distances Transported to Market

The sales of the 22 pecan producers were also classified by distances transported to market outlets. The 22 producers reported a total of 37 separate sales. Sixteen sales or 43 per cent of the total number of sales were made within five miles of the producers' farms (Table XXXVII). These 16 sales amounted to 44,126 pounds, or 37 per cent of the 119,186 pounds

sold by the 22 producers. Thirteen sales, or 35 per cent of the total number of sales, were made between 6 and 10 miles of producers' farms; these 13 sales accounted for 35,960 pounds, or 30 per cent of total off-farm sales. Four sales representing 32,550 pounds were made at distances between 11 and 15 miles of producers' farms. These four sales represented 11 per cent of the number of sales and 27 per cent of the total volume of sales. Only 4 of the 37 separate sales, or 11 per cent, were made at distances greater than 15 miles from producers' farms. These four sales represented 6,550 pounds or 6 per cent of the total pecans sold by the producers in the survey.

Table XXXVII

Pounds Sold by Number of Sales and Distances Transported to Market

Distance Transported to Market	Number of Sales	Pounds Sold	Per Cent of Total Sales	Per Cent of Total Pounds
0-5	16	44,126	43.24	37.02
6-10	13	35,960	35.14	30.17
11-15	4	32,550	10.81	27.31
> 15	4	6,550	10.81	5.50
Total	37	119,186	100.00	100.00

The sales of the 22 producers were further classified by sales outlets and distances transported to market (Table XXXVIII). General stores were the primary market outlet for pecans transported 5 miles or less and those transported between 11 and 15 miles, inclusive. Produce stores were the primary market outlet for pecans transported between 6 and 10 miles, inclusive and those transported over 15 miles.

Table XXXVIII

Distribution of Sales by Type Outlet, Total Pounds and Percentages and Distance to Market

Distance to Market	Feed Stores		General Stores		Produce Stores		Other Stores		Total	
miles	lbs	per cent	lbs	per cent	lbs	per cent	lbs	per cent	lbs	per cent
0 to 5	9,500	21.5	30,876	70.0	900	2.0	2,850	6.5	44,126	100
6 to 10	2,800	7.8	800	2.2	30,735	85.5	1,625	4.5	35,960	100
11 to 15	550	1.7	27,000	82.9	5,000	15.4	0	0	32,550	100
> 15	0	0	0	0	6,550	100	0	0	6,550	100
Total	12,850	10.8	58,676	49.2	43,185	36.2	4,475	3.8	119,186	100

Market Preferences

"Going to town" was almost as important as "best price" as the reason given for selling to a particular outlet (Table XXXIX). Thus, it appears that among the producers interviewed, other factors were more important than monetary factors in deciding where to sell pecans. "Best price," "going to town," "convenience," and "friendship" accounted for 35 per cent, 32 per cent, 14 per cent, and 11 per cent, respectively, of the 37 separate sales made by the 22 pecan producers in the sample.

Summary

The data in this chapter provide some descriptive details regarding the production and marketing of pecans in Lincoln County. The data point up the preponderance of relatively small scale pecan enterprises and the more or less haphazard and disorganized way in which production and marketing is carried on. The information provides a rather clear picture of the

existing condition and provides the framework within which any alternative solutions to marketing (or production) problems must be appraised. Any attempts to change or improve upon present production or marketing practices must begin with a factual knowledge of this present situation.

Table XXXIX

Market Preferences of Sample Producers in Lincoln County, 1957

Reason for Selling to a Particular Outlet	Number of Sales[a]	Per Cent of Total Sales
Convenience	5	13.5
Best Price[b]	13	35.1
Friendship	4	10.8
Going to Town	12	32.4
Other	3	8.2
Sample Total	37	100.0

[a]Total exceeds 22 because some producers reported more than one sale.

[b]"Best price" probably includes monetary and non-monetary factors including some of the other mentioned reasons.

Perhaps the major conclusion which might be drawn from these data is that any substantial improvements in marketing, and to a lesser extent in production practices, will depend upon a change in market structure. It is not economically feasible under present conditions for dealers in local markets to pay a premium for pecans with a high kernel percentage or which have been cleaned of trash, etc. This follows because of the small size of individual lots and the associated cost of grading and

pricing, together with the necessity for dealers to combine pecans from many growers before subsequent sale. Thus, prices paid to any grower in any local market are based on a consideration of the average quality of pecans in the entire buying territory. Hence, the producer of good quality pecans is penalized and to some extent improved production practices are discouraged.

One possible partial solution might be some type of marketing organization of growers representing a volume of production sufficiently large to render economically feasible the grading of pecans and selling on the basis of quality.

CHAPTER V

SUMMARY AND CONCLUSIONS

The major purpose of this study was to describe and analyze some of the economic factors and forces affecting the economic status of the pecan industry in Oklahoma. Emphasis was centered on those factors affecting the markets for and marketing of Oklahoma pecans. Four specific objectives of this study were (1) to review some of the basic trends in the pecan industry in the United States and Oklahoma, (2) to provide a description of the pecan industry in Oklahoma, and (3) to describe some production and marketing practices of a sample of pecan growers in Lincoln County, Oklahoma.

The production of all pecans in the United States has increased more than threefold during the period 1919-1957 despite wide annual fluctuations. The production of improved type pecans in the U.S. has increased at a more rapid rate than has the production of seedling type pecans. Between the periods 1935-1940 and 1950-1955 the production of improved pecans in the United States increased more than 92 per cent, but the production of seedling pecans increased only 27 per cent. The production of all domestic edible tree nuts in the U.S. increased almost 54 per cent during this period. Almond production increased more than 115 per cent, filbert production almost 200 per cent, all pecan production 52 per cent, and walnut production 31 per cent between the periods 1935-1940 and 1950-1955. Thus pecan production has decreased relative to the production of all domestic tree nuts in this period.

The deflated average prices received by growers for all pecans in the United States has trended downward during the period reviewed. Relative to the index of prices received by farmers for all farm products in the United States, the average price of pecans was less in the early 1950-s than it was in the early 1930's. The average price received by growers of seedling pecans has increased relative to the average price received by growers of improved pecans during the period from 1935-40 to 1950-55. During the period from 1919 to 1957 the average prices received by pecan growers has increased relative to the prices received by the growers of filberts but have decreased relative to the prices received by almond growers. The ratios of prices received by pecan growers and walnut growers have shown no appreciable upward or downward trend during the period from 1919 to 1957.

Per capita consumption of pecans has increased slightly during the period from 1919 to 1957. The trend toward marketing pecans in the shelled form has continued to increase during the period 1948-1956. Approximately 84 per cent of the sales of pecans in this period were made in the shelled form. Approximately 44 per cent of the shelled pecans are utilized by bakers and some 20 per cent are utilized by confectionery manufacturers. Sales to ice cream manufacturers and households accounted for another 24 per cent of the sales of shelled pecans.

Oklahoma is one of the principal pecan producing states in the United States. In the production of all pecans, Oklahoma is exceeded only by Texas and Georgia and only by Texas in the production of seedling pecans. The production of all pecans in Oklahoma increased about 50 per cent during the period 1919-1957. Production and value of sales have

varied more than prices in the period under review when the variation was measured by (1) the standard deviation of the changes from year-to-year expressed as a per cent of the mean of the original data and (2) the average percentage change from the previous year with the sign disregarded.

The prices received by farmers for pecans in Oklahoma relative to the index of prices received for all farm products were practically the same in the early 1950's as they were in the early 1920's.

The trend in value of sales in Oklahoma during this period has closely approximated that of all pecan production.

The number of pecan trees of all ages as reported by the Census of Agriculture decreased approximately 17 per cent between 1949 and 1954. In each year almost 90 per cent of all trees were of the seedling type. Crop reporting districts III, V, and VIII combined accounted for 77 per cent and 79 per cent of the all trees of all ages in 1949 and 1954, respectively. These same three crop reporting districts combined accounted for 84 per cent of the production of all pecans in Oklahoma in both 1949 and 1954.

Pecan production in Oklahoma is characterized by small enterprises per farm. The Census of Agriculture reported 8,399 farms in Oklahoma as having pecan trees of bearing age in 1954. Nearly 95 per cent of these farms had less than 500 trees per farm. Almost 60 per cent of the 2,763 farms reporting a harvest of seedling pecans in 1954 reported less than 500 pounds per farm.

An empirical description based on a sample of pecan producers provides some basic information on the production and marketing practices of pecan

producers in Lincoln County, Oklahoma. Twenty-two schedules served as the basis for the description. The average quantity of sales per farm amounted to 4,996 pounds of pecans, representing a value of sales of 1,058 dollars. Quantity of sales varied from 200 pounds of pecans to more than 30,000 pounds, and value of sales varied from 50 dollars to more than 6,500 dollars among the producers in the sample.

Only five producers in the sample reported fertilization practices were followed in 1957 and none of the 22 producers in the sample had ever sprayed their pecan trees for diseases or insects.

The three producers in the 10-30,000 pound classification accounted for 51 per cent of the total value of sales and 50 per cent of the total quantity of sales of the sample. Eleven producers in the 1,001 to 5,000 pound category represented 50 per cent of the total producers in the sample; however, the sales of these 11 producers accounted for only 27 per cent of the total value of sales in the sample.

All 22 producers in the sample reported 50 per cent or more of their sales were made to one outlet. Nearly 50 per cent of all the sales reported by producers in the sample were sold to general stores. Produce stores were the next most important outlet for the sales of the producers included in the sample. "Going to town" was almost as important as "best price" as the reason given by the producers in the sample for selling to a particular outlet.

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APPENDIX A

COMPARISON OF FORECAST AND FINAL ESTIMATES OF PECAN PRODUCTION: UNITED STATES AND OKLAHOMA

Forecasts of pecan production have been made by the Crop and Livestock Reporting Board of the United States Department of Agriculture since 1937. The first forecast of the size of the pecan crop is made in August and subsequent forecasts are made in September, October, and November. A final forecast is made in December. The final estimate of production is made in the succeeding July.[1] Monthly forecasts and final estimates of pecan production for Oklahoma and the United States for the years 1937 through 1957 are shown in Appendix Table A-I.

Since the forecasts are made immediately prior to and during the harvesting season, it seems reasonable to assume that the forecasts are important determinants of prices paid by shellers and received by farmers for pecans. On the other hand, shellers usually accumulate substantial inventories of inshell pecans during the harvesting period which are shelled and merchandized after January 1. One might reasonably expect, therefore, that prices received by shellers for pecan meats are influenced

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[1]The term forecast is defined for the purpose of this discussion as those predictions of pecan production computed from "condition and appraisal" reports of producers and other informed personnel before harvest is completed. The term estimate in this discussion is defined as those crop size predictions of the production of pecans in a given year after harvest is completed.

Appendix Table A-I

Monthly Forecasts and Estimates of Pecan Production, Oklahoma and United States, 1937 to 1957

Year	Production in Millions of Pounds					
	August	September	October	November	December	Final
			Oklahoma			
1937	8.64	11.52	11.52	13.248	13.824	18.4
1938	4.635	4.635	3.30	2.10	2.10	2.1
1939	11.583	11.583	11.286	10.989	10.989	19.0
1940	16.65	16.65	18.50	21.09	21.09	28.0
1941	26.23	28.38	30.96	30.1	30.1	30.6
1942	8.0	8.0	8.0	6.0	5.5	4.0
1943	16.0	14.8	14.8	14.8	18.5	26.0
1944	22.5	22.5	25.0	20.0	18.0	14.0
1945	21.15	22.5	22.5	22.5	21.0	26.0
1946	11.25	11.25	11.25	9.0	9.0	7.0
1947	24.75	24.75	24.75	28.8	24.5	44.0
1948	18.0	18.0	18.0	13.5	12.0	14.0
1949	29.5	29.5	31.5	29.6	20.0	24.0
1950	9.0	8.1	7.65	7.2	6.0	7.0
1951	21.12	21.12	29.28	29.28	27.0	25.0
1952	9.0	8.1	4.95	4.05	2.5	3.0
1953	23.4	23.4	23.4	28.0	22.0	27.6
1954	16.0	12.0	12.0	15.0	12.0	14.5
1955	21.0	29.0	29.0	30.0	33.0	33.0
1956	18.0	12.0	10.0	8.5	7.5	7.1
1957	19.5	23.0	25.0	26.0	22.0	31.0
			United States			
1937	63.440	68.777	70.553	76.608	81.093	107.19
1938	54.201	50.832	48.737	47.084	46.566	74.323
1939	62.312	61.862	59.957	60.474	61.628	97.06
1940	73.665	76.651	81.829	85.922	87.286	122.884
1941	87.641	86.234	84.909	84.759	86.201	121.781
1942	88.888	88.161	87.90	80.848	78.10	77.374
1943	98.910	98.049	104.805	105.067	114.8	133.042
1944	132.763	142.933	150.050	143.415	141.865	142.104
1945	148.331	147.77	141.533	135.96	132.582	138.854
1946	104.085	96.523	89.042	77.248	77.155	76.225
1947	106.320	102.116	100.206	104.271	100.209	119.602
1948	152.56	160.553	169.684	162.722	153.812	176.043
1949	139.238	136.872	141.251	130.215	113.694	125.690
1950	106.571	106.438	109.731	110.688	112.530	124.630
1951	128.1	133.904	146.895	147.905	143.137	156.735
1952	116.566	125.566	127.256	126.482	123.638	151.436
1953	178.354	185.132	181.136	184.962	173.065	214.170
1954	130.628	104.378	91.252	96.600	92.502	94.600
1955	70.84	81.440	89.800	91.550	96.900	146.860
1956	169.88	161.375	159.800	160.700	160.075	173.700
1957	119.0	121.850	122.150	121.550	112.100	141.35

Source: Office of Agricultural Statistician, Crop and Livestock Reporting Board, AMS, USDA, Oklahoma City, Oklahoma.

to a lesser extent by forecasts than are prices paid for inshell pecans and to a larger extent by actual supplies moving into market channels between January 1 and August 1.

Considerable price risks are associated with the pecan shelling industry, due partially to the lapse of time between the accumulation of inventories of inshell pecans and the merchandizing period and to the uncertainty regarding actual supplies compared with forecasts of production. These price risks are, of course, costs associated with shelling and distributing pecans. It seems reasonable to expect these price risks to be reflected in prices paid by shellers for inshell pecans and, thereby, in prices received by farmers.

Producers, handlers, and shellers contacted during the course of this study expressed serious concern over the alleged errros in forecasts made during the harvesting season when compared with final production estimates in the following July. Both producers and shellers believed quite strongly that errors in forecasts were to their disadvantage pricewise. The purpose of this appendix is to appraise the accuracy of early season forecasts of pecan production from 1937 to 1957 as indicators of final production estimates. The forecasts for both Oklahoma and the United States are appraised. No attempt is made to determine the influence of forecasts of production on prices received by growers of pecans.

Methods Used to Develop Forecasts[2]

The principal source of information used to develop forecasts of pecan crop sizes is questionnaires mailed to a list of farmers and ranchers who are asked to specify the "condition" of the pecan crop in their locality.[3] These condition reports are used to prepare the August, September, October, and November forecasts. In December the producers are requested to estimate the number of pounds of pecans he expects his grove to produce this season in comparison with the quantity he harvested the previous year.

Method of Analysis

The monthly forecasts of pecan production in Oklahoma and the United States were analyzed and the accuracy of early season forecasts to predict final production were appraised. The forecasts were examined for evidence of systematic errors or "biases" in estimating crops of different sizes and as indicators of year-to-year changes in production.

The 21 crop years were divided into two groups, those smaller than average and those larger than average. The average of the August forecasts for all years was used as the basis for the division. Differences

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[2]For a complete description of forecasting and estimating procedures employed by the Crop and Livestock Reporting Board, see The Agricultural Estimating and Reporting Services of the United States Department of Agriculture, Miscellaneous Publication No. 703, USDA, BAE, (Washington: United States Government Printing Office, December, 1949), pp. 65-73.

[3]Condition refers to percentage of a full crop. One hundred per cent represents a normal condition of growth and vitality which would be expected to give a full yield when weather conditions are favorable and insects and diseases cause a minimum of loss.

were computed between final production and the individual monthly forecasts. The "t" values of the mean differences served as the major criteria for the appraisal of "biases" in the forecasting procedure.

A regression analysis of final production on the monthly forecasts was made to further analyze the variation in pecan crop forecasts. Coefficients of determination (R^2) and "t" values were the criteria for this appraisal.

Comparison of Forecasts of Oklahoma Production with Final Production

Forecasts of pecan production in Oklahoma have been about equally divided between those larger and those smaller than final estimates of production. The August forecasts were larger than production in 10 of the 21 years. September forecasts were larger than final production in 9 years, October in 11 years, and November in 10 years. The forecasts in December were smaller than final production in 14 of the 21 years.

The mean differences between final production and the individual monthly forecasts for the period 1937 to 1957 were analyzed and the results are shown in Appendix Table A-II. Only in December, when farmers submit expected production rather than condition reports, is the mean difference between forecast and final production significantly different from zero in any of the analyses. This difference is significant in the analysis based on those years in which the August forecasts are smaller than 16,155,000 pounds and in the analysis based on all crop years, 1937-57. The mean differences for all other months in relation to their standard errors do not support the hypothesis of a significant bias.

Appendix Table A-II

Difference Between Indicated Forecasts and Final Production With Division into Size-of-Crop Groups Based on August Forecasts, Forecast Minus Final Production, Oklahoma, 1937 to 1957

Item	Million Pounds				
	August	September	October	November	December
Crops with August Forecast Smaller than 16,155,000 Pounds[a]					
Average Difference[b]	5.881	5.633	4.984	3.702	3.450
Mean Difference	-1.824	-2.236	-2.574	-2.552	-2.750
s_m	1.860	1.738	1.738	1.443	1.128
t_m	.981	1.146	1.481	1.769	2.438*
Crops with August Forecast Larger than 16,155,000 Pounds[a]					
Average Difference[b]	8.086	6.177	6.090	4.125	4.727
Mean Difference	-2.832	-2.014	-0.628	-0.911	-3.564
s_m	2.685	2.197	2.248	1.657	2.048
t_m	1.055	.916	.279	.549	1.740
All Crops					
Average Difference[b]	7.036	5.918	5.564	3.924	4.119
Mean Difference	-2.352	-2.120	-1.555	-1.693	-3.176
s_m	1.720	1.490	1.499	1.146	1.116
t_m	1.367	1.422	1.038	1.477	2.846**

[a]Average of August forecasts 1937 to 1957.

[b]Sign disregarded.

*Significant at 5 per cent level of probability.

**Significant at 1 per cent level of probability.

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t_m	.981	1.146	1.481	1.769	2.438*
Crops with August Forecast Larger than 16,155,000 Pounds[a]					
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s_m	1.720	1.490	1.499	1.146	1.116
t_m	1.367	1.422	1.038	1.477	2.846**

[a]Average of August forecasts 1937 to 1957.

[b]Sign disregarded.

*Significant at 5 per cent level of probability.

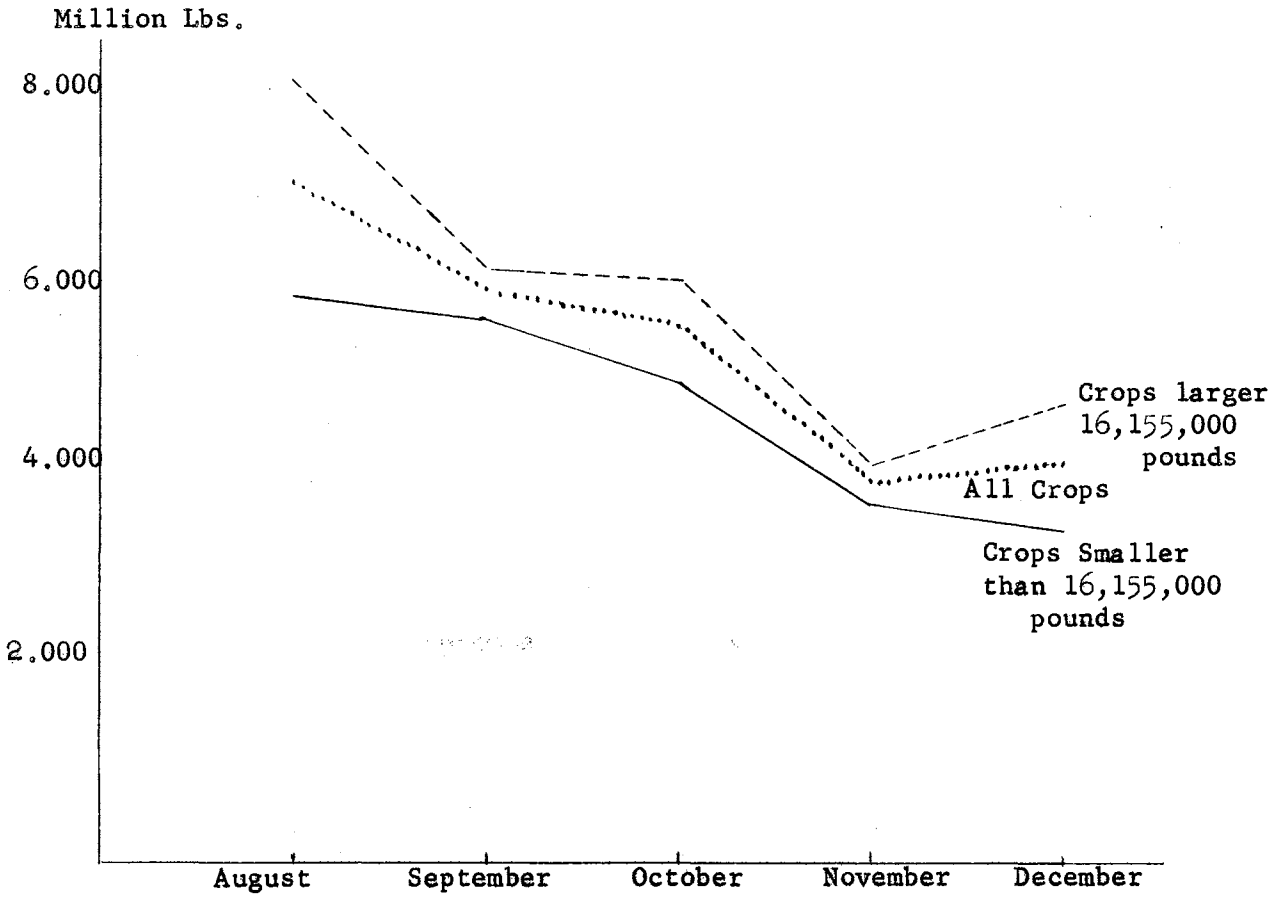
**Significant at 1 per cent level of probability.

Figure A-1 shows the average differences (sign disregarded) between forecasts and final production for the individual months for Oklahoma from 1937 to 1957. The average differences were progressively smaller as the season progressed for those crops smaller than 16,155,000 pounds. The average differences increased in December for those crops larger than 16,155,000 pounds and with respect to all 21 crops but diminished for the other months. It was expected that the succeeding monthly forecasts would diminish and approach some minimum value, since more is known about the crop as buyers, shelling plant operators, and producers gain more reliable estimates of actual crop size.

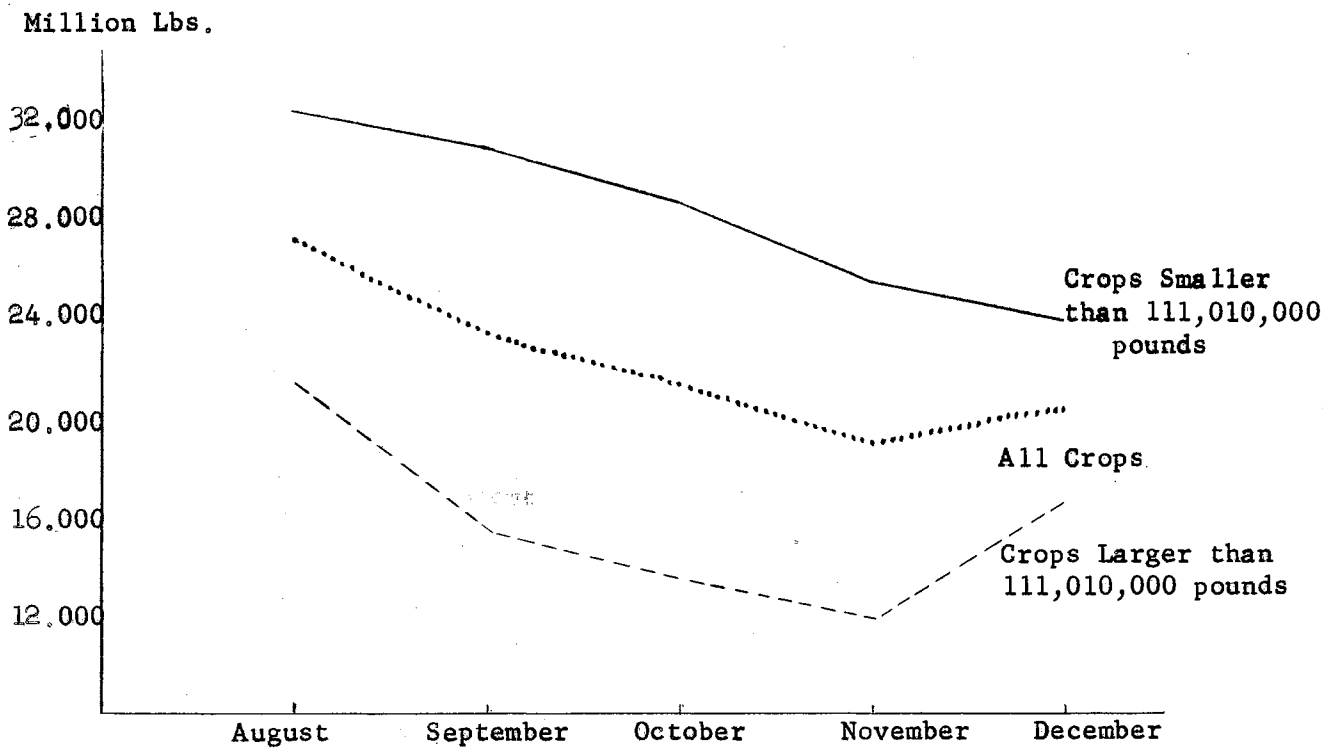
Simple regression analyses were also made in a further attempt to appraise the alleged error between the monthly forecasts and final production. Appendix Table A-III shows the regression constants, standard errors, "t" values, and the coefficients of determination for the estimating equations for both Oklahoma and United States forecasts from 1937 to 1957. The slope of the regression line is not significantly different from one, and the constant term (a) is not significantly different from zero for any of the months in the Oklahoma forecasts. Thus by both criteria there is no significant "bias" in the forecasts of final production of pecans in Oklahoma.

Comparison of Forecasts of United States Production with Final Production

Forecasts of pecan production in the United States have not been as equally divided between those which were larger and those which were smaller than final production as were the forecasts in Oklahoma. There appears to be a definite tendency for the forecast of United States pecan



Appendix Figure A-1. Average Differences, Forecasts from Production, Oklahoma, 1937-1957



Appendix Figure A-2. Average Deviations, Forecasts from Production, United States, 1937-1957

production to be less than final production. The number of years in which the various monthly forecasts were smaller than final production for the 21 years analyzed were as follows: August -- 16, September -- 15, October -- 16, November -- 16, and December -- 19.

Appendix Table III

Summary of Tests for Significance of Regression Coefficients, Oklahoma and United States, 1937-57

Month	a	s_a	t_a	b	s_b	t_b	r^2
				Oklahoma			
August	-1.719	4.853	.354	1.240	.267	.901	.53
September	1.515	4.604	.250	1.056	.246	.230	.49
October	1.220	3.545	.344	1.019	.179	.106	.63
November	0.525	2.540	.207	1.066	.127	.521	.79
December	0.500	2.363	.212	1.166	.129	1.287	.81
				United States			
August	51.174	18.580	2.754*	0.704	0.160	1.856	.50
September	41.039	15.356	2.672*	0.793	0.132	1.572	.66
October	38.653	13.627	2.836*	0.807	0.116	1.669	.72
November	32.265	11.503	2.805*	0.873	0.099	1.290	.80
December	24.408	11.436	2.134*	0.962	0.101	0.373	.83

*Significant at 5 per cent level of probability.

Appendix Table A-IV shows the results of the analysis of the forecasts of United States pecan production from 1937 to 1957. The mean differences are statistically different from zero at the 1 per cent probability level in every month when all 21 years are grouped together. In those years in which the August forecasts are less than 111,010,000 pounds,

Appendix Table A-IV

Difference Between Indicated Forecasts and Final Production With Division into Size-of-Crop Groups Based on August Forecasts Minus Final Production, United States, 1937 to 1957

Item	Million Pounds				
	August	September	October	November	December
Crops with August Forecast Smaller than 111,010,000 Pounds[a]					
Average Difference[b]	32.986	31.460	29.108	25.950	24.347
Mean Difference	-25.827	-25.808	-24.864	-25.132	-24.046
s_m	8.198	7.048	6.129	5.053	4.869
t_m	3.150*	3.662**	4.057**	4.974**	4.939**
Crops with August Forecast Larger than 111,010,000 Pounds[a]					
Average Difference[b]	21.737	15.576	13.605	11.984	16.821
Mean Difference	- 9.926	- 9.435	- 8.368	-10.417	-16.821
s_m	7.112	4.708	4.471	3.524	3.925
t_m	1.396	2.004	1.872	2.956*	4.285**
All Crops					
Average Difference[b]	27.629	23.896	21.725	19.299	20.763
Mean Difference	-18.255	-18.011	-17.008	-18.125	-20.605
s_m	5.737	4.673	4.251	3.520	3.258
t_m	3.182**	3.854**	4.001**	5.149**	6.324**

[a] Average of August forecasts 1937 to 1957.

[b] Sign disregarded.

* Significant at 5 per cent level of probability.

** Significant at 1 per cent level of probability.

the mean difference was statistically different from zero at the 5 per cent probability level for the August forecasts and at the 1 per cent probability level for all other months.

However, for the 10 years in which the August forecasts were larger than 111,010,000 pounds, the mean difference between November and December forecasts and final production were statistically different from zero at the 5 per cent and 1 per cent probability level, respectively. Thus by this criteria, a statistically significant "bias" was present in the forecasts of United States pecan production for those years in which the August forecasts were less than 111,010,000 pounds and for all crop years combined. The monthly forecasts show a clear tendency to underestimate final production.

Figure A-2 shows the tendency of the average differences (sign disregarded) between forecasts and final production in the United States to diminish in months subsequent to August. The average differences in December increased rather than decreased in those years in which the August forecasts were larger than 111,010,000 pounds and with respect to all crops.

The results of the regression analysis tend to substantiate the allegations of producers and shellers with regard to systematic errors in forecasts of pecan production in the United States. In every month the "a" value is significantly different from zero. However, the "b" values are not significantly different from one. The coefficient of determination r^2, increased for each successive monthly estimating equation. The December forecasts accounted for 83 per cent of the variation in the final production of pecans in the United States (Appendix Table A-III).

Changes in Forecasts Related to Changes in Production

If the August forecasts were reasonably accurate indicators of final pecan production, it is reasonable to expect them to forecast also changes in the size of the crop from year to year rather accurately. The relationship between changes from the preceding December forecast to the current December forecast, as the dependent variable, and the change from the preceding December forecast to the current August forecast, as the independent variable, was analyzed by means of simple regression. The results are given below.

Oklahoma Forecasts

Y = December (T) - December (T-1)

X = August (T) - December (T-1)

$\hat{Y} = -1.473 + 1.188\ X$
$\quad\quad (1.33) \quad (13.486)^{**}$

$r^2 = .91$

This regression showed that about 91 per cent of the differences between successive December forecasts was associated with differences between the December forecast and the succeeding August forecast. The slope of the regression line was statistically different from zero at the 1 per cent probability level.

Upon use of final production estimates as a replacement for December forecasts as the dependent variable in the regression equation, the results for Oklahoma were practically unchanged.

$\hat{Y} = 2.476 + 1.366\ X$
$\quad\quad (1.77) \quad (44.154)^{**}$

$r^2 = .92$

Thus the August forecasts are reasonably accurate indicators of year to year changes in final production of pecans in Oklahoma.

United States Forecasts

The change between the December forecast and the succeeding August forecast accounted for 85 per cent of the variation in the successive December forecasts of pecan production in the United States. The relationship is shown below.

Y = December (T) - December (T-1)

X = August (T) - December (T-1)

$$\hat{Y} = -13.665 + 1.123\ X$$
$$(1.03) \quad (9.821)^{**}$$

$$r^2 = .85$$

The substitution of final estimates for December forecasts in the regression equation of pecan production in the United States change the results substantially. Only 39 per cent of the variance of succeeding final estimates was associated with the differences between the final estimated production and the succeeding August forecast. The August forecast for the United States was not as accurate an indicator of year-to-year changes in production as was the August forecast in Oklahoma. The empirical results of this analysis are as follows:

Y = Final (T) - Final (T-1)

X = August (T) - Final (T-1)

$$\hat{Y} = -11.705 - 0.757\ X$$
$$(1.28) \quad (3.42)^{**}$$

$$r^2 = .39$$

Appendix Table B-I

Pecans: Production by Types, Prices Received by Farmers, Value of Production and Value of Sales; United States, 1919-57

Year	Production[a]			All		
	Improved (1,000 pounds)	Seedling (1,000 pounds)	All (1,000 pounds)	Season Average Price Per Pound[b] (cents)	Value of Production ($1,000)	Value of Sales ($1,000)
1919	6,190	62,920	69,110	19.5	13,496	11,157
1920	2,298	8,077	10,375	25.7	2,665	1,502
1921	7,764	40,391	48,155	17.6	8,469	6,470
1922	3,448	7,907	11,355	26.5	3,010	1,594
1923	10,514	47,516	58,030	19.3	11,186	8,513
1924	7,150	30,848	37,998	23.4	8,877	6,298
1925	12,316	40,147	52,463	22.1	11,593	8,681
1926	17,535	78,326	95,861	15.6	14,961	12,478
1927	9,540	26,964	36,504	20.6	7,527	5,320
1928	18,005	50,545	68,550	16.6	11,358	8,960
1929	8,839	44,501	53,340	14.7	7,862	5,933
1930	13,857	43,260	57,135	14.9	8,538	6,651
1931	22,002	66,461	88,463	7.8	6,897	5,811
1932	11,813	56,421	68,234	6.0	4,057	3,190
1933	22,941	55,871	78,812	8.0	6,334	5,289
1934	19,468	36,704	56,172	12.6	7,067	5,780
1935	29,464	95,021	124,485	6.8	8,423	7,394
1936	32,257	27,530	59,787	12.4	7,386	6,174
1937	40,026	67,164	107,190	7.7	8,288	7,263
1938	35,291	39,032	74,323	9.4	6,970	5,927
1939	40,944	56,116	97,060	9.7	9,374	8,303
1940	42,126	80,758	122,884	8.9	10,970	9,819
1941	51,452	70,329	121,781	10.3	12,535	11,276
1942	45,383	31,991	77,374	17.1	13,244	11,552
1943	57,173	75,869	133,042	23.0	30,658	27,850
1944	61,188	80,916	142,104	21.5	30,718	28,002
1945	59,236	79,618	138,854	23.8	33,200	30,415
1946	33,492	42,733	76,225	33.7	25,766	23,023
1947	45,193	74,409	119,602	22.3	27,001	24,402
1948	77,532	98,511	176,043	12.2	21,697	20,095
1949	50,105	75,585	125,690	18.8	23,754	21,870
1950	62,788	61,842	124,630	28.8	35,901	33,058
1951	88,600	68,135	156,735	19.7	31,027	28,783
1952	79,570	71,866	151,436	22.1	33,542	31,395
1953	106,215	107,955	214,170	16.3	34,854	32,947
1954	43,800	50,800	94,600	28.6	27,057	24,861
1955	42,400	104,460	146,860	32.8	48,253	45,850
1956	106,310	67,390	173,700	18.5	32,159	30,376
1957	34,110	107,240	141,350	23.7	33,651	31,642

[a] Total production and production having value are the same for all seasons.

[b] December 1 price, 1919-1936; for all methods of sale 1944-57, prices computed by weighting prices for improved and seedling pecans by quantities sold. Prices computed by weighting State prices by quantities sold.

Source: Tree Nuts, Acreage, Production, Farm Disposition, Value and Utilization of Sales, 1909-45, USDA, BAE, CRB, Washington, D. C. (October, 1947), pp. 12, 25.

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Office of Agricultural Statistician, USDA, AMS, Oklahoma City, Oklahoma, personal correspondence from D. D. Pittman, State Statistician.

Appendix Table B-II

Pecans: Production by Types, Prices Received by Farmers, Value of Production, and Value of Sales; Oklahoma, 1919-57

Year	Production[a]			All		
	Improved (1,000 pounds)	Seedling (1,000 pounds)	All (1,000 pounds)	Season Average Price Per Pound[b] (cents)	Value of Production ($1,000)	Value of Sales ($1,000)
1919	45	14,955	15,000	16.0	2,400	2,264
1920	10	2,990	3,000	17.0	510	409
1921	25	8,975	9,000	12.0	1,080	1,008
1922	10	1,990	2,000	17.1	342	231
1923	65	15,935	16,000	11.1	1,776	1,687
1924	55	10,945	11,000	16.1	1,771	1,642
1925	75	14,625	14,700	15.1	2,220	2,099
1926	100	19,600	19,700	10.1	1,990	1,909
1927	45	8,855	8,900	13.1	1,166	1,061
1928	40	8,360	8,400	11.1	932	855
1929	80	15,920	16,000	10.3	1,648	1,566
1930	75	14,925	15,000	9.2	1,380	1,306
1931	135	13,365	13,500	5.1	688	648
1932	345	22,655	23,000	3.6	828	799
1933	260	10,240	10,500	5.6	588	543
1934	370	11,130	11,500	11.9	1,368	1,273
1935	1,120	26,880	28,000	4.2	1,176	1,142
1936	90	1,910	2,000	9.2	184	138
1937	920	17,480	18,400	5.5	1,016	950
1938	252	1,848	2,100	7.6	160	119
1939	760	18,240	19,000	8.1	1,548	1,491
1940	1,960	26,040	28,000	7.1	1,980	1,913
1941	1,224	29,376	30,600	8.8	2,683	2,602
1942	300	3,700	4,000	16.5	659	556
1943	1,550	24,450	26,000	19.6	5,091	4,960
1944	1,400	12,600	14,000	17.1	2,404	2,289
1945	1,500	24,500	26,000	20.6	5,377	5,259
1946	1,100	5,900	7,000	30.7	2,157	2,098
1947	3,100	40,900	44,000	18.4	8,119	7,987
1948	1,000	13,000	14,000	11.5	1,615	1,562
1949	2,040	21,960	24,000	18.7	4,504	4,378
1950	630	6,370	7,000	26.9	1,895	1,805
1951	1,500	23,500	25,000	18.6	4,665	4,546
1952	340	2,660	3,000	19.7	594	562
1953	1,600	26,000	27,600	15.5	4,286	4,187
1954	1,500	13,000	14,500	27.2	3,955	3,815
1955	3,300	29,700	33,000	30.3	10,032	9,710
1956	600	6,500	7,100	19.5	1,388	1,308
1957	2,200	28,800	31,000	22.1	6,863	6,673

[a] Total production and production having value are the same for all seasons.

[b] December 1 price 1919-1936; for all methods of sale 1944-57. Prices computed by weighting prices for improved and seedling pecans by quantities sold.

Source: Tree Nuts, Acreage, Production, Farm Disposition, Value and Utilization of Sales, 1909-45, USDA, BAE, Crop Reporting Board, Washington, D. C., (October, 1947), pp. 23, 25.

Tree Nuts, Production, Farm Disposition, Value and Utilization of Sales, 1944-51, USDA, BAE, Crop Reporting Board, Washington, D. C., (August, 1952), pp. 7-10.

Tree Nuts by States, 1949-55, Revised Estimates, Statistical Bulletin No. 195, USDA, AMS, CRB, Washington, D. C., (October, 1956), p. 11.

Office of Agricultural Statistician, USDA, AMS, Oklahoma City, Oklahoma, personal correspondence from D. D. Pittman, State Statistician.

Appendix Table B-III

Pecan Production: All and by Types, Centered 6-Year Moving Averages, Oklahoma and United States, 1922-1954

Year	Oklahoma			United States		
	Improved	Seedling	All	Improved	Seedling	All
	(1,000 pounds)	(1,000 pounds)	(1,000 pounds)	(1,000 pounds)	(1,000 pounds)	(1,000 pounds)
1922	38	9,181	9,308	6,738	31,045	37,783
1923	48	10,537	10,675	8,518	35,002	43,520
1924	57	11,912	12,058	9,936	39,737	49,673
1925	61	12,432	12,583	11,297	42,171	53,468
1926	65	13,007	13,117	12,370	45,473	57,843
1927	68	13,382	13,450	12,791	46,256	59,047
1928	74	13,609	13,683	14,159	49,483	63,642
1929	100	13,759	13,858	14,489	49,851	64,340
1930	138	14,129	14,267	15,129	50,434	65,563
1931	183	14,475	14,658	16,368	51,690	68,057
1932	297	15,619	15,917	18,208	54,746	72,955
1933	385	15,448	15,833	21,459	57,645	79,104
1934	452	14,706	15,158	24,493	56,393	80,886
1935	510	13,315	13,825	27,951	55,003	82,954
1936	544	12,248	12,792	31,408	53,574	84,982
1937	718	14,157	14,875	34,796	57,266	92,062
1938	859	15,608	16,467	38,517	58,854	97,396
1939	885	15,659	16,850	41,443	57,193	98,636
1940	955	16,695	17,650	43,966	58,290	102,256
1941	1,103	18,172	19,275	47,555	62,597	110,152
1942	1,261	19,589	20,850	51,247	68,323	119,570
1943	1,251	18,433	19,683	52,058	67,299	119,358
1944	1,335	17,715	19,050	50,817	64,470	115,288
1945	1,550	19,450	21,000	52,975	70,354	123,329
1946	1,649	20,017	21,667	55,065	75,873	130,938
1947	1,626	19,291	20,917	54,607	74,170	128,777
1948	1,562	18,688	20,250	57,178	71,346	128,524
1949	1,498	18,335	19,833	63,458	72,630	136,088
1950	1,310	16,823	18,133	72,383	77,853	150,237
1951	1,227	15,582	16,808	74,657	76,673	151,330
1952	1,373	16,227	17,600	71,204	75,103	146,308
1953	1,476	16,883	18,358	74,189	77,972	152,161
1954	1,532	17,335	18,867	73,275	81,693	154,968

Source: Computed from Appendix Tables B-I and B-II.

Appendix Table B-IV

Prices Received by Growers for Pecans, by Types,
Oklahoma and United States, 1922-1957

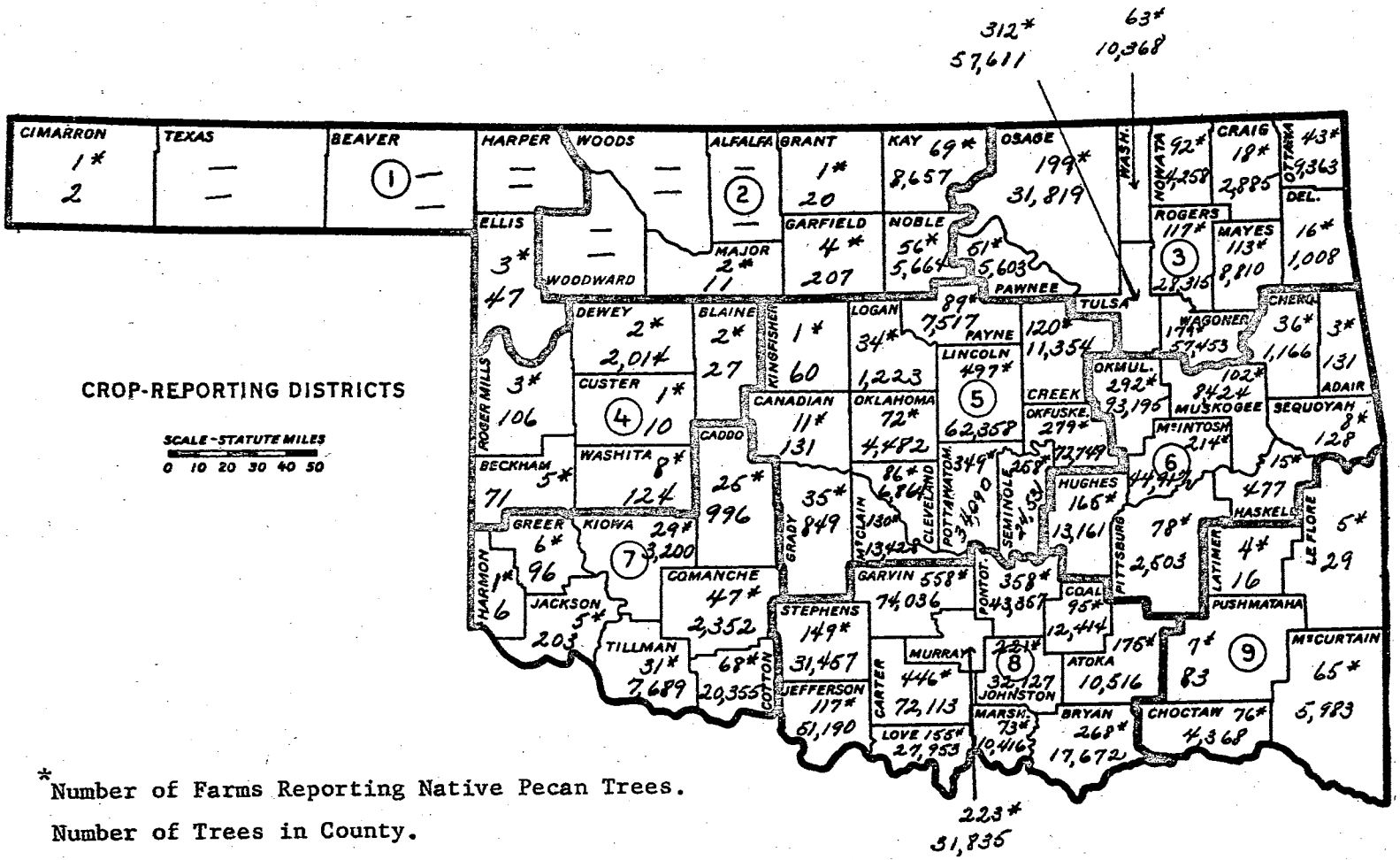
Year	Oklahoma		United States	
	Improved Price Per Pound (cents)	Seedling Price Per Pound (cents)	Improved Price Per Pound (cents)	Seedling Price Per Pound (cents)
1922	40.0	17.0	44.5	18.7
1923	42.0	11.0	42.5	14.1
1924	40.0	16.0	43.8	18.6
1925	35.0	15.0	37.6	17.3
1926	30.0	10.0	32.5	11.8
1927	35.0	13.0	35.4	15.4
1928	35.0	11.0	29.6	12.0
1929	39.0	10.2	31.7	11.4
1930	30.5	9.1	27.7	10.8
1931	19.0	5.0	13.9	5.8
1932	13.0	3.5	13.5	4.4
1933	13.5	5.4	13.0	6.0
1934	21.0	11.6	15.5	11.0
1935	8.3	4.0	12.4	5.0
1936	17.8	8.8	14.7	9.6
1937	13.6	5.1	10.9	5.8
1938	15.2	6.6	11.8	7.2
1939	14.1	7.9	12.2	7.8
1940	13.3	6.6	12.8	6.9
1941	15.2	8.5	12.8	8.5
1942	23.6	15.9	18.9	14.6
1943	30.3	18.9	28.5	19.0
1944	29.5	15.8	27.7	16.9
1945	31.8	20.0	29.2	20.0
1946	32.2	28.7	40.2	28.8
1947	31.0	17.5	29.4	18.3
1948	25.0	10.5	15.2	10.0
1949	27.0	18.0	21.8	17.0
1950	38.0	26.0	31.8	25.7
1951	29.0	18.0	21.7	17.2
1952	30.0	18.5	25.2	18.8
1953	24.1	15.0	17.8	14.7
1954	34.0	26.5	32.7	25.2
1955	38.5	29.5	40.9	29.6
1956	31.0	18.5	19.2	17.4
1957	30.5	21.5	30.7	21.6

Source: Tree Nuts, Acreage, Production, Farm Disposition, Value and Utilization of Sales, 1909-45, USDA, BAE, CRB, Washington, D. C., (October, 1947) pp. 12, 23, 25.

Tree Nuts, Production, Farm Disposition, Value and Utilization of Sales, 1944-51, USDA, BAE, CRB, Washington, D. C., (August, 1954) pp. 7-10.

Tree Nuts by States, 1949-55, Revised Estimates, Statistical Bulletin No. 195, USDA, AMS, CRB, Washington, D. C., (October, 1956) pp. 11, 12, 13.

Office of Agricultural Statistician, USDA, AMS, Oklahoma City, Oklahoma, personal correspondence from D. D. Pittman, State Statistician.

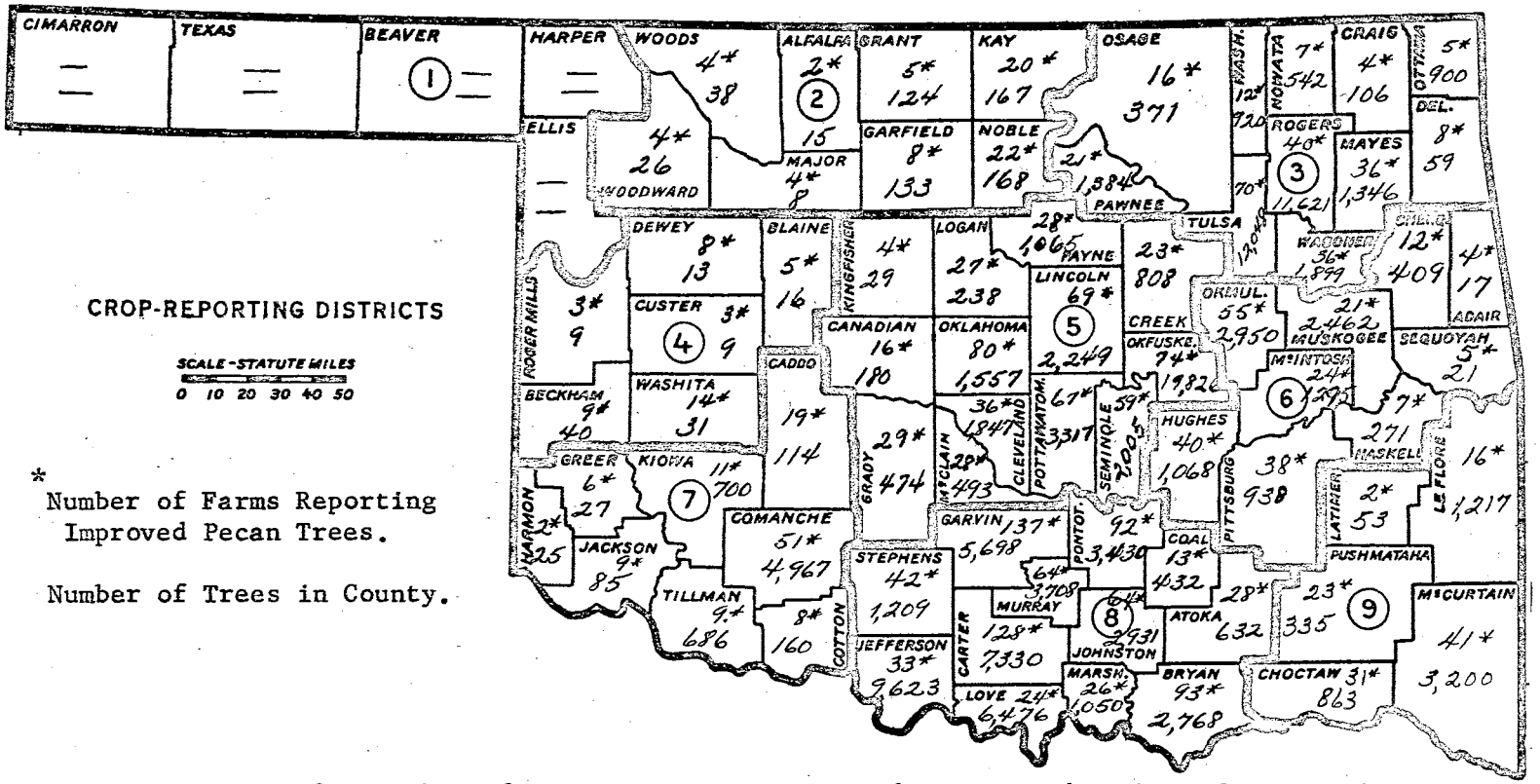


*Number of Farms Reporting Native Pecan Trees.

Number of Trees in County.

Appendix Figure B-I. Number of Farms Reporting Native or Seedling Pecans and Number of Native Pecan Trees of All Ages, Oklahoma, 1954

Source: U. S. Bureau of the Census, Census of Agriculture, 1954, Vol. 1 Part 25, (Washington: Government Printing Office, 1954) pp. 154-155.



Appendix Figure B-2. Number of Farms Reporting Improved Pecans and Number of Improved Pecan Trees of All Ages, Oklahoma, 1954

Source: U. S. Bureau of the Census, Census of Agriculture, 1954, Vol. 1 Part 25, (Washington: Government Printing Office, 1954) pp. 154-155.

VITA

Joe Senter Chappell

Candidate for the Degree of

Master of Science

Thesis: AN ANALYSIS OF SOME ECONOMIC FACTORS AFFECTING THE MARKETING OF OKLAHOMA PECANS

Major Field: Agricultural Economics

Biographical:

Personal Data: Born near Fuquay Springs, North Carolina, October 22, 1931, the son of Carl K. and Zula S. Chappell.

Education: Attended grade schools in Fuquay, Garner, and Raleigh public schools. Attended high school at Fuquay Springs, North Carolina; graduated from Fuquay Springs High School in May, 1949; received the Bachelor of Science Degree from North Carolina State College, with a major in Agricultural Economics, in July, 1957; completed requirements for the Master of Science degree in March, 1959.

Professional Experience: Entered the United States Navy in 1951 and served for a period of four years. Employed by Department of Agricultural Economics, North Carolina State College during summer of 1957. Research Assistant, Oklahoma State University from September, 1957, to February, 1959.