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FERTILIZER STATISTICS FOR TEXAS 1926 - 1938



AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

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This bulletin contains statistics of fertilizer sold in Texas from 1926 to 1938. The tonnage sold increased from 79,863 tons in 1926-27 to 187,215 tons in 1928-29, then decreased to 30,843 tons in 1932-33. Sales gradually increased to 84,938 tons in 1936-37, then decreased slightly. Tag sales by months are largest in January, February, and March. Shipments of fertilizer are largest in February, March, and April, with the heaviest movement in March. Fertilizer sales by counties is shown by a table and a map. The largest consumption is in the northeastern part of the State. The tonnage of various grades is given for the past 12 years, and the tonnage of various goods given for a few selected counties. The selling price of the various grades is given for the past 12 years, and the relation between the selling price and valuations is shown. The approximate cost of nitrogen, phosphoric acid, and potash in cents per pound is given for the past 12 years. The sales of fertilizer in the spring are related to the price of cotton in the preceding fall and winter.

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FERTILIZER STATISTICS FOR TEXAS, 1926-1938

By G. S. Fraps, State Chemist, and
T. L. Ogier, Associate State Chemist

A Texas fertilizer law was first passed in 1899 and amended in 1911. Since then the law has not been changed. Various statistics concerning fertilizer have been collected during this period of time. Fertilizer statistics from 1905-6 to 1925-6 have been published in Bulletin 350 of this Station. The object of the present Bulletin is to present statistics which have been collected for the most part from 1926 to 1938.

Fertilizer Control Bulletins

Since 1899, 37 Fertilizer Control bulletins have been published. A list of Fertilizer Control bulletins is given in Table 1. This list does not include research bulletins. These bulletins contain not only information regarding the operation of the fertilizer law, but also suggestions regarding the use of fertilizer and definition of fertilizer terms.

Table 1. Fertilizer Control Bulletins, Texas

(1) Bulletin No. 51, May	1899	(19) Bulletin No. 280, August	1921
(2) Bulletin No. 67, July	1903	(20) Bulletin No. 298, August	1922
(3) Bulletin No. 67, July	1903	(21) Bulletin No. 312, September	1923
	Reprinted Dec.....	(22) Bulletin No. 322, September	1924
	1904	(23) Bulletin No. 335, September	1925
(4) Bulletin No. 85, June	1906	(24) Bulletin No. 346	1926
(5) Bulletin No. 96, July	1907	(25) Bulletin No. 350, April, Statistics 1927	
(6) Bulletin No. 107, July	1908	(26) Bulletin No. 368, October	1927
(7) Bulletin No. 123, July	1909	(27) Bulletin No. 387, October	1928
(8) Bulletin No. 133, September	1910	(28) Bulletin No. 403, October	1929
(9) Bulletin No. 140	1911	(29) Bulletin No. 415, September	1930
(10) Bulletin No. 149, July	1912	(30) Bulletin No. 434, September	1931
(11) Bulletin No. 160, July	1913	(31) Bulletin No. 460, October	1932
(12) Bulletin No. 168, July	1914	(32) Bulletin No. 487, December	1933
(13) Bulletin No. 176, July	1915	(33) Bulletin No. 498, November	1934
(14) Bulletin No. 193, August	1916	(34) Bulletin No. 517, December	1935
(15) Bulletin No. 217, September	1917	(35) Bulletin No. 529, September	1936
(16) Bulletin No. 233, September	1918	(36) Bulletin No. 553, August	1937
(17) Bulletin No. 248, August	1919	(37) Bulletin No. 565, October	1938
(18) Bulletin No. 265, August	1920		

Tonnage Sold

The number of tons of fertilizer sold each year as reported by the manufacturers is given in Table 2, which also contains the tonnage based on the tax tags sold. This is larger than the sales actually made, as some of the tags are not used, and the tax tags are not redeemable.

The sales increased from 13,500 tons in 1905 to 77,400 tons in 1914, although there was a drop to 46,000 in 1911-12. In 1914-15, the first year of the World War, the sales dropped to 17,500 tons, but they gradually increased until in 1918-19, when there was a decrease, followed by an increase in 1919-20. In 1920-21, the sales reached the lowest point since

1905-6, 14,850 tons, because of the depression after the World War; but sales then increased rapidly to 126,180 tons in 1923-24. There was a decrease in sales in 1924-25, followed by a decided increase in 1925-26, then another decrease in 1926-27. Sales then increased rapidly to 187,215 tons in 1928-29, the largest tonnage yet sold. Sales then decreased rapidly to 30,843 tons in 1932-33. Since that date sales increased gradually to 84,938 tons in 1936-37, and then decreased slightly.

Table 3 shows fertilizer tonnage based on tag sales for some other states. Arkansas sales are the lowest, with Texas next and Louisiana sales much larger than those of Texas. In spite of the great area of Texas, fertilizer sales are small compared with those of North Carolina, Georgia, and Alabama; but fertilizers have been used in these states much longer than in Texas.

Table 2. Fertilizer sales in Texas in tons.

Date	Reported by Manufacturers	Tag Sales	Date	Reported by Manufacturers	Tag Sales
1905-6	13,500		1922-23	73,300	76,223
1906-7	19,200		1923-24	126,180	126,592
1907-8	21,850		1924-25	97,720	103,416
1908-9	23,800		1925-26	121,747	123,990
1909-10	34,000		1926-27	79,863	79,623
1910-11	52,985		1927-28	139,126	140,301
1911-12	46,000		1928-29	187,215	194,452
1912-13	75,500	76,734	1929-30	138,914	143,894
1913-14	77,400	83,207	1930-31	64,424	69,037
1914-15	17,500	23,012	1931-32	33,406	36,613
1915-16	21,500	23,388	1932-33	30,843	32,023
1916-17	40,000	40,354	1933-34	47,204	54,462
1917-18	58,000	59,575	1934-35	59,480	59,603
1918-19	46,000	50,553	1935-36	60,016	63,108
1919-20	56,700	56,979	1936-37	84,938	87,090
1920-21	14,850	19,303	1937-38	79,640	86,564
1921-22	33,000	34,316			

Table 3. Tons of Fertilizer sold as calculated from tag sales, 1935-38.

	1935-6	1936-7	1937-8
Texas	63,108	87,090	86,544
Louisiana	111,504	157,197	148,688
Arkansas	45,569	70,900	65,050
Alabama	469,200	623,260	533,600
Georgia	668,106	873,245	718,581
North Carolina	1,018,705	1,219,703	1,137,023

Sales by Months

Sales of tax tags expressed in tons of fertilizer by months are given in Table 4. Table 5 contains the same tag sales expressed in percentage of the total sales for the year. The largest tag sales occur in January, February, and March, while the heaviest shipments are made in February, March, and April. About 70 percent of the total is shipped these three months. Table 6 contains shipment in tons, as reported monthly by manufacturers, expressed in percentage of the total sales.

The tonnage sold by manufacturers shows somewhat different results from that shown by tag sales. Since tag sales are made before actual shipments of fertilizer take place, purchases of tags in the early part of the season are used in shipments made later. The two may be compared by means of the last columns in Table 5 and Table 6.

Table 4. Fertilizer tag sales expressed in tons by months.

Month	1926- 27	1927- 28	1928- 29	1929- 30	1930- 31	1931- 32	1932- 33	1933- 34	1934- 35	1935- 36	1936- 37	1937- 38
September	2050	3730	3380	3875	7650	4115	2425	2630	4028	4317	5435	8525
October	2960	1920	2650	1906	1880	730	713	600	1130	1050	813	2200
November	180	2070	625	1020	100	625	1275	75	200	2000	2625	1913
December	3430	2180	4970	3355	1565	1420	50	2706	2115	2305	3240	1785
January	17918	19650	23150	19480	15375	8115	7445	6940	11805	9600	9235	13690
February	19500	27550	31960	32309	21010	9955	5360	18650	17705	14285	20835	17841
March	20575	52800	73342	51890	14137	4148	7348	15191	16205	21115	21415	24856
April	11560	27816	53100	28909	5960	6400	5855	6450	5400	6057	19638	11677
May	1100	1910	1200	1150	1085	980	1082	1085	705	2220	2488	3508
June	100	300	0	0	275	50	20	25	125	5	300	360
July	50	25	75	0	0	25	200	60	0	129	436	60
August	200	350	0	0	0	50	250	50	185	25	630	150
Total	79623	140301	194452	143894	69037	36613	32023	54462	59603	63108	87090	86564

Table 5. Tags sold monthly, expressed in percentage of total for the year.

	1926- 27	1927- 28	1928- 29	1929- 30	1930- 31	1931- 32	1932- 33	1933- 34	1934- 35	1935- 36	1936- 37	1937- 38	Average
September	2.6	2.7	1.7	2.7	11.1	11.2	7.6	4.8	6.8	6.8	6.2	9.8	6.2
October	3.7	1.4	1.4	1.3	2.7	2.0	2.2	1.1	1.9	1.7	.9	2.5	1.9
November	.2	1.5	.3	.7	.1	1.7	4.0	.1	.3	3.2	3.0	2.2	1.5
December	4.3	1.6	2.6	2.3	2.3	3.9	.2	5.0	3.5	3.7	3.7	2.1	2.9
January	22.5	14.0	11.9	13.5	22.3	22.2	23.2	12.7	19.8	15.2	10.6	15.8	17.0
February	24.5	19.6	16.4	22.5	30.4	27.2	16.7	34.2	29.7	22.6	23.9	20.6	24.0
March	25.8	37.6	37.7	36.1	20.5	11.3	22.9	27.9	27.2	33.5	24.6	28.7	27.8
April	14.5	19.8	27.3	20.1	8.6	17.5	18.3	11.8	9.1	9.6	22.5	13.5	16.1
May	1.4	1.4	.6	.8	1.6	2.7	3.4	2.0	1.2	3.5	2.9	4.1	2.1
June	.1	.2	0	0	.4	.1	.1	0	.2	0	.3	.4	.2
July	.1	0	0	0	0	.1	.6	.1	0	.2	.5	.1	.1
August	.3	.2	0	0	0	.1	.8	.1	.3	0	.7	.2	.2

Table 6. Fertilizer sales in percentage of total for the year as reported by manufacturers.

	1930- 31	1931- 32	1932- 33	1933- 34	1934- 35	1935- 36	1936- 37	1937- 38	Average
September	1.1	1.5	1.2	.6	1.7	1.7	1.1	1.1	1.2
October	1.4	1.8	2.0	.6	1.2	1.3	1.6	1.6	1.5
November	1.1	1.6	1.9	1.5	1.5	1.7	1.2	1.9	1.5
December	2.1	3.1	1.9	1.9	3.3	2.4	2.1	2.3	2.4
January	9.9	10.4	13.3	7.6	10.8	8.9	4.5	8.1	9.2
February	24.5	20.5	15.5	26.6	16.4	18.4	20.2	18.4	20.1
March	23.7	20.1	24.7	28.8	32.0	31.5	24.9	31.7	27.2
April	24.1	30.5	24.6	22.2	25.5	25.4	33.1	20.6	25.7
May	9.6	7.9	6.5	8.2	3.9	6.0	7.6	10.8	7.6
June	1.7	.9	4.2	.6	1.5	1.6	1.9	1.7	1.8
July	.2	.3	2.8	.4	.5	.3	.8	.8	.8
August	.7	1.6	1.4	.9	1.6	.8	1.0	.8	1.1

Sales by Counties

The Texas fertilizer law requires the manufacturer to report each sale or shipment to the State Chemist within three days. This enables sales by counties to be estimated.

Table 7 contains sales by counties from 1926-27 through 1937-38 tabulated from sales reports mentioned above. This tabulation gives an idea of the relative use of fertilizers in the various counties of the State, but it is not strictly correct. Fertilizers shipped into one county may be used in an adjoining county. The reports of the manufacturers are sometimes not complete, and shipments are sometimes reported twice. The errors are, of course, not uniformly distributed.

Table 8 gives the sales by counties in order of tonnage for 1937-8, beginning with the county having the largest sales. The table includes all counties to which over 500 tons were shipped.

Table 7. Fertilizer sales by counties, in tons.

County	1926- 27	1927- 28	1928- 29	1929- 30	1930- 31	1931- 32	1932- 33	1933- 34	1934- 35	1935- 36	1936- 37	1937- 38
Anderson	479	1216	1864	1457	628	508	470	2727	2101	2421	881	801
Angelina	1107	2046	3133	1945	836	617	557	948	859	902	1187	1095
Aransas	87	52	37	32	6	6	5	1	3			32
Archer	1			5					3			21
Atascosa	456	753	977	632	348	313	213	318	478	363	472	610
Austin	385	500	486	311	255	84	59	87	160	125	123	155
Bailey					1			40	2		3	
Bandera						1						
Bastrop	88	86	192	123	112	43	16	62	181	73	75	112
Baylor		1	1									
Bee	21	22	73	61	90	20	41	17	45	64	27	36
Bell		25	4	62	17	2	1	2	1	1	3	4
Bexar	144	269	400	300	146	241	143	137	234	189	323	353
Blanco											18	
Bosque		1								1		1
Bowie	3180	5967	6687	4598	1134	273	305	716	844	1014	1301	1281
Brazoria	186	361	384	265	213	56	56	115	51	91	72	126
Brazos	117	173	326	464	334	58	154	263	148	503	210	160
Brewster				10	2							
Briscoe					1							
Brooks	48	83	197	245	249	263	151	215	304	454	533	609
Brown	5	18	29	7	4	1	1	1	7	6	27	12
Burleson	176	327	625	349	123	31	1	59	82	48	64	101
Burnet	55										35	
Caldwell	73	82	33	46	8	33	3	11	22	21	27	18
Calhoun	19	13	22	19	5			4	16	26	20	22
Callahan	18	4	20	1	37	1	2	3	3	38	6	5
Cameron	177	482	904	1529	833	573	548	500	793	822	2286	1959
Camp	648	800	1114	1103	1347	271	305	799	696	675	897	951
Carson												23
Cass	5452	9047	10738	8907	2788	645	347	1328	2076	2533	4404	3434
Castro				35								
Chambers	252	121	194	191	232	453	464	486	423	872	817	974
Cherokee	3498	6194	8751	6817	3035	2412	1576	3096	2888	3129	4252	3348
Childress		3	3	6	1					1	14	33
Clay		3	16	44	1	1	1	1	2	1	8	3
Coleman	28	1	50	17	4	1				1	1	

Table 7. Fertilizer sales by counties, in tons.—Continued.

County	1926- 27	1927- 28	1928- 29	1929- 30	1930- 31	1931- 32	1932- 33	1933- 34	1934- 35	1935- 36	1936- 37	1937- 38
Collin	1	56	3	1			19	14	11	16	14	45
Collingsworth					1							
Colorado	59	199	161	264	563	455	411	497	509	302	347	543
Comal		30		49			2	1		10	2	7
Comanche	144	166	271	181	142	15	37	128	213	277	500	634
Concho											5	
Cooke	17	160	21	52	66	36	13	21	41	1	19	24
Coryell	41	92	86	40	24		4	2	8	15	12	11
Cottle		2								4	48	
Crockett		1	1									
Crosby			1	1								
Dallam					11	1						1
Dallas	332	416	529	457	387	537	260	487	402	508	533	525
Dawson			1	2	1							
Delta		29	19	27	6	5			15		1	3
Denton	23	24	40	40	17	20	1	3	28	42	65	47
DeWitt	132	240	387	475	598	479	259	283	435	585	494	993
Dickens	1											
Dimmitt	219	439	605	340	241	124	101	129	166	125	176	274
Donley				2		1			5	5	1	17
Duval					17							1
Eastland	80	163	198	171	176	56	6	40	72	150	332	470
Ector			1	1								2
Ellis	1		32	3	3	1	1	25	5		8	15
El Paso	539	850	401	483	212	701	885	754	1120	1409	1774	1362
Erath	157	480	657	465	30			20	22	66	164	125
Falls	80	146	332	111	47	10	2	9	66	41	45	74
Fannin	43	156	62	66	20			46	47	21	39	43
Fayette	51	150	174	84	120	96	65	111	134	162	127	241
Fisher	1				2					6		1
Floyd			2	1	1							
Foard										2		
Fort Bend	33	190	330	286	679	427	349	356	324	214	343	619
Franklin	187	422	414	302	125	60	33	100	117	130	186	178
Freestone	587	1838	1869	1293	371	56	98	162	103	137	543	717
Frio	130	208	267	163	167	168	95	107	235	286	404	372
Gaines		1	1	1							2	
Galveston	435	567	504	334	359	205	154	170	326	255	332	308
Gillespie	20	93	55	31							1	1
Goliad		2	24	73	83	16	14	4	14	8	13	19
Gonzales	86	155	289	217	107	26	20	55	75	28	51	125
Gray			22	35	18	6	1					
Grayson	96	142	165	152	39	3	4	3	45	29	76	108
Gregg	3156	3761	6188	3665	971	224	212	495	562	694	1032	1021
Grimes	399	945	1775	725	482	73	94	139	200	162	275	390
Guadalupe	15	30	20	16	30			2	16	2	21	5
Hale		6	3	15	6			1		3	11	13
Hall										1		
Hamilton	44	20	119		1							
Hardeman				3	1							
Hardin	454	656	687	602	677	394	367	442	530	475	460	382
Harris	778	1480	2164	1283	1310	1003	890	1230	2287	2540	1991	2348
Harrison	3339	5169	7293	6014	1445	546	867	1347	1968	2945	4894	4048
Haskell		2	2	1	2							
Hays			18	2	4		1			8	7	1
Henderson	846	1813	3316	3221	1097	477	362	958	877	1224	1236	1081
Hidalgo	516	431	609	1092	728	404	508	514	891	1064	1324	2178
Hill		45	50	70	50	15	1	8	8	7	15	17
Hockley			16	2								
Hood	50	46	46			1	1	28	20	4	11	9
Hopkins	670	1961	2574	1443	729	319	206	563	633	722	941	1049
Houston	1107	3029	5412	2800	781	165	242	668	631	794	1739	1079
Howard	6		110	710	621	5			1	1	1	3
Hudspeth										25	114	52
Hunt	8	40	170	158	44	26	14	22	19	15	67	32
Jack	1	1										
Jackson	34	54	109	60	138	21		14	22	41	15	46
Jasper	1060	1388	1638	2107	1153	319	512	684	1055	797	944	886
Jefferson	1080	1177	1440	1595	1423	1371	1118	1288	1539	2258	2685	2714
Jim Hogg				15	16	21		3	15	15	12	10

Table 7. Fertilizer sales by counties, in tons.—Continued.

County	1926- 27	1927- 28	1928- 29	1929- 30	1930- 31	1931- 32	1932- 33	1933- 34	1934- 35	1935- 36	1936- 37	1937- 38
Jim Wells	325	36	37		517	340	187	209	287	338	418	413
Johnson	97	62	92	35	47	29	12	25	29	40	47	49
Jones	56	67	55	51	1		2		1	3	12	4
Karnes	2	25	46	59	15	1	2	11	3	3	2	9
Kaufman	154	383	615	513	147	30	22	105	123	178	190	266
Kendall								1				2
Kimble						1				1	1	1
Kerr				1		2	1	1	3	1		4
King			41			1						
Kleberg				1	18		1	1	1	49	14	51
Knox	2	9			4							
Lamar	155	706	764	1021	372	567	143	242	306	249	352	340
Lamb				2							7	1
Lampasas					1					2	1	
La Salle		50	47	25	5	10	11	21	76	52	56	66
Lavaca	23	41	236	237	543	130	275	382	475	471	375	681
Lee	59	89	232	112	73	16	2	36	44	29	41	41
Leon	1059	1996	2954	1461	450	128	139	452	478	455	691	660
Liberty	1114	1874	2297	2206	2797	1296	1068	1331	1515	1662	1913	1562
Limestone	372	1549	2307	1300	360	150	29	230	187	219	478	443
Live Oak			65	15				4			2	5
Llano				1	2				2	3	2	3
Lubbock	1	18	32	32	7	1	1	2	2	10	10	20
Lynn		26	1									
Madison	123	826	1755	608	495	109	118	245	162	205	192	367
Marion	1523	1667	1728	1752	284	65	40	160	173	88	206	156
Mason						1		3	3	5		
Matagorda	230	115	97	74	55	10	15	17	17	21	25	19
Maverick	37	19	112	82	171	294	214		429	449	512	631
Medina		36		30				15	28	22	127	231
Menard			2		1					1		
Midland			3	12	1	1		19		2	1	2
Milam	166	333	711	344	200	22	59	213	337	269	165	143
Mills	23	71	190	67	58	55	1	11	10	8	6	9
Mitchell	123	95	65	18	2	2					1	
Montague	33	35	20	4	4	3				15	20	44
Montgomery	199	310	707	209	194	90	107	159	232	179	208	257
Moore			3									
Morris	1255	2869	2860	2590	795	133	95	521	612	664	942	816
Motley			1	1								
McCulloch	19	47	54	33	47	17	13	18	33	44	53	49
McLennan	60	93	75	122	34	11	27	39	43	38	82	98
Nacogdoches	3777	8370	9004	6860	2779	848	875	1846	1545	2245	3435	2757
Navarro	46	102	249	185	73	16	72	94	38	12	94	85
Newton	275	432	496	281	195	68	111	195	354	281	382	292
Nolan	4	13	3	6	3	1					1	1
Nueces	433	304	334	517	300	48	79	123	1085	553	48	67
Ochiltree				5								
Orange	218	469	621	298	379	398	235	178	280	319	546	535
Palo Pinto	55	8	4	5	2			2			1	1
Panola	1484	3785	5088	3088	870	240	262	861	762	1063	2138	2296
Parker	22	154	99	193	199	85	74	117	91	131	176	157
Pecos	166	232	109	90	118	30	75	148	88	101	198	227
Polk	371	617	1226	668	535	281	549	1003	1015	811	582	471
Potter	1	6	5	1	4	15	9			13	3	1
Presidio	3				1						2	2
Rains	33	116	258	178	91	70	29	76	142	63	105	113
Reagan					1				2		4	
Red River	269	879	1568	1092	512	328	432	776	969	505	476	563
Reeves		29			26	1			2	6	49	10
Refugio	18	30	49	83	52		1	19	1	3	4	33
Randall										1		
Robertson	782	1282	2274	788	653	179	199	559	541	560	406	551
Rockwall	3		3					1		16		
Runnels	1	139	9	58	6	2	3	2	1	1	5	5
Rusk	2143	9683	13779	8399	2547	909	778	1517	1403	1827	358	2463
Sabine	819	1418	1708	954	425	287	316	647	677	643	660	635
San Augustine	800	1471	2417	1177	346	114	195	396	421	817	846	655
San Jacinto	16	53	124	81	69	19	26	59	72	51	51	40
San Patricio	323	306	359	248	415	154	135	352	328	347	322	308

Table 7. Fertilizer sales by counties, in tons.—Continued.

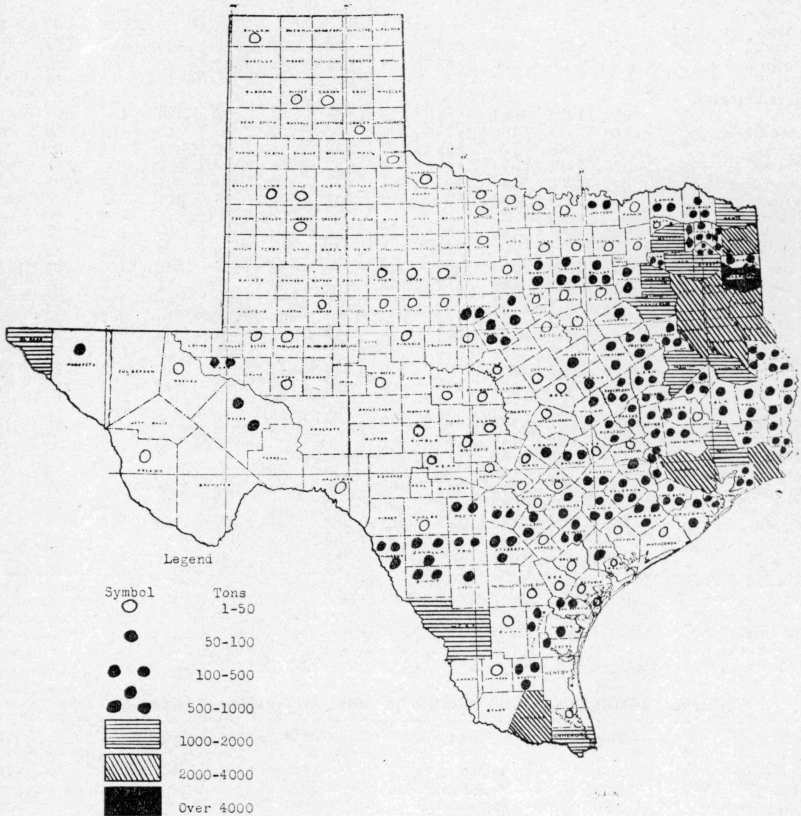
County	1926- 27	1927- 28	1928- 29	1929- 30	1930- 31	1931- 32	1932- 33	1933- 34	1934- 35	1935- 36	1936- 37	1937- 38
San Saba			1	15	2	2	2	1	1	21	5	9
Scurry		4									1	
Shackelford		5										1
Shelby	1688	3381	7137	2495	1086	346	632	937	895	1274	2833	2270
Smith	2673	5743	10758	7693	2852	1489	1928	3080	2658	2296	2776	2518
Somervell	23			1				20	3			
Starr												
Stephens	1	23	90	12	5							
Sterling			1									
Sutton				1	1							
Tarrant	108	176	434	246	327	336	314	403	530	548	614	859
Taylor		6	52	33	9	2	1	1	2	8	38	10
Terry											10	
Throckmorton			1									
Titus	536	1702	2636	1813	278	62	43	218	365	304	591	613
Tom Green	30	48	150	276	227	2	4	15	10	10	16	28
Travis	13	46	36	71	10	43	11	56	64	23	32	85
Trinity	500	1321	2259	1141	699	232	351	484	585	476	564	635
Tyler	642	1070	1140	900	391	245	309	488	606	528	601	481
Upshur	1610	2910	3200	1777	882	337	146	597	557	663	1290	1351
Upton												1
Uvalde	60	214	53	138	20	21	88		30	1	1	33
Val Verde		1		3	3	1		2	5	13	19	9
Van Zandt	243	1636	3394	2122	329	78	144	211	347	456	959	1257
Victoria	56	73	85	112	133	89	30	48	41	42	63	67
Walker	114	316	941	233	56	19	41	86	105	106	219	192
Waller	508	753	809	727	623	441	475	699	744	807	728	761
Ward		202	186	172	110	70		142	100	95	97	207
Washington	31	15	102	49	19		3	20	20	18	2	10
Webb	1369	1843	2087	1700	1123	914	1679	1195	1511	1493	1322	1230
Wharton	241	270	197	218	269	224	174	171	241	245	353	503
Wheeler					1							
Wichita	129	89	91	33	27	3	23	36	28	39	49	40
Willacy		20	119	80	48		3	5	2	2	9	22
Wilbarger	15	19	56								3	
Williamson		39	67	35	15	15	7	35	19	12	19	23
Wilson	3	107	209	311	309	266	190	262	398	194	245	399
Wise	40	44	36	42	52	5	3	23	40	14	20	41
Wood	953	1477	2642	1669	658	242	242	601	728	746	1435	1063
Young	3	6	36	78	7	20	2				1	2
Zavalla	170	210	371	402	209	406	157	92	68	377	474	502

Table 8. Fertilizer sales by counties in order of tonnage reported for 1938.

County	Tons	County	Tons	County	Tons
Harrison	4048	Webb	1230	Leon	660
Cass	3434	Angelina	1095	San Augustine	655
Cherokee	3348	Henderson	1081	Titus	643
Nacogdoches	2757	Houston	1079	Trinity	635
Jefferson	2714	Wood	1063	Sabine	635
Smith	2518	Hopkins	1049	Comanche	634
Rusk	2463	Gregg	1021	Maverick	631
Harris	2348	DeWitt	993	Fort Bend	619
Panola	2296	Chambers	974	Atascosa	610
Shelby	2270	Camp	951	Brooks	609
Hidalgo	2178	Jasper	886	Red River	563
Cameron	1959	Tarrant	859	Robertson	551
Liberty	1562	Morris	816	Colorado	543
El Paso	1362	Anderson	801	Orange	535
Upshur	1351	Waller	761	Dallas	525
Bowie	1281	Freestone	717	Wharton	503
Van Zandt	1257	Lavaca	681	Zavalla	502

The map, Fig. 1, shows the distribution of fertilizer sales for 1937-38. The greatest consumption is in the northeastern part of the State.

TEXAS AGRICULTURAL EXPERIMENT STATION
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Tonnage of Grades

Table 9 shows the tonnage of the grades sold in Texas since 1925-26, arranged in order of tonnage sold in 1937-38. The cottonseed meal included is that tagged with fertilizer tags. Considerable amounts of cottonseed meal tagged with feed tags are, no doubt, used for fertilizer in Texas, but there is no way of finding out how much.

Some of the grades of fertilizer sold in 1926-27 are still being sold, but a number of grades sold in 1937-38 were not sold at that time. The sale of superphosphate has decreased from 28 percent of total tonnage sold in 1926-27 to about 9 percent of total tonnage sold in 1937-38. Grades have been tried experimentally and then dropped. The sale of 3-10-3 fertilizer decreased from 20 percent in 1928-29 to about 4 percent in 1937-38, while the sale of 4-8-4 fertilizer increased from 12 percent to 23 percent. A number of grades of more concentrated fertilizers are gradually becoming popular, and the sale of such fertilizers may increase from year to year.

The tendency is toward higher grades of fertilizer. Thus 12% and 14% kainit have been replaced by 20% kainit and 30% manure salts. The 16% superphosphate has not been sold since 1929; 18 and 20% superphosphate are being sold in place of it. The 2-10-2 was a heavy seller in 1928 and previous years but was discontinued in 1929, being replaced by higher grades. Table 9 reflects some of the experimenting being done with grades, as some appear and disappear.

Table 9. Tons of fertilizer sold by grades in order of tonnage (1926-7—1937-8).

Grade	1937-38	1936-37	1935-36	1934-35	1933-34	1932-33	1931-32	1930-31	1929-30	1928-29	1927-28	1926-27
4-8-4	18743	23702	12118	10682	7866	3884	3661	8888	24601	22738	10615	3735
4-12-4	10345	12433	8698	9325	6443	3156	3370	8710	27180	51424	30685	8535
4-8-6	8107	8758	6995	8384	5803	2749	3409	6046	6046	4102	4219	2779
6-10-7	4901	4671	5109	6009	3951	2060	2234	3456	2652	2999	2120	1483
6-8-4	4597	2920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6-12-6	3643	3664	4029	4766	3380	2494	2122	3301	4100	4855	1749	.....
Super-phosphate, 18%	3516	2743	3408	3249	4858	4373	6505	10149	12938	12201	11353	12517
Super-phosphate, 20%	3377	2642	2517	1416	2022	1982	1637	2885	5355	5022	4811	4053
3-10-3	2961	4150	3500	3450	3579	1761	1578	7056	33837	37110	31305	13120
Sulphate of ammonia	2548	1610	1588	1139	799	801	1039	770	1324	1317	680	553
4-10-0	2137	2132	2040	1003	756	497	554	646	548	.....	.....	.....
16-20-0	1606	1637	692	570	220	445	261	232	42	.....	.....	.....
11-48-0	1585	1361	773	670	265	104	155	230	.....	.....	.....	.....
5-15-5	1525	1133	923	1420	868	606	1091	2066	3769	6562	3765	1249
Bone meal	1342	1095	1283	1232	1052	498	696	428	609	117	420	477
6-9-3	1055	1221	751	598	258	148	152	542	1650	2502	1084	73
Nitrate of soda, 15% and 16%	1048	1314	1080	1146	1116	624	726	1299	3732	4257	2846	1095
Lawn and garden fertilizer	957	157	131	183	105	94	292	369	.....	.....	.....	.....
Cyanamid	919	1475	569	507	550	169	121	176	91	50	.....	.....
3-10-0	826	1220	696	.....	.....	.....	.....	.....	.....	.....	.....	.....
4-8-10	678	589	297	301	186	110	52	.....	.....	.....	.....	.....
Super-phosphate, 32%	678	538	328	.....	.....	.....	.....	.....	.....	.....	.....	.....
4-10-7	591	814	649	681	642	211	315	686	1069	926	893	1000
10-20-10	311	246	245	314	161	151	247	375	50	.....	.....	.....
0-12-4	247	94	115	29	4	.....	196	.....	.....	246	250	441
Muriate of potash, 50%	207	142	151	122	.....	.....	.....	.....	.....	.....	.....	.....
5-15-0	216	236	67	300	.....	.....	.....	.....	.....	.....	.....	.....
Kainit, 20%	179	195	222	196	180	180	87	78	62	.....	.....	40
Cottonseed meal	158	25	100	73	191	668	574	1266	563	797	1530	2034
Super-phosphate, 45%	150	65	93	35	56	34	12	62	.....	.....	.....	.....

Table 9. Tons of fertilizer sold by grades in order of tonnage (1926-7—1937-8).—Continued.

Grade	1937- 38	1936- 37	1935- 36	1934- 35	1933- 34	1932- 33	1931- 32	1930- 31	1929- 30	1928- 29	1927- 28	1926- 27
Tankage, bat guano and activated sludge	134	295	305	679	695	1680	362	.....	.....	.....	.....	.....
10-10-0	110	91	57	169	53	.....	.....	.....	.....	.....	.....	.....
10-0-10	106	108	108	72	51	26	24	10	43	.....	.....	.....
Sulphate of potash, 48%	44	169	14	10	64	15	7	4	53	26	23	4
Soft phosphate with colloidal clay	40	138	27	65	40	42	.....	125	100	.....	.....	.....
10-20-0	14	.....	.....	.....	2	6	.....	.....	.....	.....	.....	.....
Magnesium sulphate	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Manure salts, 30%	5	9	9	.....	.....	.....	.....	.....	.....	.....	.....	.....
6-30-0	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
0-15-6	.....	54	54	34	25	23	107	452	1346	890	648	1173
Calcium nitrate	.....	.....	30	20	80	93	50	23	.....	.....	.....	.....
9-18-18	.....	952	41	76	197	200	392	727	311	.....	.....	.....
9-27-9	.....	118	49	43	22	7	42	86	124	.....	.....	.....
Miscellaneous unmixed fertilizer	26	17	10	116	58	24	44	186	82	.....	267	285
8-24-8	.....	.....	77	134	65	46	127	352	.....	.....	.....	.....
6-18-6	.....	.....	44	172	180	39	53	324	1451	919	207	75
Muriate of potash, 48%	.....	.....	.....	.....	198	178	284	222	563	579	440	409
10-30-10	.....	.....	.....	.....	25	2	8	22	70	.....	.....	.....
3-10-8	.....	.....	.....	.....	16	223	309	1065	1079	1425	706	888
4-10-2	.....	.....	.....	.....	.....	156	134	511	3117	5873	4467	1906
12-24-12	.....	.....	.....	.....	.....	121	40	3	10	.....	.....	.....
20-20-0	.....	.....	.....	.....	.....	33	23	35	.....	.....	.....	.....
3-10-1	.....	.....	.....	.....	.....	.....	118	.....	.....	.....	.....	.....
10-20-20	.....	.....	.....	.....	.....	.....	100	20	.....	.....	.....	.....
15-30-15	.....	.....	.....	.....	.....	.....	1	8	42	9	.....	.....
5-10-10	.....	.....	.....	.....	.....	.....	.....	377	.....	.....	.....	.....
Kainit, 14% and 12%	.....	.....	.....	80	122	130	95	140	221	516	558	1348
Miscellaneous mixed fertilizer	.....	.....	.....	.....	.....	.....	.....	16	192	360	466	330
2-10-2	.....	.....	.....	.....	.....	.....	.....	.....	12236	13640	8817	.....
16% acid phosphate	.....	.....	.....	.....	.....	.....	.....	.....	3920	4318	6355	.....
3-8-3	.....	.....	.....	.....	.....	.....	.....	.....	2705	3539	1889	.....
3-9-0	.....	.....	.....	.....	.....	.....	.....	.....	421	315	.....	.....
8-8-4	.....	.....	.....	.....	.....	.....	.....	.....	111	.....	.....	.....
2-12-2	.....	.....	.....	.....	.....	.....	.....	.....	.....	1060	680	.....
3-12-3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1144	.....
3-8-5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	597

Grades of Fertilizer Used by Counties

Table 10 contains, for a few selected counties, in which large quantities of fertilizer are used, the tonnage used of the different grades of fertilizer. Cass, Cherokee, and Harrison counties represent the cotton and tomato section in the northeastern part of the State. Jefferson in the southeastern part of the State grows rice as well as other crops. Cameron in South Texas and Webb County in the Southwest use fertilizer chiefly for vegetable and citrus fruits. El Paso County represents the far West. The 4-8-4 grade of fertilizer leads in Cass, Cherokee, and Harrison counties, northeastern part of the State, where most of it is probably used for cotton with some vegetables. The 4-10-0, bone meal, and superphosphate lead in Jefferson County, where fertilizer is used chiefly for rice. In

Cameron County, 32% superphosphate and 16-20-0 lead. Webb County uses 6-12-6 and 6-8-4 most extensively. El Paso County uses 16-20-0 and 11-48-0. The concentrated grades of fertilizer are used in the western counties more than the other grades, chiefly for onions, spinach, and other vegetables.

Table 10. Grades of fertilizer used by some counties—in tons, 1936-7.

Grade	Cameron	Cass	Cherokee	El Paso	Harrison	Jefferson	Webb
0-12-4	.....	.....	1	.....	.....	2	.....
0-15-6	5	.....	.....	.....	.....	.....	.....
3-10-0	.....	.....	1	.....	.....	116	.....
3-10-3	.....	399	58	3	102	64	.....
4-8-4	.....	2599	1449	.....	3039	178	.....
4-8-6	31	668	320	.....	190	10	.....
4-8-10	.....	10	20	.....	7	.....	.....
4-10-0	1	2	208	.....	58	664	.....
4-10-7	.....	.....	46	.....	2	19	.....
4-12-4	13	136	447	47	369	112	5
5-15-0	2	.....	1	14	.....	6	172
5-15-5	146	6	10	70	40	1	.....
6-8-4	33	98	153	21	615	6	232
6-9-3	20	2	61	.....	79	.....	.....
6-10-7	.....	78	790	.....	66	26	30
6-12-6	1	7	227	17	256	77	503
9-27-9	4	.....	1	.....	1	.....	.....
10-0-10	.....	2	34	.....	1	.....	.....
10-10-0	.....	.....	11	.....	.....	.....	.....
10-20-10	5	.....	1	46	1	13	.....
11-48-0	135	.....	.....	570	.....	.....	138
16-20-0	308	.....	.....	575	19	.....	97
Superphosphate, 18%	.....	14	38	162	26	441	.....
Superphosphate, 20%	97	10	20	139	71	36	1
Superphosphate, 32%	448	.....	.....	98	.....	.....	.....
Superphosphate, 45%	2	11	.....	112	.....	.....	.....
Sulphate of ammonia, 20%	222	38	42	109	21	29	20
Nitrate of soda, 15%	.....	.....	1	84	45	10	106
Nitrate of soda, 16%	129	49	68	.....	4	.....	.....
Muriate of potash, 50%	.....	10	6	.....	14	.....	.....
Sulphate of potash, 48%	8	.....	1	.....	.....	.....	.....
Kainit, 20%	.....	.....	11	.....	3	.....	.....
Bone meal	11	.....	.....	.....	.....	821	1
Cyanamid, 21%	690	10	1	.....	32	.....	.....
Cyanamid, 22%	.....	21	.....	.....	.....	.....	.....
Bat guano	2	.....	.....	.....	.....	.....	.....
Activated sludge	.....	1	.....	.....	.....	26	.....
Soft phosphate with colloidal clay	.....	.....	.....	.....	.....	44	.....

Valuations and Selling Prices

Table 11 contains the assumed valuations in cents per pound for nitrogen, phosphoric acid, and potash from 1926-27 through 1937-38. Since 1932-33 the valuation for nitrogen has been 46 percent less than it was from 1926-27 through 1929-30. The lower cost of nitrogen is no doubt due to the development of chemical methods of fixing nitrogen. The valuations for phosphoric acid have not changed appreciably, while potash is a little lower than in 1926-27.

Table 11. Fertilizer valuations, 1926-1938, in cents per pound.

Year	Available phosphoric acid	Nitrogen	Potash	Total phosphoric acid in bone and tannage	Total phosphoric acid in rock phosphate
1926-27	6	22.5	6	4	
1927-28	6	22.5	6	4	
1928-29	6	22.5	6	4	
1929-30	6	22.5	6	4	
1930-31	6	20.0	6	4	1.5
1931-32	6	16.0	5.5	4	1.5
1932-33	5.5	12.0	5	3.6	1.3
1933-34	5.5	12.0	5.5	3.6	1.3
1934-35	5.5	12.0	5.5	3.6	1.3
1935-36	5.5	12.0	5.5	3.6	1.3
1936-37	6.0	12.0	5.5	4.0	1.5
1937-38	6.0	12.0	5.5	4.0	1.5

Table 12 contains the average selling prices of grades of fertilizer sold in Texas from 1926-27 through 1937-38. These prices were collected by the inspectors at the time of sampling, and represent the cash retail prices. With the exception of 11-48-0, 16-20-0, muriate of potash, raw bone meal, and cyanamid, the selling prices were lower in 1932-33 than before or since.

Table 12. Average selling prices of some grades of fertilizer, 1926-1938.

Grade	1937-38	1936-37	1935-36	1934-35	1933-34	1932-33	1931-32	1930-31	1929-30	1928-29	1927-28	1926-27
0-12-4	\$24.77	\$25.00	\$.....	\$25.90	\$24.80	\$.....	\$.....	\$.....	\$.....	\$27.65	\$.....	\$31.65
3-10-0	25.60	25.95	25.26	.....	.....	.....	.....	.....	.....	.....	.....	.....
3-10-3	28.82	29.07	28.31	28.87	27.85	24.70	27.43	30.53	31.45	32.72	34.41	32.51
4-8-4	29.69	30.09	29.40	29.61	28.90	25.89	28.67	32.93	34.83	36.81	37.86	37.67
4-8-6	32.03	32.06	31.12	31.47	30.64	27.96	30.62	35.14	37.24	38.23	39.65	40.99
4-8-10	34.46	35.82	34.00	34.89	33.78	30.71	34.90	.....	.....	.....	.....	.....
4-10-0	28.53	28.89	27.67	27.91	26.68	23.84	26.38	32.47	34.06	.....	.....	.....
4-10-7	34.41	34.18	32.94	34.05	32.85	30.97	34.40	38.29	39.71	44.02	44.08	47.17
4-12-4	33.82	34.04	33.80	32.86	33.18	29.12	33.83	38.10	39.03	40.16	41.78	41.65
5-15-0	39.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5-15-5	39.22	39.53	39.20	39.34	38.03	36.34	35.06	43.66	46.64	48.02	48.51	49.12
6-8-4	33.94	33.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6-9-3	33.55	34.03	32.72	33.15	32.30	28.22	30.80	39.48	42.11	44.37	44.30	43.55
6-10-7	37.73	37.95	36.78	37.13	36.35	32.76	37.60	43.49	48.85	51.83	48.55	55.03
6-12-6	37.69	38.09	37.29	38.54	37.54	34.21	38.45	44.93	47.33	47.97	48.81	.....
10-0-10	39.50	38.40	39.30	42.37	40.00	37.50	.....	50.00	49.10	.....	.....	.....
10-6-4	55.00	55.00	46.07	.....	67.50	.....	.....	75.00	.....	.....	.....	.....
10-10-0	39.50	40.00	38.00	38.25	37.60	.....	.....	.....	.....	.....	.....	.....
10-20-10	59.02	.....	58.21	58.15	59.60	54.21	65.05	70.83	.....	.....	.....	.....
11-48-0	61.00	61.13	64.86	63.00	.....	75.00	78.40	.....	.....	.....	.....	.....
16-20-0	52.00	49.42	52.31	50.50	58.06	57.10	60.50	71.98	85.00	.....	.....	.....
Ammonium sulphate	46.19	44.40	45.53	46.23	53.00	40.00	.....	.....	.....	.....	.....	.....
Kainit, 20%	28.58	27.40	27.67	25.55	26.12	23.83	.....	27.20	.....	.....	.....	.....
30% manure salts	35.00	34.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Muriate of potash, 50%	50.00	46.45	42.15	40.57	50.36	50.44	42.46	52.63	48.27	52.85	50.90	51.45
Nitrate of soda, 16%	43.67	40.83	39.46	39.52	39.45	37.54	53.86	56.69	55.00	.....	.....	.....
Raw bone meal	36.52	37.80	35.02	29.00	24.73	36.10	26.00	48.50	37.00	49.88	39.25	58.33

Table 12. Average selling prices of some grades of fertilizer, 1926-38.—Continued.

Grade	1937- 38	1936- 37	1935- 36	1934- 35	1933- 34	1932- 33	1931- 32	1930- 31	1929- 30	1928- 29	1927- 28	1926- 27
Sulphate of ammonia, 20%	\$42.52	\$41.30	\$38.74	\$39.57	\$41.27	\$34.68	\$29.63	\$53.05	\$61.42	\$67.68	\$70.55	\$75.66
18% super-phosphate	24.40	24.52	24.46	24.98	23.34	19.02	20.40	21.88	21.65	21.66	22.44	22.70
20% super-phosphate	25.68	26.28	26.14	26.72	25.17	20.72	23.25	24.25	23.91	23.32	24.44	24.69
32% super-phosphate	37.83	38.00	38.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Soft phosphate with colloidal clay	14.00	14.00	12.60	.....	25.00	.....	.....	30.00	.....	.....	.....	.....
Cyanamid	33.50	38.50	38.00	39.48	41.78	37.13	41.44	44.00	.....	.....	.....	.....
Sheep manure	45.00	.....	.....	40.00	.....	.....	.....	45.00	.....	35.00	.....	.....
10-20-20	59.80	.....	.....	.....	.....	.....	80.00	.....	.....	.....	.....
Activated sludge	20.00	25.00	21.40	20.00	17.00	18.75	32.50	.....	.....	.....	.....
45% super-phosphate	56.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5-10-0	30.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
8-24-8	56.55	57.20	55.95	54.33	56.76	66.40	.....	.....	.....	.....
9-27-9	61.00	.....	60.75	.....	68.08	77.27	75.29	82.50	.....	.....
15% nitrate of soda	39.75	42.93	40.68	39.57	.....	55.28	60.19	64.65	65.72	70.20
6-18-6	45.20	43.85	.....	.....	52.95	52.99	56.77	56.15	55.17
9-18-18	62.00	61.63	59.13	67.82	.....	85.00	.....	.....	.....
Calcium nitrate (nitrate of lime)	45.00	45.00	42.00	.....	.....	54.00	.....	.....	.....
Cottonseed meal	42.00	26.50	.....	17.00	.....	41.00	49.50	49.71	30.50
0-15-6	30.00	25.00	27.18	30.35	31.75	29.20	.....	34.11
Bat guano	25.00	30.00	.....	37.00	.....	.....	.....	.....
3-10-8	30.34	33.83	37.76	39.89	39.96	39.88	42.98
4-10-2	25.67	28.65	34.06	34.57	36.58	37.72	36.65
Kainit, 14%	19.95	.....	22.48	.....	21.96	.....	.....
Sulphate of potash, 48%	72.00	67.50	.....	.....	.....	.....	.....
3-0-0	23.84	.....	.....	.....	.....	.....
5-2-2	27.56	.....	.....	.....	.....	.....
Dried shrimp, waste, and marl, low grade 3-1-1	18.50	.....	.....	.....	.....	.....
Low grade 1-3-1	27.00	.....	.....	.....	.....	.....
5-8-6	90.00	.....	.....	.....	.....
5-10-4	80.00	.....	.....	.....	.....
5-10-5	37.00	.....	.....	44.00	.....
5-10-10	43.42	.....	.....	.....	.....
9-18-9	72.30	.....	.....	.....	.....
10-30-10	79.83	.....	.....	.....	.....
11-46-0	80.50	.....	.....	.....	.....
Kainit, 12%	24.75	23.23	22.34	20.31
3-8-3	33.08	33.69	33.69
8-8-4	54.45	.....	.....
3-9-0	31.50	33.00	.....
2-10-2	28.98	30.12	29.45
Super-phosphate, 16%	21.66	21.55	21.20
Nitrate of soda—potash	67.50	.....	.....
5-9-0	39.92	.....
2-12-2	32.04	32.10
3-8-5	36.54
3-12-3	35.31
4-12-0	39.67

Table 13 shows the relation between the valuations and the retail selling prices of a number of grades of fertilizer from 1926-27 through 1937-38.

Table 14 contains the approximate cost of nitrogen, phosphoric acid, and potash in cents per pound from 1926-27 through 1937-38 for some of the largest selling grades. The cost of nitrogen was highest in the 3-10-3 grade and lowest in cyanamid. The cost of phosphoric acid was highest in the 3-10-3 grade and lowest in the 6-12-6 grade. The cost of potash was highest in the 3-10-3 grade and lowest in the 6-12-6 grade. The cost prices are calculated on the assumption that Table 12 contains the correct ratio of prices, and that Table 11 contains correct prices. These cost prices are, of course, only approximate.

Relation of Fertilizer Sales to Price of Cotton

The sales of fertilizer in Texas have shown a tendency to increase as the State grows older, the land remains longer in cultivation, and the need for fertilizer becomes greater on account of decreased producing power of some of the soils. Familiarity with fertilizers also encourages their use. There are fluctuations in the amounts of fertilizer used from year to year, and there seems to be some relation between the amount of fertilizer used and the price at which cotton is selling previous to the planting season.

Table 15 contains the sales of fertilizer in Texas and the New Orleans prices of middling cotton on the first sale day of the month. These prices were kindly furnished by Mr. Henry Plauche, Secretary of New Orleans Cotton Exchange. The prices in each list begin with the year first given and continue into January of the next year, as the fertilizer season begins September 1. It is also desirable to estimate the relation as early as possible.

The figures show that there is a relation between the prices of cotton during the fall and winter and the fertilizer sales from September 1 to August 31. This relation is to be expected. It is also to be expected that the relation will not be close, as there are other important factors which

Table 15. Fertilizer sold and price of middling cotton in cents per pound on the first sale day of the month in New Orleans.

Fertilizer, Tons	Season	Cotton, October	Cotton, November	Cotton, December	Cotton, January
79,863	1926-27	13.50	12.73	12.18	12.53
139,126	1927-28	21.56	21.10	19.26	19.30
187,215	1928-29	18.76	18.51	19.57	18.86
138,914	1929-30	18.68	17.67	17.09	17.07
64,424	1930-31	10.31	10.89	10.15	9.69
33,406	1931-32	5.55	6.50	5.98	6.08
30,843	1932-33	7.00	6.04	5.90	5.95
47,204	1933-34	9.61	9.45	9.85	10.29
59,480	1934-35	12.60	12.34	12.78	12.91
60,016	1935-36	10.86	11.38	12.11	11.95
84,936	1936-37	12.55	12.26	12.44	12.78
79,640	1937-38	8.37	7.97	8.03	8.50

affect the sales of fertilizers. The relations for the years 1905-1926 were given in Bulletin 350; the correlation between the selling price of cotton and the sale of fertilizer following from 1905 to 1926 was $.50 \pm .11$ for October, $.58 \pm .10$ for November, $.55 \pm .10$ for December, and $.55 \pm .10$ for January. The correlation coefficients for the data in Table 15 for 1926 to 1938 were calculated with the following results:

Correlation Coefficients

Fertilizer Sales and Cotton Price

October cotton	+ .86 ± .05	December cotton	+ .91 ± .08
November cotton	+ .90 ± .04	January cotton	+ .89 ± .04

The relation between the price of cotton and the sale of fertilizer in the above table is expressed by the following equation:

Estimated sales in tons equals 8400 times the November price of cotton minus 20,000 tons.

The relations of past years are not necessarily followed in future years, since conditions may change; so any attempts to use this equation for the purpose of predicting the sales of fertilizer must be recognized as extremely tentative.

SUMMARY AND CONCLUSIONS

The Texas fertilizer law was passed in 1899 and amended in 1911.

Fertilizer sales increased to 187,215 tons in 1928-29, but declined to 30,843 tons in 1932-33 and increased to 84,938 tons in 1936-37.

Tag sales expressed as tons of fertilizer are given by years and months. The percentage of sales is also given. The heaviest sales occur in March.

Total sales by counties since 1925-26 are given for each year, with a map for 1937-38.

The counties in northeastern part of the State use the most fertilizer.

Sales by grades in some counties for 1938 are given.

The tonnage of grades sold since 1925-26 is shown. The number of grades has decreased considerably.

The sale of superphosphate decreased from 28 percent of the total tonnage in 1926-27 to about 9 percent of the total tonnage in 1937-38.

More concentrated fertilizers are being used to a greater extent. A large number of grades are no longer being sold.

The average selling prices of the different grades are given for the past 12 years.

Tables relating to valuations and prices are given.

There is a relation between the price of cotton in the preceding fall and winter and the sale of fertilizer in the following spring.