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Some Trends in Utah's Agriculture

By
Walter U. Fuhriman

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Some Trends in Utah's Agriculture[1]

Walter U. Fuhriman[2]

During the last two decades agriculture has been subjected to many strains and stresses—social, economic, physical, and biological. Infestations of noxious weeds and insect pests have in some instances necessitated changes in crops grown and in farming practices. Changes in precipitation have induced alternate expansion and contraction of cultivated acreage in certain areas. Improved machinery has reduced the demand for farm labor, caused shifts in crops grown and in farm population. Changes in dietary habits have increased the demand for some farm commodities and decreased the demand for others, while wide fluctuations in farm prices have wrought rapid changes in the economic well-being of rural people. Relatively low precipitation in western United States during the early thirties reduced range forage growth and carrying capacity of ranges, which in turn, together with federal control changes, resulted in reduced numbers of range livestock.

The complexity of forces affecting agriculture makes the task of appraising general trends as a whole a complicated one. This is particularly true with respect to the diversified agriculture which characterizes the cultivated areas of the State of Utah where marked variation occurs in size of farm, in crops grown, in crop yields, in number and kinds of livestock kept, and in farm organization.

This monograph presents an approach to the evaluation of some recent trends in Utah's agriculture. Consideration will be given to changes in acreage of crops harvested, numbers of livestock, intensity of crop and livestock production, crop and livestock yields, total production, prices, income, and size of farm in the State of Utah.

Methods Used to Determine Trends

As an aid to evaluating trends a number of weighted indexes were constructed. The weights used represent the relative intensity of crop and livestock enterprises.

Table 1. *State yields, acreage, farm price, productive man-work-units per acre, value of products per acre, weight assigned each acre of cropland, and relative total weight of crops in Utah.*

	Yield		Acres 1926-1931 Utah	Percent of total acres	Utah farm price*	P. M. W. U. per acre**	Value produce per acre	Relative weight		Constant
	State average 1926-31							Per acre	Total crop†	
	unit	(Y)	1000	percent	dollars	number	dollars	(W)	percent	(K)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Hay: Irrigated alfalfa (no seed)	Tons	2.5††	471.0‡	42.2	9.88	2.4	26.68	10	33.7	4.0
Alfalfa (dry)	Tons	1.0††	5.5‡	.5	9.88	.8	9.88	3	.1	3.0
Irrigated alfalfa (with seed)	Tons	1.0††	52.3‡	4.7	9.88	.8	9.88	3	1.1	3.0
Other tame hay	Tons	1.6	62.3	5.6	9.82	.8	15.71	5	2.2	3.1
Wild hay	Tons	1.2	72.2	6.5	7.92	.8	10.30	4	2.1	3.1
Small grains: Wheat (irrigated)	Bu.	30.0	83.0	7.4	1.05	3.0	31.50	13	7.7	.43
Wheat (dry)	Bu.	19.0	172.7	15.5	1.05	.4	19.95	5	6.2	.26
Barley	Bu.	41.0	33.7	3.0	.75	3.0	30.00	12	2.9	.29
Oats	Bu.	39.0	49.7	4.4	.58	3.0	22.04	11	3.9	.28
Corn: grain (total)	Bu.	27.0	17.0	1.5	1.07	8.0	28.89	23	2.8	.85
Miscellaneous field crops:										
Alfalfa seed	Bu.	2.4	53.3	....§	9.40	1.0	25.38	7	2.7	2.9
Sugar beets	Tons	11.4	49.2	4.4	7.01	12.0	79.91	42	14.8	3.7
Potatoes	Bu.	150.0	16.7	1.5	.87	11.0	133.11	48	5.7	.32
Peas (canning)	Tons	1.2	10.0	.9	58.42	6.0	70.10	26	1.9	21.7
Tomatoes (canning)	Tons	8.7	5.7	.5	10.90	20.0	94.83	61	2.5	7.0
Tomatoes (fresh)	Bu.	172.0	.6	.1	.68	20.0	16.96	67	.3	.39
Truck crops: Cabbage	Tons	13.0	.4	....	11.91	20.0	154.83	74	.2	5.7
Onions	Bu.	413.0	1.0	.1	.63	40.0	260.19	100	.7	.24
Cauliflower (50 lb.)	Crts.	290.0	.2	....	1.57	40.0	348.54	100	.1	.34
Celery	Crts.	265.0	.5	.0	.89	45.0	206.48	100	.4	.38
Fruits: Apples	Bu.	110.0	6.9	.6	1.02	20.0	110.16	76	3.8	.69
Apricots	Bu.	150.0	.3	....	1.40	20.0	210.00	84	.2	.56
Cherries	Tons	3.6	1.1	.1	60.00	20.0	216.00	86	.7	23.9
Peaches	Bu.	165.0	3.3	.3	1.08	20.0	178.20	78	1.8	.47
Pears	Bu.	133.0	.6	.1	1.39	20.0	184.87	81	.3	.61
Strawberries (10 lb.)	Cases	260.0	1.4	.1	.85	86.0	221.00	120	1.2	.46
Weighted average or total			1,117.3	100.0			29.42¶	11.8¶	100.0	

*For the period 1926-30.
**A productive man-work-unit is 10 hours work for one man.
†Percentage which acres (col. 2) times weight (col. 7) for each crop is of the summation of these products.
††Yields of dry-land alfalfa and alfalfa with seed estimated.
‡Total acreage of alfalfa divided on basis of 89 percent irrigated alfalfa with no seed crop, 10 percent irrigated alfalfa with a seed crop and 1 percent dry-land alfalfa.
§The acreage of alfalfa seed is included in irrigated and dry alfalfa acreage.
¶Based on actual acreage; i. e., alfalfa seed deducted from total.
....Less than 0.05.

Crops such as sugar beets, tomatoes, fruits and vegetables for example, normally require considerable labor and produce crops of relatively high value per acre. Small grains and hay, on the other hand, require less labor and produce crops of a lower annual value per acre.

In developing a crop-yield index for Utah it was considered advisable to weight crops not only according to acreage grown, but also according to the relative intensity of each crop. This tends to weight each acre of crop roughly according to its contribution to farm income.

Although other factors such as relative amount of hand and machine labor used had some influence, the gross value of the product per acre,[3] and the average productive man-work-units per acre required for each kind of crop, furnished the chief statistical bases on which the weights were determined.

The weights per acre assigned to each crop, together with certain data used in determining them, are presented in table 1. These weights (column 7) may, in general be considered as showing the relative intensity of the particular crop. Alfalfa, which has the largest acreage of any crop in Utah, was given a weight of 10. By comparing the percentage of total cultivated acreage in a crop (column 3) with the relative weight ascribed to the total crop (column 8) the effect of weighting may be observed. For example, alfalfa hay (without seed) occupies 42.2 percent of the acreage, but under the weighting system used, the weight of the total crop is reduced to 33.7 percent of all crops, while sugar beets which occupy 4.4 percent of the total acreage have a total weight of 14.8 percent. Dry-land wheat occupying 15.5 percent of the cultivated acreage has a weight of 6.2 percent of total crops.

The formula[4] used in this study for calculating crop yield indexes is:

$$\frac{\Sigma T_c K}{\Sigma A W} \times 100 \text{ or } \frac{100 \ \Sigma T_c K}{\Sigma A W}$$

$T_c =$ Total production of a crop in a given year; i. e., acres grown times yield per acre.

$K =$ The weight assigned to any given crop divided by the average yield of the crop in the base period.

$\Sigma T_c K =$ The sum of the products obtained by multiplying the total production of each crop by the constant (K) for each crop.

$A =$ Number of acres grown in the current year.

$W =$ Weight assigned to each crop according to its relative importance per acre.

$\Sigma A W =$ Sum of the products obtained by multiplying acres in each crop by the weight (W) for that crop.

3. Computed by multiplying the state average yield for 1926-31 by the average Utah farm price for the 5-year period 1926-30.

4. The significance of this formula may be more readily understood by showing its derivation from, and its relation to, simpler crop yield indexes. The

(4. continued)

simplest crop yield index is merely the relationship of the yield of a single crop for a particular year to the yield of this crop in the base period. It may be expressed by the formula:

$$\frac{Y}{B} \times 100 \quad \text{or} \quad \frac{100 \ Y}{B}$$

Y = yield for given crop; and B = base yield for given crop.

This simple index while showing relative yield for single crops does not show yields for the farm as a whole. If the yield position for the farm is to be shown, some method of combining yields must be developed.

A crop yield index in which the yield of each crop is given equal weight regardless of the number of acres or kinds of crops grown may be calculated from the formula:

$$\frac{\overset{\text{Crop}}{\underset{\text{no. 1}}{Y}}{B} + \frac{\overset{\text{Crop}}{\underset{\text{no. 2}}{Y}}{B} + \frac{\overset{\text{Crop}}{\underset{\text{no. 3}}{Y}}{B} + \cdots n}{\text{Number of crops}} \times 100 = \frac{100 \ \Sigma(\frac{Y}{B})}{\text{Number of crops}}$$

A somewhat more complex index in which the yield of each crop is given a **weight equal to the number of acres** grown in the given year may be calculated from the following formula in which A is the number of acres grown.

$$\frac{\overset{\text{Crop}}{\underset{\text{no. 1}}{YA}}{B} + \frac{\overset{\text{Crop}}{\underset{\text{no. 2}}{YA}}{B} + \frac{\overset{\text{Crop}}{\underset{\text{no. 3}}{YA}}{B} + \cdots n}{A + A + A + \cdots n} \times 100 = \frac{100 \ \Sigma(\frac{YA}{B})}{\Sigma A}$$

This formula gives equal weight to the relative yield on each acre of cropland regardless of the kind of crop grown. The relative yield of an acre of dry-land wheat for example would be given the same weight as that of an acre of onions, strawberries, or sugar beets. In order to take into account the differences in the relative intensity of crops grown, an additional weighting factor (W) representing the relative importance of one acre of each particular crop may be added so that the above formula becomes:

$$\frac{\overset{\text{Crop}}{\underset{\text{no. 1}}{YAW}}{B} + \frac{\overset{\text{Crop}}{\underset{\text{no. 2}}{YAW}}{B} + \frac{\overset{\text{Crop}}{\underset{\text{no. 3}}{YAW}}{B} + \cdots n}{AW + AW + AW + \cdots n} \times 100 \quad \text{or} \quad \frac{100 \ \Sigma(\frac{YAW}{B})}{\Sigma AW}$$

Now since W and B remain the same for any given crop, $\frac{W}{B}$ may be reduced to a constant K, and since YA (yield times acres) equals total production of any given crop the total production T, may be substituted for YA and the formula becomes:

$$\frac{100 \ \Sigma T_c K}{\Sigma AW}$$

The base yields (Y), weights (W) and constants (K) used in computing the weighted crop indexes used in this study are presented in table 1.

This weighted crop yield index furnishes a comparison of the yields of the particular crops grown on a farm or in an area with average yield of these same crops in the base period, each crop being weighted according to the number of acres grown and according to the weight assigned each crop.

Crop Intensity Index

Relative yield represents but one dimension of production. The intensity of production is quite as important. Since the weights (W) assigned to the various crops are measures of relative intensity of crop production, a crop-intensity index was computed by the formula[5]

$$\frac{100 \ \Sigma AW}{11.83 \ \Sigma A} \quad \text{or} \quad \frac{8.45 \ \Sigma AW}{\Sigma A}$$

Livestock Yield and Intensity

Livestock yield index was calculated by the same formula as the crop yield index except that the number of animal units (U)[6] is substituted for the number of acres (A) and (T_s) total production of livestock products is substituted for T_c, and K and W are constants bearing the same relation to animal units that K and W, given above, bear to crops.[7]

$$\frac{100 \ \Sigma T_s K}{\Sigma UW}$$

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5. The 11.83 in this formula is the average weight per acre of crop in the base period. In this study it is the sum of the products obtained by multiplying the average acreage of each crop grown in Utah for the period 1926-31 by the weight assigned to each crop divided by the average acreage of all crops included.

6. Bases used for calculating animal units are as follows:

Kind of animal	No. of A. U.	Kind of animal	No. of A. U.
Dairy cows	1.25	Sheep	.2
Dairy heifers over 1 year	.7	Lamb feeding (4 months)	.1
Dairy heifers under 1 year	.4	Horses	1.0
Dairy bulls	1.25	Colts	.5
Beef cows	1.0	Brood sows	.25
Beef heifers 1 year or more	.6	Other hogs	.15
Beef steers 1 year or more	.7	Hens	.01
Beef heifers and steers under 1 year	.4	Pullets raised	.003
Beef bulls	1.25	Male chickens	.01
Beef fattening (4¼ mo.)	.5	Turkeys	.015

7. State average turnoff from livestock, 1926-31, and weights and constants assigned to each class of livestock are as follows:

Kind of livestock or livestock products	Animal unit basis	Average turnoff per animal unit (1926-31)		Weight per animal unit	Constant
		unit	amount	(W)	(K)
Dairy cattle	All dairy cattle	Lbs.	178	6.5	.037
Beef cattle	All beef cattle	Lbs.	270	10.0	.037
Sheep	All sheep	Lbs.	171	7.5	.044
Hogs	All hogs	Lbs.	1,322	30.0	.023
Chickens	All chickens	Lbs.	239	10.0	.042
Turkeys	All turkeys	Lbs.	904	40.0	.044
Livestock products					
Butterfat	Dairy cows	Lbs.	165	28.0	.170
Wool	All sheep less feeders	Lbs.	42	6.0	.143
Eggs	Laying hens	Doz.	920	50.0	.054

Computed from data of U. S. Bur. of Agr. Econ., supplemented by other data.

Intensity indexes of livestock production were calculated from the crop intensity formula by substituting the number of animal units (U) for acres (A) using the livestock weights (W) and replacing 11.83 with the state average weight for livestock units which is 16.16.

Combined Yield Indexes

Combined yield index for crops and livestock was calculated by adding $\Sigma T_c K$ for crop to $\Sigma T_s K$ for livestock and dividing the sum by AW for crops plus UW for livestock.

$$\frac{100 \; \Sigma(T_c K + \Sigma T_s K)}{\Sigma AW + \Sigma UW}$$

Combined Intensity Indexes

These were computed as follows:

$$\frac{100 \; (\Sigma AW + \Sigma UW)}{11.83 \; \Sigma A + 16.16 \; \Sigma U} \qquad \frac{(8.453 \; \Sigma AW) + (6.188 \; \Sigma UW)}{\Sigma AW + \Sigma UW}$$

Size Index

A simple measure of size of farm such as crop acres, investment, number of man-work-units required to care for crops and livestock, or number of animals on farm is often inadequate for making comparison between farms where marked differences in crop and livestock enterprises prevail.

A size index weighted according to relative importance of enterprises was computed as follows:

$$\frac{100 \; (\Sigma AW + \Sigma UW)}{1116 \times \text{number of farms}} \qquad \text{or} \qquad \frac{.0896 \; (\Sigma AW + \Sigma UW)}{\text{Number of farms}}$$

The 1,116 in this case represents the average AW + UW per farm on Utah farms for the period 1926-31.

(7. continued)

Productive work units per head of various classes of livestock used as one factor in computing weights (W) for livestock are:

Kind	Man-work-units per head	Kind	Man-work-units per head
Dairy cows	16.0	Beef bulls	.8
Dairy heifers over 1 year	2.0	Beef fattening (4½ months)	1.2
Dairy heifers under 1 year	2.0	Sheep (farm flocks)	.6
Dairy bulls	5.0	Sheep (range)	.5
Beef cattle (farm)	2.0	Lamb fattening (4 months)	.15
Beef cows (range)	.8	Colts	3.0
Beef heifers—1 year or		Hogs	3.0
more	.8	Hens	.15
Steers—1 year or more	.8	Pullets raised	.05
Beef heifers and steers		Turkeys	.18
under 1 year	.8		

From unpublished data, Dept. of Agr. Econ., Utah Agr. Exp. Sta.

Production Index

Production index for crops and livestock combined may be computed for the formula:

$$\frac{100 \ (\Sigma T_c K + \Sigma T_s K)}{1116 \times \text{number of farms}}$$

The 1,116 in this case represents the average $T_c K + T_s K$ per farm on Utah farms for the period 1926-31.

Acreage of Crops Harvested

The acreage of harvested crops in Utah increased from 734,000 in 1899 to a high point of 1,225,000 in 1922. Since 1922, acreage has fluctuated considerably (table 2). From 1923 to 1933 acreage ranged from 90 to 106 percent of the 1926-31 average of 1,147,000 acres. Drought in 1934 reduced acreage to 973,000 or 85 percent of the above average.

Though there has been no definite trend in total acreage of cropped land harvested in Utah during the period 1917 through 1937, acreage during the last four years (1934-37) has averaged only 91 percent of the 1926-31 average.

Trends in acreage of individual crops vary. The trend of irrigated alfalfa was upward until 1932 (table 3). The drought of 1934 reduced acreage sharply. Since the early twenties wild hay harvested has decreased markedly. Winter wheat acreage fluctuated somewhat but increased generally until 1931, and though it decreased some during the drought period, the index in 1937 on a 1926-31 base was 109. Spring wheat acreage decreased considerably from 1918 to 1934 but has since increased. Barley acreage has increased relatively more during recent years than has any other major crop. The index in 1937 was 181. The index of sugar-beet acreage decreased from 230 in 1920 to 65 in 1934 but had recovered to 98 by 1937. Potato acreage has fluctuated considerably but the general trend has been downward. During recent years apple and peach acreage has decreased while the acreage of cherries and pears has increased.

Changes in the relative acreage of crops are presented in table 4. Comparing the average of the years 1921-25 with 1931-35 shows that the percentage of alfalfa acreage to total acreage of harvested crops in Utah increased from 34.95 to 44.36 percent; that for barley the acreage increased from 1.52 to 3.55 percent; winter wheat from 12.76 to 15.76; and onions from 0.03 to 0.09 percent. The percentage in sugar beets decreased from 7.26 to 4.49; spring wheat from 9.29 to 6.39; oats from 6.22 to 3.85; and potatoes from 1.40 to 1.29 percent.

Since the average value of produce from one acre differs greatly with the kind of crop produced, an index of acreage weighted by an intensity factor is of greater significance than an unweighted index.

Table 2. *Crops harvested in Utah, 1900-37*
(thousands of acres)

Year	Alfalfa *	Wild hay	Winter wheat	Spring wheat	Barley	Oats	Corn	Alfalfa seed	Sugar beets	Potatoes	Peas	Tomatoes (can.)	Onions	Apples **	Cherries **	Peaches **	Pears **	Strawberries	Total †
1899†† ..	218	71	50	139	8	43	12	......	8	10	......	......	.2	10	.7	2.7	2.1	.3	734
1909†† ..	234	68	95	83	27	81	7	......	27	14	......	1	......	7	.8	3.6	.7	.7	821
1918	335	96	160	160	32	90	24	12‡	82	20	5‡	5	.1	10	.6‡	3.7	.5	.4‡	1,173
1919	351	88	164	130	20	72	18	13‡	103	17	6‡	5	.1	10	.6‡	3.7	.5	.3‡	1,109
1920	362	107	146	127	19	77	24	15‡	113	16	6‡	4	.1	10	.6‡	3.7	.5	.3‡	1,128
1921	381	106	150	126	16	79	21	28‡	112	15	6‡	1	.1	10	.7‡	3.6	.5	.3‡	1,157
1922	393	112	159	135	18	86	32	35‡	73	21	7	4	.2	9	.7‡	3.6	.5	.5‡	1,225
1923	409	117	148	124	22	81	31	45‡	83	16	7	5	.4	9	.7‡	3.5	.5	.7‡	1,219
1924	401	70	133	68	14	55	15	62‡	80	14	10	5	.3	8	.8	3.5	.5	1.0	1,035
1925	422	77	145	88	18	60	18	69	69	15	11	7	.5	8	.8	3.5	.5	1.0	1,127
1926	420	75	149	88	20	54	18	71	51	17	10	3	.8	8	.9	3.4	.5	1.0	1,122
1927	424	77	152	90	30	51	19	72	55	22	8	5	.9	7	1.0	3.4	.5	1.3	1,150
1928	444	77	162	95	34	55	18	52	51	23	10	6	1.0	7	1.0	3.3	.6	1.4	1,132
1929	488	69	185	80	38	49	15	58	45	11	12	6	1.1	7	1.1	3.3	.6	1.5	1,151
1930	539	69	194	82	42	46	16	35	44	12	13	8	1.2	6	1.2	3.2	.6	1.5	1,192
1931	513	66	194	63	38	43	16	32	49	15	7	6	.8	6	1.2	3.2	.6	1.5	1,136
1932	567	70	184	76	44	54	20	15	56	15	6	3	1.0	6	1.3	3.1	.6	1.2	1,210
1933	555	63	180	74	37	50	21	22	74	14	9	4	.9	6	1.4	3.0	.7	1.5	1,198
1934	411	60	153	67	31	32	19	27	32	13	10	5	.8	6	1.3	3.0	.7	1.4	973
1935	416	59	159	71	45	36	22	31	41	14	14	6	1.2	5	1.5	2.9	.7	.9	1,010
1936	439	65	172	89	55	33	21	24	36	12	13	6	1.3	5	1.6	2.9	.7	1.1	1,072
1937	439	65	188	90	61	30	22	28	48	13	14	6	1.2	5	1.7	2.8	.8	1.4	1,106

Data for 1900 and 1910 computed from census; since 1918 from U. S. Dept. of Agr. Yearbooks, and Crops and Markets.

*Irrigated alfalfa acreage obtained by deducting estimated acreage of alfalfa seed and dry-land alfalfa from total acreage of alfalfa.

**Estimates based on number of trees at census dates.

†Data for years 1918 to 1929 obtained by dividing acreage of 19 crops by 88 and multiplying by 100. These 19 crops constituted 88 percent of all crops. Data for 1930 to 1933 calculated by assuming harvested acreage of about 50 crops constituted 98 percent of total acreage. Data, 1934-36, computed by assuming acreage of 44 crops equalled 96 percent of the total acreage. These percentage figures were computed from census data.

††Based on U. S. census data.

‡Estimated.

Table 3. *Index of acreage of crops harvested in Utah,* 1900-37*
(1926-31 = 100)

Year	Alfalfa	Wild Hay	Winter wheat	Spring wheat	Barley	Oats	Corn	Alfalfa seed	Sugar beets	Potatoes	Peas	Tomatoes (can.)	Onions	Apples	Cherries	Peaches	Pears	Straw-berries	Total
1899	46	99	29	167	24	87	71	......	16	60	......	....	21	146	66	82	371	22	64
1909	50	94	55	100	80	165	41	......	55	84	......	18	......	102	75	109	124	51	72
1918	71	133	93	193	95	181	141	22	167	120	50	88	10	146	56	112	88	29	94
1919	75	122	95	157	59	145	106	24	210	102	60	88	10	146	56	112	88	22	92
1920	77	149	84	153	56	155	141	28	230	96	60	71	10	146	56	112	88	22	98
1921	81	147	87	152	47	159	124	53	228	90	60	18	10	146	66	109	88	22	101
1922	84	156	92	163	53	173	188	66	148	126	70	71	21	132	66	109	88	37	107
1923	87	162	86	149	65	163	182	84	169	96	70	88	41	132	66	106	88	51	106
1924	85	97	77	82	42	111	88	116	163	84	100	88	31	117	75	106	88	73	90
1925	90	107	84	106	53	121	106	129	140	90	110	123	52	117	75	106	88	73	98
1926	89	104	86	106	59	109	106	133	104	102	100	53	83	117	84	103	88	73	98
1927	90	107	88	108	89	103	112	135	112	132	80	88	93	102	94	103	88	95	100
1928	94	107	94	114	101	111	106	98	104	138	100	106	103	102	94	100	106	102	99
1929	103	96	107	96	113	99	88	109	91	66	120	106	114	102	103	100	106	110	100
1930	114	96	112	99	125	93	94	66	89	72	130	141	124	88	112	97	106	110	104
1931	109	92	112	76	113	87	94	60	100	90	70	106	83	88	112	97	106	110	99
1932	121	97	107	92	131	109	118	28	114	90	60	53	103	88	122	94	106	88	105
1933	118	87	104	89	110	101	124	41	151	84	90	71	93	88	131	91	124	110	104
1934	87	83	89	81	92	64	112	51	65	78	100	88	83	88	122	91	124	102	85
1935	89	82	92	86	134	72	129	58	83	84	140	106	124	73	141	88	124	66	88
1936	93	90	100	107	163	66	124	45	73	72	130	106	134	73	150	88	124	80	93
1937	93	90	109	108	181	60	129	53	98	78	140	106	124	73	159	88	141	102	96

*Computed from data in table 2.

Table 4. *Acreage of various crops in percent of total crop acreage harvested in Utah, 1918-37*

Year	Alfalfa	Wild hay	Winter wheat	Spring wheat	Barley	Oats	Corn	Alfaifa seed	Sugar beets	Potatoes	Peas	Tomatoes (can.)	Onions	Apples	Cherries	Peaches	Pears	Straw-berries
1918	31.22	8.95	14.91	14.91	2.98	8.39	2.24	1.12	7.64	1.86	.47	.47	.01	.93	.06	.34	.05	.04
1919	33.33	8.36	15.57	12.35	1.90	6.84	1.71	1.23	9.78	1.61	.57	.47	.01	.95	.06	.35	.05	.03
1920	32.09	9.49	12.94	11.26	1.68	6.83	2.13	1.33	10.02	1.42	.53	.35	.01	.89	.05	.33	.04	.03
1921	32.93	9.16	12.96	10.89	1.38	6.83	1.82	2.42	9.68	1.30	.52	.09	.01	.86	.06	.31	.04	.03
1922	32.08	9.14	12.98	11.02	1.47	7.02	2.61	2.86	5.96	1.71	.57	.33	.02	.73	.06	.29	.04	.04
1923	33.55	9.60	12.14	10.17	1.80	6.64	2.54	3.69	6.81	1.31	.57	.41	.03	.74	.06	.29	.04	.06
1924	38.74	6.76	12.85	6.57	1.35	5.31	1.45	5.99	7.73	1.35	.97	.48	.03	.77	.08	.34	.05	.10
1925	37.44	6.83	12.87	7.81	1.60	5.32	1.60	6.12	6.12	1.33	.98	.62	.04	.71	.07	.34	.04	.09
1926	37.43	6.68	13.28	7.84	1.78	4.81	1.60	6.33	4.55	1.52	.89	.27	.07	.71	.08	.30	.04	.09
1927	36.87	6.70	13.22	7.83	2.61	4.43	1.65	6.26	4.78	1.91	.70	.43	.08	.61	.09	.30	.04	.11
1928	39.22	6.80	14.31	8.39	3.00	4.86	1.59	4.59	4.51	2.03	.88	.53	.09	.62	.09	.29	.05	.12
1929	41.96	5.99	16.07	6.95	3.30	4.26	1.30	5.04	3.91	.96	1.04	.52	.10	.61	.10	.29	.05	.13
1930	44.97	5.79	16.28	6.88	3.52	3.86	1.34	2.94	3.69	1.01	1.09	.67	.10	.50	.10	.27	.05	.13
1931	45.16	5.81	17.08	5.55	3.35	3.79	1.41	2.82	4.31	1.32	.62	.53	.07	.53	.11	.28	.05	.13
1932	46.86	5.79	15.21	6.28	3.64	4.46	1.65	1.24	4.63	1.24	.50	.25	.08	.50	.11	.26	.05	.10
1933	46.33	5.26	15.03	6.18	3.09	4.17	1.75	1.84	6.18	1.17	.75	.33	.08	.50	.12	.25	.06	.13
1934	42.24	6.17	15.72	6.89	3.19	3.29	1.95	2.77	3.29	1.34	1.03	.51	.08	.62	.13	.31	.07	.14
1935	41.19	5.84	15.74	7.03	4.46	3.56	2.18	3.07	4.06	1.39	1.39	.59	.12	.50	.15	.29	.07	.09
1936	40.95	6.06	16.04	8.30	5.13	3.08	1.96	2.24	3.36	1.12	1.21	.56	.12	.47	.15	.27	.07	.10
1937	39.69	5.88	17.00	8.14	5.52	2.71	1.99	2.53	4.34	1.18	1.27	.54	.11	.45	.15	.25	.07	.13
Average 1921-25	34.95	8.30	12.76	9.29	1.52	6.22	2.00	....	7.26	1.40	.....	.39	.03	.76	.....	.31	.04	.....
1926-30	40.09	6.39	14.63	7.58	2.84	4.44	1.50	5.03	4.29	1.49	.92	.48	.09	.61	.09	.29	.05	.12
1931-35	44.36	5.77	15.76	6.39	3.55	3.85	1.79	2.35	4.49	1.29	.86	.44	.09	.53	.12	.28	.06	.12

*Figures in this table computed from data in table 1.

From 1920 to 1926 the weighted index of crop acreage harvested in Utah decreased while that for the range states increased (table 5,

Table 5. *Weighted index of acreage of harvested crops**
(1926-31 = 100)

Year	Utah	Range states**	United States
1918	109	66	95
1919	109	70	93
1920	114	79	94
1921	113	75	88
1922	109	75	91
1923	112	81	94
1924	99	90	97
1925	103	86	101
1926	96	94	100
1927	101	92	95
1928	103	100	100
1929	98	104	101
1930	103	108	102
1931	99	102	100
1932	105	92	98
1933	109	95	90
1934	83	72	82
1935	89	89	88
1936	91	90	87
1937	97	...	...

*Indexes for U. S. and range states weighted by an intensity factor according to labor requirements; for Utah weighted by labor requirements and value of product per acre. Data for U. S. and range states from Bressler, Raymond G., Jr., and Hopkins, John A. Trends in size and production of the aggregate farm enterprise, 1909-36. W. P. A. Report no. A-6. Converted to 1926-31 base.
**Range states include Colorado, Nevada, New Mexico, Utah, and Wyoming.

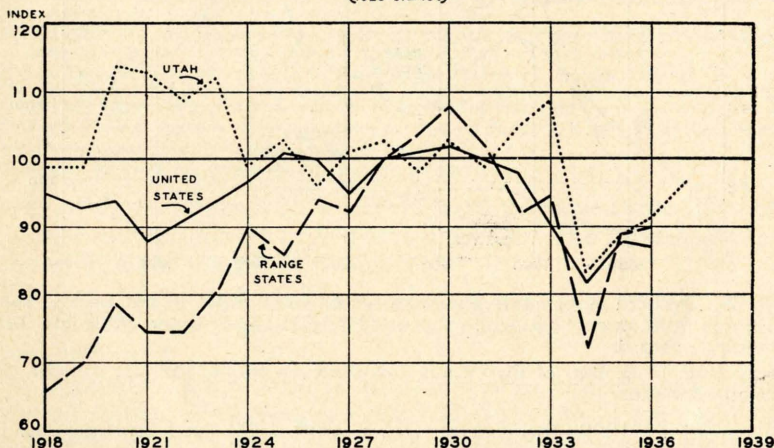TRENDS IN CROP ACREAGE HARVESTED

(1926-31 = 100)

Fig. 1. Although the weighted index of crop acreage harvested fluctuated considerably, the trend in Utah, in contrast to that for the other range states and United States, showed no increase during the twenties. Sharp reductions occurred after 1930.
Data from table 5.

fig. 1). During recent years changes in Utah and the other range states, Colorado, Nevada, New Mexico and Wyoming, have corresponded rather closely.

Numbers of Livestock

Numbers of horses and mules in Utah increased steadily until a total of 117,000 was reached in 1896, then decreased to 107,000 in 1905, and again increased to 142,000 by 1917 (fig. 2). From 1917 to 1937 the trend was sharply downward, which reduced the number to 84,000 in 1937, the lowest point in more than 50 years.[8] There was a slight increase in 1938.

Except for a slight decrease from 1918 to 1921, numbers of dairy cattle in Utah increased rather steadily until 1934, at which time there was a total of 172,000 head (table 6). Since 1934 the trend has been downward.

Numbers of cattle other than dairy move in long-time cyclical trends.[9] The trend was generally upward in Utah from the time of

TRENDS IN NUMBERS OF LIVESTOCK IN UTAH, 1870–1938
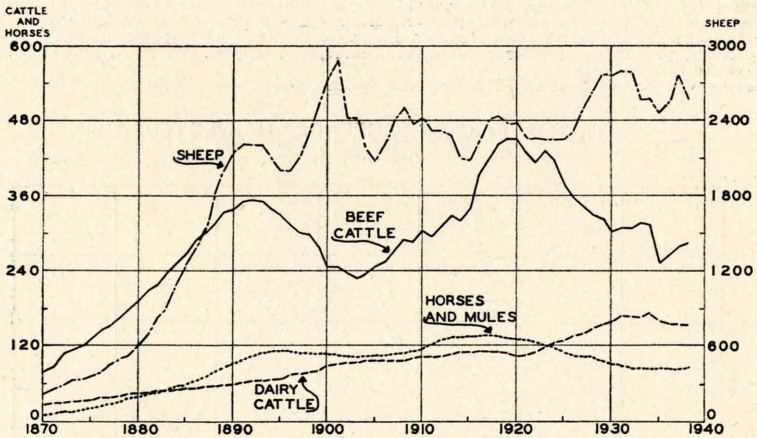
(IN 1,000 HEAD)

Fig. 2. Cyclical movements have characterized changes in numbers of sheep and beef cattle since 1890, while the trend in number of dairy cattle has been generally upward.
   Data from U. S. Bur. of Agr. Econ. Livestock on farms, January 1, 1867-1935. Revised estimates.

settlement to 1892, then downward until 1903 and again upward until a high point of 450,000 was reached in 1919.[10] Cattle numbers then decreased to 302,000 in 1930. The upward trend which began in 1930 was sharply interrupted by the drought of 1934 which had

8. Lowest since 1881.
9. The deterioration of ranges and supervision of grazing by federal authority may modify the cyclical movements in numbers of range cattle and sheep.
10. For numbers of cattle, sheep and hogs prior to 1920, see Livestock on farms, January 1, 1867-1935. Rev. estimates. U. S. Bur. of Agr. Econ. January 1938. mimeo.

reduced numbers by January 1, 1935, to the lowest point in two decades. Since 1935 there has been considerable increase but the total in 1938 was still below that of 1930. Numbers of sheep move in shorter cycles than numbers of cattle. Prior to 1890, there had been a continuous increase in the number of

Table 6. *Number of livestock on Utah farms on January 1, 1920-38**
(in thousands)

| Year | Horses and mules | Cattle | | Sheep† | Hogs | Chickens | Total productive animal units†† |
		Dairy cows and heifers**	Other cattle				
1920	135	107	449	2,464	99	956‡	974
1921	135	108	427	2,354	70	960‡	930
1922	132	113	412	2,347	80	970‡	926
1923	127	120	430	2,351	100	1,300‡	954
1924	122	126	414	2,354	90	1,436	949
1925	114	130	377	2,355	64	1,436	922
1926	110	136	354	2,472	60	1,510	930
1927	108	140	340	2,650	75	1,770	966
1928	105	148	327	2,730	90	1,950	991
1929	100	154	321	2,879	74	2,160	1,021
1930	95	159	302	2,890	70	2,550	1,016
1931	94	168	307	2,935	64	3,036	1,037
1932	89	168	307	2,845	67	2,795	1,026
1933	88	166	314	2,650	70	2,390	986
1934	87	172	312	2,645	68	2,669	993
1935	87	160	251	2,535	47	2,210	897
1936	86	157	262	2,523	52	2,257	918
1937	84	156	276	2,746	60	2,541	943
1938	85	154	282	2,568	71	2,458	916

Source of data, U. S. Bur. of Agr. Econ. Crops and Markets.
*For numbers of cattle, sheep and hogs prior to 1920 see U. S. Bur. of Agr. Econ. Livestock on farms, January 1, 1867-1935. Revised estimates. January, 1938. mimeo.
**For numbers of dairy cattle see U. S. Dept. of Agr. Livestock reports. mimeo.
For years for which there were no data on numbers of young dairy stock, it is estimated that young stock were equal in number to 50 percent of dairy cows.
†Numbers of sheep include sheep and lambs on feed on January 1, as well as stock sheep.
††For bases of conversion to animal units see footnote 6, p. 7.
‡Estimated by Professor Byron Alder, Utah State Agricultural College.

sheep in Utah. Since 1890, numbers have increased and decreased in cycles varying from 8 to 13 years in length. The most recent high point in number was 2,935,000 in 1931.

Chickens increased rapidly in Utah during the decade prior to 1930. In 1931 a peak of 3,036,000 was reached. Since then numbers have fluctuated.

By converting each class of farm animal to animal units a series showing trends in all livestock combined may be computed. Total productive animal units[11] on Utah farms and ranges for the period 1926-31 averaged slightly less than one million. In contrast to trends in crop acreage the weighted index of livestock numbers in Utah increased considerably from 1920 to 1931 while numbers in the United States and in the range states showed no increase (table 7, fig. 3).

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11. Animal unit is a common measure for combining numbers of various kinds of livestock. One mature range cow equals one animal unit and other livestock are equated to this. Work horses and mules are not included in productive animal units.

TRENDS IN LIVESTOCK NUMBERS
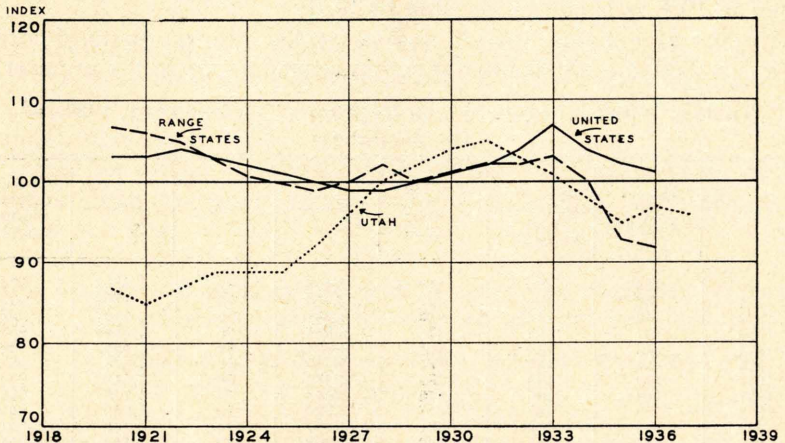
(1926 - 31 = 100)

Fig. 3. The weighted index of numbers of livestock (including poultry) in Utah was upward from 1921 to 1931. After 1931 a considerable decrease occurred. Data from table 7.

Table 7. *Weighted indexes of livestock numbers* (1926-31 = 100) *

Year	Utah	Range states**	United States
1920	87	107	103
1921	85	106	103
1922	87	105	104
1923	89	103	103
1924	89	101	102
1925	89	100	101
1926	92	99	100
1927	96	100	99
1928	100	102	99
1929	102	100	100
1930	104	101	101
1931	105	102	102
1932	103	102	104
1933	101	103	107
1934	98	100	104
1935	95	93	102
1936	97	92	101
1937	96		

*Indexes for U. S. and range states weighted by an intensity factor according to labor requirements; for Utah weighted by labor requirements and value of product per acre. Data for U. S. and range states from Bressler, Raymond G., Jr., and Hopkins, John A. Trends in size and production of the aggregate farm enterprise, 1909-36. W.P.A. Report no. A-6. Converted to 1926-31 base.
**Range states include Colorado, Nevada, New Mexico, Utah, and Wyoming.

Trends in Intensity of Production

Since the amount of labor and other factors per acre required to produce various crops and the value of products per acre differs widely among crops, shifts in the kinds of crops produced usually effect changes in intensity of crop production. A similar situation

exists with respect to livestock. In order to measure these changes, series of intensity indexes were computed (table 8).[12] These indexes measure the relative intensity of production for a group of crop or livestock enterprises or for both combined.

Table 8. *Indexes of intensity of production for State of Utah,* 1900-37 (1926-31 = 100)

Year	Crops	Livestock	Combined crops and livestock
1899*	101	92	96
1909*	101	93	97
1918	113	..	...
1919	116	..	...
1920	117	91	103
1921	114	92	102
1922	107	93	100
1923	108	94	101
1924	108	95	101
1925	104	96	100
1926	100	97	98
1927	102	99	100
1928	103	100	101
1929	98	101	99
1930	100	102	101
1931	100	102	101
1932	102	102	102
1933	106	103	104
1934	101	104	102
1935	104	105	105
1936	102	105	103
1937	104	103	104

*Computed from census data adjusted so as to be comparable with data for other years. Indexes for other years based on U. S. Dept. of Agr. data.
..Complete data not available.

The intensity of crop production in 1899 was the same as in 1909 but the next decade experienced a marked increase, the index rising from 101 to 116. Following 1920 intensity decreased until the index stood at 98 in 1929 (fig. 4). Since 1930 the intensity index, while showing some variation has remained slightly above 100. Decreased acreage of sugar beets, potatoes, and apples has been the principal factor in decreased intensity since 1920.

Intensity in livestock production showed little change from 1900 to 1920. From 1920 to 1934 the trend was definitely upward. This upward trend was largely the result of increased number of dairy stock and poultry.

Exceptionally great turkey numbers was a factor in the high intensity index for 1936. The combined intensity index shows some increase from 1910 to 1920. Since 1920 there has been no consistent trend. During the decade between 1920 and 1930 the increase in intensity of livestock production was offset by the decrease in intensity of crop production. Since 1930 the index has continued slightly above

12. Intensity indexes show the relative intensity of crop or livestock enterprises as compared with the intensity during the base period—in this case 1926-31. The measure of intensity used for crops is largely a combination of the labor required to produce crops and the value of crops per acre. For livestock the measure is a combination of labor required to care for one animal unit of livestock and the value of animal products obtained from one animal unit.

100, the last five years having an average of 104, which suggests that this may mark the beginning of an increased trend in intensity of production on Utah farms.

TRENDS IN INTENSITY OF CROP AND LIVESTOCK
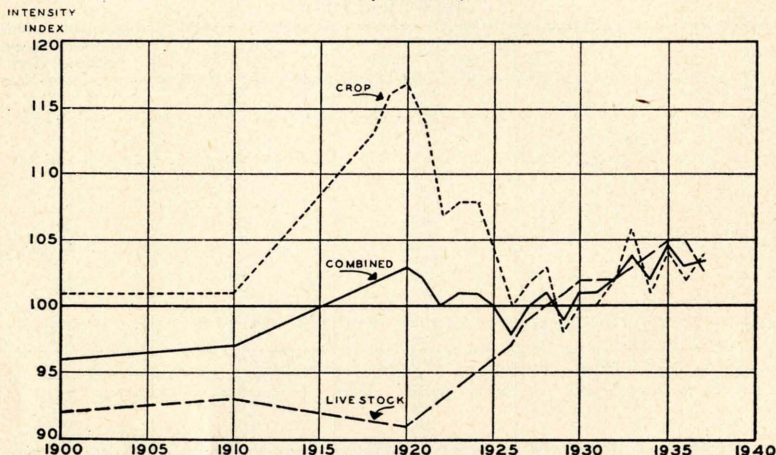PRODUCTION IN UTAH
(1926-31 = 100)

Fig. 4. Intensity of crop production increased sharply from 1910 to 1920, but lost all of the increase during the next ten years. Intensity of livestock production has been generally upward since 1920.
Data from table 8.

Trends in Yield

Since crops are directly affected by many natural influences which differ rather widely from year to year, considerable variation in crop yield occurs. Yields of important crops in Utah over a series of years are presented in table 9. The amount of variation is not the same for all crops. Relative yields readily show the degree of variation among crops (table 10). Variation is greatest among fruit crops but each crop has shown rather marked differences in yield from year to year.

Crop Yields

Crop yields increased greatly from 1890, the first year for which data are available, until the early part of the present century (table 11). Since then there have been wide fluctuations but no definite long-time trend. The highest point reached was in 1925 when the yield index was 138 and the lowest point during this century was 60, in 1934.

Probably the greatest single factor affecting crop yields in Utah is the water supply available for plant growth. Although this sup-

Table 9. *Average yields per harvested acre of various crops, State of Utah, 1917-37*

Year	Alfalfa*	Wild hay	Winter wheat (dry)	Spring wheat (irr.)	Barley	Oats	Corn	Alfalfa seed	Sugar beets	Potatoes	Peas	Tomatoes (can.)	Onions	Apples	Cherries	Peaches	Pears	Strawberries
	tons	tons	bu.	bu.	bu.	bu.	bu.	bu.	tons	bu.	tons	tons	cwt.	bu.	tons	bu.	bu.	10-lb. crts.
1917	3.3	1.7	20	25	37	44	25	......	9.5	189	......	9.0	228	96	......	371	87	......
1918	2.6	1.1	17	24	35	45	28	......	12.2	180	......	11.2	291	80	......	285	97	......
1919	2.2	1.1	11	14	30	34	18	4.5	9.9	141	......	8.5	285	75	......	240	152	......
1920	2.9	1.2	16	24	31	34	22	4.9	12.3	189	......	9.6	276	102	......	127	183	......
1921	2.8	1.1	20	26	32	36	25	5.0	10.3	161	......	12.3	252	105	......	210	169	......
1922	3.1	1.4	14	26	35	39	24	5.6	11.2	197	1.4	10.0	228	115	......	247	204	......
1923	3.0	1.5	20	29	41	38	25	4.7	13.0	168	1.5	8.8	215	125	......	226	133	......
1924	2.3	1.1	13	23	28	33	20	5.3	7.0	137	1.2	6.4	264	71	5.0	214	145	254
1925	3.9	1.7	22	33	43	47	24	6.4	15.4	160	1.6	18.0	376	163	6.7	29	51	209
1926	3.6	1.3	21	27	40	40	24	4.1	8.1	145	1.3	7.0	256	107	5.9	161	157	360
1927	3.0	1.3	19	31	47	42	27	3.7	12.3	135	1.2	9.3	228	90	3.9	167	113	294
1928	2.7	1.3	23	33	49	45	29	2.1	12.5	144	1.3	11.6	296	126	4.5	184	157	304
1929	2.3	1.2	16	29	38	38	31	1.4	12.6	185	1.1	9.2	246	92	2.9	184	137	253
1930	2.2	1.0	22	32	43	38	31	1.2	12.6	180	1.4	6.8	189	180	3.0	115	159	253
1931	1.4	1.1	14	25	32	30	20	1.8	10.3	130	1.0	8.3	234	64	1.9	174	79	143
1932	2.0	1.1	17	29	39	34	27	1.2	15.1	150	1.1	8.2	285	152	3.2	241	118	300
1933	2.0	1.1	13	24	31	31	23	1.5	12.3	150	1.0	8.6	215	53	2.2	20	71	223
1934	1.1	.7	10	23	27	26	16	2.2	7.8	80	1.0	4.9	295	97	2.9	187	77	109
1935	2.1	1.1	19	31	38	38	14	2.5	12.3	146	1.7	5.1	229	99	2.3	232	69	200
1936	2.4	1.1	13	27	37	36	25	2.2	13.9	152	.9	8.6	280	102	2.1	192	172	180
1937	2.4	1.1	15	29	39	38	27	2.3	12.7	164	1.3	8.3	240	98	1.3	26	85	234

Basic data from U. S. Dept. of Agr. Yearbook and Crops and Markets.

*Alfalfa on irrigated land exclusive of acreage with seed crop.

Table 10. *Relative yields of crops in State of Utah, 1917-37*
(In percentage of 1926-31 average yield)

Year	Alfalfa	Wild hay	Winter wheat (dry)	Spring wheat (irr.)	Barley	Oats	Corn	Alfalfa seed	Sugar beets	Potatoes	Peas	Tomatoes (can.)	Onions	Apples	Cherries	Peaches	Pears	Strawberries
1917	132	142	105	83	90	113	93	....	83	126	....	103	97	87	....	225	65	....
1918	104	92	89	80	85	115	104	....	107	120	....	129	124	73	....	173	73	....
1919	88	92	58	37	73	87	67	188	87	94	....	98	121	68	....	145	114	....
1920	116	92	84	53	76	87	81	204	108	126	....	110	117	93	....	77	138	....
1921	112	92	105	67	78	92	93	208	90	107	....	141	107	95	....	127	127	....
1922	124	117	74	47	85	100	89	233	98	131	117	115	97	105	....	150	153	....
1923	120	125	105	67	100	97	93	196	114	112	125	101	91	114	....	137	100	....
1924	92	92	68	43	68	85	74	221	61	91	100	74	112	65	139	130	109	98
1925	156	142	116	73	105	121	89	267	135	107	133	207	160	148	186	18	38	80
1926	144	108	111	90	98	103	89	171	71	97	108	80	109	97	164	98	118	138
1927	120	108	100	103	115	108	100	154	108	90	100	107	97	82	108	101	85	113
1928	108	108	121	110	120	115	107	88	110	96	108	133	126	115	125	112	118	117
1929	92	100	84	97	93	97	115	58	111	123	92	106	104	84	81	112	103	97
1930	88	83	116	107	105	97	115	50	111	120	117	78	80	164	83	70	120	97
1931	56	92	74	83	78	77	74	75	90	87	83	95	99	58	53	105	59	55
1932	80	92	89	97	95	87	100	50	132	100	92	94	121	138	89	146	89	115
1933	80	92	68	80	76	79	85	62	108	100	83	99	91	48	61	12	53	86
1934	44	58	53	77	66	67	59	92	68	53	83	56	125	88	81	113	58	42
1935	84	92	100	103	93	97	52	104	108	97	142	59	97	90	64	141	52	77
1936	96	92	68	90	90	92	93	92	122	101	75	99	119	93	58	117	129	69
1937	96	92	79	97	95	97	100	96	111	109	108	95	102	89	36	16	64	90

Weighted average 1926-31=100.
Based on data in table 9.

ply is influenced by ground and artificial storage, the supply is largely dependent on precipitation during the current year.

Table 11. *Indexes of crop yield and precipitation, Utah 1890-37*

Year	Crop yield*	Precipitation**	Five year moving average Crop yield	Five year moving average Precipitation
	index	inches	index	index	index
1890	52	18.25	114	...	88
1891	54	12.24	76	...	94
1892	50	14.85	93	58	96
1893	56	16.25	101	64	90
1894	80	15.70	98	71	97
1895	82	12.87	80	77	99
1896	88	17.73	111	84	99
1897	81	16.90	105	85	101
1898	90	16.19	101	86	100
1899	84	17.54	109	85	99
1900	87	11.52	72	87	93
1901	83	17.35	108	90	89
1902	93	12.01	75	97	91
1903	102	13.37	83	105	92
1904	119	18.48	115	111	95
1905	128	12.56	78	109	106
1906	115	20.11	125	109	111
1907	79	20.29	127	109	114
1908	106	17.64	110	106	113
1909	119	21.22	132	105	106
1910	114	11.36	71	112	104
1911	108	14.76	92	113	105
1912	116	18.65	116	112	101
1913	107	18.33	114	111	103
1914	115	17.95	112	110	103
1915	106	13.10	82	108	102
1916	104	14.48	90	107	96
1917	107	17.80	111	100	89
1918	101	13.47	84	100	97
1919	82	12.47	78	99	101
1920	104	19.62	122	100	104
1921	101	17.80	111	102	112
1922	110	19.83	124	103	112
1923	113	20.32	127	109	113
1924	85	12.41	77	112	109
1925	138	20.28	127	112	106
1926	112	14.51	91	111	101
1927	110	17.79	111	113	104
1928	110	15.61	97	106	96
1929	97	14.88	93	98	93
1930	99	14.28	89	95	91
1931	72	12.33	77	90	88
1932	97	15.72	98	83	81
1933	85	13.07	82	81	84
1934	60	9.35	58	86	88
1935	92	16.60	104	86	87
1936	95	15.58	97	...	...
1937	96	15.40	96	...	...

*State average 1926-31=100.
**Precipitation for crop year September to August. Mean precipitation of 16.03 inches for 1875-1936=100. Data from U. S. Weather Bur. Annual meteorological summary, 1936.

Five-year moving averages of crop yields and precipitation indexes as presented in table 11 are shown graphically in fig. 5. There is a marked tendency for crop yields to increase and decrease with corresponding movements in annual precipitation. The year to year variation of yield and precipitation since 1917 is shown in fig. 6. Precipitation has been equal to normal in but one year since 1927. Since 1929 yields have continued below the 1926-31 average. The decade 1920-29 had relatively high yields, the average for the 10-year period being 108. The period following 1929 (1930-37) had an

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average of only 87, which was 21 points below that of the previous decade.

RELATION OF CROP YIELD TO PRECIPITATION
IN UTAH, 1885–1935
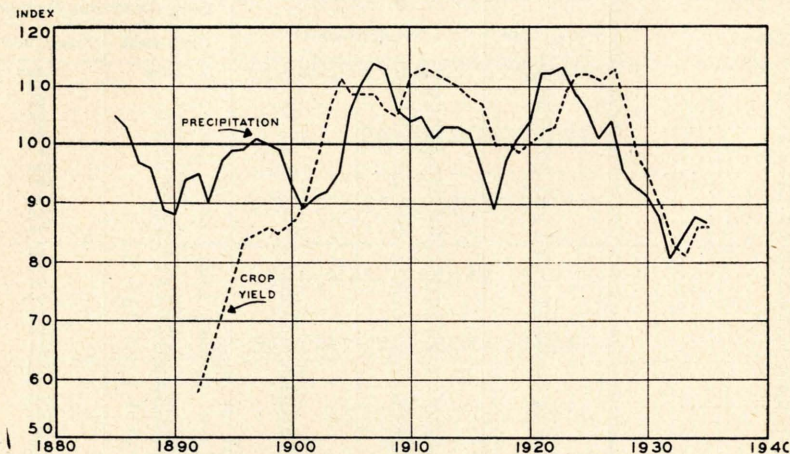(5-YEAR MOVING AVERAGE OF INDEXES)

Fig. 5. Since 1900 there have been two complete cycles of precipitation in Utah. There was a marked tendency for changes in crop yield to follow changes in precipitation.
Data from table 11.

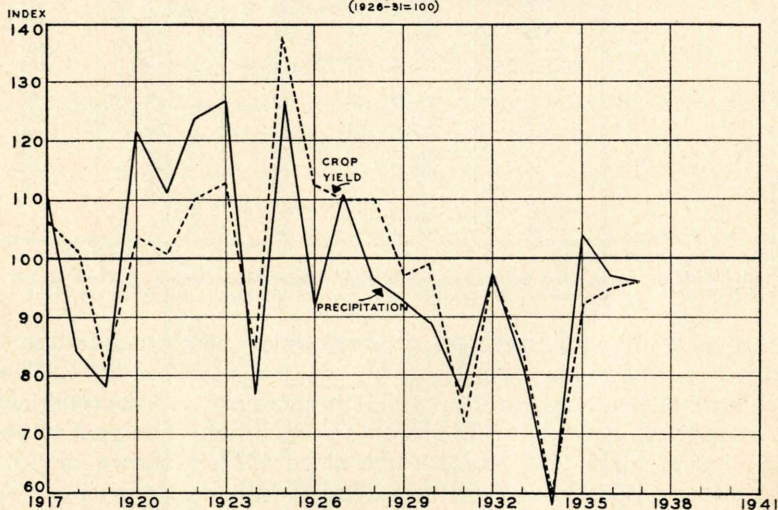ANNUAL INDEXES OF CROP YIELD AND PRECIPITATION
IN UTAH, 1917–1937
(1926-31=100)

Fig. 6. Yearly fluctuations in crop yield in Utah have been closely associated with changes in annual precipitation.
Data from table 11.

Livestock Yields

Data on livestock production or yields are available in fairly satisfactory form since 1924. Yields of the more important livestock products for years 1924 to 1937 and the average for the 6-year period 1926-31 are presented in table 12. The relative variation from

Table 12. *Net production or yield of various livestock products in Utah,*
1924-37*

Year	Eggs per hen**	Butterfat per dairy cow**	Wool per stock sheep†	Beef (inc. veal) per head of cattle**	Mutton per sheep**	Pork per hog**
	number	pounds	pounds	pounds	pounds	pounds
Average 1926-31	104	210.5	8.5	205	33.3	223
1924	82	188	8.0	223	32	195
1925	92	194	8.2	206	35	221
1926	95	207	8.7	204	40	243
1927	96	208	8.4	208	34	228
1928	99	220	8.8	209	36	222
1929	104	215	7.5	212	29	213
1930	108	208	8.9	201	32	214
1931	121	205	8.7	197	29	217
1932	116	201	6.8	185	15	184
1933	109	201	7.8	202	21	165
1934	118	189	8.1	183	27	167
1935	121	198	7.8	213	26	172
1936	120††	196‡	8.1	201	29	165
1937	122††	196‡	7.8	200	28	180

*These yields are computed on the basis of number of animals on January 1. They will, therefore, differ somewhat from such figures as average weight of fleece which is computed on basis of sheep shorn rather than on numbers as of January 1.
**Numbers were obtained by averaging the opening and closing inventory number for the year as reported from the revised estimates of the U. S. Bur. of Agr. Econ.
Yield figures were obtained from the following sources:
For eggs and milk, U. S. Dept. of Agr. Yearbooks.
For wool, U. S. Bur. of Agr. Econ. Wool production 1937. mimeo.
For beef, mutton, and pork, U. S. Bur. of Agr. Econ. Farm production and income from meat animals 1924-35, and 1936-37.
†Based on number of stock sheep on hand at beginning of each year. U. S. Bur. of Agr. Econ. estimates.
††Yield estimated from information on record keeping projects conducted by Poultry Dept., Utah St. Agr. Coll.
‡Yield estimated on basis 1933-35 average.

year to year may be more conveniently seen from the yield indexes in table 13. Although indexes for years 1899, 1909, and 1919 are not

Table 13. *Indexes of livestock production, Utah 1899-37*
(1926-31 = 100)

Year	Egg production per laying hen	Butterfat per cow	Wool per stock sheep	Beef per head all cattle	Mutton per sheep	Pork per hog
1899	76	66	75	...	...	...
1909	85	60	95	...	...	...
1919	75	55	92	...	...	...
1924	79	89	94	109	96	87
1925	88	94	96	100	105	99
1926	91	98	102	100	120	109
1927	92	99	99	101	102	102
1928	95	105	104	102	108	100
1929	100	102	88	103	87	96
1930	104	99	105	98	96	96
1931	116	97	102	96	87	97
1932	112	95	80	90	45	83
1933	105	95	92	99	63	74
1934	113	90	95	89	81	75
1935	116	94	92	104	78	77
1936	115	93	95	98	87	74
1937	117	93	92	98	84	81

Indexes for years 1899, 1909, and 1919 were computed from census data. Those for other years were computed from data in table 12.

entirely comparable with data for subsequent years, they are sufficiently so to indicate broad trends.

Livestock yields, although varying less from year to year than crop yields, still show considerable fluctuation. Egg production per hen showed little change until the early twenties. Since then, there has been a marked increase in number of eggs per hen. Production of butterfat per cow has also shown a definite increase during the decade of the twenties. Wool per sheep has shown some increase but this has been less marked. Data on net production of meat are available only since 1924. Mutton per head of sheep has shown more variation than meat per head of cattle or pork per hog, the yield index ranging from 120 in 1926 to 45 in 1932.

Variations in yields of individual crops and livestock enterprises tend, to some extent, to offset each other but there are, nevertheless, distinct trends in combined crop and livestock yields.

Indexes of beef production ranged from 109 to 89 and those of pork production from 109 to 74.

Livestock yields as already indicated, increased considerably during the twenties (fig. 7). The late twenties appears to have been the period of highest yield for livestock (table 14). The period after 1930

TRENDS IN YIELD OF CROPS AND LIVESTOCK
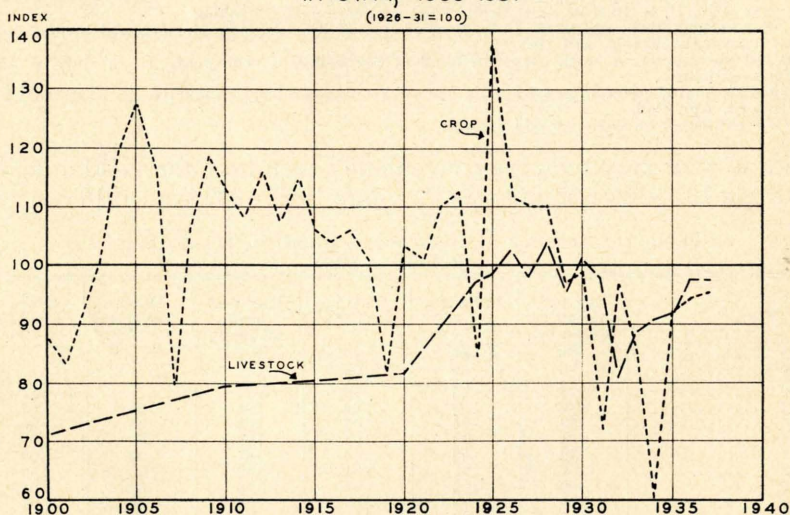IN UTAH, 1900-1937
(1926-31 = 100)

Fig. 7. Crop yield in Utah since 1900 shows great yearly fluctuation but no definite trend. The general trend in livestock yield has been upward. Data from tables 11 and 14.

experienced some decline, but by 1937 the index was within two points of the 1926-31 average.

The highest combined yield for both crops and livestock was in 1925 when the index reached 118. Since 1930, the combined yield

Table 14. *Yield indexes for State of Utah, 1900-37*
(1926-31 = 100)

Year	Crop yield*	Livestock yield	Combined yield
1899	85**	71†	79
1909	105**	79†	95
1917	107	...	...
1918	101	...	...
1919	82	81†	...
1920	104	...	...
1921	101	...	...
1922	110	...	...
1923	113	...	...
1924	85	97	91
1925	138	98	118
1926	112	103	107
1927	110	98	104
1928	110	104	106
1929	97	96	97
1930	99	101	100
1931	72	98	86
1932	97	81	88
1933	85	89	87
1934	60	91	78
1935	92	92	92
1936	95	98	97
1937	96	98	97

*Based on 24 most important crops.
**For years 1899 and 1909 the index is a 5-year average, centering around these years. Indexes computed from census data for 1899 and 1909 are not substantially different from these indexes.
†Livestock yields based on census data and assuming yields of beef, pork, and mutton to be equal to 1926-31 average.
..Data not available.

index has remained below 100, but there has been an increase during the last three years.

Table 15. *Production indexes for crops and livestock, Utah, range states, and United States, 1924-37**
(1926-31 = 100)

Year	Crop production	Livestock production	Combined production		
	Utah	Utah	Utah	Range states	United States
1924	83	86	85	84	92
1925	142	87	113	91	98
1926	107	95	101	93	101
1927	111	95	102	96	96
1928	113	104	108	100	100
1929	96	98	97	103	100
1930	102	105	104	111	97
1931	71	103	88	97	106
1932	102	83	92	88	100
1933	93	91	92	94	95
1934	50	89	71	77	80
1935	82	87	85	90	94
1936	87	96	92	93	88
1937	93	94	94	...	...

*See footnotes table 5.

Trends in Total Production

The discussion to this point has presented trends in (1) acres harvested and numbers of livestock (2) intensity of crop and livestock production, and (3) crop and livestock yields. Total production for

a state or a farm is influenced by all of these factors. In the production indexes presented in table 15, the effect of numbers, intensity and yield are combined in one figure.

Table 16. *Indexes of farm prices and of cash income for Utah and United States, 1924-37*
(1926-31 = 100)

Year	Utah indexes of prices of farm products*			Cash income from crop and livestock production**		
	Crops	Livestock	Crop and livestock	Utah		United States
	index	*index*	*index*	*1000 dollars*	*index*	*index*
1924	106	104	105	50,836	97	108
1925	120	114	116	63,757	122	113
1926	106	109	108	54,331	104	109
1927	106	107	107	56,184	107	111
1928	106	115	112	62,519	119	112
1929	108	116	113	58,283	111	114
1930	96	88	91	48,605	93	89
1931	77	64	69	34,644	66	65
1932	66	48	55	25,602	49	49
1933	61	51	55	27,256	52	57
1934	78	60	67	29,241	56	63
1935	85	74	78	34,628	66	75
1936	85	84	84	41,300	79	85
1937	99	90	93	46,250	88	91

*Data from Thomas, W. Preston. Prices of farm products in Utah. Utah Agr. Exp. Sta. Bul. 217. 1930.
**Data from U. S. Bur. of Agr. Econ. Crop Reporting Board.

Total production varies more widely than numbers, intensity or yield, because some conditions affect various factors in the same direction, and production registers the combined effect. An abundant water supply tends to increase acreage harvested because more acres of crops are likely to be planted and fewer abandoned. It also increases yield. A combination of very good yield and fairly large acreage in Utah in 1925 resulted in a crop production index of 142, the highest point reached from 1924 to 1937, while poor yield and low acreage in 1934 reduced the crop production index to 50. The crop production index for the 7-year period 1931-37 averaged 83 as compared with 108 for the previous 7 years.

Year to year variations in Utah livestock, both with respect to numbers and yield, are less than for crops, so that livestock production likewise experiences less fluctuation than crop production. The range of variation in livestock production indexes was from 105 in 1930 to 83 in 1932, the low production in 1932 being greatly influenced by heavy loss of sheep and lambs on the winter and spring ranges. The livestock production index for the past 7 years averaged 92 as compared with 96 for the next preceding 7 years. Since 1924 the combined production index ranged from 113 in 1925 to 71 in 1934. The average for the 7-year period 1931-37 was 88 as compared with 101 for the preceding 7 years.

Indexes of total production in Utah were usually above those of

the range states and United States from 1924 to 1930, but have been slightly below these since 1930 (fig. 8).
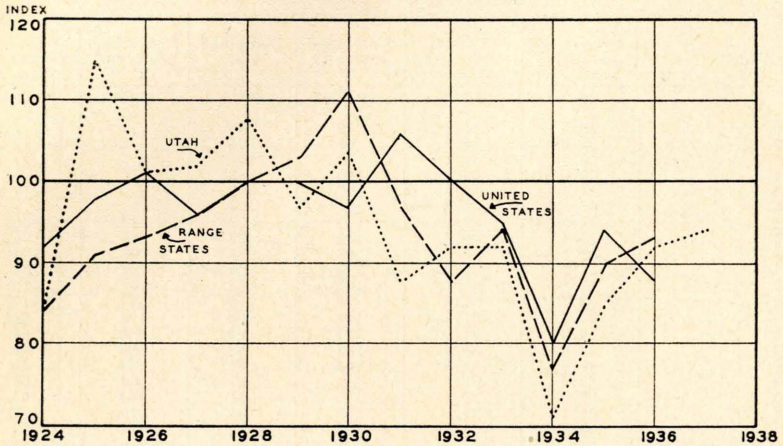
TRENDS IN TOTAL FARM PRODUCTION

(1926-31 = 100)

Fig. 8. Total farm production since 1930 has been below that of the 1924-30 period.
Data from table 15.

Trends in Prices and Income

Along with decreased production, after 1930, farmers experienced a drastic decline in farm prices (table 16). By 1932 the farm price of crops had decreased to 66 percent, and of livestock to 48 percent of the 1926-31 average. Since the amount of production had also decreased cash income had decreased more than prices, going from an average of $52,428 for 1926-31 to $25,602 in 1932, a decrease of 51 percent. The percentage decrease in cash income from farms in the United States was also 51 but following 1932 farm income increased more rapidly in United States than in Utah. By 1935 cash farm income in Utah was two-thirds of the 1926-31 average as compared with three-fourths for United States. In 1937 Utah's farm income was 88 percent and United States farm income 91 percent of the 1926-31 average. Cash income for 1931-37 in Utah averaged 60 percent of the income during the 7 preceding years.

Trends in Size of Farm

Traditionally, size of farm has been measured in terms of area. Because of wide variation in the productivity of land, acreage as a measure of economic size of farm in Utah is of slight significance. Acres of harvested crops is a better measure. Acres of crops harvested per farm increased from 35.3 in 1910 to 47.5 in 1922 (table

17). Since then the trend has been downward so that by 1937 the average per farm was 34.4 acres.

Table 17.   *Trends in average size of farm in Utah, 1900-37*
(For index figures 1926-31 = 100)

Year	Crop acres harvested per farm*	Animal units per farm*	Combined intensity	Combined size	Production per farm*	Cash income per farm**
	acres	A. U.	index	index	index	index
1900	35.5	43.8	96	99	...	...
1910	35.3	39.2	97	93	...	...
1920	44.0	37.1	103	104	...	...
1921	45.0	36.1	102	102	...	...
1922	47.5	36.4	100	102	...	...
1923	47.1	36.8	101	104	...	...
1924	39.9	36.1	101	97	88	100
1925	43.4	35.6	100	99	116	125
1926	42.8	36.2	98	96	103	106
1927	43.5	37.0	100	100	104	108
1928	41.9	37.7	101	102	109	120
1929	42.7	37.8	99	100	97	111
1930	43.9	37.8	101	103	103	91
1931	40.8	37.0	101	99	85	64
1932	42.3	35.2	102	98	86	46
1933	40.9	33.8	104	96	84	48
1934	32.4	31.5	102	81	64	50
1935	32.9	29.6	105	81	74	58
1936	34.1	29.6	103	81	79	67
1937	34.4	28.9	104	81	78	74

*In calculating average per farm, the number of farms reported by census were used. For other than census years straight interpolations between numbers at census dates were used.
**Average cash income for 1926-31 was $1,956.00.

Another measure of size is the number of livestock per farm. The trend in livestock numbers per farm in terms of animal units has been downward since 1900. From an average of 43.8 in 1900, animal units per farm decreased to 28.9 in 1937. Neither acres harvested nor number of animal units takes into account the effect of relative intensity of crop and livestock enterprises.

The combined size index,[13] which takes into account not only acres of cropland harvested and number of animal units but also differences in intensity among these, furnishes a more satisfactory measure of size of farm, (fig. 9).

The combined size index for Utah farms decreased from 99 in 1900 to 93 in 1910 and then increased to 104 in 1920. This increase was the result of increased crop acres and increased intensity of production which was only partially offset by the decrease in animal units. From 1920 to the present the trend has been distinctly downward. Decreases in acreage and in animal units per farm have been only partially offset by the slight increase in intensity of production. The change from 104 in 1920 to 81 in 1937 shows a reduction in size of farm of nearly one-fourth during this period of 17 years.

13. The size index combined number of crop acres harvested and the number of animal units of productive livestock. Each acre and animal unit is weighted according to the relative intensity of the enterprise.

The index of production per farm takes into account both .size and yield. Production indexes per farm have decreased even more rapidly than size. From a high of 116 in 1925 the index decreased

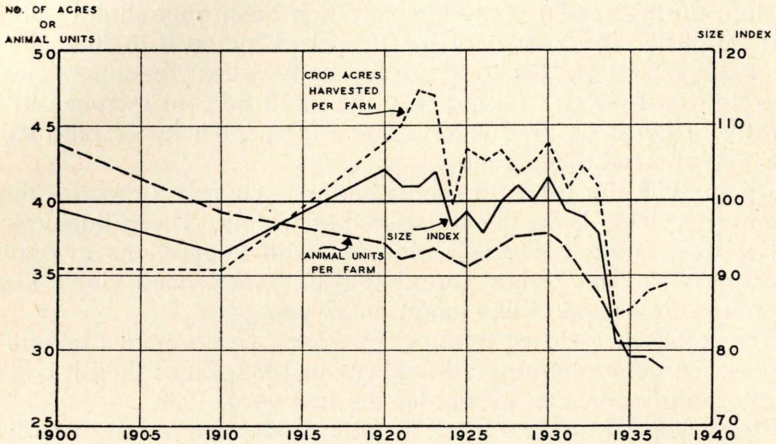TREND IN SIZE OF FARM IN UTAH, 1900-1938

(1926-31 = 100)

Fig. 9. The weighted index of size of farm in Utah decreased from 1900 to 1910, increased from 1910 to 1920, showed little change from 1920 to 1930 and then decreased sharply.
Data from table 17.

to a low of 64 in 1934. Although production per farm has increased some since 1934, the long-time trend appears to be distinctly downward. This downward trend is to a considerable extent the result of increased number of farms in Utah with no increase—in fact some decrease—in resources used for agricultural production. During the 7 relatively good years, 1924-30, the production index per farm averaged 103 as compared with 79 during the 7-year period, 1931-37.

Because of lower prices of farm products cash income per farm has declined more than farm production, reaching in 1932 a low of 46 percent of the 1926-31 average. For the 7 good years cash income was 109 percent of the 1926-31 average as compared with 58 percent for the 7 less favorable years.

Summary

Acreage of crops harvested in Utah increased until about 1920, then remained fairly constant from 1920 to 1933. Acreage decreased markedly during the drought of 1934 and although it has increased each year since 1934 acreage in 1937 was still 4 percent less than the 1926-31 average.

The number of productive animal units on Utah farms during the past 30 years has been affected by cyclical movements in sheep

and cattle numbers, but the trend was generally upward until about 1931. There was a marked decrease in 1935. Since then numbers have remained from 5 to 10 percent below the 1926-31 average.

Intensity of crop production increased about 15 percent from 1910 to 1920, and then decreased about 15 percent during the next decade so that during recent years intensity has been only slightly above that of 1910. The period of most marked increase in intensity of livestock production occurred during the twenties when increases in dairying and poultry raising resulted in 10 percent increase in intensity of livestock production. Since then intensity of production has experienced little change.

Up to 1905 the trend in crop-yield was sharply upward. Since then crop yields have fluctuated rather widely. These fluctuations have, to a marked degree, coincided with fluctuations in annual precipitation. The 7-year period 1931-37 experienced yields lower than for any period of like length in 50 years.

The trend in yield of livestock products per animal appears to have been generally upward until about 1926. Since then it has remained fairly constant except for the low year, 1932.

There was an upward trend in total production of crop and livestock products until the late twenties. Since 1930 production has averaged about 14 percent below that of the previous 7 years. As a result of lower prices the cash income from crops and livestock products for 1931-37 averaged only $34,131,000—60 percent of that for the preceding 7 years.

The number of farms in Utah increased from 25,992 in 1925 to 30,695 in 1935, an increase of 18 percent. Smaller total production and more farms reduced the average production per farm for the period 1931-37 to 76 percent and cash income to 53 percent of that for the preceding 7 years.

This halving of the income per farm was largely the result of (1) unusually low precipitation—a factor in the hands of providence, (2) low prices of farm products—a problem of national scope, (3) increase in the number and decrease in size of farms in Utah—a critical problem facing Utah's agriculture, and (4) failure to increase, or in some aspects, maintain yields and intensity of crop and livestock production—a condition for which the individual farmer in Utah is to a considerable extent responsible.

The operation of physical and economic forces will eventually remove some causes of distress but the correction of others lies ultimately in the hands of Utah's farmers.

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