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**RELATIONSHIP BETWEEN SIZE OF FARM BUSINESS
AND LABOR INCOME ON UTAH FARMS**

by

Milton S. Folkman

**A thesis submitted in partial fulfillment of the requirements
for the degree of
Master of Science
in the
School of Agriculture**

Utah State Agricultural College

1940

ACKNOWLEDGMENTS

Acknowledgments of appreciation are gratefully given Doctor W. Preston Thomas for his guidance and supervision; Professor George T. Blanch and Dee A. Broadbent who spent considerable time in careful and detailed advice and supervision and who checked the manuscript and subject matter critically; Miss Edith Hayball for her assistance in checking the manuscript; and the staff of the Department of Agricultural Economics in general for their contributions to this study.

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INTRODUCTION

Since the turn of the century there has been a trend within the State of Utah toward more and smaller farms. The original farm units taken up by the early settlers of this state have been divided and subdivided until Utah today has hundreds of uneconomical-sized farms too small to be operated profitably under their present organization.

To make room for the new agricultural generation, the old homesteads have been divided among the sons of the families until a farm that was once supporting one family is now unsatisfactorily contributing to the support of several families. This condition has resulted in serious economic and social problems.

With the advent of modern machinery and the trend from self-sufficing to commercial agriculture, there has developed a surplus supply of farm labor on many Utah farms. This factor, coupled with the increasing number of small farms, has contributed greatly to the financial difficulties of Utah farmers.

Many of Utah's small farms cannot supply an adequate amount of work to keep all labor dependent upon it productively employed. This situation has been especially serious during the last 10 years when very little of this excess labor has been able to find profitable employment elsewhere.

The amount of arable land and irrigation water in Utah is limited; and because it is now practically all in use, very little additional land can be brought under cultivation at a cost low enough to make use of such land feasible without a subsidy. This does not offer a very optimistic outlook for the future development of Utah's agriculture.

In view of the condition that exists in Utah's agriculture at the

present time, this treatise was undertaken, (1) to determine the relationship that exists between the size of farm business and labor income on Utah's irrigated farms, (2) to determine the amount of excess labor available on Utah farms, and (3) to determine what effect it would have on the labor income of these farms if this excess farm labor could be economically utilized in agricultural production.

HISTORICAL BACKGROUND

The early settlement of Utah took place under conditions peculiar to this area and quite unlike the typical occupation of other areas of the United States. Much of the present difficulty in regard to size and organization of Utah's farms can be traced back to the unique circumstances under which this state was settled and to the lack of resources for agricultural expansion.

When Utah was first settled, and for many years after, the acquirement of title to land was governed by the Preemption Act. This act provided that any person who settled on government land in certain territories and made certain improvements on it was entitled to the non-competitive right to purchase the land at \$1.25 per acre. The amount of land that any one person could acquire under this act was 160 acres.

The territory of Utah had no land laws at the time of settlement; consequently, the first land settled was given a local title which had no legal status. §

After the establishment of a land office in Salt Lake City in 1869, all land was patented under national regulations, except in a few communities located on unsurveyed lands, where the settlement was made under the plan of the "Mormon" Church. Under this plan cities and towns were divided into 10-acre blocks and each block was divided into § building lots of $1\frac{1}{2}$ acres each. § Near the edge of town the land was divided into 5-acre lots for the use of mechanics and artisans, beyond these were 10-acre lots; and adjacent to these were tracts of from 40 to 80 acres where farmers could settle.

This plan was very well suited to the natural conditions prevailing at the time and to the needs of these pioneer settlements. These dwarf holdings characterized all the "Mormon" settlements of this early period, and they exist in very much the same manner today. When Brigham Young framed this cooperative system of settlement and irrigation, he taught his people that the only possible way farming in this region could succeed was through the operation of small farm units intensively cultivated. This was not intensive cultivation as we know it in this age of commercial agriculture, but it was more along the lines of a self-sufficing unit, each farm producing and manufacturing all foods and material needed by the family. He realized that the value of the area as an agricultural region depended upon water. Its value existed in the water and not in the land. With this thought in mind, he allotted to each family only as much land as it could handle properly.

The early inhabitants of Utah settled in villages and small towns partly as a protection against Indians, but chiefly because of the religious and social advantages which this type of settlement afforded. The farmers living in these small villages cultivated the lands close by, a practice that exists in most of the irrigated sections of Utah today.

As the population of the state grew and commercial agriculture became more practical, these small tracts of land became uneconomical to operate. To rectify this condition and extend their operations, additional land had to be rented or purchased; and because of this, the condition that is prevalent in Utah today developed: that of a farm being composed of several small pieces of land often 5 or 10 acres in size, located in various directions and distances from the farmstead. This condition

results in low labor and machinery efficiency because of the poor organization and layout of farm fields.

Although the early policy used in the settlement of Utah was very efficient and well adapted to the conditions that prevailed at that time, it has contributed greatly to the present unfavorable condition of Utah farmers with respect to the numerous small pieces of land comprising the set-up of many farms.

TRENDS IN NUMBER AND SIZE OF FARMS

Ever since its settlement, Utah has been a state of relatively small farms, especially the irrigated farms. This condition is not improving, for the trend during the last 25 years has been toward more and smaller farms. The number of farms in Utah has increased from 21,676 in 1910 to 30,695 in 1935 (see table 1).

Table 1. Number of farms of various sizes in Utah, 1910 to 1935*

Range in size of farms Acres	Number of farms by years				
	1910	1920	1925	1930	1935
Under 3	297	268	762	1,444	1,425
3 to 9	1,836	1,942	2,415	2,613	3,990
10 to 19	2,541	2,399	2,461	2,560	3,163
20 to 49	5,550	6,549	6,608	6,268	7,286
50 to 99	4,170	5,080	5,143	5,235	5,501
100 to 174	3,660	4,036	3,753	3,805	3,769
175 to 259	1,372	1,771	1,609	1,617	1,614
260 to 499	1,309	2,096	1,817	1,794	1,871
500 to 999	551	852	807	1,050	1,198
1000 and over	390	618	617	793	888
Total	21,676	25,662	25,992	27,159	30,695

*Source: Utah State Agricultural College Extension Service, Rural Utah builds for better living, p. 59.

This increase in number of farms has not been accompanied by a proportional increase in the total acreage of crop land.

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. From 1923 to 1933, acreage ranged from 90 to 106 per cent of the 1926-31 average of 1,147,000 acres. Drought in 1934 reduced acreage to 973,000, or 85 per cent of the above average.

Though there has been no definite trend in total acreage of crop land harvested in Utah during the period 1917

through 1937, acreage during the last four years (1934-37) has averaged 91 per cent of the 1926-31 average. 3/*

Because the total acreage of crop land harvested has not increased materially and the total number of farms has increased 18 percent, the size of Utah's farms must necessarily have decreased so far as acreage is concerned.

This fact in itself need not be significant, since acreage alone does not accurately indicate the true size of a farm. A small truck farm of 10 to 15 acres might be as large a farm as a 1,500- to 2,000-acre dry farm when considered from the standpoint of labor required and receipts from the two farms. If the intensity of cultivation had increased in direct proportion to the decrease in acreage, the problem of Utah's small farms might not be so important as it is today. This has not been the case, however, as is indicated by Fahrman in his monograph, "Some Trends in Utah's Agriculture"**, in which he says:

Intensity of crop production increased about 15 per cent from 1910 to 1920, and then decreased about 15 per cent 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 the production of dairying and poultry resulted in ten per cent increase in intensity of livestock production. Since then intensity of production has experienced little change.

Contrary to the belief of many people, the small farms of Utah are not generally very intensively cultivated. The fact that around 60 percent of the total cultivated land of the state is in alfalfa and other hays, and 32.5 percent is in grains, none of which are intensively cultivated crops, 8/ is evidence that a great number of Utah's farms are not

*Fahrman, Some trends in Utah's agriculture, p. 9.

**Ibid., p. 30.

being operated on a very intensive basis.

Of the total 30,695 farms reported in Utah for the year 1935, 27.9 percent were less than 20 acres in size, 51.6 percent less than 50 acres; 30.2 percent were from 50 to 174 acres in size, and 18.2 percent over 175 in size (see table 2).

Table 2. Percentage of farms of various sizes in Utah, 1910 to 1935*

Range in size of farms Acres	Percentage of farms by years					
	1910	1920	1925	1930	1935	
	Percent	Percent	Percent	Percent	Percent	Percent
Under 3	1.4	1.1	2.9	5.3	4.6	
3 to 9	8.5	7.6	9.5	9.6	15.0	
10 to 19	11.7	9.3	9.5	9.4	10.3	
20 to 49	25.6	25.5	25.4	23.1	23.7	
50 to 99	19.2	19.8	19.8	19.3	17.9	
100 to 174	16.9	15.9	14.4	14.0	12.3	
175 to 259	6.3	6.9	6.2	6.0	5.3	
260 to 499	6.0	8.2	7.0	6.6	6.1	
500 to 999	2.6	3.3	3.1	3.8	3.9	
1000 and over	1.8	2.4	2.4	2.9	2.9	
Total	100.0	100.0	100.0	100.0	100.0	

*Source: Utah State Agricultural College Extension Service, Rural Utah builds for better living, p. 59.

There was an increase of 5,033 farms between 1920 and 1935. Of this number 4,695 were less than 50 acres in size, and only 338 were over 50 acres in size (see table 1). This would indicate that the new farms tend to be of the smaller size.

In 1930 only 19.3 percent of Utah's farms were over 175 acres in size, but they contained over four-fifths of all the farm land 8/10 and

*Figures taken from Utah - Activities and Resources, p. 247.

almost one-half of the crop land harvested. If the upper one-fifth of the farms of the state were excluded, the remaining four-fifths would have an average crop acreage harvested of about 27.8 acres.

During the last 25 years there has been a marked increase in the number of farms under 3 acres in size. In 1910 there were but 297 farms in this class, but by 1935 this number had increased to 1,425, or 4.6 percent of the total number of farms in the state (see table 1). This increase in the number of farms under 3 acres is not in itself significant, since most of the increase was due to the development of small commercial poultry farms. It is the trend of all farms toward smaller units without intensification that is the significant factor in the future social and economic development of Utah's agriculture.

This tendency in Utah toward more and smaller farms has not come about because of any added economies of the small farms. Any future improvement of the economic condition of the agricultural population will depend to a great extent upon the ability of Utah farmers to increase the size of their farm business either by extension or intensification of their farm enterprises.

REVIEW OF LITERATURE

Much has been written concerning the relationship between size of farm business and labor income, but very little in any one bulletin or book. What has been written is confined largely to a small section or chapter in various publications. Of the books containing a small section on this subject those by Warren 13/, Forster 2/, and Hopkins 6/ are well known and probably the best in this field. Numerous bulletins have sections pertaining to the subject, but they are sectional in nature and may not have general application. Because of this, the most that can be obtained from them is an indication of general tendencies.

DEFINITION OF TERMS

Productive man-work-unit is the equivalent of 10 hours of labor at productive farm work for the average farmer and farm laborer in Utah.

Farm income is the difference between farm receipts and farm expenses. It is the income from the farm for the operator's labor and the use of farm capital. It does not include the family living from the farm.

Labor income is farm income minus value of unpaid labor, minus interest on investment. This is a return to the operator for his year's labor and management. In addition to this, he receives a house in which to live and farm produce used in his household.

Animal unit is a unit used for combining numbers of various kinds of livestock. For example, 1 dairy cow equals 1.25 animal units, 1 beef cow equals 1 animal unit, 5 sheep equal 1 animal unit, and 100 hens equal 1 animal unit.

A farm is the total land, livestock, and other farm assets operated as one unit for agricultural production.

Man equivalent is a measure of the total amount of man labor used on the farm during the year. It is calculated by reducing all labor to a basis of 25-day months and dividing by 12. Labor of boys is adjusted to its equivalent in man time.

Excess labor available as used in this treatise means the amount of time worked away from the farm by the operator or any of his regular farm help, when not using farm capital, plus any additional time he could have worked away without neglecting farm duties.

MEASURES OF SIZE

There are four major means of measuring the size of a farm business. One is the area of land utilized; another is amount of capital invested; a third is number of livestock on the farm, and a fourth is amount of productive labor required to operate the farm. These four factors are not independent of each other. In general, the larger the area of productive land and the greater the capital invested, the larger the number of livestock and the amount of productive labor required; but this is not always the case.

Area of land cannot be used as an accurate measure of size of farm business, because a farm small in area may be so organized as to yield a large income. The area of improved land on a farm may be an adequate measure of size on specialized crop farms of the same type, but cannot be successfully used as a measure of size when comparing combined crop and livestock farms or farms of different types. There is such a variation in degree of intensity of production from farm to farm that land area is not a satisfactory measure of size.

Capital invested on a given farm depends both on the size of the farm and the type of its organization. In general, the larger the farm business the larger the capital investment. This does not hold true in all cases, for some farms may have a heavy investment in buildings and machinery and still be operating a small business. Much of the capital may be non-productive and not increase the size of the business at all. A farm that is over-capitalized in buildings and machinery may have a large capital investment and still be a small business. Because of this, the amount of capital invested cannot in all cases indicate the true size of a farm business.

The number of livestock on a farm is an adequate measure of size on specialized livestock farms, but cannot indicate the true size of a combined crop and livestock farm. The livestock enterprise on a farm may be a minor enterprise of the entire farm business; and because of this, the number of livestock can only be used as a measure of size on specialized livestock farms of the same type.

Productive labor required on a farm depends both on the size of a farm and the degree of intensity of production of the crop and livestock enterprises. The number of productive man-work-units required to handle any crop or livestock enterprise can be calculated and all reduced to a common unit. Because of this, farms of different types and degrees of intensity can be compared on a comparable basis. For this reason the number of productive man-work-units required on a farm is the best measure of size, and is used throughout this treatise.

SOURCE OF DATA

All information and data used in the analysis of the Weber Area, Sanpete-Sevier Area, Utah County, and Utah farm account study were taken directly from farm financial records secured from the Department of Agricultural Economics of the Utah Agricultural Experiment Station.

The records of the Weber Area were obtained in 1937. They consist of records secured through personal contact with dairy farmers who sold milk on the Ogden Milk Market. These farms were composed largely of diversified irrigated farms. The basis for selection as dairy farms was that they have an average of 5 milking cows and sell the major portion of their products wholesale, rather than retail.

The records in the Sanpete-Sevier Area Study were obtained in 1936. The records are for all types of farms of the area, being composed mainly of diversified irrigated farms and a few specialized livestock farms.

The records for the Utah County Study were obtained in 1935. These are for all types of farms in the area, being composed mainly of diversified irrigated farms with some specialized fruit and livestock farms.

The farm account records are from farm account books kept by farmers throughout the state and sent in to the Utah State Agricultural College to be summarized. These records are for the year 1935. They come from various sections throughout the state, with 15 counties represented. They consist mostly of records on diversified irrigated farms.

These data, all of which are secondary, have been supplemented by data from published texts, bulletins, and from the files of the Department of Agricultural Economics, Utah State Agricultural College.

METHOD OF PROCEDURE

In order to determine (1) the relationship that exists between size of farm business and labor income, (2) the amount of excess labor available on Utah farms, and (3) the effect on labor income of these farms if this excess farm labor could be economically utilized in agricultural production, permission was obtained from the Department of Agricultural Economics of the Utah Agricultural Experiment Station to use data from farm financial records secured by the department during the last 10 years. These records included studies made on dairy farms in the Weber area, general farms in Sanpete-Sevier and Utah Counties, a financial study of Utah commercial poultry farms, and summaries of farm record books on Utah diversified irrigated farms.

From all these records, with the exception of the poultry study, were taken the total productive man-work-units, productive man-work-units per man, labor income, and excess days labor available on each farm. These data were then sorted into the various size groups desired on a basis of total productive man-work-units to show the relationship between the various sizes of farms and labor incomes. A new labor income was calculated on the basis of the increased size of farm which had been adjusted in order to utilize the excess labor in agricultural production.

PRESENTATION AND ANALYSIS OF DATA

Utah's rural people face extremely perplexing problems in regard to their present and future economic and social status. The farmers of Utah, as well as other parts of the nation, have had a very difficult time during the last 10 years to make farming a paying occupation. Even in years of high prices, as in 1929 for instance, 20 percent 12/* of Utah's farmers received a gross income of less than \$400, and only 27 percent received a gross income above \$2,500. Out of this distressingly low income must be paid all expenses of operating the farm, church contributions, civic improvement expenses, payment on debt, if any, and the living expenses of the family.

This low farm income is comparable with farm incomes of other states of the nation. In 1929 Utah's farm population 1** ranked twelfth in the nation on a per capita income basis with \$496, while the non-farm population ranked thirty-seventh, with a per capita income of \$629.

Much of the present difficulty in which the Utah farmer finds himself is due to the factors over which he has no control. He can do nothing about low prices, adverse weather conditions, or the other so-called "acts of God", but he can do something about the kind of crops and livestock he raises, the efficiency with which he uses his labor and farm machinery, and the organization and management of his farm.

The very fact that some farmers can show a profit on their farms during some of the poorest agricultural years, while the remainder just

*Figures taken from Rural Utah builds for better living, p. 29.

**Figures taken from America's Capacity to Consume, p. 173.

break even or lose money, shows that with the proper combination and management of the factors of production, an average farm can be made to pay.

Whether a farm is profitable or not depends upon many variable factors, with some exerting more influence than others. One of the more important factors influencing labor income is the price received for the products the farmer produces. In 1932 and 1933 the combined price index reached its lowest point for the period of years from 1924 to 1937 (see figure 1). It was also during these same years that the index of cash income for the same products reached its low point with an index of 49 and 52 for 1932 and 1933, respectively.

High price alone will not bring a high farm income, but along with this must come an additional factor of a large quantity of goods to sell. Without a large quantity of farm produce to sell, even unusually high prices cannot produce a very substantial income. The factor of price is not within the control of the individual farmer. However, the total volume of produce a farmer has to sell is more or less within his control. Because of this, it is one of the main factors affecting the income of the individual farmer.

Of the many factors over which the individual farmer has control, none has more influence upon labor income than the size of farm business. While other factors over which the farmer has control have an influence upon the farmer's labor income, the amount and direction of their influence is determined largely by the size of farm business.

There is a direct relationship between the size of farm business as measured by total productive man-work-units and labor income (see

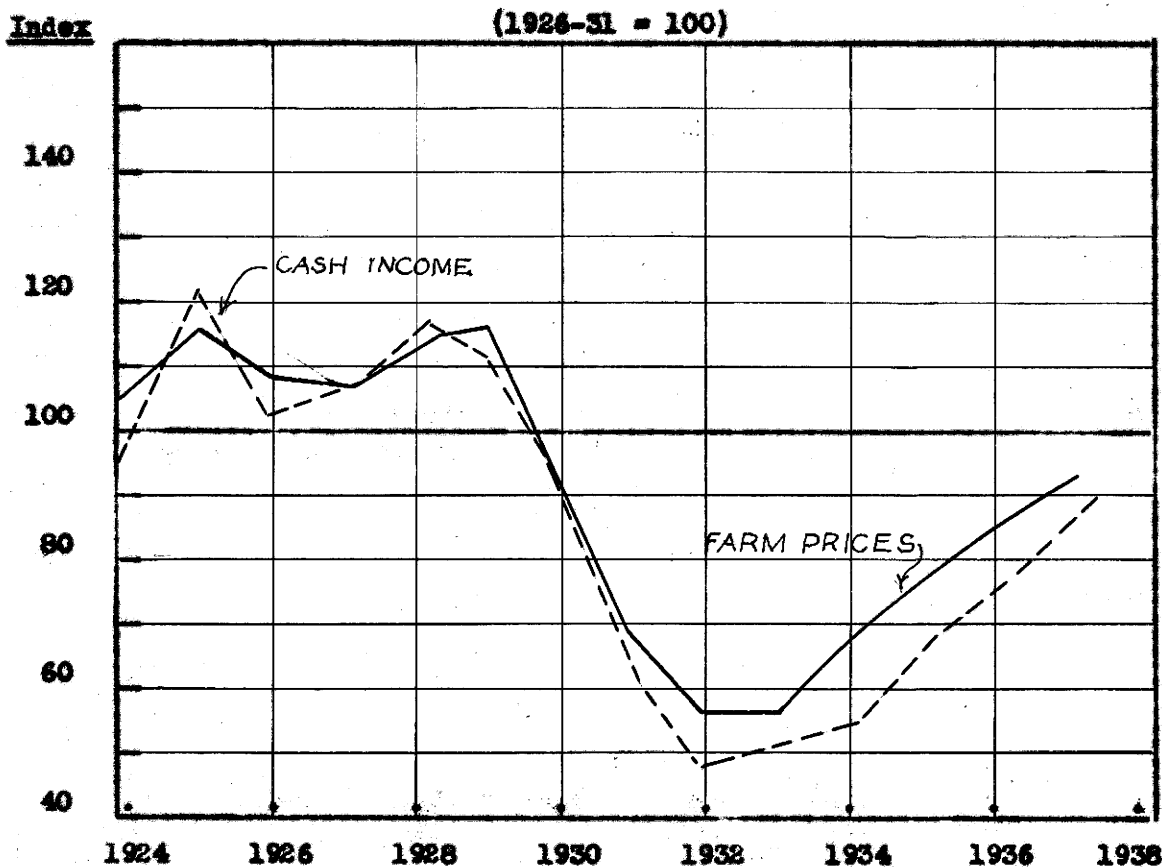


Figure 1. Index numbers of Utah farm prices and cash income from crops and livestock, 1924-37.

Data source: Fuhrman, Some trends in Utah's agriculture, p. 26.

table 3). As the number of productive man-work-units per farm increases, there is a proportional increase in the size of the labor income. In all areas analyzed having farms under 100 productive man-work-units in size, there was a negative labor income ranging from a negative \$290 for Sanpete-Sevier farms to a negative \$233 for Utah County farms. In the Weber County survey of dairy farms, and the farm account records, there were no farms this small.

For farms of a size between 100 and 200 productive man-work-units, the labor income was still negative in all but one area, but the less

Table 3. Relation of productive man-work-units to labor income on Utah irrigated farms

Range in :	Weber area :			Sanpete-Sevier area :			Utah County :			Farm accounts		
Productive:	:Av.prod:Av.lab.:		:Av.prod:Av.lab.:		:Av.prod:Av.lab.:		:Av.prod:Av.lab.:		:Av.prod:Av.lab.:		:Av.prod:Av.lab.:	
M.W.U.	: Farms :	M.W.U.:	income :	Farms :	M.W.U.:	income :	Farms :	M.W.U. :	income :	Farms :	M.W.U.:	income
Number	:Number	:Number	:Dollars:	Number	:Number	:Dollars:	Number	:Number	:Dollars:	Number	:Number	:Dollars
0 - 99	: 0	: 0	: 0	: 3	: 77	: -290	: 22	: 77	: -233	: 0	: 0	: 0
100 - 199	: 7	: 176	: 243	: 44	: 167	: - 51	: 115	: 158	: - 59	: 6	: 153	: - 11
200 - 299	: 28	: 259	: 274	: 84	: 242	: 160	: 127	: 247	: 46	: 13	: 261	: 44
300 - 399	: 54	: 352	: 538	: 58	: 347	: 245	: 89	: 346	: 144	: 13	: 355	: 208
400 - 499	: 32	: 437	: 579	: 35	: 440	: 321	: 52	: 436	: 197	: 9	: 447	: 362
500 - 599	: 18	: 550	: 971	: 15	: 546	: 437	: 29	: 541	: 321	: 10	: 536	:1054
600 - 699	: 7	: 624	: 168	: 4	: 653	: 784	: 14	: 647	: 375	: 5	: 660	:1253
700 - 799	: 4	: 641	:1265	: 7	: 726	: 421	: 10	: 738	: - 8	: 5	: 763	: 589
800 - 899	: 9*	: 847	:1174	: 3	: 849	: 66	: 8	: 831	: 784	: 6	: 826	:1034
900 - over	: 0	: 0	: 0	: 3	:1102	: 316	: 6	:1275	: 1083	: 5	:1086	:1883

*Includes one farm over 900 P.M.W.U.

was not so great, ranging from a negative \$59 in Utah County to a positive \$243 in the Weber area. The Weber study was the only one showing a positive labor income in this size group. All studies show a positive labor income in the next size class between 200 and 300 productive man-work-units, ranging from a positive \$44 in the farm account studies to a positive \$274 in the Weber area study.

From this point on all studies show a positive labor income which increases faster than the size of farm. This increase goes on uninterrupted until the farm size approaches and goes beyond the 2-man size farm, or one of 600 productive man-work-units in size. At this point there is a distinct drop in the upward trend of labor income. This point is reached at slightly different sized farms for different studies. It is first reached in the Weber area study (see table 3) somewhere between 600 and 700 productive man-work-units in size. At this point the labor income drops from a previous high of \$971 down to \$168; and then as the size of farm increases, labor income goes up again, reaching \$1,265.

This unexpected drop in an otherwise regularly increasing trend could be attributed to chance due to sampling, had it only occurred in the Weber area study, but it occurs again in every one of the other studies in very nearly the same size class. It appears in the size class between 600 and 900 productive man-work-units in the Sanpete-Sevier study, between 700 and 800 productive man-work-units for Utah County, and between 700 and 800 productive man-work-units in the farm account study. The drop appears in all four studies between 600 and 900 productive man-work-units and in all cases after the drop the trend resumes its normal increase.

If the labor incomes of all four studies are weighted by the number of farms in each class and an average for all four studies is found (see table 4), the drop in labor income is found to occur in the size class between 700 and 800 productive man-work-units, or at an average of 740 productive man-work-units per farm. The size class 600 to 700 productive man-work-units, just preceding the one in which the decline in labor income occurs, shows an average labor income for all four studies of \$528. The labor income then drops to \$309 in the low point, and as the size of farm increases, goes back up to \$894 in the size class between 800 and 900 productive man-work-units (see figure 2).

Table 4. Relation of number of productive man-work-units to labor income on Utah farms*

Range in productive M.W.U.	:	Farms	:	Av. prod. M.W.U.	:	Av. labor income	:	Percentage farms hav- ing \$1000 labor inc.
Number	:	Number	:	Number	:	Dollars	:	Percent
0 - 99	:	25	:	77	:	-240	:	0
100 - 199	:	172	:	161	:	- 38	:	0
200 - 299	:	252	:	249	:	109	:	5
300 - 399	:	214	:	348	:	275	:	8
400 - 499	:	128	:	438	:	338	:	14
500 - 599	:	72	:	544	:	610	:	35
600 - 699	:	30	:	645	:	528	:	30
700 - 799	:	26	:	740	:	309	:	23
800 - 899	:	26	:	838	:	894	:	27
900 - over	:	14	:	1170	:	1204	:	64

Data source: table 2.

The fact that in all four farm groups analyzed the same drop in labor income occurred in very nearly the same size class indicates that there is something inherent in the size class of Utah diversified irrigated farms that causes this wholly unexpected drop in their labor income.

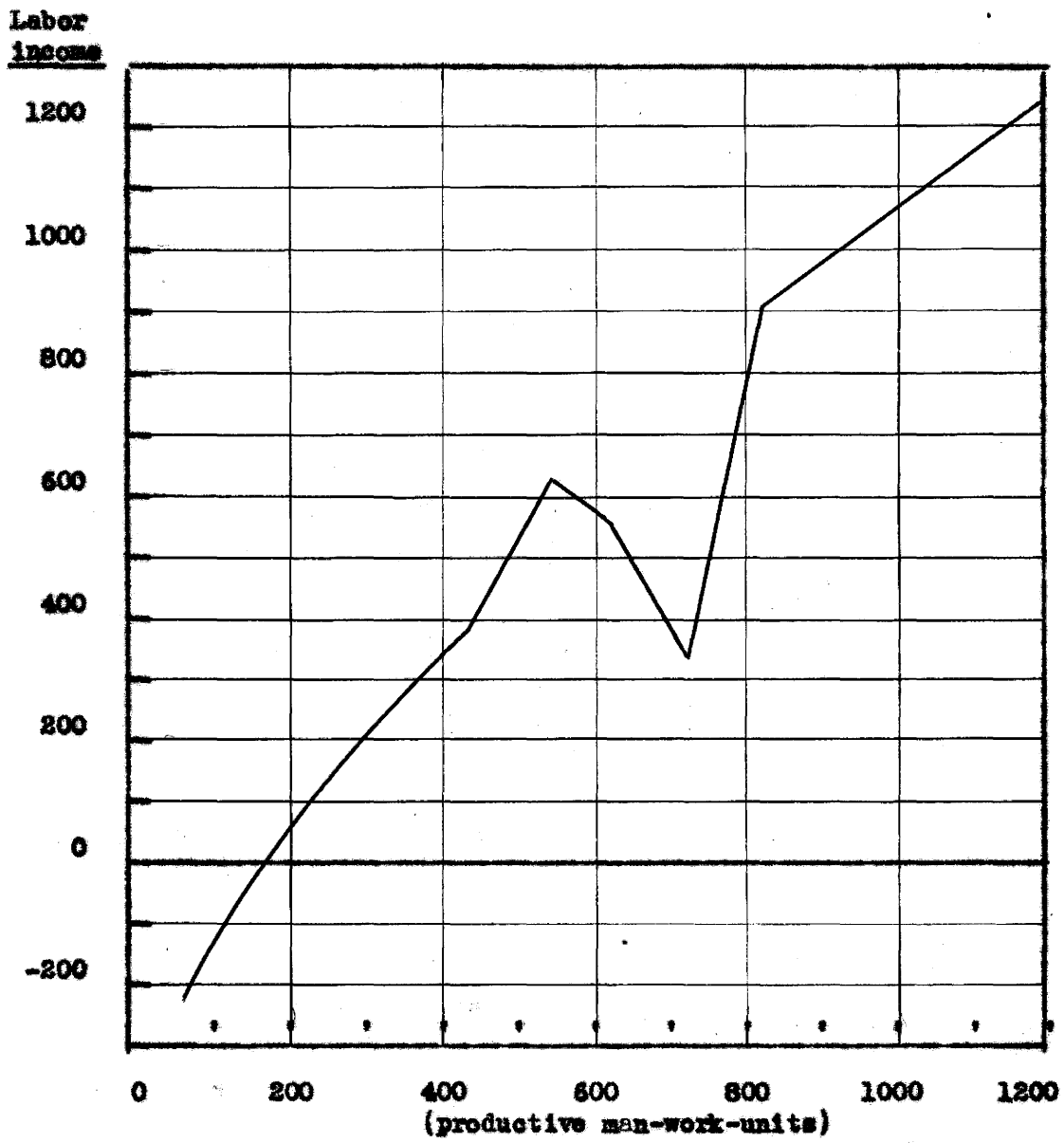


Figure 2. Relation number of productive man-work-units to labor income on Utah farms.

Data source: table 4.

It is at this point, 600 to 900 productive man-work-units, that the transition from 2-man to a 3-man farm occurs. After a farm reaches 600 productive man-work-units and larger, two men of average ability can no longer do all the work required by a farm of this size. If there is not sufficient family help, an additional man must be employed or the farm will suffer from neglect and delay in various farm operations. At this point a farm is too large for two men to operate, but not large enough to keep three men profitably employed all the time. Because of this, a decline in labor efficiency might reasonably be expected, but actually occurs in only one of the four areas analyzed (see table 5).

It is also at this transitional stage that additional machinery and equipment are usually needed. Up to this point one unit of machinery and equipment of various kinds may be sufficient to take adequate care of the farm requirements in an efficient manner, but as the size increases much of the machinery and equipment must be duplicated. If additional machinery and equipment are not purchased when this point is reached, there may be delays in attending to the various farm jobs at the proper time. Delay in performing many operations in farming may mean the difference between success and failure. Delays in planting, cultivating, and harvesting, which would more than likely be the result of inadequate machinery or power, may mean the difference between good and poor yields, high and low quality, or high and low prices. The total result of this would be the difference between a profit or a loss. Because of this, some new machinery must be purchased; and if a farmer in this size class does purchase new machinery, a new problem presents itself, that of efficiency in the use of capital invested in machines and equipment. One

Table 5. Relation of size of farm to labor efficiency on Utah irrigated farms

Range in productive M.W.U.	Weber area			Sanpete-Sevier area			Utah County			Combined*		
	Number	Av. prod: M.W.U.	P.M.W.U. per man	Number	Av. prod: M.W.U.	P.M.W.U. per man	Number	Av. prod: M.W.U.	P.M.W.U. per man	Number	Av. prod: M.W.U.	P.M.W.U. per man
0 - 99	0	0	0	3	77	121	22	77	92	25	77	95
100 - 199	7	176	209	44	167	146	115	158	140	166	161	144
200 - 299	28	259	219	84	242	206	127	247	190	239	248	199
300 - 399	54	352	259	58	347	251	89	346	239	201	348	248
400 - 499	32	437	277	35	440	268	52	436	272	119	437	272
500 - 599	18	580	313	15	546	295	29	541	331	62	545	317
600 - 699	7	624	252	4	653	378	14	647	347	25	642	325
700 - 799	4	741	308	7	726	323	10	738	385	21	734	350
800 - 899	**9	847	351	5	849	374	8	831	334	20	841	368
900 - over	0	0	0	5	1102	331	6	1275	348	9	1217	342

* Averages of Weber, Sanpete-Sevier, and Utah County farms combined.

**Includes one farm over 900 P.M.W.U.

unit of machinery and equipment may not be enough to take care of the requirements of the farm; but at the same time the farm is not large enough to require the full service of two units; consequently, both machines cannot be used to capacity. This results in over-capitalization of the farm, with idle capital not being fully used. Because of this, the farm cannot pay a normal rate of return on its investment, which in turn will result in a lower labor income.

The exact point at which this decline in labor income may be expected for any individual farm cannot accurately be determined because of the great differences in farm organization and abilities of farm operators. The point of decreasing labor income probably can be delayed or in some cases even be eliminated. The ability of the operator, the number of hours worked each day, the efficiency in the use of labor and machinery, and the organization and management of the farm may all tend to reduce or eliminate the decline in labor income at this point.

It was not apparent from previous analyses of these data that labor income declined at this point in size of farm based on man-work-units. Not having sufficient time to analyze the conditions thoroughly, and because it was not the original purpose of this thesis, no definite reasons based on actual data contained in the study can be given to explain this unexpected drop.

The chances of making a very large labor income upon a farm under 300 productive man-work-units in size are small. In the four studies made, not one farmer operating a farm under 200 productive man-work-units in size received a labor income of \$1,000 (see table 4). In the size class between 200 and 300 productive man-work-units, only 5 percent

of the farmers received a labor income of \$1,000 or more. In the size group over 900 productive man-work-units, 64 percent of the farms received a labor income above \$1,000. From this it can be seen that the chances for success and large incomes is greater in the operation of a large farm rather than in that of a small farm. It is also with the large farm that the largest individual losses occur. If a farmer is a good manager and is a capable farmer, his chances of success will be greatly increased, provided he operates a large sized farm.

To make even a moderate success on a small farm is very much more difficult than it is to make a good success on a fair-sized farm. When the necessary equipment and horses for an eighty-acre farm will be almost sufficient for 160 acres, and when a family can do all the work on the larger farm, it will be seen at once that the larger farm will double the income without much more expense. It therefore becomes a task for a genius on the 80 acre farm to compete with a very ordinary mortal on the larger area. 13*

Efficiency of Large Farms

Labor Efficiency. Labor efficiency as used in this treatise is measured by the average number of productive man-work-units of work performed by each person actively employed on the farm. This figure is then compared with a figure, generally accepted in the field of agricultural economics, which considers 300 productive man-work-units or 300 days per year to be the average number of days worked each year by the average farmer. The average for the individual farm is then compared with this average figure and will be high or low, depending upon whether the number of productive man-work-units per man is greater or smaller than the average.

*Warren, G. F. Farm Management, p. 263.

There is a direct relationship between size of farm as measured by productive man-work-units and labor efficiency (see table 5). On the farms below 100 productive man-work-units in size the labor efficiency is 95 productive man-work-units per man. It is not until the size of farm reaches 500 productive man-work-units or above that the productive man-work-units per man reaches the equivalent of an average man working under average conditions. In this size group there is an average of 317 productive man-work-units per man.

There is a steady increase in labor efficiency up to the farm size between 800 and 900 productive man-work-units, where the labor efficiency reaches its highest point of 368 productive man-work-units per man.

The range in labor efficiency in the studies analyzed is from 95 productive man-work-units per man to 368 productive man-work-units per man. This shows that the average man employed on a farm averaging 841 productive man-work-units in size accomplishes 3.81 times as much productive work as one employed on a farm averaging 77 productive man-work-units in size. This does not necessarily mean, however, that the man on the large farm works harder or longer, but it does mean he can do more work with less effort and waste of time because of the labor-saving devices and large-scale operations incident to a large farm.

There are many reasons why increasing the size of the farm business may result in higher labor efficiency. Large farms can use improved machinery to a better advantage than small farms. In most cases there is not so much labor required when large improved machinery is used in proportion to the amount of work accomplished. Large farms can maintain larger fields, and still keep up their rotation, than can the smaller farms.

This is a distinct time- and labor-saving advantage to the large farm (see table 6). By increasing the size of the field from an average of 1.02 acres up to 3.48 acres, 2 man-hours and 4.8 horse-hours can be saved on each acre of land plowed. This increased efficiency of labor holds true not only with plowing, but with every farm operation requiring the use of machinery. On the large field the number of times required to turn per acre is greatly reduced and results in a saving of time as well as more efficient use of labor.

Table 6. Relation of size of field to labor required to plow an acre of land*

Size of fields (Acres)	: Number : of : fields	: Aver. size: : of fields: : (Acres)	: Av. length: : of fields: : (Rods)	Time required to	
				: Man hours	: Horse hours
Less than 2	: 40	: 1.02	: 20.6	: 8.5	: 19.8
2 - 4.9	: 57	: 3.48	: 34.6	: 6.5	: 15.0
5 - 9.9	: 78	: 7.24	: 49.9	: 6.2	: 16.2
10 - 14.9	: 40	: 11.68	: 54.7	: 5.7	: 14.3
15 or more	: 27	: 20.26	: 77.9	: 5.1	: 13.2
Total	: 242	:	:	:	:
Average	:	: 7.51	: 45.4	: 5.8	: 14.8

Data source: Myers, W. I. An economic study of farm layout, p. 411, table 3.

There are many jobs on a farm that require more than one man, and if he cannot be acquired when needed and dispensed with when through, it may be necessary to hire him for the entire year or at least for the season. On the small farm it may not be possible to utilize the services of a hired man as efficiently as on a large farm. It may not be necessary to hire a man if there is sufficient family labor, but if the farm is small, the use of labor will be just as inefficient whether it

is hired or unpaid labor. The cash cost may be greater in the one case, but the returns for labor expended will not differ greatly.

There are many jobs on a farm which do not demand twice the labor requirement when the size of the job is doubled. It does not take twice as long to feed and tend 10 cows as it does 5 because of the many small jobs subsequent to the care of cows that remain very nearly the same in any sized herd, or at least do not increase in direct proportion to the increase in number of cows.

On the small farm the operator may be idle part of the time because of the lack of productive man work to do, or he may spend more time on non-productive operations than he would if he had more productive labor to keep him busy. These factors all tend to lower the labor efficiency on the farm, which in turn results in lower labor income.

Efficiency of Capital. The small farm has much more of its capital invested in an unproductive way than the large farm. No matter how small the farm may be, the operator usually desires to have a fairly respectable house. The larger farms may, on the average, have larger houses than have the small farms, but the proportion of the farm capital invested in this item is smaller. In a study made in New York it was found that on the smallest farms of less than 30 acres there was 43 percent of their capital invested in houses, while on the largest farms, over 200 acres, only 9 percent of the capital was invested in the home. 13*

The barns and other buildings on a small farm also comprise a larger percentage of the total capital invested. A barn that will care

*Figures taken from Warren, G. F. Farm Management, p. 261, table 50.

for twice as many animals as another one does not necessarily cost twice as much to build, and because of this, the investment in buildings per animal unit housed is reduced. In New York it was found that the smallest farms had an investment in barns of \$164 per animal unit, while the largest farms had only \$50 per animal unit. 13/* It can be seen from these figures that it would cost over three times as much per animal unit to pay interest, repairs, depreciation, and insurance on the small farms as on the large ones.

The small farm may require almost as much capital invested in farm machinery as a farm twice its size. There are many kinds of farm machinery necessary to the operation of even the smallest of farms that need not be duplicated if the size of the farm is doubled. Because of this, these machines are idle a good portion of the time. Money invested in large houses, idle machinery, and buildings on small farms is not only unproductive but requires expenditures for repairs and interest.

Power Efficiency. The efficiency with which horse and tractor power can be used may be increased materially as the size of the farm unit increases. The small farms cannot afford to keep enough horses to make what is considered efficient teams; and yet they are over-supplied with horses compared with their cultivatable area. Most modern machinery requires at least 3 horses or a tractor to operate efficiently, yet a small farm cannot afford to keep that many horses or a tractor. As a result, the efficiency in the use of farm power is low. In a study made by G. F. Warren, it was found that on a farm under 30 acres in size there was an average of 15 acres per horse, while on the farms over 200 acres

*Warren, op. cit., p. 261, table 50.

in size the acreage per horse increased up to 49. 13/^{*} This shows the added efficiency in the use of horses which the large farm has over the small one. The same condition would hold true in the efficient use of a tractor.

It has been estimated that in 1924-25 in the United States, horse and tractor power represented approximately 40 percent of the total cost of farm production. 2/^{**} From this it can be seen that the efficient use of farm power is an important factor to consider in any attempt to increase the operator's labor income.

There are many other advantages a large farm has over a small one, which contribute to the size of the labor income of the farm. The percentage of the total acreage of farm that is not used because of the area in fences, roadways, and ditches decreases as the size of the farm increases. The loss in land not used was 5.48 percent for farms having less than 100 acres, and it decreased to 3.25 percent on farms of over 175 acres. 2/^{***} This shows that the large farm can on the average use 2.23 percent more of its total acreage for productive purposes than can a small farm. This factor in itself may seem unimportant, but when added to the other factors working against the efficiency in use of land, labor, and capital by the small farm, it has a considerable influence upon labor income.

*Warren, op. cit., p. 256, table 46.

**Forster, G. W. Farm Organization and Management, p. 276.

***Ibid., p. 279.

Specialized Livestock

The size of farm business is important to the success of the diversified irrigated farms of Utah, but not to any greater degree than it is to the specialized livestock farms. Success is perhaps more dependent upon size for a specialized livestock farm than for a diversified irrigated farm (see table 7).

Table 7. Relation of size of specialized livestock farms to labor income in Sanpete and Sevier Counties, 1934

Productive man-work-units	Farms	Average productive M.W.U.	Average labor income
Number	Number	Number	Dollars
Under 500	11	369	-33
500 - 999	8	776	305
1000 - 1499	11	1234	2990
1500 - over	7	2356	4469

In the Sanpete-Sevier area study the specialized livestock ranches under 500 productive man-work-units have an average labor income of a negative \$33 (table 7). In the same study the diversified irrigated farms in the same size class have a positive labor income of \$245 (table 3). This would seem to indicate that the diversified irrigated farms do not require so large a farm business as do the specialized livestock ranches. This condition holds true up to about 800 productive man-work-units; beyond that size there are not enough diversified irrigated farms to make a comparison.

The range of labor income on the specialized livestock farms varies from a negative \$33 on farms having an average of 369 productive man-work-units and increases up to \$4,469 on farms having an average of

2,356 productive man-work-units. This would seem to indicate that in order to have any degree of success with specialized livestock, the unit must average larger than for a diversified farm.

Commercial Poultry

Another type of enterprise that is adapted to large-scale, specialized farming is the commercial poultry flock. The effect of size of farm business on labor income is very much the same for poultry as for the specialized livestock farm.

In a study made in Utah of commercial poultry flocks over the entire state in 1930 10/ it was found that for the average-sized flock of 374 hens there was a negative labor income of \$14 (table 8), while the flock with an average of 2,501 hens received a labor income of \$3,272.

Table 8. Relation of number of hens in laying flock to labor income on Utah farms, 1930

Number of hens	Farms	Average hens per flock	Average labor income
	Number	Number	Dollars
0 - 499	26	374	-14
500 - 999	37	722	712
1000 - 1499	22	1234	1130
1500 - over	18	2501	3272

The income is higher both for total farm and on a per-hen basis in the larger flocks for several reasons, chiefly since the producers are specialized in the business and have very few other things to detract from caring for the flock. This better care and equipment results in higher production per hen, lower death loss, higher quality eggs,

and a higher price per dozen.

The amount of labor required to care for a small flock is greater per hen than it is for a large flock. In the previously mentioned study of Utah commercial poultry flock it was found that the average labor requirement for the 3 years of the study was 2.9 hours per hen for a flock averaging 375 hens, and was reduced to 1.5 hours for the group averaging 2,586 hens. 10/* Because of the nature of the many operations in caring for poultry, as for many other farm jobs, the larger the flock the smaller the amount of time required to care for each hen, or at least until an economical unit is reached.

In the analysis of this poultry study, it will be noted that number of hens is used as a measure of size instead of the productive man-work-units. Number of hens is an adequate measure of size on commercial poultry farms where the poultry flock is the principal source of income.

Delta Area

In an area not adapted to the type of farming carried on, or during a period of unfavorable prices or adverse weather conditions, the general relationship between labor income and size of farm does not hold. The return from farming in the Delta area in Millard County for the years 1929-31 indicate this inverse relationship (table 9).

The measure of size used in this study is not comparable to the measure of size used previously in this treatise. When this study was made, no productive man-work-units were calculated, and the area of land cultivated was used as a measure of size. Although the measure of size

*Thomas, W.P., and Clawson, Marion. Economic factors affecting poultry production and marketing in Utah, p. 43.

is not entirely comparable to the one used previously, it is reliable enough to indicate the relationship that does exist.

Table 9. Analysis of farm business of farms of different sizes in Millard County, Utah, 1929-31*

Factors used in analysis of farm business	Unit	Acreage of cultivated land			
		Less than 50 acres	50 - 99 acres	100 acres or more	All farms
Size of farm bus.:					
Cultivated land	acres	32	71	168	70
Total in farm	acres	55	105	282	112
Total capit.invest:	dollars	4,520	8,530	14,502	7,804
Total farm income	dollars	800	1,629	3,521	1,580
Total farm expense	dollars	1,126	2,142	4,277	2,053
Farm success:					
Labor income	dollars	-502	-798	-1,279	-750
Farm income per \$1 expense	dollars	0.71	0.76	0.82	0.77
Total number of farms		121	121	46	288

*Adapted from: Thomas and Blanch. Drainage and irrigation, soils, economic, and social conditions, Delta area, Utah, p. 37, table 34.

The general relationship between size of farms and farm profits in the United States is that as size of farm business increases farm profits increase also. However, the opposite of this general relationship prevailed in the Delta Area. It is axiomatic that whenever the per unit cost of production exceeds the selling price of the commodity produced, then the larger the farm business the larger will be the loss. The reason for the larger losses on the larger sized farms, is, no doubt, the result of low crop yields, exceptionally high tax costs, and an unfavorable relationship between prices of goods bought and amount received for goods sold. 11/*

*Thomas and Blanch. Drainage and irrigation, soils, economic, and social conditions, Delta area, Utah, p. 36.

It is only reasonable to expect that where large profits are made there is always the chance for large losses. In the Delta area the small farms under 50 acres in size had a negative labor income of \$502, while the larger farms having over 100 acres of cultivated land had a negative income of \$1,279 (table 9). Although farm income and farm expense both increased as size of farm increased, the income increased slightly more than did the expense, as is shown by the income per \$1.00 of expense. For the small farms, each \$1.00 of expense returned only \$0.71 in farm income, or a loss of \$0.29 for each \$1.00 of expense, while for the largest farms each \$1.00 of expense returned \$0.82 in farm income, or a loss of \$0.18 per \$1.00 of expense (table 9). Although the larger farms did not lose so much per \$1.00 expended, they had more units upon which to lose, thus making the total loss greater for the large farms than for the small ones.

Excess Farm Labor

It has been generally recognized that Utah, with her many small farms and relatively large families, has an excess farm labor supply. Many figures* have been worked out showing the extent of this excess labor; but none, to the knowledge of this writer, have attempted to show the effect it would have upon labor income and family income if all excess farm labor could be productively employed.

Table 10 shows the distribution and amount of excess farm labor on the farms studied in the Weber area, Sanpete-Sevier area, and Utah County. As used in this treatise, excess farm labor means the amount

*Some figures on the amount of excess farm labor available for various sections of Utah may be found in unpublished data of the Dept. of Agric. Economics, Utah State Agric. Expt. Sta. stencil #462 to 464.

Table 10. Relation of size of farm and excess farm labor available on Utah irrigated farms

Range in	Weber area			Sanpete-Sevier area			Utah County			Combined		
productive	: Av. prod	: Excess	:	: Av. prod	: Excess	:	: Av. prod	: Excess	:	: Av. prod	: Excess	:
M.W.U.	: Farms	: M.W.U.	: lab. av.	: Farms	: M.W.U.	: lab. av.	: Farms	: M.W.U.	: lab. av.	: Farms	: M.W.U.	: lab. av.
Number	: Number	: Number	: Number	: Number	: Number	: Number	: Number	: Number	: Number	: Number	: Number	: Number
0 - 99	: 0	: 0	: 0	: 3	: 77	: 33	: 22	: 77	: 164	: 25	: 77	: 148
100 - 199	: 7	: 176	: 115	: 44	: 167	: 78	: 115	: 158	: 107	: 166	: 161	: 100
200 - 299	: 28	: 259	: 26	: 84	: 242	: 82	: 127	: 247	: 113	: 239	: 248	: 92
300 - 399	: 54	: 352	: 28	: 58	: 347	: 68	: 89	: 346	: 59	: 201	: 348	: 53
400 - 499	: 32	: 437	: 44	: 35	: 440	: 60	: 52	: 436	: 53	: 119	: 437	: 53
500 - 599	: 18	: 560	: 39	: 15	: 546	: 65	: 29	: 541	: 49	: 62	: 545	: 50
600 - 699	: 7	: 624	: 19	: 4	: 653	: 6	: 14	: 647	: 32	: 25	: 642	: 24
700 - 799	: 4	: 741	: 22	: 7	: 726	: 43	: 10	: 738	: 91	: 21	: 734	: 62
800 - 899	: *9	: 847	: 13	: 3	: 849	: 33	: 8	: 831	: 38	: 20	: 841	: 28
900 - over	: 0	: 0	: 0	: 3	: 1102	: 122	: 6	: 1275	: 0	: 9	: 1217	: 29

* Includes one farm over 900 P.M.W.U.

of time that the farm operator and his regular farm help could have worked away from the farm without neglecting farm duties. It does not include the time they did work away and for which work the farm received credit for the income.

Farms under 100 productive man-work-units in size have an average of 148 days excess labor available (table 10). This is equivalent to approximately one-half a man unemployed for a full year. The amount of excess farm labor decreased as the size of farm increased. The low point was reached at the size class between 600 and 700 man-work-units, where only 24 excess days labor were reported.

From this, it can be seen that the amount of excess farm labor varies inversely with the size of farm business. Since the figures (table 10) are for some of the better agricultural areas, the amounts reported are probably less than for the state as a whole, but probably are representative of the general trend of excess labor in relation to size of farm business.

In order to show the effect upon labor income of putting all excess farm labor available at some productive work, it was necessary to calculate a trend line. In calculating this trend, labor income was used as the dependent variable and productive man-work-units as the independent variable. The equation for the trend line was found to be

$$Y = -313 / 1.53X.$$

The trend line was fitted by the method of least squares (see figure 3).

It was necessary to calculate the new labor income by a trend line, because when the excess farm labor was added to the labor already employed, it moved the farm into another size class which theoretically

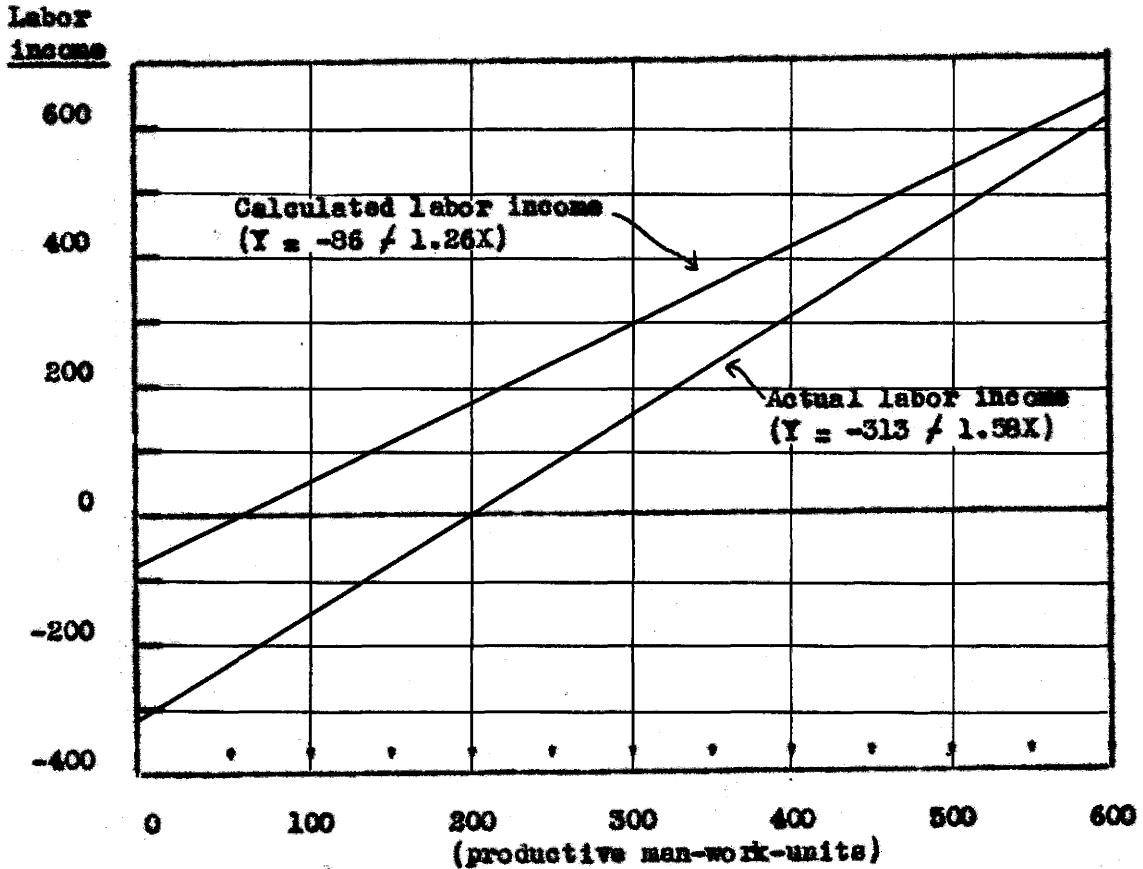


Figure 3. Effect on labor income of productive utilization of excess farm labor

operated with greater efficiency in the use of land, labor, and capital. In order to calculate the new labor income, it was necessary to calculate it at the same efficiency as the class in which it fell.

In order to eliminate any undue influence upon the trend line by the extremely large incomes and sizes, all farms of over 600 productive man-work-units in size were excluded. Above this size class there was such a small amount of excess labor that it would have very little influence upon the labor incomes of these farms.

The actual labor incomes ranged from a negative \$240 for farms under 100 productive man-work-units in size up to a positive labor

income of \$538 for farms from 500 to 600 productive man-work-units (see table 11).

Table 11. Effect of utilization of excess labor upon labor income of combined Weber, Sanpete-Sevier, and Utah County farms

Range in productive M.W.U. Number	Farms :Number:	Average : M.W.U.:	Excess : M.W.U.:	Total* : M.W.U.:	Actual : labor : income : Dollars:	Calculated** : labor : income : Dollars
0 - 99	: 25	: 77	: 148	: 225	: -240	: 42
100 - 199	: 166	: 161	: 100	: 261	: - 39	: 99
200 - 299	: 239	: 248	: 92	: 340	: 113	: 224
300 - 399	: 201	: 348	: 53	: 401	: 279	: 321
400 - 499	: 119	: 437	: 53	: 490	: 336	: 461
500 - 599	: 62	: 545	: 50	: 595	: 538	: 627

*Average P.M.W.U. actually used on farm plus excess P.M.W.U. available.

**Arrived at from trend line which was calculated by method of least squares $Y = -313 / 1.58X$

After the excess labor available in each size class had been added to the amount of labor actually utilized and a new labor income calculated on the basis of the new farm size, the labor incomes were all positive. The calculated labor incomes ranged from positive \$42 for the small farms of under 100 man-work-units to \$627 for the farms between 500 and 600 productive man-work-units (see table 11).

These calculations show that by enlarging the size of farm business to utilize all excess farm labor, the smallest farms could increase their labor income from a negative \$240 to a positive labor income of \$42, or an increase of \$282. This is a very modest figure for a person to receive for his labor and management wage, but in addition he receives 5 percent interest on his investment, a house to live

in, and payment of wages for unpaid labor. To the extent that the enlargement of farms would utilize more family labor, the family income would be increased, even though the labor income remained the same.

Whether a farm operator could afford to spend this extra time for such a small income would depend upon whether or not he could make more money elsewhere or whether this time was leisure and not being used for any productive purpose. If farming is just an avocation and the operator's main interests lie elsewhere, he probably cannot afford to increase the size of his farm unit; but if farming is his full-time job, he cannot afford to operate on so small a scale and have so much leisure time.

As the size of the farm unit increases, the amount by which the labor income would be increased is at a decreasing rate (figure 3). This is because of the decreasing amount of excess labor.

From figure 3 it can be seen that the greatest increase in labor income, if the farm business were enlarged to profitably employ all excess labor, would occur on the smaller farms. It is in this size group that the labor income is low, and any increase in labor income within this group is highly desirable.

There are two ways a farmer can increase the size of his farm business so as to utilize all labor available on his farm. One is by extension or acquiring of additional land, and the other is by increasing the size by intensification of paying farm enterprises.

To increase the size of farm business by acquiring additional land means that the operator must purchase the land or rent it for a period of time. To be able to purchase or rent land near enough to the present land he is operating may be very difficult. Whether or not it would be

feasible to add additional land would depend largely upon the location. If the distance away is great, the resultant lowering of efficiency in use of land, labor, and capital may more than offset the advantages of a larger business.

The other method of increasing the size of farm business is by increasing the intensity of the crop and livestock enterprises. An increase in the intensity of enterprises to the seasonal supply of labor on the farm can be adjusted more readily and with less expense than can the purchase of additional land. If most of the surplus labor on a farm is present during the winter months, the purchase of additional land may not remedy the situation greatly, but the addition of a few dairy cows may supply the operator with a profitable job during the winter with very little conflict for labor between enterprises during the summer.

The degree and direction of intensification depend upon the individual characteristics of the farm, the location, the ability of the operator, and the size and age of the operator's family. A farm having nothing but shallow, rocky soil, good only for pasture, could not be successfully intensified by planting intensive crops, but would probably succeed best through specialization in dairy or livestock production.

Whether the size of the farm could best be increased by acquiring additional land or by increasing the intensity of crop and livestock enterprises depends on many factors. No set rule can be established that would fit each individual farm. The location, texture of soil, distance to market, and amount and season of excess labor will all influence the means of increasing the size of the farm and business.

CONCLUSIONS

The analysis of farm financial records on diversified irrigated farms from various sections of Utah shows a definite relationship between the size of farm business and labor income. As the size of farm business increases, there is a more than proportional increase in the labor income. The labor income increases without interruption until the size of farm business reaches a point somewhere between 600 and 900 productive man-work-units in size. But, after exceeding 600 productive man-work-units, and before reaching 900 productive man-work-units per farm, a decided decline in labor income was found to exist in each of the areas studied. The decline did not occur in exactly the same size group of farms for each area. But the fact that the drop came at approximately the same place would seem to indicate that this fact is not the result of an error in sampling. There seems to be something inherent in the organization of that group of farms that is responsible for this deviation from the expected relationship. Further detailed study could well be made in order to determine which factors are responsible for this situation.

The study also tends to show that there is a high degree of correlation between size of farm business and labor efficiency. The small farms below 100 productive man-work-units in size averaged but 95 productive man-work-units per man, while on the larger farms, averaging 841 productive man-work-units in size, the laborers accomplished 368 productive man-work-units per man. This would seem to show definitely that the large farms can utilize their labor more efficiently than can the small farms.

Since the large farm is more efficient in the use of labor and the

other factors of production, an increase in the size of many small Utah farms would in all probability result in larger farm incomes. This increase of size may be accomplished by extending the physical area or increasing the intensity of crop and livestock enterprises.

Utah has a considerable amount of excess man labor available for agricultural production, and if it could be productively employed, the labor incomes of many farms would no doubt be materially increased. And on those small farms where excess farm labor has no opportunity for more remunerative employment away from the farm, the income to the farm family would likewise be increased by intensifying or expanding the size of the farm in order to employ this surplus labor productively.

SUMMARY

1. The early settlement of Utah took place under conditions peculiar to this area. It followed closely a plan set up by the "Mormon" Church.
2. Utah's early settlement was characterized by dwarf-sized farms surrounding small villages.
3. The small-sized farms so characteristic of Utah's early settlement have developed into a serious problem which faces Utah farmers today.
4. The number of farms in Utah has increased from 21,676 in 1910 to 30,695 in 1935, an increase of 42 percent (table 1).
5. In 1930 the 19.3 percent of Utah's farms over 175 acres in size contained over four-fifths of the total farm land and almost one-half the crop land harvested.
6. The number of farms under 3 acres in size has increased from 297 in 1910 to 1,425 in 1935 (table 1).
7. The index of cash income received by farmers follows closely the index of farm prices (figure 1).
8. There is a high degree of relationship between size of farm business, as measured by productive man-work-units, and labor income (table 3).
9. There is an unexpected drop in the labor income for all four studies for the size class between 600 and 900 productive man-work-units (table 3).
10. There is a close relationship between size of farm and labor efficiency. The farms under 100 man-work-units in size have a labor

efficiency of 95 productive man-work-units per man, while those farms over 900 productive man-work-units have a labor efficiency of 342 man-work-units per man (table 5).

11. The Weber area study is the only one that shows a decline in labor efficiency in the size class in which the drop in labor income occurs. Between 600 and 700 productive man-work-units in size there is a drop in labor efficiency from 313 productive man-work-units per man down to 252 (table 5).

12. The average labor income for farms under 100 man-work-units in size was a negative \$240, while for the large farms of over 900 productive man-work-units it was \$1,204 (table 4).

13. Of the farms over 900 man-work-units in size, 64 percent received a labor income of \$1,000 or more, while for those between 200 and 300 man-work-units in size only 5 percent received an income this large (table 4).

14. The specialized livestock farms under 500 man-work-units in size received a negative labor income of \$33, while those having 1500 or more man-work-units received a labor income of \$4,469 (table 7).

15. Utah farms having less than 500 laying hens had a negative labor income of \$14, while those having flocks of 1500 or more hens averaged \$3,272 labor income (table 8).

16. In an area not adapted to the type of farming carried on, or during periods of unfavorable prices or adverse weather conditions, the general relationship between size of farm and labor income is opposite to what is generally expected. Under these unfavorable conditions the larger the farm, the larger the losses.

17. The farms under 100 productive man-work-units in size have

an average of 148 days of excess man labor, while the farms over 900 man-work-units in size have only 29 days of excess labor available (table 10).

18. If all excess labor available on the average farm in this study under 100 man-work-units in size could be productively employed on the farm, the labor income could be increased from a negative \$240 up to a positive \$42 (table 11).

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