THESIS
ON
A FARM MANAGEMENT STUDY OF TWO GROUPS
OF FARMS IN THE SHERWOOD DISTRICT

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By
JAMES MARCUS ALCORN
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<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outline and Table of Contents</td>
<td></td>
</tr>
<tr>
<td>Purpose of Survey</td>
<td>1</td>
</tr>
<tr>
<td>Value of Survey Work</td>
<td>1</td>
</tr>
<tr>
<td>Location of Survey Area</td>
<td>2</td>
</tr>
<tr>
<td>Description of Area</td>
<td>2</td>
</tr>
<tr>
<td>Intensive Type</td>
<td>2</td>
</tr>
<tr>
<td>Diversified Type</td>
<td>3</td>
</tr>
<tr>
<td>Markets</td>
<td>4</td>
</tr>
<tr>
<td>Onion Farms</td>
<td>4</td>
</tr>
<tr>
<td>General Farms</td>
<td>7</td>
</tr>
<tr>
<td>Definitions</td>
<td>8</td>
</tr>
<tr>
<td>Statistical Study</td>
<td>10</td>
</tr>
<tr>
<td>Labor Income</td>
<td>10</td>
</tr>
<tr>
<td>Onion Farms</td>
<td>10</td>
</tr>
<tr>
<td>Major Factors and Labor Income on Intensive Farms</td>
<td>10</td>
</tr>
<tr>
<td>Size of Business</td>
<td>11</td>
</tr>
<tr>
<td>Yields per Acre</td>
<td>12</td>
</tr>
<tr>
<td>Price of Onions</td>
<td>15</td>
</tr>
<tr>
<td>Minor Factors and Labor Income on Onion Farms</td>
<td>15</td>
</tr>
<tr>
<td>Per Cent of Income from Onions</td>
<td>15</td>
</tr>
<tr>
<td>Productive Live Stock</td>
<td>17</td>
</tr>
<tr>
<td>Crop Area per Man</td>
<td>18</td>
</tr>
<tr>
<td>Crop Acres per Horse</td>
<td>18</td>
</tr>
<tr>
<td>Machinery</td>
<td>18</td>
</tr>
<tr>
<td>Distribution of Capital</td>
<td>19</td>
</tr>
<tr>
<td>Working Capital</td>
<td>19</td>
</tr>
<tr>
<td>Sources of Income</td>
<td>20</td>
</tr>
<tr>
<td>Conclusions</td>
<td>21</td>
</tr>
<tr>
<td>General Farms</td>
<td>22</td>
</tr>
<tr>
<td>Factors Influencing Income on General Farms</td>
<td>22</td>
</tr>
<tr>
<td>Major Factors</td>
<td>26</td>
</tr>
<tr>
<td>Size of Business</td>
<td>26</td>
</tr>
<tr>
<td>Total Capital</td>
<td>27</td>
</tr>
<tr>
<td>Working Capital</td>
<td>28</td>
</tr>
<tr>
<td>Distribution of Capital</td>
<td>29</td>
</tr>
<tr>
<td>Diversity of Business</td>
<td>29</td>
</tr>
<tr>
<td>Production per Animal Units</td>
<td>29</td>
</tr>
<tr>
<td>Minor Factors</td>
<td>34</td>
</tr>
<tr>
<td>Crop Acres per Horse</td>
<td>34</td>
</tr>
<tr>
<td>Crop Acres per Man</td>
<td>34</td>
</tr>
<tr>
<td>Machinery and Tools</td>
<td>35</td>
</tr>
<tr>
<td>Conclusions</td>
<td>35</td>
</tr>
<tr>
<td>Comparative Summary</td>
<td>38</td>
</tr>
</tbody>
</table>
AN AGRICULTURAL SURVEY
of the
Sherwood District, Sherwood, Oregon.

Purpose of the Survey.

This survey was undertaken for the purpose of determining, so far as possible, the relative profits from intensive as compared with general or diversified farming and to inquire as to the factors that contribute to the results shown by the survey. The Sherwood onion district with the general farms adjacent thereto was selected as representative of these two types of farming and statistics gathered on sixteen farms from each of the groups. The material thus obtained has been worked over and conclusions drawn as set forth in the body of this paper.

Value of Survey Work.

Success or failure on the average farm is dependent on a number of factors, such as size of farm; diversity of enterprises; quantity and quality of livestock; the efficient use of man and horse labor and of machinery; amount and distribution of capital; yields per acre, etc. The best known means of determining the relation of each of these many factors to the success of the whole is through the Agricultural Survey as developed by Warren of the N. Y. Experiment Station within recent years. Many of the States have taken up this
work and have done much in leading the farmer to realize wherein he is making his success or his failure. Work of this kind is needed in practically all sections of this State and it is hoped that this survey, though limited in extent, may shed some light on the problems of the farmers in the Sherwood district.

Location of the Survey Area.

Sherwood is located on the Southern Pacific railroad, in Washington County, some eighteen miles southwest of Portland. It is a small rural town of about four hundred people and is the shipping center for the district represented in the survey. The onion land lies along the Tualitan river North of the town and the general farms within a radius of four or five miles around it.

Description of Area.

Intensive Type:— The onion land is a pure beaver dam soil which accumulated during past ages in old river channels and swamps of the Tualitan river valley. Most of this soil is very rich and deep. It lies in two main swamps near the river and several smaller ones in narrow arms of the main valley or in isolated pockets in the second bottoms. Most of the swamps are subject to overflow during the rainy season, often being covered to a depth of fifteen to twenty feet one
or more times during the winter and spring. The water remains so late in the spring occasionally that seeding is delayed beyond the proper season and it is only through intensive drainage that planting is at all possible.

Most of the onion farms are small tracts compared with the general farms, and consist of a few acres of beaver dam lying in the swamp and a small acreage of adjacent second bottom land on which the buildings, home orchard, etc. are located. The onion land is very high priced, ranging from about four to eight hundred dollars. The different holdings are not fenced, border lines being represented by open ditches, narrow paths between areas, etc. The open ditch has largely given place to the covered drain, however, and the land more fully utilized. There is generally a considerable incline connecting the upper and the lower portions of the farm. Onion seed, vegetables, etc. are grown along the base of this on the soil that has worked down from above so as to cover the beaver dam.

Diversified Type:— The sixteen general farms included in the survey are among the better diversified farms of the community. About half of them are river bottom land of a good loam type and the remainder rolling upland of about equally productive soil. The cultivated area of most of these farms is being gradually enlarged through the clearing of new land. A large number
of them thus represent land that has been under cultivation anywhere from one to as many as thirty to forty years. Many of the farmers practice quite systematic crop rotations, using clover as one of the crops so that the soil is kept in good tilth and productiveness. There is no one general product that is common to all these farms as a major source of income. Some do considerable dairying, other grow hops as their main crop, while still others are grain or livestock producers. Several of them grow a considerable acreage of onions, but not enough to place them among the special onion farmers. The farmers are as intelligent and progressive as the average farmer of the valley.

Markets.

Onion Farms.—The onion growers have an association which maintains a warehouse and selling agency in Sherwood and an agency in Portland during the marketing season. This association has done much for the growers in the way of finding markets and in maintaining prices, especially during years when there was not a ready market for the output. A few of the larger growers do not sell through the association but secure the advantages brought about by the organization without paying the commissions required from those selling through it. They argue that anyone can sell onions when they are scarce and in demand, but that no one can get much for them when they are plentiful and cheap and that they are
thus as well off without the association whatever the conditions. They do not consider that if all the growers were to throw their product on the market individually and in competition with each other it would be extremely difficult to maintain the prices they get even in the best years. As it is the association sets and maintains the prices and the few growers who sell independently may hold to these when onions are moving well or they may sell slightly under them so as to move their crop when the market is a little slow.

Prices were good during the year covered by the survey, reaching a height of two dollars per sack during a part of the season. Many of the growers were unable to take advantage of this high price, however, since they store their crop in buildings that permit the onions to freeze during the cold weather, and they must not be handled when frozen. One of the larger growers has double-walled houses for his crop and by placing stoves in them prevented the freezing of his onions. He was thus able to turn his holdings at the high prices and at much better profit than was general for the community. After warm weather set in and the onions thawed, prices went down to one dollar and fifty cents. Many of the onions softened and sprouted so they could not be marketed and considerable loss was sustained in this way. During this one season the well built onion house much more than paid for the additional expense in its construction.
One of the well constructed onion houses in which the onions do not freeze.

Markets are not always as satisfactory as they were this year. A very considerable portion of the 1914 crop could not be marketed at all and many of the growers lost hundreds of sacks. The remainder of the crop sold at prices ranging from fifty cents to one dollar per sack, and many of the growers scarcely made enough to pay their expenses. This condition came about largely through the very abundant crop in this and other northern onion sections, which prevented the early marketing of the supply before the California crop came on in the spring. This condition happens rather frequently so the onion grower does not secure uniform results from his crop. The present survey is thus only indicative of what may be done by the specialized farm during one of its best years.
number of years would need to be taken into consideration before a general conclusion could be drawn as to the desirability of this type of specialized farming, as compared with the general farm.

**General Farms.** Marketing from these farms is done largely in Portland where cash crops, live stock and surplus products are sold at reasonably good prices. A number of the farmers have special customers in the city from whom better prices are obtained than are common to the average general farmer of the valley. A few of the farmers are organized for selling certain products on the public market in Portland and for buying farm supplies in quantity and at better than retail prices. The good roads to Portland make possible the hauling of large loads or the making of quick trips with light wagon, or auto. Rail connection is good, freight and express charges small, so considerable produce is sent in by rail. Where larger freight shipments are made, small stations on each side of Sherwood render the local haul almost negligible. This easy access to market probably brings the general farms of the community more prosperity than if they were located in sections of the valley more remote from the city.

The present survey represents the average condition for a number of years on the general farms much more closely than in the case of the onion farms, since the former experience less fluctuation in prices from year to year than do the latter. However, the hop growers
have to contend with more or less variation in yields and prices, the year covered by the survey being a rather unprofitable one for this industry. Of course the general farmer who obtains a considerable proportion of his income from onions has the same fluctuation in this portion of his income as is felt by the special grower of onions, and the present year being a good one for the crop would tend to give better returns to the growers who produce onions as a minor crop.

Definitions.

The following definitions are given in order that certain portions of this paper may be made clear to the general reader:

Farm Capital.- This represents the total investment of the farmer and includes land, buildings, livestock, machinery, supplies, etc. For the rented farm, it would represent the combined investment of both landlord and tenant and cover such items as given above.

Working Capital.- The working capital covers all the farm capital except the real estate and covers livestock, machinery, supplies, feed, etc.

Farm Income.- By this term we mean the total receipts from all sources less the total expense for all other than household and personal use. The income would cover such items as cash taken in from various sources, increase in value of livestock as from growth of young
stock, etc., increased feed and supplies during the year, improvements added during the year, etc. The expense would cover money actually paid out, decrease in value of livestock, depreciation in value of buildings, machinery, fences, etc., decrease in amount or value of supplies, feed, etc. The farm income is thus the combined earnings of the farmer together with that of the capital invested in the farming enterprise.

**Labor Income.**—A farmer's labor income is the amount he has left at the end of the year after all expenses have been paid and five percent on the value of the farm investment has been deducted. In other words, it is what the farmer has made from his own effort after allowance has been made for the earnings of his capital and for farm labor done by other members of the family for which they have not been paid.

**General Farm.**—A farm having its income derived from a number of main sources is here considered a general or diversified farm.

**Intensive Farm.**—A farm having sixty percent or more of its income from onions is considered a special onion farm, or an intensive farm, in this survey.

**Productive Animal Unit.**—A productive animal unit is one cow, two young cattle, or enough other stock to consume as much food and produce about as much manure as one mature cow.
The following table is arranged to show the average labor income derived from the general as compared with the specialized farms of this survey. Following this table will be a discussion of the factors that contribute to the conditions shown by this table:

Table 1. Comparative labor incomes from specialized and general farms.

<table>
<thead>
<tr>
<th>Number of farms.</th>
<th>Type of farm.</th>
<th>Range of labor income: income.</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Diversified.</td>
<td>-$864 to $376</td>
</tr>
<tr>
<td>16</td>
<td>Intensive</td>
<td>-$408 to $1927</td>
</tr>
</tbody>
</table>

There are three main factors that determine the success of the onion farmer in this district. These are: size of business, yields per acre, and price of onions. The farm profits are reduced in proportion to the number of these factors that falls below normal, as well as to the extent of the fall. There are, of course, a number of other minor factors influencing the results, but when these are known, a very close estimate of farm profits can be made. The first two of the factors are largely under the control of the farmer. The third is partly under the control of the association, but not under that of the individual farmer.
Discussion of the above major factors along with some of the minor ones follows:

Size of Business.- The average acreage of onions on the 16 farms was determined and found to be very close to eight-and-one-half. With this number as a division point, it was found that eight, just one-half, of the farms fell below it. These eight ranged from two-and-a-half to eight acres and average 4.8. The average labor income of this group was found to be $91. The other eight farms ran from nine to twenty acres and averaged 12.25 acres. They had an average labor income of $848. Table No. 2 shows the result obtained from grouping the farms as to size:

Table 2. Relation of size of business to labor income on onion farms.

<table>
<thead>
<tr>
<th>Number of Farms</th>
<th>Av. No. of Acres</th>
<th>Av. Labor Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>4.8</td>
<td>$91</td>
</tr>
<tr>
<td>8</td>
<td>12.25</td>
<td>848</td>
</tr>
<tr>
<td>16</td>
<td>8.5</td>
<td>469</td>
</tr>
</tbody>
</table>

It is thus seen that size of business plays an important part in the making of a satisfactory labor income on the specialized farm as well as on the general farm as shown by Warren in the N. Y. surveys. It seems necessary that the onion grower who proposes to make much clear money, even in good years have eight or more acres devoted to the crop. The farmer with a smaller acreage than this has open to him two methods of increasing his
farm area. These are by purchase or by rent; unless he does one or the other he must be content with a small income.

The larger business permits a fuller employment of the time of the farmer and his team, especially during the winter in topping and hauling the onions to market. Where a profit is made over the cost of production the larger the business the larger the income. Much work has to be hired, but it is very seldom that the onions sell below the cost of production, so little risk is run in hiring labor in raising and marketing the crop. On the larger farms the farmer thus has the income from his own efforts as fully as on the smaller one and also from the labor of a considerable number of hired hands during a part of the year.

Yields per Acre.—The sixteen farms were again divided according to yields per acre from onions. There were eight farms that had yields of 200 sacks or more and averaged 243 sacks. All of these made plus labor incomes with the average of $840. Two of these farms had incomes of $1810 and $1927 respectively, the largest incomes of the farms in the survey. If these two be eliminated from the number with the larger yields the remaining six have an average income of $498. The other eight farms had less than 200 sacks per acre and averaged 165 sacks. Five of these made minus and three plus labor incomes. The eight had an average of only $33. The difference in yields
between the two groups is 78 sacks per acre, or an amount equal to almost 50% of the crop of the lower yielding group. The average farm consisted of $8\frac{1}{2}$ acres and the selling price of onions for the year was $1.27. The increased yield made a difference of $774 for the year in favor of the better yielding farms. This amount was largely clear money to the better growers since the preparation of the land and the raising of the crop was practically the same whether the smaller or the larger crop was obtained. About the only extra expense would come from the sacking, hauling in, topping and marketing the extra crop.

The following table shows the relation of yield to income as determined by the survey:

| Number of farms | Av. Yields : Labor Income : Number making plus Labor Income |
|-----------------|------------------------|-----------------------------|
| 8               | 165 sacks              | $91                         | 3               |
| 8               | 243                    | 840                         | 8               |
| 16              | 204                    | 469                         | 11              |

Thus to a larger business it is seen that the grower must add good production per acre if the best results are to be obtained. Neither alone is sufficient to produce the best results.

The difference in yields cannot be accounted for in difference in labor cost since the farms having the
larger yields had an average labor expense of 31 cents per sack produced and the farms with the low yields had an average of 45 cents per sack. It is impossible to segregate the expense on onions from that of other crops since none of the farms are devoted entirely to onions. The average percent of income from this crop on the better yielding group was 84 and on the other group 75. The extra labor expense found on the poorer yielding farms might have been due to labor on other crops rather than being spent on the onions. This factor would probably not have overcome the difference in cost per sack, however, so that the increased yield would still probably not be due to increased labor cost.

The additional yield from the better farms is not overcome by a larger expense for manure and fertilizers, since the farms with the smaller yields spent an average of $11.00 per acre for these materials and the better farms an average of only $18.00. The difference is too small to in any measure off-set the value from the additional yields, yet it is a difference of more than 60% of the fertilizer used on the less productive farms. This difference probably accounts, in large measure, for the increased yields. The farmers who give more attention to fertilizers probably are more careful with their crop in other ways, such as drainage, time of seeding, care in weeding, cultivation, etc., all of which would tend to increase the yields.
Price of Onions.- Price is the third major factor determining the profits from onion growing. As has already been pointed out, prices vary so widely that profits may be wiped out even with a large acreage, and the best of yields. The grower is thus never certain of his income until his sales are made. It is frequently difficult to determine the best time of the season to sell, even with the assistance of the association in learning conditions of supply and demand in other sections of the country. Prices are occasionally higher in the fall than in the spring. This results from good spring crops in California that cannot be foreseen in the fall. On the other hand, a short crop in California may permit higher prices in the spring. In order to meet the condition halfway many growers sell part of their crop in the fall and hold the remainder for the season following the holidays. The average price over a number of years is high enough to permit a reasonable average profit on the larger, better managed farms, if indications on these farms are not misleading, as the onion farmers seem to be prosperous.

Minor Factors Influencing Profits on Intensive Farms.

Percent of Income from Onions.- The percent of income derived from onions on the farms of this survey varied from practically nothing to about 99 percent. Only those deriving sixty percent or more from onions have been considered special onion farms. Some statistics on
those running from 20 to 40 percent have been given in one or two cases, but there are no farms falling in the gap between 40 and 60 percent. There were 16 of this specialized type ranging in income from onions from 61.5 to 98.94 percent and averaging 78.1. Eleven of the sixteen made plus labor incomes ranging from $272 to $1927 and averaging $800. The remaining five had minus labor incomes varying from minus $50 to minus $772, with the average at minus $416. The average of the whole sixteen farms was a plus labor income of $469.

If we divide these sixteen farms into two groups again, placing those that obtain 80% or more of their income from onions in one group and those between 60 and 80 percent in another, we find that there are seven farms in the first group making an average labor income of $880 with only one making a minus income. This farm had 81 percent, the lowest of the group, from onions and made a minus income of $408. This low income came from a large expense and poor yield. The remaining nine farms, with 60 to 80 percent from onions, made an average labor income of $162. Five of this number had plus labor incomes averaging $624, the other four having an average income of minus $415.

The following table shows the effect of percent of income from onions on labor income:
Table 4. Relation of percent of income from onions to labor income.

<table>
<thead>
<tr>
<th>Percent of Income</th>
<th>Number of Farms</th>
<th>Range of Income</th>
<th>Average labor Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-43 Av.30%</td>
<td>5</td>
<td>$34 to -$864</td>
<td>-$229</td>
</tr>
<tr>
<td>60-80 Av.71%</td>
<td>9</td>
<td>$1068 &quot;-$772</td>
<td>$162</td>
</tr>
<tr>
<td>80-99 Av.90%</td>
<td>7</td>
<td>$1927 &quot;-$408</td>
<td>$880</td>
</tr>
</tbody>
</table>

It is thus seen that the farms with the largest percent of their income from the specialized crop make the largest labor income and that this income grades down steadily as the percentage of income from this crop falls. It thus appears that the onions were more profitable than the other crops largely grown with them.

Productive Livestock.- The amount and quality of livestock determine largely the success of the general farm. This does not apply to the specialized farm such as truck or onions. Land used for these purposes is usually too expensive for growing crops for the average dairy cow or other farm stock. Only the horses necessary for farm work and other stock needed for family use is kept on such farms. The onion farms averaged only four productive livestock units each. This stock generally consisted of two family cows, one or two pigs, and a flock of poultry for family use. The income from stock and stock products was thus so small as to have no appreciable influence on the labor incomes of these farms.
Crop Acres per Man.- These farms have an average of only four acres of onions per man. Most of the labor such as seeding, weeding, cultivating, pulling, topping, etc. is done by hand. The work is, for the most part, rather tedious, and time consuming, and requires a large amount of labor per acre. The farmer with any considerable acreage must therefore use a comparatively large amount of outside labor. Much of the weeding and hoeing is done by women and children. They can do it easily and as efficiently as men and are paid the same wages as men receive. The labor item is one of the heaviest expenses of the crop.

Crop Acres per Horse.- The onion farms have an average of thirteen acres for each horse kept. This is a smaller acreage per horse than is usually found on general farms, but each farm must have two horses though they work but a small portion of the time. They are used very little except for preparing the soil for the crop and for hauling in onions when harvested in the fall, and to market when sold. Where the acreage is small and the ground works very easily, very large expensive teams are unnecessary. On the larger farms where some general crops are grown, from three to five horses are usually kept.

Machinery.- The small amount of machinery required on the onion farm is very simple and inexpensive. About all that is needed is a wagon, a light walking plow, a harrow, an onion drill, and a few hoes. The total value
of machinery necessary for the larger onion farms was only $160 to $340, including a manure spreader on many of the farms. Two of the farms have special onion topping machines; these, however, are not an essential part of the equipment and do not top and sort the onions so well as when done by hand.

**Distribution of Capital.** - The capital invested in the onion business is very largely in real estate. The average for this item was 94% of the whole capital invested. This was divided into 80% land and 14% buildings. Four percent of the total was in livestock and two percent in machinery. This is a relatively larger proportion in real estate and much less in livestock and machinery than the average for the general farms of the survey, or for those of the United States as a whole. This distribution, however, seems to be the logical one for farms of this type.

**Working Capital.** - The farm surveys that have been made in the various parts of the United States have consistently shown that the farm with a liberal working capital is more efficient than one lacking in this respect. The amount and percent vary widely with the different types of farms. Most of the specialized type, such as dairy, pure bred stock, etc. require more than the average general farm. The smaller the total capital, the larger the percent required as working capital. In New York where the average total capital is about $5,000
thirty percent is required. In Illinois where the total farm investment averages above $15,000, only 15% is necessary for best results. The onion farms of this survey, being composed of very high-priced land and not being adapted to livestock, do not need a very large percent of working capital. The seven farms having the largest percent, ranging from 6.9 to 12.4 and averaging 8.9 have an average labor income of $579. The remainder of the farms have 1.9 to 6.3 percent working capital and the average at 4.7, and a labor income of $309. It thus seems that working capital, though small on these intensive farms, is also a factor influencing labor income.

The table below shows the influence of working capital on labor income:

Table 5. Relation of percent of working capital to labor income.

<table>
<thead>
<tr>
<th>Number of Farms:</th>
<th>Av. total Capital:</th>
<th>Av. working Capital:</th>
<th>Percent of W. Capital:</th>
<th>Labor Income:</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>$18,355</td>
<td>$1,362</td>
<td>8.9</td>
<td>$570</td>
</tr>
<tr>
<td>9</td>
<td>12,735</td>
<td>613</td>
<td>4.8</td>
<td>309</td>
</tr>
</tbody>
</table>

Sources of Income: These farms have a very limited number of sources from which an income is derived. Onions, of course, serve as a major source on each of them. More than 87% of the total comes from this crop. One farm has a major income of $434 from hay and another one of $771 from stock. The remaining farms have only one main source of income. They average less than two
minor sources of $40 to $400. Stock and stock products bring in about 5 per cent of the total income, and crops other than onions about 8 per cent of the whole. It is thus seen that these farms are highly specialized and that when the onion crop fails very little is left for the year's work.

Conclusions

The success attained by a number of the onion farms during the year of this survey was due very largely to the major factors as formerly set forth in this paper. These controlling factors are:

Size of Business.—The eight farms carrying an average of 12.25 acres each did a large total business (though the acreage was small) and made very nice labor incomes. The other onion farmers should make an effort to increase their crop acreage as a means of obtaining better incomes. This increased acreage might be obtained either through rent or purchase.

Quality of Production.—The farms securing the larger yields, averaging 243 sacks per acre, were
much more successful on the average than those with the smaller yields of 165 sacks. The low yielding farms would probably increase their incomes if they would increase their yields per acre. This could in all probability be done by the use of as much manure and fertilizers as are used on the better farms, by the use of green manure crops, etc.

Price as a Factor.—The returns per sack of onions often determined whether or not the grower is to make a profit on his crop. The grower has very little control over prices. He may hold his onions in condition for quick marketing, however, so he can put them out when prices are good. Many of the growers lost heavily the year of this survey from letting their onions freeze so they could not be handled during the period of high prices. Better storage facilities and closer allegiance to the selling organization would help materially. It would seem that most of the growers could make money, especially during a year like the one under consideration here, if they would comply with the demands of the factors here shown to be the ones determining success or failure on these farms.

Per Cent of Income from Onions.—It has been shown that the labor income increases directly as the per cent of income from onions. The farms averaging
30 per cent had an income of minus $229. Those averaging 71 per cent had a plus income of $162. Ninety per cent gave an average labor income of $880. The growers, therefore, should exclude other crops so far as possible.

Productive Live Stock.—No live stock other than work horses and a family cow or two, with a few chickens, is kept. Therefore this factor is of no importance on onion farms.

Crop Acres per Man.—The onion farmers had an average of only 4 crop acres of onions per man. This is an unusually small acreage and indicates the intensity of the crop.

Crop Acres per Horse.—The number of crop acres per horse is very small, being only 13, which is unusually small even for intensive farms, showing that this type of farming cannot make efficient use of horses.

Machinery.—Very little machinery is required on the onion farm, since most of the work is done by hand. This factor is therefore unimportant in relation to labor income.

Distribution of Capital.—Owing to the high price of land and small equipment in machinery and live stock, a very large per cent (94) is invested in real estate.

Working Capital.—The farms with best equipment in working capital made the most satisfactory labor
incomes. The seven averaging $1,362 had an average income of $570. The nine having an average of only $613 made an average of only $309. More working capital would thus apparently increase the chances of success on these farms.

Sources of Income.-These farms have a very limited number of sources of income, averaging only slightly better than one major and two minor ones. The indications are that the centering of all the income in onions where a large enough business can be done, would be desirable, since the larger the per cent of income from onions the better the labor income.
General Farms.

One of these sixteen farms was discarded from consideration since it was found not to be strictly comparable with the others. The others were analysed in much the same way as the onion farms. It was found that when the actual business expenses for the year and five percent on the investment had been deducted from the total receipts for the year, there was an average minus labor income of $208. Twelve of these farms had minus labor incomes ranging from minus $51 to minus $864 and averaging minus $331. Three had plus labor incomes ranging from $34 to $376 with the average at $220. These figures contrast rather sharply with those from the onion farms, eleven of which made plus incomes averaging $469 each.

Factors Influencing Incomes on General Farms.

There are four major factors that combine to determine the income from the general farm. These are: size of business; diversity of business; crop yields per acre; and production per animal unit. A number of minor factors also effect the final result as in the case of specialized farms, but if these four main factors are held up to proper standards, the chances are very much in favor of satisfactory farm profits.
Major Factors.

Size of Business. In the farm surveys thus far made in the United States, it has been found that size of business is a constant factor affecting farm profits. The average general farm of less than about one hundred acres has been shown to be unprofitable. The farm must be large enough to permit the production of a number of crops on rather an extensive scale. For more intensive farming a smaller acreage may be needed, but it must always be sufficient to permit of a large business. The truck farm may succeed with but a few acres, and the special greenhouse with only a fraction of an acre, but the volume of business must still be large.

Only one of these farms exceeded one hundred acres in crops. Seven of them had less than fifty, and eight ranged from fifty to one hundred and seven acres. The first group averaged thirty-nine acres, with a farm income of minus $33, as an average for the seven. The labor income was minus $437. The eight farms each having more than fifty acres averaged eighty and had an average farm income of $872, with a labor income of minus $31. Table No. 6 shows the relation of size of farm to labor income.

Table 6. Relation of Size of farm to Labor Income.

<table>
<thead>
<tr>
<th>No. of farms</th>
<th>Range: in A.</th>
<th>Av. Acres</th>
<th>Labor Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>18-49</td>
<td>39</td>
<td>$-437</td>
</tr>
<tr>
<td>8</td>
<td>55-107</td>
<td>80</td>
<td>$-31</td>
</tr>
</tbody>
</table>
The 15 farms averaged 110 acres in size. This included all woods, waste and crop areas. The average crop area was 61 acres, or 55 per cent of the total area. The acreage in woods equaled 38 acres per farm, or 34.5 per cent of the farm, and the waste land 11 acres, or 10.5 per cent.

The average value per acre of the total acreage is $156, a rather high figure for land all of which is tillable. The realty investment on these farms averages $264 per acre for the productive land. The interest charge per acre at this price is $13.20, an amount too large for general farm land to stand and still make profitable returns under average conditions. Most of the farmers are gradually cutting down this acreage charge by clearing more of their wood land and putting it into crops. The expense of clearing is so heavy, however, that it adds a considerable investment charge to the already high price of land.
It is thus seen that the size of the farm or the size of the business also has a great influence over the income derived from the farms of this survey. The smaller farms do not offer work enough to keep the owner and his team, machinery, etc., occupied during enough of the year to make profits possible. There is no chance for profits from hired labor on the small farm. A relatively large part of the product is needed for the maintenance of the farmer's family and for his work horses, so little is left for the market. The small farm, to be profitable, must be devoted to intensive farming, not to general farm crops. An onion farm of twenty acres may be a large farm supporting a large business, while the same acreage devoted to grain, etc., would not be sufficient to support even a small family in comfort.

Capital.—The amount of capital invested is another measure of the size of business. The average total capital of these fifteen farms was $16048. With this number as a division point, it was found that eight farms each had a smaller capital than this, with the average at $12207. These farms all made minus labor incomes averaging $415. The other seven farms having more than $16000 averaged $20106. This group included the three farms that made plus labor incomes. The average labor income for the seven was plus $3.
The farms having the larger capital are thus able to make interest on the larger investment and $418 better labor income than the smaller farms. Capital or size of business is thus seen to be one of the very important factors governing labor income on the general farms of this survey. The same condition has been shown to exist in other farm surveys of this and other states.

The table below shows the influence of capital on farm profits:

<table>
<thead>
<tr>
<th>No. Farms</th>
<th>Average Total Labor Income</th>
<th>No. Making Plus Capital</th>
<th>Labor Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>$12207</td>
<td>-$415</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>20106</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

From the above results we see that the farmers in this district have very little chance of making a satisfactory labor income unless they have the use of at least $16000 capital.

Working Capital.—The farm surveys from various parts of the country have shown the farm that is better stocked and supplied with machinery to be more profitable than the one more deficient in these respects. This survey is in keeping with these findings. There were six farms in the survey having a working capital of more than $2000, and averaging $3264. These farms had an average plus labor income of $14. The other nine farms each had
less than $2000 and averaged $1470, and had an average labor income of -$374. The accompanying table shows these results.

Table 8. Relation of Working Capital to Labor Income

<table>
<thead>
<tr>
<th>No. Farms</th>
<th>Average Working Capital</th>
<th>Labor Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>$3264</td>
<td>$ 14</td>
</tr>
<tr>
<td>9</td>
<td>1470</td>
<td>- 374</td>
</tr>
</tbody>
</table>

The larger working capital consisted principally of more live stock carried on some of the farms, thought better machinery equipment accounted for part of it.

Distribution of Capital.—Of the total average capital on the general farms, $14,069 or 87.3 per cent was invested in real estate; $1331 or 8.3 per cent in live stock; and $715 or 4.4 per cent in machinery. The per cent in real estate was 14 per cent higher than in the New York Survey, the live stock was 8 per cent lower, and the machinery 3 per cent lower. It thus seems that real estate is either higher here in proportion to machinery and stock, or that the farms here are not so well stocked and supplied with machinery as in New York. Both factors probably account in part for the condition shown here.

Diversity of Business.—Farm surveys made in various parts of the United States have shown that the
farm which derives its income from more than one main source has a better chance of success than where all the income is derived from a single product. The best proportion from different sources seems to be about 50 per cent from stock, 30 to 40 per cent from crops, and 10 to 20 per cent from other sources. A farm with a small capital must usually derive a larger per cent of its income from crops than where larger capital is possible.

The average gross income on these general farms was $1,596. Of this, $921 or 58 per cent was derived from crops; $511 or 32 per cent from stock receipts; and $164 or 10 per cent from miscellaneous sources. It is thus seen that the distribution on these farms was not entirely satisfactory, since too much of the income was derived from crops and too little from stock.

The following table shows the crops grown in this section and the number of farms growing each as major and minor crops. A product returning an income of $400 or more is considered a major source of income, and one producing $40 to $400 a minor one.
Table 9. Distribution of Crops on General Farms

<table>
<thead>
<tr>
<th>Crop</th>
<th>Major</th>
<th>Minor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hops</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Wheat</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Oats</td>
<td>0</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Hay</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Onions</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Potatoes</td>
<td>2</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Fruit</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Stock</td>
<td>8</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>35</td>
<td>60</td>
</tr>
</tbody>
</table>

The farms of this survey thus averaged about one and one-half major products each and about three minor ones. The major products averaged $704 and the minor $175 each. The average general farmer who obtains his income from so few sources and in such small amounts usually does not make as good an income as the one with a larger variety of products, or with a small variety products in large quantities.

A diversified business usually distributes the income through the year better than the single crop system. With only one product for market, all the year's money is likely to come in at one time, and it is often very difficult to distribute it over the year until the next crop is sold. The well balanced farm does not experience this difficulty.
The following table shows crops grown on the general farms in this survey:

Table 10. Acreage and Yields of Crops on General Farms

<table>
<thead>
<tr>
<th>Crops</th>
<th>No. Farms Growing Crop</th>
<th>Total Acreage</th>
<th>Ave. No. Acres</th>
<th>Ave. Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat</td>
<td>14</td>
<td>160.5</td>
<td>11.5</td>
<td>28</td>
</tr>
<tr>
<td>Oats</td>
<td>15</td>
<td>296.0</td>
<td>20.0</td>
<td>44</td>
</tr>
<tr>
<td>Barley</td>
<td>2</td>
<td>4.0</td>
<td>2.0</td>
<td>59</td>
</tr>
<tr>
<td>Corn</td>
<td>3</td>
<td>10.5</td>
<td>3.5</td>
<td>42</td>
</tr>
<tr>
<td>Corn for Silage</td>
<td>2</td>
<td>10.0</td>
<td>5.0</td>
<td>8</td>
</tr>
<tr>
<td>Hay</td>
<td>15</td>
<td>231.0</td>
<td>15.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Hops</td>
<td>4</td>
<td>34.0</td>
<td>8.5</td>
<td>480</td>
</tr>
<tr>
<td>Potatoes</td>
<td>15</td>
<td>88.0</td>
<td>5.5</td>
<td>37</td>
</tr>
<tr>
<td>Onions</td>
<td>6</td>
<td>15.5</td>
<td>2.6</td>
<td>179</td>
</tr>
<tr>
<td>Kale</td>
<td>4</td>
<td>6.0</td>
<td>1.5</td>
<td>---</td>
</tr>
<tr>
<td>Apples</td>
<td>3</td>
<td>8.0</td>
<td>2.6</td>
<td>61</td>
</tr>
</tbody>
</table>

It will be noticed from the above table that the total and average acreage of the various crops are very small for diversified farms. The yields in most cases are reasonably good. It is thus the size rather than the quality of business that stands in the way of success on these farms.

Production per Animal Unit.—Warren and other investigators have shown that the more successful general farms receive about 50 per cent of their income from stock and stock products, and that in order to be profitable each productive live stock unit must give a return of about $75 or more.

The following table shows the relation of receipts per live stock unit to labor income:
Table 11. Relation of Production per Live Stock Unit to Labor Income

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>15</td>
<td>$71</td>
<td>-$69</td>
</tr>
<tr>
<td>6</td>
<td>6.5</td>
<td>$29</td>
<td>-$354</td>
</tr>
</tbody>
</table>

The condition shown in the above table with reference to productive live stock kept on the farm has been found to exist in most of the other surveys made, and seems to be one of the constant factors affecting the income of the farm.

The value of the manure produced by farm live stock must be taken into consideration in all computations affecting the value of stock on the farm. From $30 to $50 worth of manure is produced annually by each thousand pounds of live stock on the farm, and stock should be credited with the value of the manure produced. It it be properly cared for, it will materially aid in keeping up soil fertility, where any considerable amount of live stock is kept. The farms in this survey carrying a larger amount of live stock produced two bushels more of wheat, seven bushels more of oats, and three-tenths of a ton more of hay to the acre than those with a fewer head of stock. This is one way in which live stock helps to increase farm profits. Another is through turning into cash pasture and so forth that could not be utilized to
advantage in any other way.

**Minor Factors**

In addition to the foregoing major factors affecting farm incomes, there are a number of minor ones that must be taken into consideration. Some of these are crop acres per horse, crop acres per man, and equipment and farm machinery.

**Crop Acres per Horse.** These general farms averaged 17 acres of crop area per horse, there being an average of 3.8 horses per farm. The small farm is thus required to keep too many horses in proportion to its area, since much of the farm work cannot be done with much less than three to four horses. There is so small an acreage, however, that it is impossible to keep the teams busy for any considerable portion of the time. For this reason, horse labor on the small farm is exceedingly expensive.

**Crop Acres per Man.** There is an average of 31 crop acres per man on the general farms of this survey. This is an unusually small acreage for the type of farming done. The onion crops grown by a number of the farmers bring this acreage down to a considerable extent. Since the farms producing onions as a part of their crops had the best labor incomes and also the smallest acreage per man, it was impossible to
draw any definite conclusions on crop acres per man and labor income that would be consistent for general farms.

Machinery and Tools.—The farms of this survey had an average of $682 per farm invested in machinery and tools. This is an average of $11.20 per acre of the tillable area. It is a very high investment per acre in machinery, though the percentage of the total investment is normal, being only 4.4 per cent. This condition comes from the relatively high price of land on these farms.

Conclusions

The general farms, as a group, failed to make satisfactory returns. This condition is due to a number of factors, most of which might be remedied by the farmers. Among these are:

Size of Business.—The size of business, as measured by size of farm, is seen to be too small for adequate returns. This is the greatest hindrance to success on these farms, and it will be necessary that the farm area be increased through purchase or rent of additional land, or increasing the tillable area by clearing their timber and stump land.

The results obtained from increasing the size of the farm might be secured through intensifying the
crops in many cases, and thus increasing the size of business.

The size of business as measured by total capital invested has also been shown to be one of the important considerations influencing labor income. The farms with the larger capital make more profits than those with less capital, after paying interest charges on the greater investment. The larger capital should be invested in tillable land and high producing live stock. The total capital should be in the neighborhood of $20,000 for best results.

**Working Capital.** The study indicated that the larger the working capital the better the labor income. An average working capital on six farms of $3264 was accompanied by a labor income of plus $14, while an average of $1470 on nine farms was accompanied by an average labor income of minus $374.

**Distribution of Capital.** Eighty-seven percent of the total investment was invested in real estate. This is a rather large proportion and would be bettered by carrying more live stock.

**Diversity of Business.** Another of the weak places in the system of farming in this section is the lack of diversity of business. The income is derived from too small a number of sources. Diversity can come only through a larger acreage or a more intensive type
of farming, however.

**Productive Live Stock.**—Many of the farms have live stock of good quality, but the average is too low. More and better stock should be carried on most of these farms.

**Crop Acres per Horse.**—The average crop acres per horse were 17. This low average is due largely to the small size of farm. The remedy lies in increased farm acreage, since the number of horses kept is little in excess of that needed in the use of farm machinery or even the small farm.

**Crop Acres per Man.**—The general farms, though small, averaged two men per farm, or 31 crop acres per man. The onion land farmed by the general farmers probably is the main factor in this low acreage per man.

**Farm Machinery.**—The investment in farm machinery is very high, being $11.20 per acre. This is one of the unavoidable drawbacks connected with the small farm and is usually remedied only by an increase in size of tillable area.
The following table will give a brief comparison of some of the important factors associated with the two types of farms considered in this survey:

Table 12. Comparison of Factors on Intensive and General Farms

<table>
<thead>
<tr>
<th>Factor</th>
<th>Intensive Farm</th>
<th>General Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor Income</td>
<td>$469</td>
<td>$208</td>
</tr>
<tr>
<td>Total Capital</td>
<td>$16098</td>
<td>$16048</td>
</tr>
<tr>
<td>Working Capital</td>
<td>878</td>
<td>2115</td>
</tr>
<tr>
<td>Size of Farm</td>
<td>58</td>
<td>110</td>
</tr>
<tr>
<td>Total Crop Acres</td>
<td>36</td>
<td>61</td>
</tr>
<tr>
<td>Onion Crop Acres</td>
<td>8.5</td>
<td>1</td>
</tr>
<tr>
<td>Gross Income per Acre</td>
<td>239</td>
<td>27</td>
</tr>
<tr>
<td>Productive Live Stock</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Crop Acres per Man</td>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td>Crop Acres per Horse</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>Value of Farm Machinery</td>
<td>377</td>
<td>682</td>
</tr>
<tr>
<td>Per Cent of Capital in Real Estate</td>
<td>94.</td>
<td>87.3</td>
</tr>
<tr>
<td>Sources of Income</td>
<td>3</td>
<td>4.5</td>
</tr>
<tr>
<td>Per Cent of Income from Stock</td>
<td>5</td>
<td>38</td>
</tr>
</tbody>
</table>