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Man-Power in Agriculture



Address

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FOREWORD

The conclusions of this bulletin are based upon records of farm operations in Texas. Specialists of the Extension Service, working with farmers, helped them to make careful records of all their expenditures and all receipts; therefore, the earnings exhibited in the case of each farm may be accepted as correct.

This bulletin is not an expression of a theory of farm management; it is a photograph of actual farming in Texas. The farms chosen for investigation typified average conditions, and were not selected for the purpose of proving any theory. It applies the acid test of experience to the several types of farming described.

The results establish beyond question the wisdom of farming under well matured plans of diversification as compared with the wisdom of hit-or-miss farming, and especially one crop cotton farming, even at the high prices of cotton that have prevailed during the past three years.

The outstanding fact of these records, covering two years, is that diversified agriculture in the south means success on the average of years; is an insurance against disaster, due to fluctuations in the price of cotton.

Diversified agriculture does not mean abandonment of cotton; it means a system of farming that utilizes the idle time of the cotton farmer and enables him to grow other crops for sustenance and for profit without growing substantially less cotton.

CLARENCE OUSLEY, Director.

Man-Power in Agriculture

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CHAPTER I.

WHY DIVERSIFICATION PAYS.

It is a well recognized fact that some farmers are better managers than others. This variation in managerial ability is exhibited in every farming community, and the farm of the successful farmer often joins that of the unsuccessful farmer. With the same markets, the same seasons and the same soil, the one seems always to prosper, the other always to fail. The successful farmer is often said to be "lucky." Luck can not bring success in the long run.

A comparison of a large number of farms shows that as a rule the successful farmers are successful, not because of a combination of fortunate circumstances, but because they are practicing a well worked out plan of **diversification**, and that the unsuccessful ones are either one-crop farmers, or are not carefully following correct principles. The principles of diversification may be grouped under six heads:

(1) By growing several crops, the farmer may plant them in rotation in a given field and thus better control weeds, insects, and plant diseases.

(2) By growing a legume in the rotation, and by raising livestock, soil fertility may not only be maintained but it may be increased. This will not only improve the yield but increase the selling value of the land.

(3) By growing several crops, a farmer is better able to escape the disasters that come from unseasonable weather, from periodic outbreaks of insect pests, and from fluctuations in market prices.

(4) By having farm products to market at the several seasons of the year, a farmer is able to make cash purchases, and thus avoid high credit prices.

(5) When livestock, especially cattle, are made part of a plan of diversification the natural growth in the size of the herd materially helps the farmer in the accumulation of wealth.

(6) The proper seasonal distribution of labor enables a farmer to utilize his own labor to a greater advantage and to economize in horse labor, and equipment.

The first and second of these points are extensively dealt with in publications on the science of agriculture; the third, fourth and fifth belong in the field of Farm Management, but are so nearly self-evident that they do not need discussion.

The sixth, the seasonal distribution of labor constitutes the farmer's most important problem, and its discussion will consume the major portion of this bulletin. The farmer who grows a variety of crops and who keeps a sufficient amount of livestock will have profitable employment for himself, his boys, his hired labor, his workstock and his farm equipment, uniformly throughout the year. He will have remunerative employment at seasons when the one crop farmer is partly or wholly idle, and will also be able to cut down the stress of work at seasons when the one crop farmer must work to the very limit of human endurance to care for his crop. This principle of an even demand for man labor, for horse labor and for farm equipment is called SEASONAL DISTRIBUTION OF LABOR. The degree in which the farmer applies it to his operations, especially at this period when labor is so difficult to obtain at times of extra demand for cultivation and harvest, will be very largely the degree in which he attains financial success. The operation of this principle is unmistakably shown in Table No. I.

TABLE NO. 1.
DIVERSIFICATION INCREASES PROFITS.

The most successful farmers have a more efficient seasonal distribution of labor.

- (1) They are putting in each year more hours of productive labor. (See column 4.)
- (2) They are caring for more acres of crops per man. (See column 5.)
- (3) They are caring for more livestock per man. (See column 6.)
- (4) Their horses and equipment are employed to a greater extent. (See column 7.)

1	2	3	4	5	6	7
Group	Number Farms in Groups	Average Farmer's Earnings	Hours of Productive Labor per yr per Man	Acres in Crops per Man	Value of live Stock Cared for per Man	Hours of Labor per yr. per Horse
1	12	\$307	2,103	31	\$558	515
2	23	\$760	2,432	48	\$651	561
3	16	\$1,261	2,671	54	\$761	609
4	20	\$1,759	2,763	55	\$822	747
5	21	\$2,843	3,173	64	\$852	760

In this table, 92 Texas farms are arranged in five groups according to the farmer's earnings they yielded. Farms on which the earnings were from \$1.00 to \$499 are placed in Group No. 1; from \$500 to \$999 in Group No. 2; from \$1000 to \$1499 in Group No. 3; from \$1500 to \$1999 in Group No. 4; and \$2000 and over in Group No. 5.

The phrase, "Farmer's Earnings," as used at the head of Column 3, means the AMOUNT THE FARMER RECEIVES FOR A YEAR'S WORK, BOTH AS LABORER AND MANAGER. To find a farmer's earnings, determine the gross income from the farm and subtract from it the sum of all the expenses connected with the operation of the farm, including interest on the capital invested, depreciation of farm buildings and equipment, and a reasonable wage for work done by any members of the family, besides himself. It will be observed (see Column 3) that the 12 farmers in Group 1 earned an average of \$307 a year, and that the average earnings of each group increases until the 21 farmers in Group 5 average \$2,843.

The term "Productive Labor" at the head of Column 4, may be defined as labor put on anything that brings in money, such as crops, livestock, fruit, and so forth. The productive labor as summarized in this column ranged from an average of 2103 hours, or 210 ten-hour days in Group 1, to 3173 hours, or 317 days, in Group 5; that is, 50 per cent more of profitable employment per man was being found on their farms by the farmers of Group 5 than by those of Group 1. Column 5 shows that the farmers of

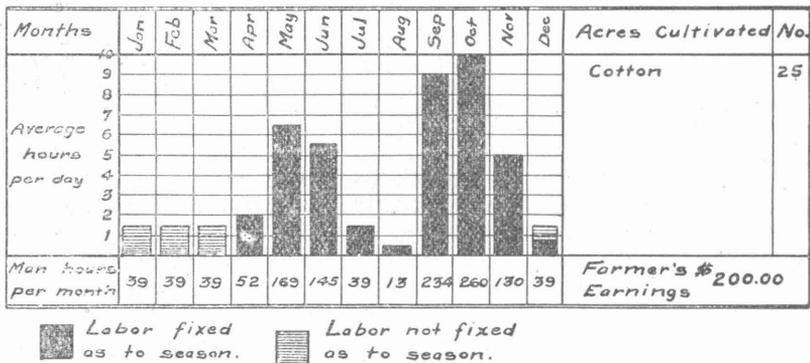
Group 5 were able to cultivate twice as many acres per man employed, as were the farmers of Group 1. Column 6 indicates that 53 per cent more livestock per man was kept, and Column 7 that the workstock, and equipment were employed 47 per cent more. The only magic in this increased efficiency is the magic of good planning.

To prove that successful farmers are carefully planning their farm business in accordance with the principles of crop rotation and seasonal labor distribution, the remainder of this chapter will be devoted to the discussion of six farms, which were investigated, and which are typical of the various degrees of diversification.

A one-crop cotton farm of the less efficient type will first be considered. Following this, farms of varying degrees of diversity will be discussed; and last, a well managed dairy farm, representing a maximum of diversity will be analyzed. These farms are represented by accompanying charts, which show both in figures and in a graphic way, the hours of man labor per month, the crops and livestock cared for, the varying periods of demand for labor and equipment, and the Farmer's Earnings.

It will be observed that all the charts are reduced to a one-man basis. In the first three the farmer does all the managing and all the work, in the last three he does the managing and part of the work, hiring the rest. The one-man basis is the only fair basis of comparison.

FARM NO. 1.
A ONE-CROP FARM IN CENTRAL TEXAS.



Farm No. 1 consists of 25 acres. It is a one-man cotton farm. It is too commonly found in nearly every part of the state, and is typical of the bottom land plantation cotton patch. In using a farm of this size as an illustration, the question is some times raised, as to whether one man can not work more cotton than this. The answer is as follows: One farmer doing all the work himself will find the number of acres of cotton he can care for limited by the number of acres he can pick in the picking season. About 9 1-2 hours an acre are required the first month, and this

increases to 10 1-2 hours an acre the second month. Even if we assume that there is no loss of time from rain or other causes during the second month, and that the farmer averages ten hours a day in the field, he can not attend unaided to the picking of more than 25 acres. To be sure, if his wife helps him in the field, the two can pick more, but the farm then becomes something more than a one-man farm. If they have a family of children and keep them out of school to pick cotton the farm will expand to a family sized farm, and so could not be considered a one-man farm. (The question of hiring transient labor during the chopping and picking season will be discussed later. It should be said in passing, however, that successful farmers plan their work so as to rely as little as possible upon this type of help.)

The number of acres of any crop that a farmer should plant is strictly limited to the largest acreage that he can care for at the busiest season for that crop. This busiest season for any crop is called the limiting season for that crop. The limiting season for cotton in Central and North Texas, is the month of October; the limiting month for corn as it is ordinarily handled in Texas, is September; and so on with the other crops and with the various classes of livestock. (See charts Pages 14 and 15.)

Farmers understand the limiting months for crops and while they may not consciously follow any mathematical formula in determining the acreage of crops they can care for, the conclusions they arrive at may be reached in the following manner: There are on the average twenty-six working days in a month. If we assume that the farmer wishes to plan his work so as to average ten hours per day of productive labor, he will expect to work 10 times 26 or 260 hours a month. (While farmers during the busy season often work twelve or more hours per day on the days when they can work, still time out for rainy weather and other causes makes ten hours per day of productive labor a good average even for the busy season.) Take cotton as an illustration: As October is the limiting month on cotton, and ten and four-tenths hours are required in October to care for an acre of cotton, a farmer can care for as many acres of cotton in October as ten and four-tenths is contained times in 260 which is 25. Twenty-five acres of cotton, then, is all that one man can care for, if the total amount of work in the limiting month is confined to 260 hours.

Turning now to the Table for Farm No. 1, there are three important reasons why this one-crop cotton farmer did not prosper: First, while moderately busy in May and June, and very busy in September and October, there was little work of any kind to be done in December, January, February, March, July and August. If we define productive labor as labor on something that brings in money, he worked only 1200 hours, or 120 days of 10 hours each, during the entire year. Furthermore, his horses and equipment were idle over half the time. He plowed his land with two horses and a walking plow because he could not afford to keep an extra horse and disk, or sulky plow, to work so small a farm.

Second, a sum for overhead expense amounting to about \$350 had to be set aside before there was any real profit for labor. A farmer needs

a house to live in, a windmill, a shop outfit, a buggy, a telephone, and other conveniences, regardless of whether he works 25 acres or 50 acres, and regardless of whether he works 120 days in the year or 300 days in the year. These fixed expenses of farm operation are called farm overhead. The greater the volume of business done with a given amount of overhead expense, the greater will be the farmer's profit at the end of the year.

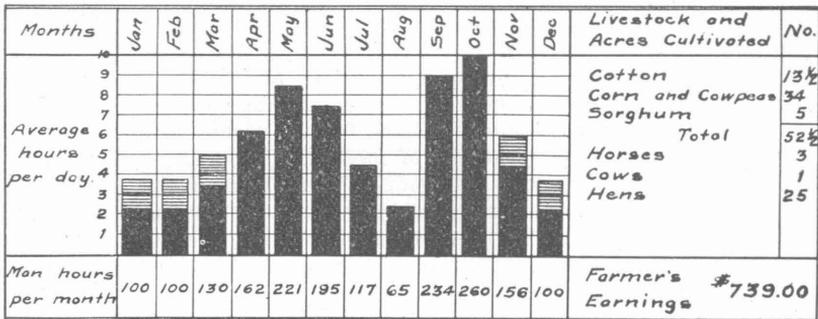
Third, year by year, bit by bit, this one crop farmer is disposing of those plant food elements which are most needed and least abundant in the soil, while those elements which are abundant become less and less available as the organic matter is exhausted under such a cropping system.

To summarize the reasons for his limited income: (1), he was busy on productive enterprises less than one-half of the possible working time, (2), his overhead expenses had to be met from the sale of a limited crop; (3), he is wearing out his farm.

FARM NO. 2.

A STEP TOWARD DIVERSIFICATION.

As the demand for labor is distributed more evenly throughout the year, the farmer's earnings increase.



Farmer No. 2 has taken the first step in diversification. On this farm one man was able to cultivate 52 acres of crops and care for one cow and 25 hens, as compared with only 25 acres of crops per man on Farm No. 1.

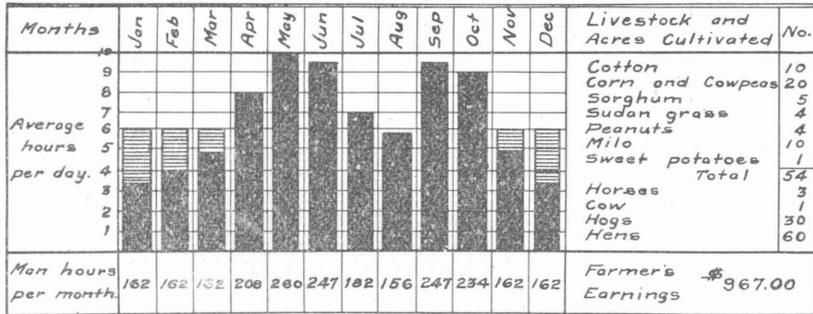
He did a little over 1800 hours of productive man labor during the year as compared with 1200 hours on the one-crop farm. That is, he did 600 hours or 60 ten-hour days' more work and received \$539 more net returns than did the one-crop farmer. This is equivalent to \$9.00 a day for the extra time. The demand for horse labor was such that he found it profitable to keep an extra horse and to use a three-horse team in the preparation of his land. The acreage of crops cared for increased; the total overhead cost remained almost the same. This farmer is better able to maintain the fertility of the soil than is the operator of Farm No. 1. He is rotating his crops, adding nitrogen by growing a legume, and thus supplying the soil with organic matter. The acre yields are greater as a result of the rotation followed.

Let us now examine a farm on which diversification was practiced to a still greater extent.

FARM NO. 3.

A WELL DIVERSIFIED FARM.

Those farmers who so systematize their business as to have an even demand for labor make the largest profits.



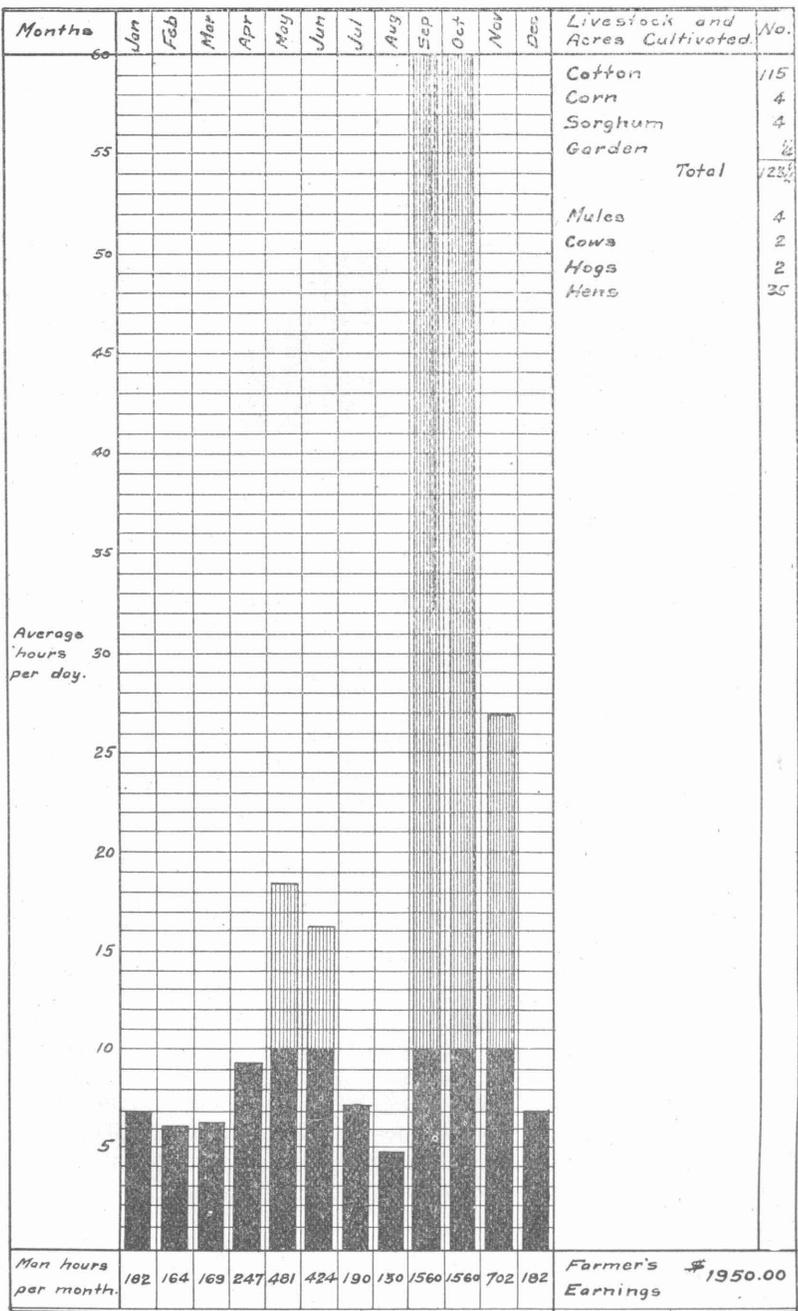
On Farm No. 3, one man cultivated 54 acres and cared for one cow, 30 hogs, and 60 hens. He put in about 2400 hours of productive labor during the year. His horses and equipment were seldom idle. The total overhead costs were about the same as on Farm No. 1.

Farmer No. 3 grows leguminous crops and thus supplies the soil with organic matter. By adding phosphorous, and if necessary potassium and lime, this farmer can gradually increase the productivity of his soil, while on Farm No. 1 it is necessary or will ultimately become necessary, (1), to buy prepared commercial fertilizer in increased quantities year by year, (2) to change the cropping system, or (3) to abandon the farm.

Farms 1, 2 and 3 are small farms. Each operator, by exchanging work with his neighbors, is able to care for all the crops and livestock. Farm No. 1 is a one-crop farm. The operator made \$200. On Farm No. 2 the operator is diversifying to some extent. He made \$739. Farm No. 3 may be called a diversified farm, although the operator is not completely using his available time. He made a net income of \$967.

This shows what is possible on a farm where little or no labor is hired. Let us now examine, one by one, three farms on which labor is hired to a considerable amount and the business is managed on a large scale. These are arranged in the order of increased diversification. Does it pay to diversify under such conditions?

FARM NO. 4.
A NORTH TEXAS COTTON FARM IN 1916.



 Hired labor.

It is true that the more capital and labor a man manages the greater opportunity he has to make large profits. Merely increasing the acreage on a one-crop farm does not, however, eliminate the economic error of the one-crop system.

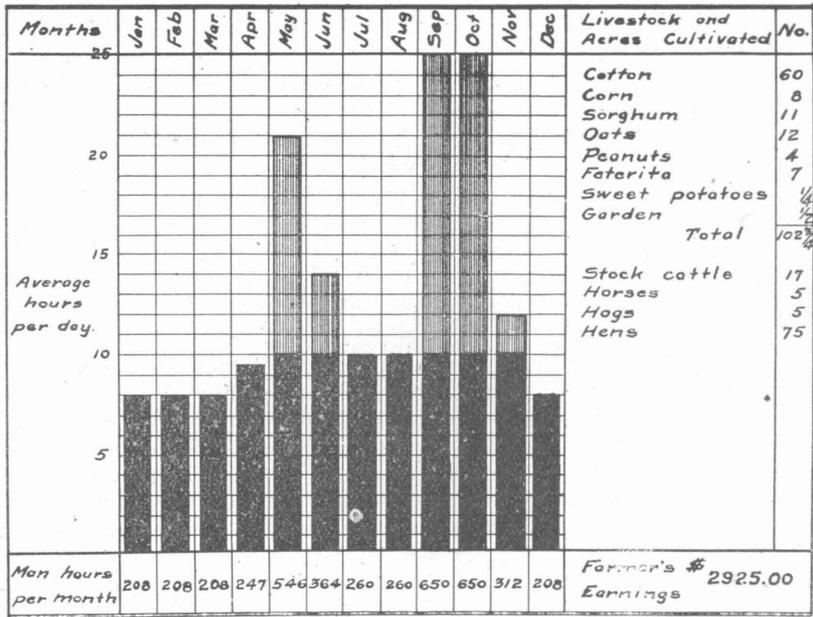
While this farmer's earnings appear comparatively quite large, still to accumulate them he was compelled to resort to practices which in the long run will be bad for his family, bad for his hired labor, bad for his soil, and bad for the social well-being of his community. He kept his children out of school to pick cotton and sent his wife into the cotton field. An undesirable class of itinerant labor was brought into the neighborhood which became a burden to the rest of the community when the picking season was over. If the farmer diversified his crops, he could hire his help for the year round, and thus bring into the neighborhood a desirable type of help.

He is gradually robbing his soil. If he had to purchase commercial fertilizer in sufficient quantity to maintain the fertility at a fixed point, his earnings would be much less. Furthermore, the use of commercial fertilizer is not entirely satisfactory as it is not possible to maintain the productivity of farm lands indefinitely by the application of mineral fertilizers alone, regardless of the amounts applied. Each year more and more, the organic matter is reduced, thus reducing the capacity of the soil to absorb and hold moisture, and subjecting the farmers to loss in adverse seasons. There is an erroneous idea prevalent among farmers that commercial fertilizers alone will keep up productivity, but experiments have demonstrated the error of these conclusions.

And finally, it will be noticed that this is not a pure and simple cotton farm; some diversification with stock, corn and sorghum was practiced. This diversification adds to the yearly income about \$450, and might be greatly increased by proper planning.

In the next farm, not only does a greater degree of diversification yield larger earnings to the farmer, but the fertility of the soil is better maintained.

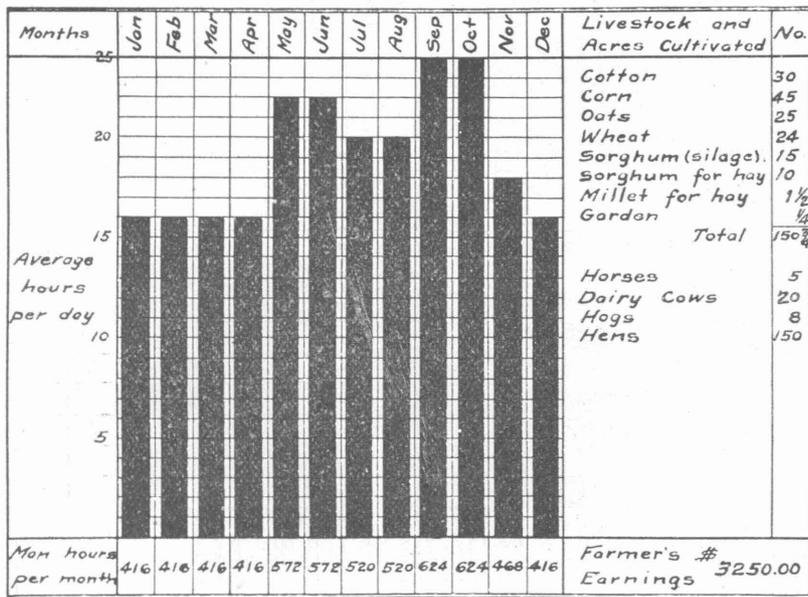
FARM NO. 5.
A NORTH TEXAS FARM WITH LESS COTTON AND MORE FEED.



Farm No. 5, is growing less cotton, more of other crops and is caring for considerable livestock. On this farm men, teams and equipment were seldom idle. The temptation to keep the children out of school for work in the cotton field was not so great, less itinerant labor was brought in, credit was not so essential, the risk of crop failure was not so great, and the fertility of the soil was better maintained. The farmer's income speaks for itself.

FARM NO. 6.

A NORTH TEXAS DAIRY FARM WITH SOME COTTON.



On Farm No. 6 one man was hired by the year. The boys helped when not in school. Additional labor was not needed; there were comparatively no periods of idleness for men, teams or equipment; a regular hand took the place of itinerant labor. Sales were made regularly to meet bills as they became due. Had one crop failed the entire year's work would not have been a loss. A definite rotation was followed and crop yields compared favorably with any in the community, and the soils were improved. The farmer's earnings were \$3250.

In view of these facts and of the principles underlying diversity, **diversification may be defined** as that type of farming in which a sufficient variety of crops and livestock are grown: (1) So that the farmer may follow a rotation that will enable him (a) to keep weeds, insects and plant diseases under control, and (b) to maintain the fertility of the soil; (2) So that he may have something to sell at each season of the year and thus escape ruinous credit costs; (3) So that a bad season may not find him without anything to sell; and (4) So that he may utilize to the fullest extent his time, his workstock and his equipment.

SEASONAL DISTRIBUTION OF LABOR ON EIGHT IMPORTANT CROPS AS GROWN IN TEXAS IN 1916.

Chart No. 1 Peanuts. Distribution of Man Labor on 37 acres (What one man can care for—threshing not included.)

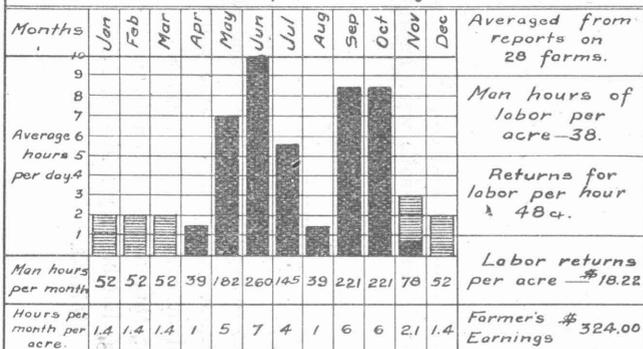


Chart No. 2 Corn. Distribution of Man Labor on 70 Acres. (What one man can care for.)

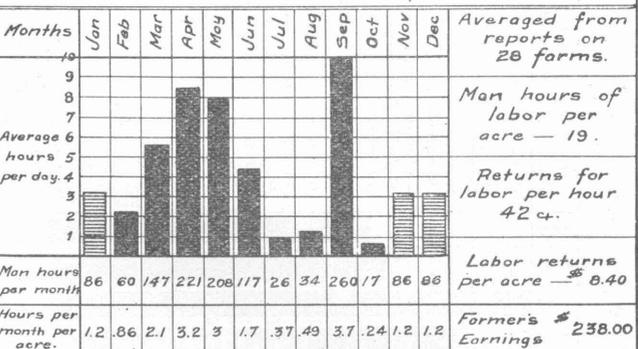


Chart No. 3 Small Grains. Distribution of Man Labor on 58 acres (What one man can care for.)

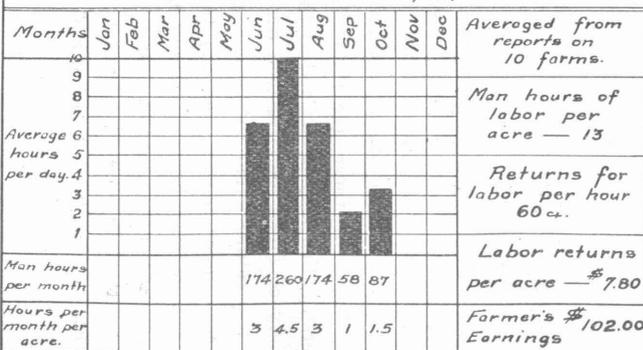


Chart No. 4 Grain Sorghum. Distribution of Man Labor on 36 acres. (What one man can care for.)

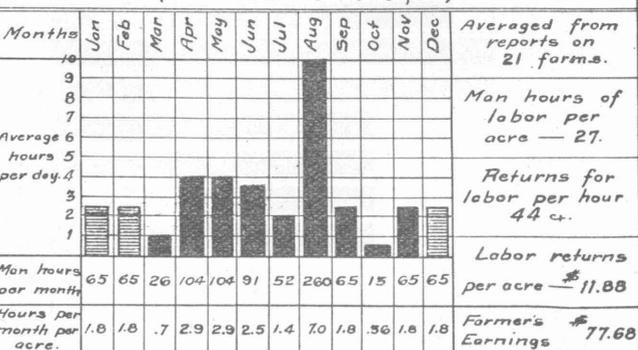


Chart No. 5 Sorghum for Hay. Distribution of man Labor on 30 acres
(What one man can care for)

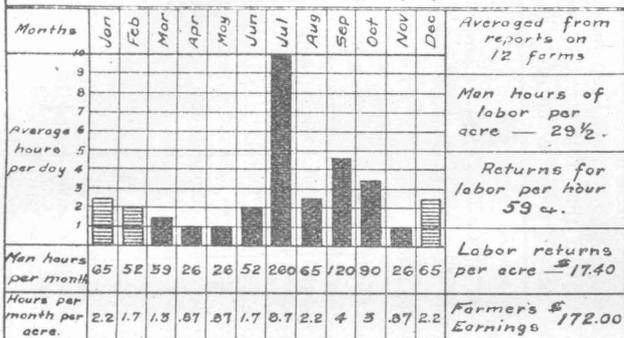


Chart No. 6 Sorghum for Silage. Distribution of man Labor on 46 acres
(What one man can care for)

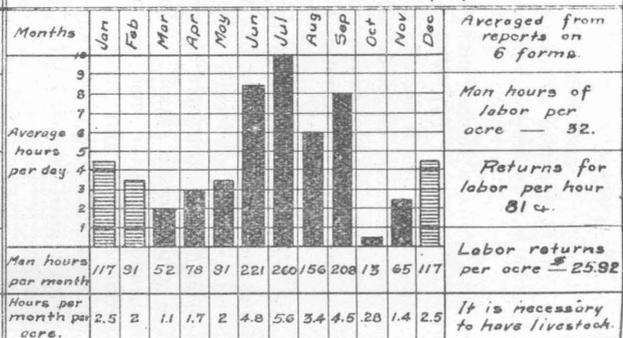


Chart No. 7 Cotton (N. Tex.) Distribution of man labor on 25 acres
(What one man can care for)

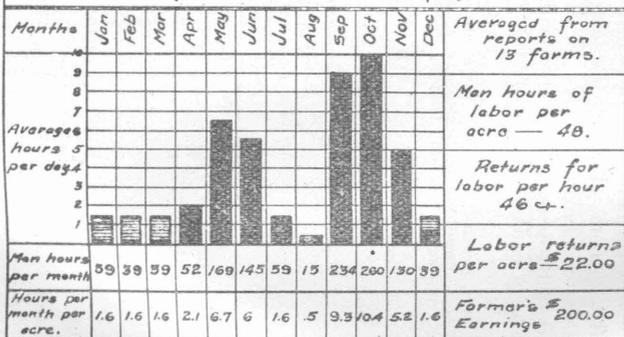
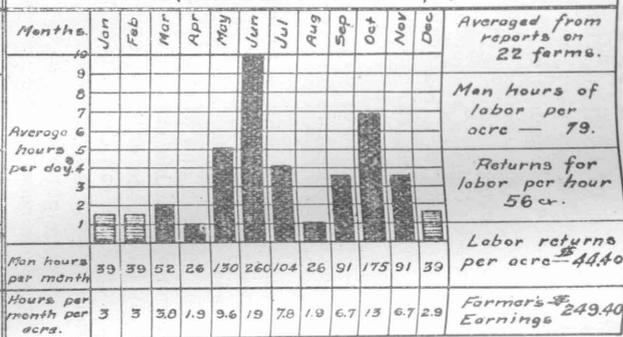


Chart No. 8 Sweet Potatoes. Distribution of man labor on 13½ acres
(What one man can care for)



■ Labor fixed as to season

▨ Labor not fixed as to season

CHAPTER II.

PLANNING THE YEAR'S BUSINESS.

Since diversification pays, as shown in Chapter I and exemplified by the experience of thousands of farmers, the main question arising in the mind of a farmer who desires to increase his income by crop diversification is: How does one go about it?

First of all to plan a system of diversified crops, a farmer must know the following facts to a reasonable degree of accuracy: (1) What crops will thrive on his soil, (2) About what gross cash return each kind will produce per acre, and (3) What the seasonal demands on labor are, to care for each kind. With these facts in mind, any farmer can work out a system of diversification for his farm that will bring his earnings to the highest point.

The main reason why a farmer should keep accounts is to furnish himself with the necessary facts for looking ahead and planning his work. If he **knows** reasonably, (1) What cash returns per acre each crop has yielded in the past, and what the returns from his livestock have been; and, if he **knows** from his experience, (2) The approximate seasonal requirements of labor done on each kind of crop, and when the rush and slack seasons come, he can choose that combination of crops and livestock that will yield him the largest income for his year's work. It will be found that for all ordinary purposes these two facts with regard to each kind of crop, are all that are necessary for successful planning.

When a farmer has reliable figures of his own, it is desirable that he should use them. But for the benefit of those who do not keep accounts, and also to serve as a basis for the illustration that follows, the accompanying table is included. The results are taken from a careful survey of thirteen counties in Texas for 1916.

TABLE NO. 11

Relative profitableness of farm enterprises as shown by average figures taken from Farm Management Survey records in Anderson, Atascosa, Bexar, Brazos, Collin, Comanche, Coryell, Dallas, Falls, Harris, Tarrant, Kerr and Red River counties.

FOR THE YEAR 1916.

1	2	3	4	5	6
Enterprise	Number of Farms Reporting	Total Number of Acres	Returns per acre for Man Labor	Man Hrs. of Labor per Acre	Returns per Hour for Man Labor
Sorghum for Silage	6	80	\$25.92	32	81c
Small Grain (Oats and Wheat)	67	2444	7.80	13	60c
Sorghum for Hay	58	337	17.40	29 1-2	59c
Sweet Potatoes	28	53	44.24	79	56c
Peanuts	36	564	18.24	38	48c
Cotton	75	2882	22.00	48	46c
Grain Sorghum	24	196	11.88	27	44c
Corn	104	2200	8.40	20	42c
Barley	7	36	3.60	9	40c
Millet	7	45	1.90	10	18c
Blackeyed Peas	20	240	6.37	49	13c
Poultry					46c
Hogs					34c
Cattle					29c

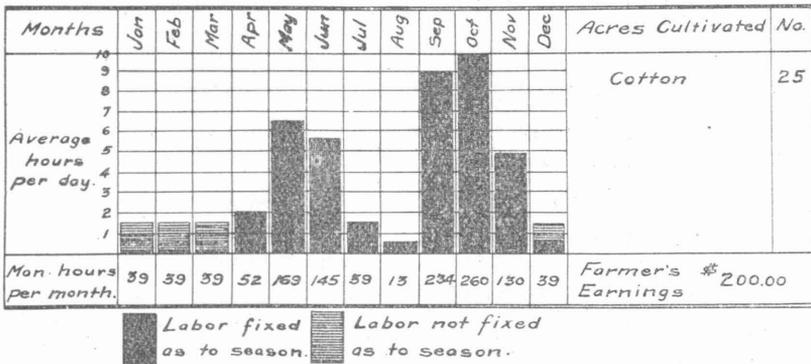
Besides the returns per acre found in Column 4, the seasonal distribution of labor on adaptable crops must also be known. Accordingly, charts showing seasonal labor distribution on eight different crops—peanuts, corn, small grain, grain sorghum, sorghum for hay, sorghum for silage, cotton and sweet potatoes are found on Pages 14 and 15.

It should be clearly understood before going further, that the illustration we are about to undertake is not taken from any farm. It is merely an illustration of how planning for the year's business can be most effectively done. No directions can be laid down that all farmers can follow—each man must work out his own problems.

With this understanding in mind, let us start with a one-man cotton farm and see how diversification is accomplished, adding crop after crop, increasing the earnings from \$200 up to \$893, and without the hiring of any additional labor whatever.

CHART NO. 9.

One-crop farms always have much unproductive time.



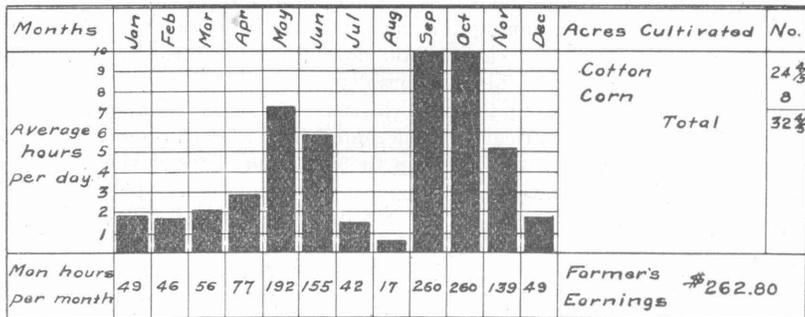
A study of this chart shows much unproductive time. During the working season this comes mostly in July and August. If some crops could be planted that would utilize this lost time without perceptibly reducing the cotton acreage, the farmer could give himself a paying job. Turning to Chart No. 2, Page 14, it is seen that corn competes with cotton for labor, mainly during September; in other words, there would be plenty of time for a considerable acreage of corn during all the months except September. Hence only as much corn should be planted as will utilize the time left over from the cotton in this month. This spare time will care for about eight acres of corn. The addition of eight acres of corn would make necessary a reduction in cotton of only 1-5 of an acre, an amount which is negligible from a practical standpoint. The following table will show that this combination is more profitable than cotton alone, when no more is grown than can be cared for by one man:

Eight acres of corn at \$8.40 an acre will return	\$67.20
One-fifth acre less cotton at \$22.00 is	4.40
This combination gives an increased profit over cotton alone of	62.80

The distribution of man labor on the combination of corn and cotton is shown in Chart No. 10, and a financial statement of the amount the combination will return follows the chart.

CHART NO. 10.

Earnings are increased by the addition of some corn.



Financial Statement Accompanying Chart No. 10.

24 4-5 acres of cotton at \$22.00 an acre will return	\$545.60
Eight acres of corn at \$8.40 an acre will return	67.20
	\$612.80
Less overhead expense	350.00
	\$262.80
FARMER'S EARNINGS	\$262.80

This combination would give the farmer 1342 hours of productive work, and a return of \$262.80.

As there is still idle time in June, July and August as shown by Chart 10, 49 acres of fall sown small grain might be grown. (For seasonal distribution of labor on small grains see Chart No. 3, Page 14.) This would make necessary a reduction of the cotton to 17 acres. Such a combination would increase the returns by \$210.60 as follows:

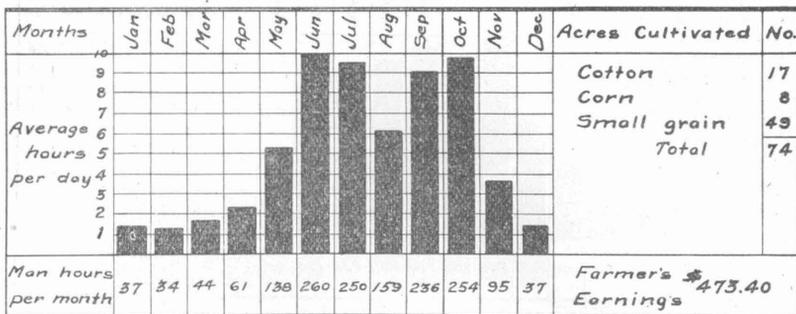
49 acres of small grain at \$7.80 an acre would yield.....	\$382.20
7 4-5 acres less of cotton at \$22.00 an acre would be	171.60

The increased profit for the year's work over the previous combination is\$210.60

The seasonal distribution of labor on a combination of cotton, corn and small grain which one man could care for without hiring additional labor is given in Chart 11.

CHART NO. 11.

This combination increases the year's profits \$210 without the hiring of additional labor.



Financial Statement Accompanying Chart No. 11.

17 acres of cotton at \$22.00 an acre	\$374.00
8 acres of corn at \$8.40 an acre	67.20
49 acres of small grain at \$7.80 an acre	382.20
	<hr/>
	\$823.40
Less overhead expense	\$350.00
	<hr/>

FARMER'S EARNINGS\$473.40

This combination furnishes 1600 hours of productive labor during the year for which the farmer earns \$473.40.

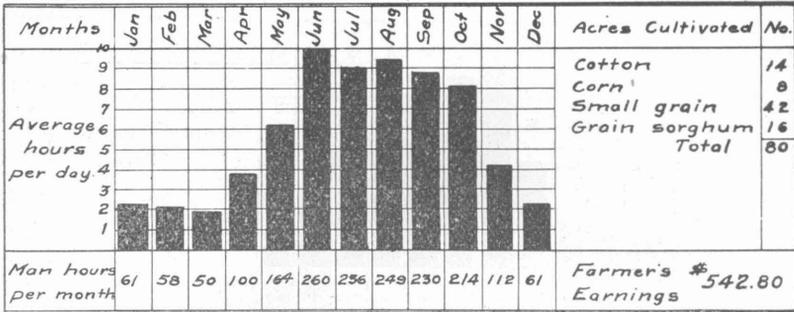
An examination of Chart 11 will show that June is fully occupied, and July, September and October are almost entirely so, but there are still comparatively idle periods in August and in the winter months. As grain sorghum requires a maximum amount of labor in August (See Chart No. 4, Page 14) 16 acres may be grown if the small grain in combination No. 11 be reduced from 49 acres to 42 acres and the cotton from 17 to 14 acres. This would give a combination which would exceed the previous one in profitableness by \$69.40, as follows:

16 acres of grain sorghum added at \$11.88 an acre would return	\$190.00
3 acres less of cotton and 7 acres less of small grains means a reduction of only	\$120.60
	<hr/>

The increased profit over the previous combination is.....\$ 69.40

CHART NO. 12.

The more even the labor distribution, the greater the profits.



Financial Statement Accompanying Chart No. 12.

14 acres of cotton at \$22.00	\$308.00
8 acres of corn at \$8.40	67.20
42 acres of small grain at \$7.80	327.60
16 acres of grain sorghum at \$11.88	190.00
	<hr/>
	\$892.80
Less overhead expense	\$350.00
	<hr/>

FARMER'S EARNINGS\$542.80

This combination of Chart 12 will show that the summer is well occupied, but that there is opportunity to add other enterprises in the winter and spring months. The addition of some livestock will bring added returns. A flock of poultry may be kept on which the maximum amount of work comes in March and April when the chickens are being hatched. A drove of hogs that requires little work in the summer months while on pasture may be cared for, and the pasture crop may be planted in April or May. This livestock and the pasture, with a cow or two to furnish milk and butter for home consumption, may be added by reducing the small grain from 42 to 20 acres and the cotton from 14 to 12 acres. The results of these changes are as follows:

30 hogs and 4 acres of Sudan grass for pasture will return ..	\$371.00
75 hens will return	124.20
One milk cow will return	70.60
	<hr/>
Total	\$565.80

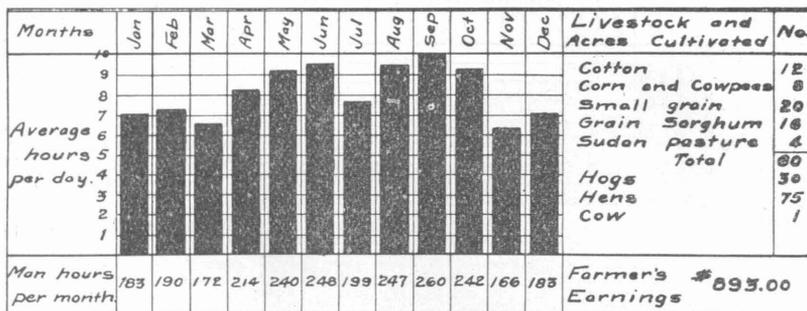
22 acres less of small grain at \$7.80 an acre	\$171.60
2 acres less of cotton at \$22.00 an acre	44.00
	<hr/>

\$215.60— 215.60

The increase of profit for the year's work over the previous combination is\$350.20

CHART NO. 13.

Better planning gives this combination \$693 more per year than the one-crop cotton farm.



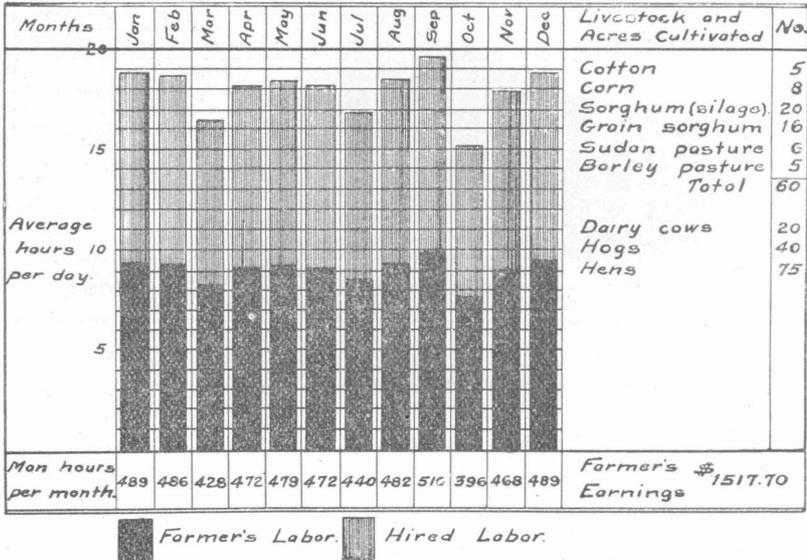
Financial Statement Accompanying Chart No. 13.

12 acres of cotton at \$22.00 an acre	\$264.00
8 acres of corn and cowpeas	67.20
20 acres of small grain at \$7.80 an acre	156.00
16 acres of grain sorghum at \$11.88	190.00
4 acres of Sudan grass and 30 hogs	371.00
75 hens	124.20
One milk cow	70.60
	\$1,243.00
Less overhead expense	\$350.00
FARMER'S EARNINGS	\$893.00

The distribution of labor as shown by Chart No. 13 is comparatively even throughout the year. The chart represents a one-man farm well organized. But by hiring a regular hand for the year, by adding cattle to his business, by growing sufficient silage for feed, and by increasing the number of hogs kept, the operator might effect a combination by which he would earn \$1517.70 while his acreage need not be increased. Such a combination is shown in Chart No. 14.

CHART NO. 14.

On the same acreage, the profits from this combination are nearly double those in Chart No. 13, due to the addition of livestock and the employment of a regular hand.



Financial Statement Accompanying Chart No. 14.

5 acres of cotton at \$22.00 an acre	\$ 110.00
8 acres of corn at \$8.40	67.20
16 acres of grain sorghum at \$11.88 an acre	190.00
20 dairy cows and 20 acres of sorghum for silage	1,324.80
40 hogs, 6 acres Sudan grass and 5 acres barley pasture	501.50
75 hens	124.20
	\$2,317.70
Paid for hired labor	\$450.00
Overhead expense	350.00—

FARMER'S EARNINGS\$1,517.70

Chart No. 14 represents a suppositional farm, the results shown being taken from the averages of 92 farms, including all grades. The Farmer's Earnings on such a farm after some time would begin to increase and might conceivably be doubled, due to certain beneficial results which automatically follow good planning and crop rotation. Crop yields should increase due to better control of weeds, insects, plant diseases, and to increased soil fertility. Not only this, but the increased number of acres handled per man, team and equipment would bring the acre cost of production to a very much lower point than the average, and thereby materially

increase profits per acre. Farm No. 6, Page 13, (an actual farm), is operated by its owner so as to take advantage of all these points of efficiency and the farmer's earnings amounted for the year 1916 to the handsome sum of \$3250.00.

CONCLUSION—In Chapter I it was demonstrated by a comparison of six farms that diversified farming is much more profitable than single-crop farming. In Chapter II the question of combining farm enterprises to give maximum profits has been discussed. In combining enterprises for maximum profits a farmer should know the relative profitableness of the enterprises which are adapted to his farm. He should know, also, the seasonal labor demand on these enterprises. Farmers know the seasonal labor demand on enterprises with which they are experienced. For the use of farmers who wish to consider enterprises with which they have not had experience we give on Pages 14 and 15 of this bulletin such labor distribution charts as we have available at this time.

Any farmer may reorganize his cropping system for greater profit as we have reorganized the cropping system of the cotton farm in Chapter II. Starting with the amount of cotton which one man could care for, and using average returns (see Table II, Page 16) as reported on one hundred and twenty-six farms in 1916, we first added eight acres of corn. This combination showed an increased profit of \$62.80 over cotton alone. We next added small grain and obtained an increase of \$210.00. We continued to add crops and livestock until we reached a combination which gave the farmer and a hired man full employment for the year and which enabled the farmer to earn \$1517.70. This is based on average returns, but a farm organized as this one is would produce more than average yields and be operated at less than average horse and equipment costs. Therefore, it should yield earnings which would compare favorably with the farms of Group 5, Table I, Page 5, which is \$2843.

The purpose of this chapter has not been to point out to any farmer the exact combination of enterprises that he should have on his farm, but to give a method of so combining enterprises adapted to his farm as to yield the highest possible financial results. Any farmer by observing the seasonal demand for labor and by keeping sufficient accounts to show the relative profitableness of his various enterprises will be able to plan combinations for maximum profits.

CHAPTER III.

MAN-POWER AND FOOD PRODUCTION.

The shortage of food is one of the critical problems of the war. It creates the problem of stimulating production per acre, but especially of increasing production per man. The shortage of ships has denied us the abundance of fertile fields in countries far from the scene of battle. Australia, India, South Africa and South America can not be drawn upon to their full capacity, for lack of time. As it requires three times as long, for example, for a ship to make a trip from France to Australia and return, as to the United States and return, our acres and our workers must do added duty.

Not only is there an acre shortage but there is also a shortage in agricultural man-power seeking employment. The acre shortage is being overcome by the shipbuilding program, but the problem of man power available for agriculture will continue to grow more acute as long as the war lasts.

Our great national army of food production has for its rank and file the industrious, efficient, and patriotic American farmer. He is private and officer in one and may be depended upon to do his full duty. But there is a general headquarters of this food army; it is the administration forces that are directing the food army's activities through the issuance of information and the regulation of prices to stimulate production and to restrain speculation. It remains, therefore, to conclude this bulletin with an application of its conclusions to the problem of increasing food production in the present emergency.

The question of acre production is thoroughly discussed in Farmers' Bulletin No. 877 issued recently by the Office of Farm Management of the United States Department of Agriculture, and may be had by writing to the Department. In Table III are given the conclusions taken from that bulletin.

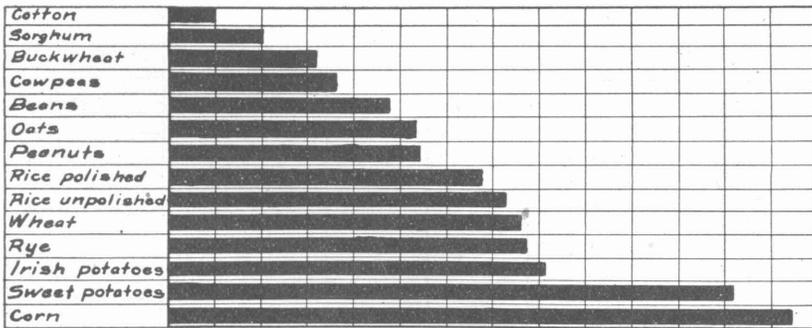
TABLE NO. III.

A comparison of the food produced annually by an acre of land when utilized in the production of various food crops and livestock products.

Food Products.	Yield per acre.		Calories per pound	Pounds protein per acre (digestible)	Calories per acre
	Bushels	Pounds.			
Food Crops:					
Cottonseed		333			234,170
Corn	35	1,960	1,594	147.0	3,124,240
Sweet potatoes	110	5,940	480	53.5	2,851,200
Irish potatoes	100	6,000	318	66.0	1,908,000
Rye	20	1,200	1,506	118.8	1,807,200
Wheat	20	1,200	1,490	110.4	1,788,000
Rice, unpolished	40	1,154	1,460	55.4	1,684,840
Rice, polished		1,086	1,456	50.0	1,581,216
Peanuts	34	524	2,416	126.2	1,265,018
Oats	35	784	1,600	89.4	1,254,400
Beans	14	840	1,337	157.9	1,123,080
Cowpeas	10	600	1,421	116.4	852,600
Buckwheat	24	600	1,252	34.5	751,800

CHART NO. 15.

Cotton has less food value to the acre than any of the well known food crops.



No discussion of how these conclusions are reached will be entered into here, except so far as the food yielding value of cotton is concerned, as its food value does not appear in the bulletin of the Department of Agriculture.

Cotton's production of food for human consumption was estimated as follows: The 333 pounds of seed derived from a third of a bale per acre, will yield 42.4 pounds of edible oil, 150 pounds of prime meal and 107 pounds of hulls. This quantity of oil produces 163,280 human food units. One hundred and fifty pounds of meal would produce 209.86 pounds of average milk which, in turn, would produce 65,900 human food units, while the 107 pounds of hulls will produce 15.89 pounds of common milk, which in turn would yield 4990 units of human food, making 234,170 food units in all, or considerably less than any other standard food crop.

Not only is cotton at the foot of the list of food producing crops when considered on the acre basis, but it is hopelessly inferior when considered on the basis of what one man can produce in a season, and our food problem is much more a problem of man-power than of acre power. In Table IV are given the relative food producing possibilities of five of the most common crops where acre production is combined with possible man production, when only one crop is considered. Here cotton is hopelessly deficient as a food crop.

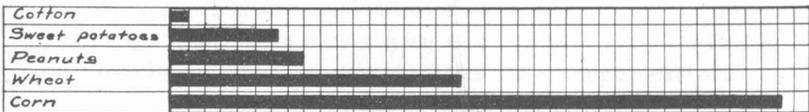
TABLE NO. IV.

Amount one farm hand can produce if only one crop is grown.

Crops	Acres	Yield	Food units per acre	Food units per farm hand
Cotton	25	1-3 bale	234,170	5,850,000
Corn	Texas	19.9	1,776,354	124,344,780
	U. S.	35	3,124,240	218,696,800
Wheat	Texas	12.4	1,108,560	64,296,480
	U. S.	20	1,788,000	103,704,000
Peanuts	37	34	1,265,018	46,805,666
Sweet potatoes	13 1-2	110	2,851,200	38,491,200

CHART NO. 16.

The labor of one man produces over 37 times as much food in a year growing corn as growing cotton.



Now let us draw a comparison between a typical cotton farm and a typical diversified farm. Farm 4, Page 10 is a typical cotton farm. Farm 6, Page 13 is a typical diversified farm. The conclusions of Table V show that the cotton farmer worked 25 acres per man employed and that the yield was 336,000 food units per acre, and 8,351,392 food units per man. As against this the diversified farmer operated 62 acres per man employed, and produced 1,570,000 food units per acre and 97,656,583 food units per man. When food production alone is considered this is nearly twelve times as much per man.

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APPENDIX

METHOD OF SECURING AND COMPILING THE DATA.

During the year 1915, visits were made to 87 farms, located in Red River, Anderson, Comanche and Bexar Counties, and records were taken covering the labor and financial transactions on each farm enterprise for the year. In 1916 similar records were taken on 126 farms in the following counties: Anderson, Atascosa, Bexar, Brazos, Collin, Comanche, Coryell, Dallas, Falls, Freestone, Hunt, Harris, Kerr and Tarrant. In Table VI. are given the number of farms studied in each county and the county agents co-operating in the investigation.

TABLE NO. VI.

County	Number of Records		County Agent
	1915	1916	
Atascosa	13	G. P. McLelland
Anderson	4	H. Gentry
Brazos	12	C. L. Beason
Bexar	8	G. W. Hand
Comanche	23	D. F. Eaton
Collin	4	L. F. Arnold
Coryell	5	R. P. Elrod
Dallas	11	C. O. Moser
			R. A. Hall
Falls	4	N. C. Chaney
Freestone	3	W. S. Symonds
Harris	23	W. L. Stallings
Hunt	7	J. H. Erickson
Kerr	5	K. G. Baker
Tarrant	4	H. M. Means
			W. R. Nisbet
Red River	16		Wm. McMaster

Representative farmers were chosen, each of whom was willing to spend from three to ten hours with the Farm Management Specialist in filling out a business record covering all of the activities of his farm for the preceding year.

Many farmers were found who were keeping financial records of sales and purchases; there were very few who did not remember how many hogs, cows, horses, sheep, chickens, etc., they had sold during the year, and just what each lot brought. If the farmer's memory chanced to be a little indefinite, his wife and children were ready and accurate references. Averages from figures thus obtained on a number of farms have proved to be very accurate, indeed.

The year's business was recorded and analyzed by enterprises. Each crop for example was charged with seed, rent, use of crop equipment, horse labor, fertilizer and special expenses, such as twine, crates, bags, etc., and was credited with sales, produce fed to livestock and food used in the home; and each class of livestock was charged with feed and special expense, such as interest on the money invested in them, and interest and depreciation on buildings and special equipment used for them and was credited with sales, increased inventory and products used in the home.

METHOD OF FINDING FARMER'S EARNINGS.

The method of charging interest, rent, depreciation, fertilizer, overhead, horse labor, and man labor calls for a brief statement.

Interest was charged at 6 per cent on the average inventoried value of the livestock on each farm, on the livestock equipment, and on the crop equipment. General equipment costs were charged to overhead. Rent was charged at customary rental prices.

Depreciations were carefully estimated and charged to the proper enterprises. Adjustments were made in regard to manure utilized and fertilizers purchased.

Horse labor was charged against each enterprise at 10 cents an hour, as this was the average cost of horse labor at the time for the farms visited. The horse account was credited with a like amount.

Overhead is a name given to expenses of a general nature. It covers interest, depreciation, and upkeep on general farm equipment such as buggies, engines, shop outfit, etc., and on the house and other buildings that were not used for some specific enterprise. Telephone, farm papers, and a multitude of little items were grouped under this head. These costs were not distributed to the various enterprises but were charged against the farm business as a whole.

Hired labor was also charged against the business as a whole. The labor of the members of the family, other than that of the farmer himself, was treated as hired labor.

To restate briefly, all farm expenses were distributed to the enterprises for which they were incurred and charged against them, except that overhead and hired labor, which are expenses of so general a nature that they can not be easily applied to separate enterprises, were charged against the total earnings of the farm, and subtracted from them. The remainder, which is called Farmer's Earnings, is regarded as the farmer's pay for his year's work.