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A Farm Business Report  
Relating to Twenty Farms Located in Phillips, Yuma and  
Washington Counties, Northeastern Colorado  
1939

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## A Farm Business Report

Relating to Twenty Farms Located in Phillips, Yuma and  
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By Ramey C. Whitney<sup>1/</sup>

Introduction.--This reports represents a study of farm businesses located on first-grade dry-farming land in northeastern Colorado. It is presented in such a way that the farmers who cooperated in developing the project may discover possible changes in their farm businesses which would make possible an increase not only in money income but also in the real income of the farmer and his family. Other farmers who live in this particular type-of-farming area<sup>2/</sup> of approximately  $1\frac{1}{2}$  million acres may find the data in this report helpful. Obviously, one should not base his decisions merely on one annual report. Climatic conditions are favorable in some farming areas during some years and unfavorable during other years. Changes in prices often favor one area in comparison with another. For these and other reasons it has been considered desirable to carry on a farm account project for a series of years. This is the third report of this particular series for this area in recent years.

All information given in the Farm Business Section of this publication pertains to the farm businesses as a whole. That is, the records of the farm operator and the landlord (if there was a landlord) were considered as one record. Each farm operator who cooperated in this project may find information pertaining to his share of earnings on the farm, as well as the landlord's share, on pages 38 and 39 of his farm account book.

The basis for classifying the farms into the most-profitable and least-profitable groups was the rate earned on the total farm investment. The investment was assumed to consist of each farmer's estimate of the value of all farm land operated, improvements (excluding farm residence), livestock, machinery, feeds, grains, and growing crops on the farm. The rate earned on the investment was calculated after deducting from the net farm gain (receipts and inventory increases less expenses and inventory decreases in the account book) an arbitrary wage of \$50 per month for the labor of the operator and of members of the family who actually contributed services on the farm. Farm products used in the farm home and the imputed rental value of leased farm residences were not considered as being farm business receipts. Expenses pertaining to the residences of the farm operators were not included as farm business expenses.

Besides using the "rate earned on the farm investment" as a measure of the success of the farm operator, we use also another measure, "the labor and management wage." This wage represents an amount which the farm operator received after deducting from the net farm gain an assumed rate of interest on the investment and after deducting an imputed wage for members of the family

<sup>1/</sup>Acknowledgement is made of the cooperation of the farmers who submitted their farm business records for this report and to the county agricultural agents who assisted in making this study possible: A. E. Hoffman of Phillips County, B. H. Trierweiler of Yuma County, Milton Nelson and Charles Giles of Washington County. Considerable credit is also due Prof. L. A. Moorhouse and J. M. Whalley of the Rural Economics Section of the Experiment Station for contacting farmers and checking records.

<sup>2/</sup>See "Type of Farming Areas in Colorado," Colo. Exp. Sta. Bul. 418.

(excluding operator) who performed work on the farm. These imputed rates were considered to be approximately equal to the compensation which would have been received if the capital and labor were applied in alternative opportunities.

#### Cash Income and Expenses, Inventory Changes, and Net Farm Gain:

The farm account cooperators received an average cash income of \$1,449 during the year 1939 (see table 1). This is slightly greater than the amount received by account cooperators in 1938 but considerably less than that received in 1937. However, after considering inventory changes the net farm gain of \$2,403 in 1939 was greater than in the two preceding years. The unusual increase in the value of farm property in 1939 was due largely to the acceptance by farmers of the wheat-loan program of the Federal Government. In place of selling wheat at harvest time, farmers stored the wheat in anticipation of receiving a higher price. Most of them actually did receive a higher price in the year 1940 when the wheat was sold.

The net farm gain of \$2,403 represents the amount that the farmer had for interest on an estimated value of farm property of \$22,246, for his wages and profits as a laborer and manager of the farm business, and for unpaid family labor. As indicated previously, these figures pertain to the farm businesses as a whole.

Other observations relating to table 1 are: (1) The net gain from live-stock production was about \$250 greater in 1939 than during the two preceding years. (2) The net gain from crop production in 1939 was about \$800 greater than it was in 1938 but about equal to that of 1937. (3) The net power and machinery expenses in 1939 were about equal to those of 1938. Purchases of new farm machinery and equipment exceeded the depreciation to the extent that the farm machinery and equipment was worth about \$100 more at the end of the year than at the beginning. Purchases were about equal to depreciation in 1938 but exceeded depreciation considerably in 1937. (4) Farm improvements consisting primarily of farm buildings (excluding residences) have declined in value during each of the 3 years 1937-39. (5) There has been little change in the expenditures for hired labor during the 3-year period.

#### Distribution of Investments, Receipts, Expenses, and Earnings for "Your" Farm, the Average, and the 7 Most- and 7 Least-Profitable Farms:

Each farmer who cooperated in this study may compare certain characteristics of his farm business with those of other farm businesses by observing table 2. A few comparisons concerning the average figures for 20 farms, the 7 most-profitable, and the 7 least-profitable may be of interest. Obviously, such comparisons have definite limitations, especially when such comparisons are based upon averages. Some of these will be pointed out in the following discussion.

The average value of farm property operated by the 20 farmers was \$22,246. The farmers who received the highest rate of return on their investment had an investment of \$28,409 while those farmers who received the lowest rate of return had less than one-half as much, or \$13,705, invested. The difference in investment was due primarily to the amount and value of land operated by these different groups.

Although the investment in land of the most-profitable group was more than two times the investment of the least-profitable group, it was apparently

Table 1.-- Cash income and expenses, inventory increases and decreases, and net farm gain (excluding interest paid) for 20 farms located in Phillips, Washington, and Yuma Counties, northeastern Colorado, 1939, as compared with similar data for 26 and 23 farms in the same type-of-farming area during the years 1938 and 1937, respectively (in dollars per farm).

Item	Cash						Inventory					
	Income			Expenses			Increases			Decreases		
	1939	1938	1937	1939	1938	1937	1939	1938	1937	1939	1938	1937
Livestock	\$1,555	\$1,217	\$1,214	303*	221*	152*	54	42	--	--	--	22
Feed, grain, crops	2,089	2,071	3,128	365	177	181	808	--	--	--	174	437
Machinery & equip.	171	105	261	1,013	914	1,421	110	17	380	--	--	--
Farm improvements	1	--	1	96	99	125	--	--	--	18	16	12
Labor off farm	67	39	58	--	--	--	--	--	--	--	--	--
Miscellaneous	26	6	40	11	13	17	--	--	--	--	--	--
Livestock expense 1/	--	--	--	27	22	8	--	--	--	--	--	--
Crop expense 2/	--	--	--	207	202	215	--	--	--	--	--	--
Hired labor	--	--	--	202	213	231	--	--	--	--	--	--
Taxes 3/	--	--	--	236	169	191	--	--	--	--	--	--
<b>TOTAL</b>	<b>3,909</b>	<b>3,438</b>	<b>4,702</b>	<b>2,460</b>	<b>2,030</b>	<b>2,541</b>	<b>972</b>	<b>59</b>	<b>380</b>	<b>18</b>	<b>190</b>	<b>471</b>

#### Summary

	1939	1938	1937
Net cash income.....	\$1,449	\$1,408	\$2,161
Net inventory increase.....	954	--	--
Net inventory decrease.....	--	131	91
Net farm gain (in account book, receipts less expenses).....	\$2,403	\$1,277	\$2,070

\*Livestock bought.

1/Veterinary bills, medicine, etc.

2/Custom work, seed, twine, and crop insurance.

3/Real estate and personal taxes. Sales taxes included with purchases.

Table 2.--Farm investment, receipts, expenses, and earnings on 20 farms located in Phillips, Washington, and Yuma Counties, Colorado, 1939.

Item	Your Farm	Average of 20 farms	7 Most-profitable farms	7 Least-profitable farms
<b>Investments:</b>				
Land	\$	\$14,772	\$18,996	\$ 8,075
Farm improvements		2,422	2,999	2,212
Horses		200	157	326
Cattle		604	592	614
Hogs		133	144	56
Sheep		66	—	190
Poultry		161	159	154
Productive livestock <u>1/</u>		(964)	(895)	(1,014)
Livestock--Total		(1,164)	(1,052)	(1,340)
Farm machinery & equipment		1,846	2,239	1,361
Farm share of auto <u>2/</u>		184	230	60
Feed grain and crops		1,858	2,893	657
Total investments		<u>22,246</u>	<u>28,409</u>	<u>13,705</u>
<b>Receipts--Net Increases</b>				
Horses		10	8	18
Cattle		406	438	308
Hogs		246	243	57
Sheep		60	—	172
Poultry		140	95	258
Egg sales		313	232	282
Dairy sales		166	149	234
Livestock--total		(1,341)	(1,165)	(1,329)
Feed, grain and crops		2,590	5,090	396
Labor off farm		67	77	98
Miscellaneous		26	17	22
Total receipts and net increases		<u>4,024</u>	<u>6,349</u>	<u>1,845</u>
<b>Expenses--Net Decreases</b>				
Farm improvements		113	94	123
Horses		19	10	32
Misc. livestock decreases		16	24	13
Machinery and equipment		731	967	417
Feed, grain and supplies		59	—	169
Livestock expense		27	11	34
Crop expense		207	300	140
Hired labor		202	388	50
Taxes		236	347	156
Miscellaneous		11	9	9
Total expenses & inv. dec.		<u>1,621</u>	<u>2,150</u>	<u>1,143</u>

Table 2 continued

Item	Your farm	Average of 20 farms	7 Most-profitable farms	7 Least-profitable farms
Total receipts & inventory inc.	\$	\$ 4,024	\$ 6,349	\$ 1,845
Total expenses & " dec.		<u>1,621</u>	<u>2,150</u>	<u>1,143</u>
Receipts and inventory increases less expenses and inventory decreases-----		2,403	4,199	702
Total unpaid labor		<u>666</u>	<u>634</u>	<u>723</u>
Net income from investment, labor and management -----		1,737	3,565	-21
Rate earned on investment -----		<u>7.81%</u>	<u>12.55%</u>	<u>-0.16%</u>
Return to capital and operator's labor and management		\$2,309	\$ 4,108	\$ 557
5% int. on investment		1,112	1,420	685
Labor and management wage		<u>1,197</u>	<u>2,688</u>	<u>-128</u>

1/All livestock except horses.

2/The share indicated represents 60, 63, and 63 percent of the total auto investment on the average, most-profitable, and least-profitable farms, respectively.

necessary for the most-profitable group to have only about 50 percent more dollars invested in power, machinery, and equipment. Although the least-profitable group had much more invested in horses than did the most-profitable group, it does not necessarily mean that the horses are uneconomical. It is quite possible that the use of horses for the production of power and colts on a small farm would be more economical than a tractor under certain conditions. In many cases, however, a tractor may have been purchased and no reduction in horses made. This practice increases costs unless the farm is increased in size.

The most-profitable group of farmers had a greater investment in hogs and less in sheep. From observation of the records it is apparent that hogs are produced where large quantities of concentrated feeds are available and that the sheep are produced where there are relatively more roughages. Each farm is an individual case, and it is not advisable to make specific recommendations only on the basis of averages for an individual farm. However, average figures do indicate some of the possibilities.

Total receipts and inventory increases amounted to \$6,349 for the most-profitable group and \$1,845 for the least-profitable group. The important difference was in receipts from crop sales. Receipts from the sale of livestock and livestock products were slightly higher on the least-profitable farms.

Total expenses amounted to \$2,150 and \$1,143 on the most- and least-profitable farms, respectively. The important differences were in crop production expenses.

The cash receipts and inventory increases less the cash expenses and inventory decreases (net farm gain) amounted to \$2,403 for the average of 20 farms, \$4,199 for the average of the 7 most-profitable farms, and \$702 for the average of the 7 least-profitable farms. After deducting from these amounts an arbitrary wage of \$50 per month for the operator's and family labor, and \$8 per month for the cash cost of board for hired labor, we find that the average rates earned on the whole farm investments were 7.81, 12.55, and -0.16 percent for the average, most-profitable, and least-profitable farms, respectively.

Another measure of so-called success is the labor-and-management wage. This average wage of the 20 operators amounted to \$1,197 (whole farm basis). This figure is obtained after deducting 5 percent interest on the investment and an assumed wage of \$50 per month for family labor (other than operator) from the net farm gain. The labor-and-management wage for the most-profitable group was \$2,688. The least-profitable group, assuming 4 percent earned on the investment, had nothing left for a labor-and-management wage. It is interesting to note that some of the farmers in the least-profitable group constituted a part of the most-profitable group in previous years. This emphasizes the point that in this particular farming area farmers may have well-organized farms and still have losses due to changing climatic and other conditions during certain years.

#### Factors Affecting Profits:

Those factors that are usually important in affecting the rate earned on the investment or the labor-and-management wage are: (1) Size of farm



business, (2) kinds and acres of crops grown and the yields of these crops, (3) man labor cost, (4) power and machinery costs, (5) net returns from livestock, (6) price of farm products. Another factor that may be of considerable importance in many cases is the cost of farm buildings and other improvements.

Some data pertaining to these factors are given in tables 3 and 4. Here again there are certain limitations when averages are used and when information pertaining to these factors is based upon what happened on the most- and least-profitable farms. It is assumed that experienced farmers who have become acquainted with information pertaining to the most- and least-profitable farms can readily draw satisfactory conclusions as to which enterprises were profitable for each group.

Size.— The most-profitable group of farmers had under cultivation 858 acres of land valued at \$17.85 per acre as compared with 419 acres valued at \$14.18 per acre for the least-profitable group. The former group had more and better land than the latter group. The difference in number of acres of native pasture was not sufficient to make much difference in size of the farm. The least-profitable group had slightly more dollars invested in livestock per farm and the returns from livestock were slightly greater. Taking everything relating to size of farm into consideration, we conclude that the most-profitable group of farmers had much larger farm businesses than had the least-profitable group.

It is of interest to note that a separate tabulation indicates that a few farmers with less than 640 acres of land in the farm have increased the size of their farm businesses by the addition of livestock. The livestock required the use of considerable labor distributed throughout the year. The profitable production of livestock plus satisfactory crop yields provided as much as \$800 per year for a labor-and-management wage for a few farmers on these smaller farms. So long as livestock production is profitable there is a possibility that, even though one is unable to buy or lease more land and even though it is necessary to buy some feed, some increases in profits are attainable by the production of more livestock.

Crops and Yields.— Wheat was the major crop produced on the farms included in this study. It occupied 28 and 24 percent, respectively, of the tilled land on the most- and least-profitable groups of farms. Slightly more land was summer-fallowed than was planted to wheat. If we assume that most of this area of summer-fallowed land is intended to be used for wheat during the following year, then it is obvious that approximately one-half of the tilled land is being used for the production of wheat. Corn ranked second in importance. It occupied 25 and 14 percent, respectively, of the cultivated acreage on the most- and least-profitable groups of farms. Barley ranked third but was relatively unimportant.

The average yields of wheat, corn, and barley were 10.5, 9.6, and 9.5 bushels per acre, respectively. The yields of the two major crops, wheat and corn, were 14.8 and 11.9 bushels per acre on the most-profitable group of farms or approximately three times the yield on the least-profitable group of farms. It is quite evident that profits were made by the most-profitable group of farms in the production of the two major crops. It is equally obvious that income from yields of 4.5 bushels of wheat and 4.2 bushels of corn per acre was insufficient to pay expenses on the least-profitable farms.

Other grain or seed crops produced were rye, barley, kaffir, coes, milo, millet, sudan, and hegari. Often these crops are planted as catch crops on land which has been previously planted to another crop that failed. Therefore it is difficult to make an adequate comparison of the profitability of minor crops as compared with the major crops, wheat and corn. However, on the basis of the acreages, yields, prices, and probable comparative costs there is no evidence that any minor crop was sufficiently profitable to warrant an increase in the acreage planted to it. Since the Akron Dry-Land Field Station, which is located in the extreme southwestern part of this particular type-of-farming area, has had considerable success in the production of certain grain sorghums on summer-fallow, it may be advisable for farmers to continue to experiment with a few minor crops. Apparently, it takes time to find out the best practices in the production of new kinds of crops.

Man labor costs.— The man-labor cost per tilled acre ranged from \$1.15 on the most-profitable farms to \$1.79 on the least-profitable farms. The man-labor cost as calculated includes an arbitrary wage of \$50 per month for the operator and members of the family, besides actual wages paid for hired labor. On this basis the total cost of labor was about \$230 (per farm) or one-third greater on the most-profitable farms than on the least-profitable. However, the cost per tilled acre was less on the most-profitable farms because there were 439 additional acres under cultivation on these farms. Since there was only a slight difference in the amount of livestock handled by each group, it is quite obvious that the most-profitable group was able to produce more agricultural products per unit of labor employed.

Obviously, some farm operators prefer to have smaller farms rather than to have larger farms and operate larger power units. (Of course, it is possible for some farmers using large-scale machinery to have more leisure time than some farmers on smaller farms with small-scale machinery.) Often competition is such that it is impossible to obtain more acres of land to cultivate even though the desire for more agricultural land exists. An increase in the size of the livestock enterprises or a shift toward the production of more intensive profitable crops may in certain instances make possible the use of available labor during "slack" months.

There are certain limitations which probably should be recognized in drawing conclusions by use of this particular method of arriving at labor costs. In the first place it is possible that many farmers who are cultivating the larger acreages could obtain greater returns for their labor if they were working elsewhere. Therefore, it might have been advisable to have assumed a higher monthly wage for those farm operators. Nobody knows exactly what they would now be receiving if they had chosen some other vocation. An assumption would need to be made in any case. It has been considered desirable for this study to assume a flat rate per month for each operator and then explain how it was done.

Secondly, these cost figures are merely estimates in dollars and cents and do not measure the actual human effort involved in the production of crops and livestock. Some operators of farm businesses may enjoy their work so much that they would consider the human cost as being negligible. Others may dislike farming because of various reasons and find that farm work for them is difficult. To the latter group the real human cost would undoubtedly be greater than to the former group, even though the same

Table 3.- Factors for comparing farm businesses in type-of-farming area 12  
in Phillips, Washington, and Yuma Counties, northeastern Colorado, 1939.

Items	Your farm	Average of 20 farms	7 Most- profit- able farms <sup>1/</sup>	7 Least profit- able farms <sup>1/</sup>
Size of farm, acres		783	1004	572
Investment per acre:				
Land		\$17.70	\$17.85	\$14.18
Improvements		3.35	3.03	4.37
Total land and improvements		21.05	20.88	18.55
Productive livestock		1.44	1.14	1.88
Horses		.31	.20	.61
Machinery and equipment		2.59	2.36	2.61
Feed, supplies and crops		2.09	2.71	1.20
Total investment		27.48	27.29	24.85
Gross productive livestock receipts and/or net inventory increases per farm acre		1.68	1.13	2.27
Gross receipts and/or net increases from crops and other sources per farm acre		3.46	5.19	.95
Total farm receipts and/or net increases per farm acre		5.14	6.32	3.22
Farm cash expenses and/or net decreases per farm acre		2.07	2.14	2.00
Receipts less expenses per farm acre		3.07	4.18	1.22
Operator's and unpaid family labor per farm acre		.85	.63	1.26
Net income from investment per farm acre		2.22	3.55	-.04
Acres of farm land tilled		645	858	419
Acres of tilled land in:				
Wheat		200	243	102
Corn		134	211	56
Barley		44	43	43
Oats		13	33	4
Other grains		17	25	22
Cane		20	25	23
Other roughage crops		15	12	23
Miscellaneous crops		11	--	22
Total all crops		454	592	295
Tilled pasture		13	10	18
Summer-fallow		177	252	106

Table 3 continued

Items	Your farm	Average of 20 farms	7 Most-profitable farms	7 Least-profitable farms
Percent of farm land tilled		82	85	73
Percent of tilled land in:				
Wheat		31	28	24
Corn		21	25	14
Barley		7	5	11
Oats		2	4	1
Other grains		3	3	5
Cane		3	3	5
Other roughage crops		2	1	5
Miscellaneous crops		2	-	5
Total crops		71	69	70
Tilled pasture		2	1	4
Summer-fallow		27	30	26
Total percent		100	100	100
Crop yields per acre, bu.				
Wheat		10.54	14.80	4.53
Corn		9.55	11.90	4.25
Barley		9.47	9.03	7.29
Sale prices for				
Wheat, bu.		.58	.62	.54
Corn, bu.		.47	.47	.53
Market hogs, per cwt.		6.11	5.46	6.15
Returns per \$100 feed fed to productive livestock <sup>2/</sup>		148.42	138.17	163.78
Returns per \$100 feed fed to productive livestock <sup>3/</sup>		169.29	162.30	185.84
Value of feed fed to productive livestock		886.00	820.00	792.00
Dairy sales per cow		37.00	34.00	44.00
Average number of cows milked		4.48	4.43	5.36
Man labor cost per tilled acre		1.31	1.15	1.79
Horse and tractor power and machinery cost per tilled acre		1.41	1.37	1.39
Total man labor and horse and tractor cost per tilled acre		2.72	2.52	3.18
Percent farms with tractors		95	86	100
Number of workable horses		2.30	2.43	2.71
Cost of horse feed per workable horse		20.10	25.10	19.41
Rate earned on investment		7.81	12.55	-0.16

<sup>1/</sup>Basis - rate earned on investment.

<sup>2/</sup>Excluding value of livestock products consumed in the farm home.

<sup>3/</sup>Including value of livestock products consumed in the farm home.

number of months of labor were performed. The development of greater opportunity for persons to change vocations would undoubtedly reduce this discrepancy. However, because of the persistence of things which retard the mobility of labor it is likely that such discrepancies shall persist in the future. Thus, conclusions based upon this method of calculating labor costs must be made after giving adequate consideration to the limitations involved.

Power and machinery costs.— It is indicated in table 3 that the horse and tractor power and machinery costs per acre of cultivated land were \$1.37 on the most-profitable farms and \$1.39 on the least-profitable farms. These figures merely indicate that the most-profitable group of farmers produced and harvested higher-yielding crops at approximately identical power and machinery costs per tilled acre. Farmers obviously know that there are many factors which affect the size of these figures. For example, if a portion of a wheat crop winter-kills it may be advisable to plant a second crop on this land. The replanting increases the cost. Or, if the wheat crop is destroyed by hail in the spring and it is too late to plant another crop, the land will probably be summer-fallowed. The costs of summer-fallowing and planting the land to a crop in the fall will undoubtedly exceed the cost of harvesting and marketing the grain.

Let us take an example relating to the production of corn. The greater the yield the greater the cost per tilled acre of corn because of the difference in harvesting costs. This variation in cost due to variation in yield will be less if mechanical corn pickers are used than if the corn is picked by hand. But if the corn is picked by hand there will be more stalks left on the ground to prevent wind erosion of the soil and to stop snow. The decrease in soil erosion and the increase in moisture supply in a hand-picked cornfield might add to the yield of the next year's crop such that it would pay to pick the corn by hand, even though the cost of picking corn by hand exceeded the cost of picking by use of a mechanical corn-picker. This may be true even though the increased amount of cornstalks left in the field by hand pickers cannot be utilized by livestock. Consequently, even though a farmer might have a relatively higher cost per tilled acre than the average, it is quite possible that the additional cost might pay good dividends the following year.

However, over a period of years, if one or more farmers are performing the same tillage practices as are their neighbors in the same type-of-farming area and find that the records show that they consistently have much higher power and machinery costs than the average, it may be desirable to find out the reasons for this higher cost.

Let us consider one possible reason why the power and machinery cost might be "out of line." For example, assume a farmer has recently purchased a \$1,100-truck for a small farm on a time-payment plan. It is expected that there will be on the average about 1,500 bushels of grain to haul to the local market each year. The balance of the crop is fed to livestock. Most of the livestock products are hauled to town in the family auto. Possibly a maximum of 5 truck loads of livestock are hauled to the local market each year. It is necessary to haul fuel, oil, water, and other items to the field to service the tractor. Some seed needs to be hauled to the field at planting time. Other odd jobs require the services of either a truck or a small so-called "pickup." There is little opportunity for custom hauling. Should the farmer have purchased the \$1,100-truck?

It is estimated that the grain could have been hauled by a commercial trucker for \$45 each year. It would cost about \$35 to have hauled the livestock. This makes a total of \$75 per year. The service work on the farm could have been done with a light "pickup" costing possibly \$200 for which operating expenses would have been much less than operating expenses of a large truck. The interest, depreciation, fuel and oil costs, and the hiring of a man to operate the large truck would obviously exceed considerably the cost of hiring the grain and livestock hauled by a commercial trucker plus the cost of using a small "pickup." The conclusion is based upon the assumptions given. It is quite possible that if a farmer were operating a large farm or had opportunity to do considerable custom work it would be advisable to buy an \$1,100 truck. We cannot say, however, that just because a neighbor has a large farm truck everyone should have a truck.

Returns from livestock.-- The average return per \$100 worth of feed fed to productive livestock (all livestock except horses) on the 20 farms amounted to \$169.29. It was \$162.30 on the most-profitable farms and \$185.84 on the least-profitable farms. These livestock returns include an estimated value of the livestock products consumed in the farm home. These figures represent the amount received before any expenses are figured for the labor of taking care of livestock, for shelter, fences, stock water, veterinary bills, stock medicines, and interest on investment. They indicate the amount received from the sale and home-use of livestock and livestock products per \$100 worth of feed fed, after deducting livestock purchases and breeding fees and after making adjustments due to changes in inventory valuations. These figures are not calculated on a per-farm basis. They are calculated by dividing the total returns by the total amount of feed fed on the various groups of farms.

It is evident that the least-profitable group of farmers received greater returns on feed fed than did the most-profitable group. Even though the former group fed slightly less feed, it is obvious that this group of farmers had greater returns from livestock.

Six farmers in this project have been interested in finding out the returns per \$100 worth of feed fed to each class of livestock. From these figures they are able to estimate roughly which kinds of livestock were the most profitable. Their records have been summarized for comparison.

As indicated in table 4 the returns per \$100 worth of feed fed cattle, hogs, and poultry were \$174, \$155, and \$175, respectively. A portion of the margin above feed costs is required to offset other expenses besides feed. The amount per \$100 worth of feed fed that is required for these other expenses has been estimated to be about \$50 for cattle (primarily milk cows) and for poultry and about \$35 for hogs on an average farm in this area, assuming the farmer allots 25 cents per hour for his labor and no costs for shelter and fences. On the basis of the indicated assumptions it is evident that the returns from the production of cattle, hogs, and poultry were favorable on these farms during the year 1939. Returns were much less favorable in 1939 than they were in 1938. In 1938 the returns for the three classes of livestock, cattle, hogs, and poultry were \$200, \$158, and \$270, respectively, or \$26, \$3, and \$95 greater per \$100 worth of feed fed than in 1939.

Table 4.- Comparison of returns from different kinds of livestock produced on 6 farms in Phillips, Washington, and Yuma Counties, Colorado, 1939.

Items	Cattle	Hogs <u>1/</u>	Poultry
Returns per \$100 feed fed (includes home-used livestock products as returns)	\$174	\$155	\$175
Total value of feed fed	2,347	933	1,866
Average value feed fed per farm	391	233	311
Returns per \$100 invested (includes home-used livestock products)	104	284	364
Total investment	3,908	510	900
Average investment per farm	651	170	150
Returns per \$100 feed fed (includes home-used livestock products):			
3 most-profitable farms <u>2/</u>	213	---	220
3 least-profitable <u>2/</u>	137	---	157

1/ Hogs were produced on 3 of the 6 farms.

2/ Classified on basis of returns from each enterprise

Prices.- The average price of wheat and corn sold during 1939 was 58 and 47 cents per bushel. This includes all wheat and corn sold during the year for the whole farm business. Any landlord's crops are considered as sold during the year either at the market price when sold or at the market price if on hand at the end of the year. As indicated in table 3, the most-profitable group of farmers received 8 cents more for wheat sales than the least-profitable group, but the latter group received 6 cents more per bushel from corn sales.

Summary of comparison of factors affecting profits.- Important factors which influenced farm earnings either directly or indirectly on the farms in this study are given in table 5. Each farmer is able at a glance to compare certain phases of his farm business with certain phases of other farm businesses located in the same dry-farming area, type-of-farming area 12, in Colorado. Explanation of the contents of the table is given in the heading of the table. The factors given are of interest to the farmers in this particular farming area. In other farming areas different factors would need to be considered.

Table 5.-- A comparison may be made of figures given in each column relative to the factors at the head of each column for your farm (indicated by red line), for the average of all farms in this study (given between the lines across the middle of the page), for the 7 most-profitable farms (black line), and for different farms which were high and low (for each factor), Phillips, Yuma, and Washington Counties, Colorado, 1939.

	Rate earned on investment	Bushels yield per acre <sup>1/</sup>			Size of farm (acres)	Percentage land tilled	Percentage of tilled land in <sup>2/</sup>			Returns per \$100 fed to P.L. <sup>3/</sup>	Value of feed fed P.L. <sup>3/</sup>	Cost per tilled acre	
		Wheat	Corn	Barley			Wheat	Corn	Fallow			Man power	Power and machinery
High	24.7	24	18	17	1,600	98	55	60	53	\$264	\$1,881	\$2.69	\$2.16
	22	21.0	16	16	1,500	96	52	56	48	253	1,586	2.36	2.11
	20	19.5	15	15	1,400	94	49	51	45	241	1,486	2.21	2.01
	18	18.0	14	14	1,300	92	46	46	42	229	1,386	2.06	1.91
	16	16.5	13	13	1,200	90	43	41	39	217	1,286	1.91	1.81
	14	15.0	12	12	1,100	88	40	36	36	205	1,186	1.76	1.71
	12	13.5	11	11	1,000	86	37	31	33	193	1,086	1.61	1.61
	10	12.0	10	10	900	84	34	26	30	181	986	1.46	1.51
Av.	7.8	10.5	9.6	9.5	783	82	31	21	27	169	886	1.31	1.41
	6	9.0	8	8	700	80	28	16	24	157	786	1.16	1.31
	4	7.5	7	7	600	78	25	11	21	145	686	1.01	1.21
	2	6.0	6	6	500	76	22	6	18	133	586	.86	1.11
	0	4.5	5	5	400	74	19	1	15	121	486	.71	1.01
	-2	3.0	4	4	---	72	16	---	12	109	---	.56	.91
	-4	---	3	3	---	70	13	---	9	97	---	.41	.81
	---	---	2	2	---	68	10	---	6	85	---	---	.71
Low	-5.3	1.5	0	.6	320	48	0	0	0	50	390	.34	.59

<sup>1/</sup>Based on acres planted and left for harvest (that is, not planted to another crop or fallowed in case of failure).

<sup>2/</sup>Includes all crops requiring seedbed preparation, tilled pasture, and summer-fallow; excludes wild hay.

<sup>3/</sup>Productive livestock: all livestock except horses.

<sup>4/</sup>Includes value of livestock products used in the home.

#### Landlords' earnings on leased lands

The average rate earned by owners of leased private lands was 4.8 percent on a total investment of \$21.21 per farm acre (see table 6). Land constituted \$19.71 of the total investment and improvements \$1.50. The investment represents the operators' estimates of the value of land and improvements, excluding the residence. The rate earned varied from a loss of four-hundredths of one percent to a gain of 10.34 percent. On the one-third of the farms where owners received the lowest returns, the rate earned was 1.19 percent. The landlord's investment on these farms amounted to \$9,261 per farm. The average rate earned on the high-return farms was 8.17 percent and the average investment per farm was \$13,264.



The landlords' sources of income were sales of cash crops, government benefit payments, and cash rent. All crops on hand at the end of the year were considered as sold at the market price at the end of the year, except in one case. Thus it is possible that some landlords who stored grain could have received a higher or lower price for their crops, depending upon their ability as speculators. The landlords' expenses consisted of taxes and depreciation on farm buildings and improvements, excepting the residence.

Table 6.-- Rate of interest earned by landlords of leased private lands on 17 farms located on first-grade dry-farming land in Phillips, Washington, and Yuma Counties, northeastern Colorado, 1939. <sup>1/</sup>

Classification (basis rate earned)	No. farms	Range in rates earned on total investment	Average rate earned on total investment	Average total investment (land & improvements) per acre	Average investment farm land only per acre	Total average acreage per farm	Total average investment per farm
		Pct.	Pct.			acres	
Low	6	-.04 to 2.71	1.19	\$20.23	\$17.81	458	\$9,261
Medium	5	2.71 to 4.02	3.49	25.68	23.76	470	12,070
High	6	4.02 to 10.34	8.17	19.38	18.70	709	13,264
Average			4.79	21.21	19.71	550	11,670

<sup>1/</sup>Nineteen of the 20 farmers included in this study leased all or a part of the land that they operated. Figures given in this table pertain only to private lands leased. The figures have been calculated on a weighted-average basis.

#### A few factors that affected crop yields

A farmer in this particular farming area knows that there are numerous factors causing a high or a low yield of a particular crop and that any one of these might be a major factor in some one year. A few of these factors are the amount of rainfall, the distribution of rainfall, the temperature at critical times during the growing season, velocity of wind at certain periods during the fall or early spring, methods of cultivation in relation to the distribution of rainfall, timeliness of cultivation, thoroughness of cultivation, the preceding crops, variety of seed planted, insects, rust damages, hail, and time of planting. Several farmers have been interested in making comparisons of one variable factor, namely, rainfall. A report of the results is given in tables 7, 8 and 9.

Each individual farmer who has a knowledge of other varying factors that affected wheat yields (see table 7) may arrive at his own interpretation of the reasons for differences in yields. In the first column of the table is given the range in precipitation (from high to low) during the period January 1 to July 1 of the crop year. The latter date is assumed to be the latest date that the rainfall could be effective in influencing the yield of wheat. Obviously, under certain conditions late rains during the growing season are not effective.

An analysis of the information given in table 7 provides the following suggestions: The amount of precipitation varied from 6.4 inches to 10.5 inches during the period January 1 to July 1 or a difference of approximately 4 inches. The yield of wheat varied from 4.7 to 17.3 bushels per acre or a difference of 12.6 bushels. The farmer who received the lowest amount of rainfall on his farm during the growing season in 1939 and during the preceding year when summer-fallow operations were being carried on, obtained the lowest yield of wheat per acre. The farmer who obtained the highest yield of wheat did not receive the highest amount of rainfall during the growing season, January 1 to July 1, but he did receive the largest amount of rainfall during the month of June and also considerably more rainfall than the average during the preceding year.

The farmer receiving the highest amount of precipitation had considerably less than the average yield. However, the distribution of the rainfall was not satisfactory and considerable hail fell during one thunder shower. During the month of May 5.4 inches of rain fell. More than 3 inches came in a relatively short time during one day. There was considerable runoff, so the rain was not very effective. During the month of June no single rain exceeded more than three-tenths of an inch and most of the rains amounted to less than two-tenths of an inch. During the preceding year the rainfall was less than that received on those farms where the highest yields were obtained.

It is of interest to note the difference in yields on farms 5 and 6. The total precipitation during the growing season and during the summer-fallow season of the preceding year was only slightly greater on the higher-yielding farm. There were two differences in the distribution of the rainfall that might have been important. First, in the middle of September of the preceding year, that is, at planting time, a rain measuring three-tenths of an inch fell on farm No. 5 where the higher yield was obtained. Again, from the middle of April to the latter part of May no effective rain fell on the low-yield farm, but 1.1 inches fell on the high-yield farm. The additional "fall" moisture accompanied by slightly different cultural practices might have been the reason the winter wheat was growing on the higher-yield farm but not on the low-yield farm by the beginning of the year 1939. A better distribution of rainfall in the spring was undoubtedly one reason for the higher yield on the one farm. Other factors may have been of greater importance.

The amount and distribution of precipitation and the yields of corn are given in table 8. Each individual farmer who kept a rainfall record may find his farm number and make comparisons.

On farm No. 1 the rainfall was apparently quite adequate until the month of August. On farm No. 2 the rainfall in June and July was greater

Table 7.— Precipitation to harvest time, corresponding yields of wheat, and other related data pertaining to 9 farms in northeastern Colorado, 1939, (only those farms where rainfall records were kept).

Farm No.	Precipitation to Jan. 1 to July 1	Yield of wheat per acre	Distribution of precipitation, 1939				Precipitation preceding year, 1938 <sup>2/</sup>			Wheat harvested 1939	Wheat growing beginning of year	Summer-fallow 1938	Type of soil
			Jan. 1 to Mar. 31 <sup>1/</sup>	Apr.	May	June	Jan. 1 to July 31	Aug.	Sept.				
	in.	bu.	in.	in.	in.	in.	in.	in.	in.	acres	acres	acres	
1	10.5	7.0	3.0	.8	5.4	1.3	11.7	1.23	.68	157	76	158	Hard
2	9.3	17.3	3.0	.9	1.8	3.6	14.5	1.23	.83	280	300	150	<u>3/</u>
3	9.2	15.5	3.0	.7	2.5	3.0	12.2	1.04	.76	201	197	0	Sand
4	9.3	14.8	3.0	1.6	2.8	1.9	15.8	1.90	1.67	575	577	732	Sand
5	8.9	13.0	3.1	.7	3.3	1.8	10.3	1.25	.63	297	297	272	Hard
6	8.5	4.8	3.1	1.8	2.1	1.5	10.0	1.27	.43	242	0	170	Hard
7	8.1	8.0	3.0	.4	2.2	2.4	12.8	.56	.89	188	88	210	Hard
8	7.9	8.0	3.0	.8	2.2	2.0	12.9	.42	1.21	560	520	320	<u>3/</u>
9	6.4	4.7	2.4	.9	1.0	2.1	9.7	.62	1.11	81	128	248	Hard
Av.	8.7	10.3	3.0	.9	2.6	2.2	12.2	1.06	9.1	287	243	251	

<sup>1/</sup>Estimated from data published for nearby towns by the U. S. Weather Bureau.

<sup>2/</sup>Virtually no effective precipitation was received during the month of October on any of these farms.

<sup>3/</sup>Both "hard" and "sand" land on farm.

than on farm No. 1 although rainfall during preceding months was less. The yield on farm No. 2 was 3 bushels per acre greater. On farm No. 3 the rainfall was inadequate during the months of June and July. Because of the effect of the summer drought on the corn plants it is doubtful if the rainfall in August and September was effective.

On farm No. 4 rainfall during the early part of the growing season was satisfactory but not excessive. The corn plants thus would not develop an overabundance of foliage. During the latter part of the growing season considerable rain fell. It was undoubtedly effective. The yield was 18 bushels per acre.

Farm No. 5 is an exceptional case. Virtually no rain fell during the month of July when temperatures were high. Only on the summer-fallow corn was the August rainfall of any use as far as influencing the corn yield was concerned. The non-fallow corn had dried up.

On Farm No. 6 the corn yielded 9.5 bushels per acre with only 9.6 inches of precipitation. It is of interest to compare farm No. 6 with farm No. 4. Both farmers are first class corn producers and both farm corn on similar types of soil. During the preceding year, 1938, both farmers had approximately the same amount of rainfall. There was some difference in distribution of rainfall. However, yields were about identical. During the year 1939 both farms received approximately the same amount of precipitation from January 1 to May 30. However, during the months of June, July, and August the low-yield corn land received 1.0, 1.0, .6 fewer inches of rainfall, respectively, than the high-yielding corn land. The difference in the yield of corn was 8.5 bushels per acre.

Table 8.— Precipitation to harvest time and corresponding yields of corn on 7 farms in northeastern Colorado, 1939, (only those farms where rainfall records were kept).

Farm No.	Precipitation Jan. 1 to Sept. 30	Yield of corn per acre	Distribution of precipitation							Acres of corn	Major type of soil <sup>1/</sup>
			Jan. 1 to Mar. 31	Apr.	May	June	July	Aug.	Sept.		
	in.	bu.	in.	in.	in.	in.	in.	in.	in.		
1	13.6	7.5	3.1	.7	2.8	4.6	1.9	.4	.1	200	Sand
2	13.0	10.5	3.0	.9	1.9	3.6	2.6	.9	.1	525	Hard
3	12.8	0	3.0	1.6	2.8	1.9	.9	1.5	1.1	15	—
4	12.3	18.0	3.0	.7	2.5	3.0	1.7	1.3	.1	395	Sand
5	9.6	10.02 <sup>2/</sup>	3.1	.7	3.3	1.8	.1	.5	.1	20	Hard
6	9.6	9.5	3.0	.8	2.2	2.0	.7	.7	.2	425	Sand
7	7.4	0	2.4	.9	1.0	2.1	.6	.3	.1	51	Hard
Av. per farm	11.2	7.9	2.9	.9	2.4	2.7	1.2	.8	.3	233	

<sup>1/</sup>"Sand" is the popular name for very fine sandy loam soils and "hard" the name for silt loam soils.

<sup>2/</sup>Part of this land was summer-fallowed for corn.

On farm No. 7 inadequate supplies of precipitation fell during May and only .6 of an inch of rain fell during July and .3 during August. It is extremely doubtful if any person could have produced a profitable corn crop with such a limited supply of rainfall, even though the land were summer-fallowed.

In table 9 is given data pertaining to precipitation and barley yields. If farms No. 2 and No. 5 were deleted the yields would appear to be definitely associated with amount of rainfall. Apparently other factors were more important on these two farms than the amount of rainfall.

Table 9.— Precipitation to harvest time and corresponding yields of barley on 6 farms in northeastern Colorado, 1939, (on those farms where rainfall records were kept).

Farm No.	Precipitation Jan. 1 to July 1. in.	Yield of barley per acre bu.	Distribution of precipitation				Acres of barley	Type of soil 2/
			Jan. 1 to Mar. 31 <sup>1/</sup> in.	Apr. in.	May in.	June in.		
1	10.5	9.0	3.0	.8	5.4	1.3	20	Hard
2	9.3	.6	3.0	.9	1.8	3.6	85	—
3	8.9	6.0	3.1	.7	3.3	1.8	30	Hard
4	8.5	5.0	3.1	1.8	2.1	1.5	60	Hard
5	8.1	17.0	3.0	.4	2.2	2.4	62	Hard
6	6.4	5.3	2.4	.9	1.0	2.1	81	Hard
Av. per farm	8.6	7.2	2.9	.9	2.6	2.1	56	

<sup>1/</sup> Estimated from data published for nearby towns by the U. S. Weather Bureau.

<sup>2/</sup> "Hard" land; silt loam soils.

#### Farm Family Income

The average income obtained from the farm per farm family amounted to \$1,520 during the year 1939. This income figure excludes 5 percent interest on the operator's investment of \$11,000 per farm but includes all other income from the farm business. For example, the \$1,520 includes the value of all livestock products, fuel, and the rental value of leased farm residences. These items totaled \$250. It included an income for the services of members of the farm family of \$70 per year. The balance of the \$1,520 consisted of an imputed labor and management wage of approximately \$1,200 for the farm operator.

The average income per person in the farm family amounted to approximately \$27 per month, provided it is assumed that there were 4.5 members in the farm family, the actual number of members in the account cooperators' families during the year 1938. Including interest of 5 percent on the operator's investment of \$11,000 the per capita monthly income amounted to less than \$40 per month. Monthly per capita income during the two preceding years, 1937 and 1938, averaged about \$30 and \$21, respectively, assuming earnings on investment were included. These amounts were less than voters in Colorado have considered is needed for people over 60 years of age. These farmers have undoubtedly received an income equal to the average in this type-of-farming area that is composed of  $1\frac{1}{2}$  million acres.

### Summary

Twenty farmers operating farms valued at an average of \$22,000 and located on first-grade dry-farming land in northeastern Colorado received a net average cash income of \$1,449 during the year 1939. After including the net inventory increases of \$954 the total net farm gain amounted to \$2,403. This figure represents the income from a total farm investment evaluated by farmers at approximately \$22,000 per farm. It includes the wages and profits of the farm operator as a laborer and a manager and services performed by the farmers' families. It excludes about \$250 consisting of farm products used in the farm home and an imputed rental value of leased farm residences. These figures pertain to the farm business as a whole, that is, the records of the farm operator and the landlord (if there was a landlord) were considered as one record.

On the same basis the net farm gain for the most-profitable one-third of the farmers amounted to \$4,199 on farms valued at \$28,000 each. The least-profitable one-third had a net gain of \$702 and a corresponding investment of \$14,000.

The average size of farm was 783 acres during the year 1939. The most-profitable one-third of the farmers operated farms consisting of an average of 1,004 acres. The average yields of the two major crops, wheat and corn, were 10.5 and 9.6 bushels per acre. The yields were slightly lower than the 13-year average during the period 1924-36. From twice as many acres in wheat and corn, the most-profitable group obtained average yields of 14.8 bushels per acre for wheat and 11.9 bushels for corn or three times the per-acre yields received by the least-profitable group. The less prosperous farms were located quite generally in low-rainfall areas. A higher percentage of the cropland was planted to other crops than wheat and corn in these low-rainfall areas and unsatisfactory yields were obtained. The average prices received for wheat and corn were 58 and 47 cents per bushel. Labor and power and machinery costs were less on the most-profitable farms.

Livestock returns were favorable. The returns per \$100 worth of feed fed to productive livestock amounted to \$169. This figure includes the value of livestock products consumed in the farm home. The returns on feed fed cattle, hogs, and poultry amounted to \$174, \$155, and \$175, respectively, on a small sample of farms. A portion of the margin above feed costs is required to offset other expenses besides feed. Since more labor is required to take care of cattle (primarily milk cows) and poultry than hogs it is quite likely that the returns were approximately equal for each class of livestock indicated. Slightly more dollars were invested in livestock on the least-profitable farms

and slightly greater returns were received per \$100 worth of feed fed livestock on the least-profitable farms. However, higher yields on larger acreages of land accompanied with lower labor and power and machinery costs per unit of product on the most-profitable farms more than offset the favorable income from livestock on the least-profitable group of farms.

Landlords received an average of 4.8 percent interest on an average investment of more than \$11,000 per farm. This rate was earned on an estimated investment of \$21.21 per acre in land consisting of \$19.71 for investment in land and \$1.50 for buildings and improvements, excluding the farm residences. The average investment of landlords in farm residences was 95 cents per acre.

Rainfall was very definitely a factor in affecting yields of crops and ultimately farm income. However, the distribution of that rainfall, as well as the amount of rainfall, was important. There was evidence to indicate, however, that other factors were more important than rainfall in a few cases in obtaining satisfactory crop yields.

The estimated farm family income secured from the farm amounted to less than \$40 per person per month in 1939. This was higher than the per capita monthly income of \$30 and \$21 during the preceding years, 1937 and 1938.