

An Economic Study
of
Farm Management and Land Utilization
in
Buckingham County, Virginia, 1938-1940
by
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AN ECONOMIC STUDY OF FARM MANAGEMENT AND LAND UTILIZATION
IN BUCKINGHAM COUNTY, VIRGINIA, 1938 and 1940.

INTRODUCTION

Successful programs of Vocational Agriculture are based upon local situations and needs. Specific rather than general knowledge is needed, and each community presents its own peculiar problems. To determine what they are, each teacher must make a careful and systematic study of the local farming situation to obtain definite and concrete information on which to base a course of study in order to be sure that this course of study actually meets the needs of students in Vocational Agriculture. If a teacher is to train present and prospective farmers for greater proficiency in farming, he must first become familiar with the strong and weak points in the present farm program, or much lost motion is apt to be generated.

This study was initiated locally by the author and includes twenty-eight typical farms represented in all-day classes in Vocational Agriculture. The idea of the survey was to determine what information could be secured locally by a teacher in building a program of instructions to be used in his all-day classes.

The survey was conducted over a two-year period and includes the results obtained from a study of the farm business records on twenty-eight farms. It includes such information as the prevailing types of farming, average size of business, rates of production, sources and amounts of income, and causes of variations in incomes between farms.

A general description of the area is also given, which includes topography, climate, soils, present land use, soil erosion conditions, and other basic data and information.

An attempt has been made to put this information into a form usable in formulating a program of instructions for all-day classes.

At least two studies of a somewhat similiar nature have been made. The thesis study of Mr. E. G. Smith, presented to the Agriculture Education Department, V.P.I., Blacksburg, Virginia in 1925, entitled "The Farm Survey and Its Use in Teaching Vocational Agriculture in Virginia High Schools", is of a very similiar nature. However, a different type of survey form was used and more space is devoted to determining the kind of farm practices being carried out by the farmers in the area studied. This thesis was based on a study of fifty farms in the area surrounding Blacksburg, Virginia, and covered a period of one year.

The second study, by Mr. A. T. Lewark entitled "A Course of Study in Farm Management", was made for the purpose of giving teachers of Vocational Agriculture additional aid in teaching Farm Management in all-day classes. Here an attempt has been made to adapt a course in farm management to the various types of farming in Virginia. The object of the study was to aid teachers of Vocational Agriculture in teaching farm management -- not to determine what information could be secured by the teacher to help in building a program of instruction.

GENERAL DESCRIPTION OF THE COUNTY

A. Physical Description

1. Topography

The topography of Buckingham County may be described as an eroded plain, except for a few uplifting hills, causing a variation from hilly along the James River front to gently rolling and undulating throughout most of the County. The County is well drained by numerous small streams flowing generally in north-east and south-east directions.

2. Climate

The general climatic conditions are very favorable for the production of hay and pasture, and especially adapted to the production of dark-fired tobacco.

The rainfall is approximately 44.44 inches and is well distributed throughout the year, with the months of September and October usually having the least precipitation. During the spring and summer months there are frequent quick thunderstorms, which often cause considerable damage to land in cultivation. Often too, there are periods of drought during the hot summer. It is therefore necessary as a rule to conserve all the rainfall possible during growing seasons.

The temperature at New Canton, which is located in the north-eastern end of the County, is 56.84 degrees F. over a ten-year period, extending from 1931 to 1940. The coldest month is January, with an average temperature of 37.62 degrees F and

the warmest month is July, with an average temperature of 76.15 degrees F. Outside work can be done with comfort throughout most of the winter. The fall months are usually ideal for that regular farm work which must be done outside.

3. Soils

Buckingham County has not been surveyed by the Soil Conservation Service to date and as a result not much definite information can be secured in regard to the various soil types and their special adaptation to various crops.

In their virgin condition the soils vary from gray, grayish brown, or light brown in the surface, and brown, reddish brown, red or reddish yellow in subsoil. The textures range from loose, coarse sandy loams, to silt and clay loams. The soils are largely the heavier-textured red soils, as Cecil, Davidson, and Tatum, which are excellent general-purpose types. Most of the soils in this County are medium to strongly acid.

4. Present Land use according to A.A.A. records

The record of the Agricultural Adjustment Administration lists Buckingham County as being 69% forest, 23% cropland, 5% pasture, and 2% other land. The number of farms in Buckingham County is given as 2000, with an average size of 124.6 acres. Of the 23% of Buckingham devoted to crops, 40.2% is devoted to soil conserving crops, 39.8% to soil depleting crops, and 17% is classed as idle land. This means that the idle cropland in Buckingham County would be equivalent to 80.9 farms of average size.

A large percentage of the land used as pasture is of an unimproved nature. The pasture consists of natural vegetation made up largely of broom sedge, poverty grass, and crab grass. On the heavier soil types where adequate applications of lime and fertilizer are made, blue grass and white Dutch clover will replace the broom sedge, under proper pasture management, often without the addition of seed.

Buckingham County is listed as being 69% forest, which means it is in woodland or brush. The present stand of hardwood consist of mixed oak, hickory, poplar, and gum. Very few stands of original timber growth exist. Abandoned farm land has reseeded to almost pure stands of pine, either short leaf or Virginia scrub. Fire, grazing, and indiscriminate cutting have greatly impaired the natural forest.

5. Soil Erosion Conditions

On most of the farms in Buckingham County, signs of erosion are apparent on almost all slopes of significance, both sheet and gully erosion being present. This widespread erosion is largely due to lack of winter and summer cover crops, poor methods of cultivation, and overgrazing.

B. Other Basic Information

Buckingham County lies in the Virginia dark-fired tobacco belt, and has long been a heavy producer of this type of export tobacco. However, due to loss of export trade and the decrease of home consumption, the total production has gradually de-

creased. In order to make up for this loss of a source of cash income there has been, and is now, a trend towards increased numbers of cattle and a more diversified type of farming.

According to the census reports for 1930 there were 2,615 head of cattle, two years old and over, in Buckingham. In 1935 there were 3,658 head, or an increase of 39.8 percent. This increase in the number of cattle has been even greater in recent years.

1/ Acknowledgement: Much of the information given here under "Description of the County" was obtained from the Program and Work Plan for the Robert E. Lee Soil Conservation District. This information was compiled in 1941 by the Supervisors of the Robert E. Lee Soil Conservation District, which includes Buckingham County.

Weather Conditions

The rainfall at New Canton, located in the north-eastern part of the County, was about four inches less in 1938 than the average for the ten years in 1931-1940. This was especially true in February, April and October, in which months the rainfall was slightly more than one-third the ten-years' average for those months (Table 1). The annual rainfall in 1940 was slightly over two inches more than for the ten-year period. The rainfall was unusually heavy in 1940 during July and August. In that year over seven inches of rainfall fell during each of these months. Torrential rains came on August 14, 15, 16 and 17, and 6.05 inches of rain fell during these four days, producing a flood of record size. Terrible erosion was produced on high land, and acres of crops, particularly corn, were destroyed or badly damaged in the low grounds. Following these rains, September and October were unusually dry, but in spite of this the crops did not suffer for lack of moisture.

The temperatures during 1938 were generally about the average for the ten years 1931-1940. During no month in 1938 did the average temperature vary much more than one degree from the average for that month over the ten-year period, and the average annual temperature varied less than one degree from the ten-year annual average. During 1938 the average length of growing season, or time between the last killing frost in the spring and the first in the fall, was 197 days. The average annual temperature for 1940 was about two degrees colder than for the ten-year period, the winter and spring months being somewhat cooler, particularly January. The average length of growing season was 189 days.

Table 1--- Rainfall at Buckingham Court House, Virginia, average 1931-1940
and 1938 and 1940 by months.

Month	Rainfall				
	Average 1931-1940 Inches	Monthly, 1938		Monthly 1940	
		Inches 1938	Percent of 1931-40	Inches 1940	Percent of 1931-40
January	4.73	2.58	54	5.04	106
February	3.04	1.99	62	2.58	84
March	4.08	3.93	96	2.12	52
April	4.07	1.49	36	5.40	132
May	3.65	3.41	93	3.11	85
June	3.70	6.72	127	3.92	106
July	4.86	6.51	134	7.08	145
August	4.00	2.48	62	7.39	184
September	2.79	3.39	121	.93	33
October	3.39	1.01	106	1.69	47
November	3.09	3.29	109	5.43	175
December	3.04	3.67	120	2.30	75
Annual	44.44	40.47	91.6	46.99	106

Table 1--- Temperature at Buckingham Court House, Virginia, average 1931-1940 and 1938-1940 by months.

Month	Temperature				
	Average	Monthly 1938		Monthly 1940	
	1931-40 Degrees F.	1938 Degrees F.	Percent of 1938-40	1940 Degrees F.	Percent of 1931-40
January	37.62	37.58	99	24.78	65
February	39.31	43.89	111	38.14	89
March	46.46	52.77	113	43.40	93
April	54.96	57.90	105	52.71	94
May	64.80	64.69	99	64.51	99
June	72.94	68.57	93	73.85	101
July	76.15	75.58	99	73.80	95
August	74.97	75.84	101	72.67	96
September	68.90	68.35	99	64.55	93
October	57.43	56.37	98	56.50	98
November	47.92	49.83	104	48.23	100
December	40.66	38.82	95	42.59	104
Annual	56.84	56.76	99.8	54.64	96.1

The prices received for products sold from the farms in this county in 1938 averaged, as far as crops are concerned, slightly higher than the average in Virginia for those same products during the same year, with the exception of hay sold (Table 2). The prices received for tobacco and potatoes were slightly higher than those for the State average for the four-year period, 1935-1938, but lower for corn, wheat, and hay. The price received for hay was very low in both 1938 and 1940, but this can be partially explained by the fact that no clover hay was sold and very little alfalfa hay. Lespedeza hay amounted to about 90 percent of all the hay sold. The prices received in 1940 for tobacco and corn were slightly higher than the average for the State during the same year, while the prices received for wheat, hay, and potatoes were slightly lower.

Since the Virginia state average for livestock prices was computed on the basis of pounds, and information on prices on this basis was not available for the County, it was impossible to give a comparison of prices received for livestock.

Prices received for livestock products from the farms studied in this County in 1937 averaged slightly less than those for the State during the same year, with the exception of eggs and wool. The fact that a better price was received for the wool, both in 1938 and 1940, than the State averaged may be explained by the fact that almost all the wool and lambs raised in the County are marketed through a local Sheep Growers' Cooperative Association and shipped to distant markets. Prices received for milk and eggs were somewhat higher in 1940 than the Virginia average for the same year. A considerable quantity of the milk

produced by one dairyman was sold in his own restaurant, but most of the milk was hauled to the Richmond market and sold as whole milk. The prices received for livestock products in 1938 and 1940, when averaged together, vary very little from the State average for the four years, 1935-1938.

Table 2--- Comparison of Virginia Farm prices for different periods with prices received for important products sold from 28 farms in Buckingham County, Virginia.

Product	Virginia State Average			Buckingham Average-28 farms	
	1935 to 1938	Marketing season 1938	Marketing season 1940	Marketing season 1938	Marketing season 1940
<u>Crops</u>					
Tobacco, dark fired, per 100 lb.	\$11.4	\$10.75	\$9.37	\$12.22	\$10.05
Wheat per bu.	0.95	0.80	0.95	0.81	.86
Corn, per bu.	0.81	0.64	0.74	0.72	.75
Hay, per ton	13.70	11.42	11.74	8.08	8.00
Potatoes, white	0.69	0.70	0.84	0.84	0.70
<u>Livestock</u>					
Beef, per 100 lb.	\$5.88	6.44	6.94	----	-----
Veal, per 100 lb.	7.67	8.84	9.34	----	-----
Sheep, per 100 lb.	2.95	2.91	3.00	----	-----
Lambs, per 100 lb.	7.82	8.02	8.65	----	-----
Hogs, per 100 lb.	8.07	7.93	5.73	----	-----
Chickens, per lb.	0.165	0.169	0.148	----	-----
Turkeys, per lb.	0.190*	0.190	0.170	----	-----
<u>Livestock Products</u>					
Milk, per 100 lb.	\$2.50	\$2.55	\$2.61**	\$2.45	\$2.63
Cream, per lb. B.F.	0.265	0.235		0.175	0.26
Butter, per lb. B.F.	0.22	0.22	0.22	0.219	0.215
Eggs, per doz.	0.223	0.221	0.206	0.211	0.227
Wool, per lb. un- washed	.28	.25	.32	0.264	0.36

* 4 Years only
1934-1938

** Approximate

Sources of Information

1. Virginia Farm Statistics -----1935-36
2. Virginia Farm Statistics -----1937-38
3. Virginia Crops and Livestock -----
4. Crops and Markets -----

Average Farm Business

The average total receipts from the business enterprises of these farms for 1938 was \$1,295 per farm and \$1,169 for 1940, thus giving an average of \$1,295 per farm for the two years. Since the farm business expenses averaged \$954 for 1938, \$861 for 1940, or an average of \$907 for the two years, this left only \$341 in 1938, \$308 in 1940, or an average of \$325 for the two years, to pay for the use of capital, and to pay the operator for his year's work. This lacked \$18 in 1938, \$27 in 1940, or an average of \$22 of being enough to pay interest on the average capital invested in the farm business. In

other words, the average amount left to pay the farm operator for his year's work for the two years was-\$22.00. However, he had the use of a dwelling and various farm products furnished the household, amounting to \$818 in 1938, \$650 in 1940, or an average of \$734 for the two years. These products combined with the labor income amounted to \$800 per farm in 1938, \$623 per farm for 1940, or an average of \$712 per farm for the two years. This means that for the two years the operator averaged \$1.95 per working day.

The return for the use of capital and operator's time (an average of \$325 for the two years) was \$71 greater in 1938, \$27 greater in 1940 and averaged \$47 greater for the two years than the estimated value of the operator's time. Or, we might say, the return for the use of capital and operator's time averaged \$49 per farm greater for the two years than these operators estimated the work they did would cost if it had been hired. In other words, if all business expenses were paid, including the operator's time, the return on capital averaged \$49 per farm for the two years. This was an average rate of return of .6% for the year.

Not all the farms averaged as low in income as these figures indicate. About one-third of them made labor incomes of \$100 or more in 1938 and three made \$500 or more. However, in the same year six farms made labor incomes lower than -\$100 and four farms below -\$500. Approximately the same variations occurred in 1940. Some of the reasons for these differences in incomes between farms operating under similar weather and economic conditions are discussed in this study under "Factors Affecting Incomes".

Table 3--- Summary of average profits on 28 farms in Buckingham County, Virginia 1938 and 1940

Item	Average per farm		
	1938	1940	1938 and 1940
Total farm business receipts	\$1,295	\$1,169	\$1,232
Total farm business expenses	<u>954</u>	<u>861</u>	<u>907</u>
Income for capital and operator's time-----	\$ 341	\$ 308	\$ 325
Interest on average capital invested in the farm business	<u>359</u>	<u>335</u>	<u>347</u>
Labor income-----	\$ - 18	\$ -27	\$ -22
Value of farm furnished products used in household-----	<u>818</u>	<u>650</u>	<u>734</u>
Labor earnings-----	\$ 800	623	712
Value of operator's time for the year-----	<u>270</u>	<u>281</u>	<u>276</u>
Return on capital invested in the farm business	\$ 71	\$ 27	\$ 49
Rate of return on the investment-----	.9%	.4%	.6%

Use of Land

The farms averaged 208.6 acres in size (Table 4). Owing to the nature of the general topography of the County and to the prevailing type of farming, most of the land was occupied by woods not pastured, and by crops. More than one-fourth of the total farm area was in woods, not pastured, and 30 percent of the total land area was devoted to crops. An additional 17 percent of the land area was in woods pasture, making nearly 50 percent of the land area in woods. Most of the woods represented timber stands of various stages of growth and condition, most of it having been cut over at one time or another, either for lumber or pulp wood. Most of the woods in pasture furnished very little grazing, as it is rather heavily covered with bushes and trees of various sizes. Almost one-third of the total land area is devoted to crops, since most of the farmers depend on crops as their chief sources of income. However, a rather large percent of the land listed as cropland is badly run down and cannot profitably be devoted to soil depleting crops.

Table 4--- Use of Land on 28 Farms in Buckingham County, Virginia
During 1938 and 1940

<u>1938</u> Land use	Number of farms having	Acres per farm (all farms)	Percent of total land area
Woods not pastured-----	24	66	30.0
Woods pastured-----	27	35.70	16.2
Crops-----	28	63.80	29.0
Other permanent pasture-	28	37.22	16.9
Other land-----	<u>14</u>	<u>17.63</u>	<u>7.9</u>
Total -----	28	220.35	100%
<u>1940</u>			
Woods not pastured-----	25	55.0	27.8
Woods pastured-----	27	35.6	17.9
Crops-----	28	59.9	30.3
Other permanent pasture-	27	32.7	16.5
Other land-----	<u>22</u>	<u>14.8</u>	<u>7.5</u>
Total-----	28	198.	100%
<u>1938 and 1940 averaged together</u>			
Woods not pastured-----	25	60.0	28.9
Woods pastured-----	26	35.7	17.0
Crops-----	28	61.8	30.1
Other permanent pasture-	28	34.9	16.7
Other land-----	<u>19</u>	<u>16.2</u>	<u>7.7</u>
Total-----	28	208.6	100%

Capital Investment

The average total amount of capital invested in the business for both years was \$6,942 per farm, of which 70.7 percent represented farm real estate (Table 5). Of the 70.7 percent represented by real estate 31.4 percent was invested in land and 39.3 percent in buildings. Practically all the farms' dwellings, as well as the other farm buildings, have been erected from native materials. In a large percent of cases most of the timber used for farm buildings has been sawed from the operator's own farm. The average working capital, for the two years studied, averaged together, on these farms was \$2,035 per farm. This amount was fairly evenly distributed between work animals, other livestock, equipment, feed, and supplies. There is very little variation in the amount of capital invested in any one item during the years 1938 and 1940.

Table 5 - Distribution of capital invested in 28 farms in Buckingham County, Virginia - 1938 and 1940.

Item	Average	Percent	Average	Percent
	per farm	of total	per farm	of total
	1938		1940	
Land-----	\$2,347	32.7	\$ 2,013	30.1
Buildings-----	<u>2,785</u>	<u>38.8</u>	<u>2,669</u>	<u>39.8</u>
Total Real Estate----	5,132	71.5	4,682	69.9
Work animals-----	406	5.7	434	6.5
Other Livestock-----	639	8.9	579	8.6
Equipment-----	478	6.0	492	7.4
Feed and Supplies-----	<u>535</u>	<u>7.5</u>	<u>508</u>	<u>7.6</u>
Total Working Capital	2,058	28.1	\$2,013	30.1
Total Capital-----	\$7,190	100%	\$6,695	100%

1938 and 1940 Averaged together	
Land-----	\$2,180 31.4
Buildings-----	<u>2,727</u> <u>39.3</u>
Total Real Estate----	4,907 70.7
Work Animals-----	420 6.1
Other Livestock-----	609 8.8
Equipment-----	485 6.7
Feed and supplies-----	<u>521</u> <u>7.5</u>
Total Working Capital	\$2,035 29.1
Total Capital-----	6,942 100%

Analysis of Receipts and Expenses

When the receipts for the farms for the years 1938 and 1940 are averaged together, we find that they are fairly equally divided between crop sales, livestock increases, livestock products, and miscellaneous receipts (Table 6). The receipts from crops accounted for 22.88 percent of the total receipts, 17.92 percent of which was obtained from the sale of tobacco. Most of the corn, wheat, potatoes, etc. was consumed on the farm. Including increases in value of dairy animals and the sales of dairy products, dairying was the largest source of income. The sale of milk accounted for 18.83 percent of the total farm income, this being almost one percent higher than the return from the sale of tobacco. Almost one-half of the income from these farms was obtained from livestock, dairying being the largest source of income. Tobacco is often more important on individual farms, particularly the smaller farms, and probably is the largest source of income on most individual farms in the County. Of the 28.38 percent of the farm income from miscellaneous receipts, real estate and equipment increase amounted to 12.41 percent and was the largest single item. Feed and supply increase, labor off the farm, and government payments were the other more important sources of income. A large part of the labor off the farm was obtained from work on the secondary roads in the County during the slack season on the farm.

Approximately one-third of the expenses on these farms for the two years was accounted for by labor, which amounted to 33.81 percent of the total expenses. Feed bought, the next largest item accounted for 7.66 percent, while fertilizer and lime accounted for 7.55 percent, or one-tenth percent less. Real estate and equipment decrease, and decrease in value of feed and supplies were the next largest items.

Table 6 --- Analysis Of Receipts On 28 Farms in Buckingham
County, Virginia.

Table 6 --- Analysis of receipts on 28 farms in Buckingham County, Virginia 1938 and 1940.

Receipts	Average		Percent	
	per farm	of total	per farm	of total
	1938		1940	
Crop Sales:				
Tobacco-----	\$226	17.45	\$215	18.38
Wheat-----	21	1.62	21	1.79
Corn-----	23	1.77	15	1.28
Potatoes-----	8	.61	2	.18
Truck Crops-----	6	.46	2	.18
Hay-----	8	.61	1	.08
Other Vegetables-----	2	.15	None	
Total Sales -----	\$294	22.67	\$256	21.89
Other Crop Receipts-----	2	.15	12	1.02
Total Crop Receipts-----	\$296	22.82	\$268	22.91
Livestock Net Increase:				
Dairy-----	\$ 19	1.46	\$ 39	3.33
Beef-----	55	4.24	2	
Sheep-----	31	2.48	5	.43
Swine-----	40	3.09	11	.94
Poultry-----	46	3.54	25	2.13
Veal Calves and Bulls---	25	1.91	58	5.00
Work Stock-----	52	4.01	37	3.20
Heifers-----	63	4.87	22	1.02
Total Increase	\$331	25.60	\$195	16.05
Livestock Products Sold:				
Milk-----	\$213	16.44	\$248	21.21
Cream-----	47	3.62	33	3.00
Butter-----	7	.54	14	1.19
Eggs-----	56	4.32	52	4.44
Wool-----	2	.15	4	.34
Pork-----	7	.54	1	.08
Total Livestock Products-----	\$332	25.61	\$352	30.26
Total Livestock Income-----	\$663	51.21	\$547	46.31
Miscellaneous Receipts:				
Care of hunting reserve \$	4	.30	None	

Table 6 --- (Continued)

Receipts	1938		1940	
	Average per farm	Percent of total	Average per farm	Percent of total
Crop Sales:				
Care of Hunting Reserve--\$	4	.30		
Forest Products-----	20	1.54	41	3.50
Labor on farm-----	4	.30		None
Labor off farm-----	20	1.54	83	7.09
Government payments-----	25	1.93	53	5.00
Feed and supply increase-	44	3.39	65	5.55
Real estate & eqpt. in-				
crease-----	219	16.83	90	8.00
Board and room rent-----		None	8	.68
Miscellaneous-----		None	13	1.11
Total-----	\$336	25.83	\$354	30.93
Total Farm Receipts-----	\$1295	100%	\$1169	100%

Crop Sales:	1938 and 1940	
	Averaged together	
Tobacco-----	\$221	17.92
Corn-----	19	1.53
Wheat-----	21	1.71
Potatoes-----	5	.39
Truck Crops-----	4	.32
Hay-----	5	.34
Other Vegetables-----	1	.07
Total Sales-----	\$276	22.28
Other Crop Receipts-----	7	.58
Total Crop Receipts-----	\$282	22.86
Livestock net increase:		
Dairy-----	\$ 29	2.39
Beef-----	26	2.12
Sheep-----	18	1.45
Swine-----	25	2.01
Poultry-----	35	2.83
Veal Calves & Bulls-----	42	3.46
Work Stock-----	45	3.61
Heifers-----	43	2.95
Total Increase-----	\$263	20.82

Table 6 --- (Continued)

Receipts	Average per farm 1938 and 1940 <u>averaged together</u>	Percent of total
Livestock Products Sold:		
Cream-----	\$ 40	3.31
Milk-----	231	18.83
Butter-----	10	.86
Eggs-----	54	4.38
Wool-----	3	.24
Pork-----	4	.31
Total Livestock Products-----	<u>\$342</u>	<u>27.93</u>
Total Livestock Income-----	\$605	48.75
Miscellaneous Receipts:		
Care of hunting reserve	\$ 2	.15
Forest Products-----	31	2.52
Labor on farm-----	2	.15
Labor off farm-----	52	4.32
Government payments-----	39	3.46
Feed and supply increase	54	4.47
Real estate & eqpt. in- crease-----	155	12.41
Board and room rent-----	4	.34
Miscellaneous-----	6	.56
Total-----	<u>\$345</u>	<u>28.38</u>
Total Farm Receipts-----	\$1232	100%

Table 6 - (Section (2) - Analysis of Expenses on 28 Farms in Buckingham County, Virginia

Item	1938		1940	
	Average per farm	Percent of total	Average per farm	Percent of total
Hired and unpaid labor----	\$274	28.72	\$335	38.90
Seed-----	16	1.67	8	.92
Fertilizer and lime-----	79	8.28	59	6.85
Taxes-----	41	4.29	32	3.70
Real estate & eqpt. decr.-	15	1.57	86	9.98
Decrease in value of feed and supplies-----	72	7.54	32	3.70
Livestock decrease-----	7	.73	m 9	1.04
Feed bought-----	61	6.39	77	8.94
Miscellaneous expenses----	<u>389</u>	<u>40.76</u>	<u>223</u>	<u>25.90</u>
Total Farm Expenses-----	\$954	100%	\$861	100%

	1938 and 1940 Averaged together	
Hired and unpaid labor----	\$304	33.81
Seed-----	12	1.29
Fertilizer and lime-----	69	7.56
Taxes-----	37	3.99
Real estate & eqpt. decr.-	50	5.77
Decrease in value of feed and supplies-----	52	5.62
Livestock decrease-----	8	.88
Feed bought-----	69	7.66
Miscellaneous expenses----	<u>306</u>	<u>33.33</u>
Total Farm Expenses-----	\$907	100%

Crops Grown and Sold

Most of the crop acreage was devoted to the production of grain and other feed crops (Table 7). Tobacco, the chief cash crop, occupied only 3.5 percent of the total crop area during the two years. Of the 28 farms, 22 produced tobacco, all of which was dark-fired. The average yield of dark-fired tobacco for the two years was 943 pounds per acre, all of which was sold. The farms averaged 10 acres of wheat per farm with an average yield of 16.5 bushels per acre. This wheat accounted for 16.2 percent of the total crop area and 16.9 percent of the crop was sold. The farms averaged 14.9 acres of corn per farm, the largest acreage devoted to any single crop, covering nearly one-fourth of the total crop area. The corn averaged 29.8 bushels per acre, and almost all of it was consumed on the farm, only 3.7 percent being sold. The farms averaged 3.2 acres of clover hay, 6.6 acres of lespedeza hay, 0.5 of an acre of alfalfa, and 12.7 acres of other hay. Practically no hay was sold, more lespedeza being sold than any other kind in proportion to the amount grown. The yields for most crops were fairly satisfactory as compared with State and National yields, the yield for potatoes and lespedeza being unusually low. However, the lespedeza is usually seeded on land which is not capable of producing clover or alfalfa, and no fertilizer is applied.

Table 7 --- Summary of Crops Grown and Sold on 28 farms in Buckingham County, Va.

Crops	Number of farms growing	Acres per farm (all farms)	Yield per acre	Percent of total crop sold	Percent of total crop area
1938					
Tobacco, pounds-----	22	2	958	100	3.2
Wheat, bushels-----	26	10.3	17.7	17.4	16.2
Corn, bushels-----	28	15.5	26.8	7.1	24.2
Potatoes, bushels----	23	.5	79.0	19.6	.8
Clover hay, tons-----	7	3.3	1.4	None	5.2
Alfalfa hay, tons-----	3	.2	2.6	None	.3
Lespedeza hay, tons--	(Included under other hay)				
Corn for silage-----	None				
Other hay, tons 1/-----	27	21.4	1.76	.25	33.6
Legumes and grasses--- left on hand-----	None				
Other crops-----	None				
Home garden and or- chard-----	25	8	None	None	12.6
Lespedeza seed, bushels	3	1.3	7.3	49.5	2.1
Oats, bushels-----	7	1.1	17.7	.13	1.7
Barley, bushels-----	None				
Rye, bushels-----	None				
Sorghum, gallons-----	2	.05	20	None	.1
Strawberries, qts.-----	1	.02	576	None	None
1/ Lespedeza, timothy, herd's grass, and cow peas.					
Totals-----	28	63.8			100%
1940					
Tobacco, pounds-----	23	2.3	929	99.7	3.83
Wheat, bushels-----	26	9.7	15.3	16.5	16.19
Corn, bushels-----	28	14.3	32.9	.43	23.87
Potatoes, bushesl-----	23	.5	79.1	5.15	.83
Clover hay, tons-----	7	3.1	1.73	None	5.17
Alfalfa hay, tons-----	8	.8	1.8	None	1.33
Lespedeza hay, tons----	26	13.2	1.07	1.4	22.03
Corn for silage-----	1	.35	10.	None	.58
Other hay, tons 1/-----	11	4.1	1.7	None	6.84
Legumes and grasses left on hand-----	14	7.2	None	None	12.02
Other crops-----	11	.7	None	None	1.16
Home garden and orchard	28	1.3	None	None	2.17
Lespedeza seed, bushels	2	.67	4.5 bu.	.14	1.11
Oats-----	4	.71	12.8 bu.	None	1.18
Barley-----	2	.82	20.5 bu.	None	1.36
Rye-----	1	.21	12 bu.	None	.35
Sorghum, gallons-----	1	.03	13 gal.	None	.05
Totals-----	28	59.9			100%
1/ Includes: pea hay, soy beans, timothy, herds' grass, orchard grass, and mixture of these.					

Table 7 - (Continued)

Crops	Number of farms growing	Acres per farm (all farms)	Yield per acre	Percent of total crop sold	Percent of total crop area
<u>1938 and 1940 averaged together</u>					
Tobacco, pounds-----	22	2.2	943.0	99.8	3.5
Wheat, bushels-----	26	10.0	16.5	16.9	16.2
Corn, bushels-----	28	14.9	29.8	3.7	24.0
Potatoes, bushels-----	23	.5	79.0	12.4	.8
Clover hay, tons-----	7	3.2	1.6	None	5.2
Alfalfa hay, tons-----	5	.5	2.2	None	.8
Lespedeza hay, tons----	13	6.6	.5	.7	11.0
Corn for silage, tons--	5	.2	5.0	None	.3
Other hay, tons <u>1</u> /-----	19	12.7	1.7	.2	20.2
Legumes and grasses left on hand-----	7	3.6	None	None	6.0
Other crops-----	5	.3	None	.3	.5
Home garden and orchard	26	4.7	None	None	7.4
Lespedeza seed, bushels	3	.9	5.9	24.8	1.6
Oats, bushels-----	5	.9	15.2	.6	.6
Barley, bushels-----	1	.4	10.2	None	.7
Rye, bushels-----	5	.2	6	None	.1
Sorghum, gallons-----	1	.04	16	None	.1
Strawberries, qts.-----	5	.01	288	None	1.0
Totals-----	<u>28</u>	<u>61.8</u>			<u>100%</u>

1/ Includes: Lespedeza, timothy, herds grass, cow peas, soy beans, orchard grass, and mixtures of these.

Livestock Kept and Average Rates of Production

Of the livestock kept on these farms, only sheep and beef cattle, as a general rule, represented strictly commercial enterprises (Table 8). On individual farms the dairy, poultry, and occasionally the hog enterprises were conducted on a commercial scale, but in most cases these classes of livestock were kept primarily for home use. Almost one-half of the total dairy production, over three-fourths of the pork, over half of the eggs, and probably half of the poultry meat were used in the farm household, while very little of the beef or sheep production was used at home.

The average number of dairy cows per farm for the two years was 5.4, and the average milk equivalent of dairy products sold and used on the farm was only 4,485 pounds per cow. Some milk was used in raising dairy calves for veal, but it is highly probably that fewer cows would be necessary if better cows were kept.

Information on just how many pounds of beef was produced per beef-animal unit and the pounds of pork produced per hog-animal unit is not available. Sheep were kept primarily for lambs rather than for wool. The wool production averaged only 4.0 pounds of wool per sheep; income, wool and lambs, after allowance for depreciation of the breeding herd, averaged \$6.20 per breeding animal.

The average number of hens kept per farm was 70.6, these averaged 69.6 eggs per hen (sold and used in the house). The total income per mature fowl, eggs and meat income, averaged \$1.12.

Other livestock kept included work animals, which averaged 3.6 per farm, including horses, mules, and colts.

Table 8---Livestock kept and average rates of production on 28 farms in Buckingham County, Virginia.

Kind of Livestock and form of product	Number of farms	Average no. per farm (all farms)	Average Rates of Production Number	Lbs. Value	Percent of total production used in household
1938					
Dairy cows (milk equivalent)	28	5.4	3,986	\$103	49.1
Bulls-----	10	.4			
Heifers over 1 year-----	17	1.1			
Heifers under 1 year-----	18	1.5			
Veal calves-----	13	2.1			
Dairy stock increase per animal unit-----				37.05	
Beef cattle animal unit-----	9	14.9			
Brood sows (pigs weaned per sow)-----	19	1.7	6		
Pigs weaned-----	17	6.2			
Other hogs-----	24	5.7			85
Ewes (lambs raised)-----	3	3.1	97	13.99	
Lambs raised-----	3	3			
Bucks-----	3	.1			
Pounds of wool produced per sheep-----				3.8	.91
Sheep income plus wool per sheep (above depreciation in breeding herd)-----					- 8.04
Hens - eggs-----	27	81.2	66	1.08	43.6
Chickens raised-----	22	93.3			
Meat income per mature fowl-----				.49	
Work animals-----	26	3.8			
1940					
Dairy cows (milk equivalent)-	28	5.3	4,984	96.69	57
Bulls-----	9	.4			
Heifers over 1 year-----	23	1.5			
Heifers under 1 year-----	18	1.3			
Veal calves-----	19	2.5			
Dairy stock increase per animal unit-----					93.57
Beef cattle - per animal unit	5	2.7			
Brood sows - pigs weaned-----	24	1.1	4.24		
Pigs weaned-----	23	5.0			
Other hogs-----	20	3.5			
Ewes (lambs raised)-----	2	3.0	1.1	8.12	
Lambs raised-----	2	3.0			
Pounds of wool produced per sheep-----				4.3	1.59
Sheep income plus wool per sheep (above depreciation in breeding herd)-----					4.37
Bucks-----	2	.1			

Table 8 - (Continued)

Kind of Livestock and form of product	Number of farms	Average no. per farm (all farms)	Average Rates of Production		Percent of total produc- tion used in household
			Number	Lbs. Value	
<u>1940</u>					
Hens- Eggs-----	27	60.2	73.2	\$ 1.30	38.7
Chickens raised-----	23	73.5			
Meat income per mature fowl-----				.40	50.6
Work animals-----	27	3.4			
<u>1938 and 1940 averaged together</u>					
Dairy cows(milk equivalent)	28	5.4	4,485	99.84	53.0
Bulls-----	9	.4			
Heifers over 1 year-----	20	1.3			
Heifers under 1 year-----	18	1.4			
Veal calves-----	16	2.3			
Dairy stock increase per animal unit-----				65.31	
Beef cattle per animal unit-----	7	8.8			
Brood sows - pigs weaned	21	1.4			
Pigs weaned-----	20	5.3			
Other hogs-----	22	4.6			
Ewes (lambs raised)-----	2	3.1	1.0	11.05	
Lambs raised-----	2	3.			
Pounds of wool produced			4.0	1.25	
Sheep income plus wool per sheep (above depre- ciation in breeding herd				6.20	
Bucks-----	1	.5			
Hens - Eggs-----	27	70.6	69.6	0.68	41.1
Chickens raised-----	22	83.4			
Meat income per mature fowl-----				.44	54.3
Work animals-----	26	3.6			

Factors Affecting Farm Income

The factors which seemed most responsible for the differences in income between farms in this study were: (1) the rates of production, (2) the efficiency of labor as indicated by the amount of productive work accomplished per man, and (3) the size of the farm business. There are other factors important only in the way they affect these factors.

Production

Tobacco Yields---On the 22 farms growing tobacco, the yield per acre was closely related to the average labor income for the year's work (Table 9). When the years 1938 and 1940 are averaged together, we find that there are 11 farms which produced less than 1,000 pounds of tobacco per acre, and 11 farms which produced over 1,000 pounds of tobacco per acre. The 11 farms which obtained yields of less than 1,000 pounds per acre (averaging 728 pounds per acre) averaged -\$66.00 labor income, as compared to \$217.00 for the 11 farms whose yields were 1,000 pounds or over (averaging 1,176 pounds per acre). The acreage of tobacco per farm varied only 0.02 of an acre between the two groups, being slightly less in the case of the farms producing higher yields. Since the price received per pound did not vary a great deal, it would seem that the influence of tobacco on labor income was due chiefly to the difference in yield per acre. The farms with better yields also did more productive work per man, and their farm businesses, as measured by the total amount of productive work accomplished, were somewhat larger. However, most of the difference in labor income was due to the difference in tobacco yields.

Table 9 --- Relation of Tobacco yield per acre to various factors
28 farms in Buckingham County, Virginia.

Tobacco yield per acre	Number of farms	Yield per acre	Acres of tobacco	Value of tobacco sold	P.M.W.U. per man	P.M.W.U.	Labor income
<u>1938</u>							
Less than 1000 lbs.	9	713	3	\$ 209	159	304	\$ 11
1000 lbs. or more	13	1146	3	338	231	318	131
<u>1940</u>							
Less than 1000 lbs.	14	742	2.4	\$ 169	206.1	331	\$-144
1000 lbs. or more	9	1,205	2.35	414	203	408	304
<u>1938 and 1940 averaged together</u>							
Less than 1000 lbs.	11	728	2.7	\$ 189	182	317	\$ -66
1000 lbs. or more	11	1,176	2.68	376	217	363	217

Crop Index---The crop index is the average yield of all crops combined according to their importance, expressed as a percentage of the average for the area. The farms whose combined yields of all crops were less than 85 percent of the average earned -\$51.00 per farm to pay the interest on the capital invested in the farm business and to pay the operator for his year's work (return to capital and operator's labor, Table 10). This means that the farm expenses were greater than the receipts, and there was nothing left to pay the interest on the capital invested in the business or to pay the operator for his year's work. The 8 farms whose crop yields were between 85 to 104 percent of the average for the region (an average of 96 percent), however, averaged \$71.00 per farm, to pay for the use of capital and operator's time. These farms were larger and had more capital invested than the first group, so that while the labor income was small it was of a positive quantity.

The 10 farms whose crop yields were 5 percent or more above the average for the region (an average of 123 percent) averaged \$227.00 per farm to pay for the use of capital and operator's time. This was \$278 more than the average for the first group. These farms were larger than either of the other groups, had more capital invested, and made a more efficient use of labor. These farms returned an average labor income of \$70.00 per farm. Thus we see that the farms with the higher crop index made a better use of labor, had more capital invested in the farm businesses, and made higher labor incomes.

Table 10 --- Relation of crop index to various factors on 28 farms in Buckingham County, Virginia

Crop Index	Number of farms	P.M.W.U.	P.M.W.U. per man	Labor earnings	Return on capital	Crop Index	Average capital per farm	Labor income
<u>1938</u>								
Less than 85	12	307	174	\$ 399	\$ 40.32	68	\$ 4,838	\$ 7.66
85 to 104	6	312	124	734	145.16	93	5,184	38.66
105 or more	10	559	272	1,232	252.20	124	11,422	149.62
<u>1940</u>								
Less than 85	9	285	185.4	\$ 353	\$-142	69	\$3,994	\$-141
85 to 104	9	417	217.5	688	-2	100.4	5,329	66
105 or more	10	464	201.3	808	203	122.4	10,357	-8
<u>1938 and 1940 averaged together</u>								
Less than 85	10	296	179	\$ 376	\$-51	68	\$4,416	\$-67
85 to 104	7	364	198	711	71	96	5,256	52
105 or more	10	511	236	1,020	227	123	10,889	70

The Effect of Fertilizer on Crop Yields and Labor Income

Most of the fertilizer bought was used on tobacco, wheat, and corn, so that the amount used, as a rule, depended on the acreage of these crops. However, this did not hold true on individual farms. Two farms used in this study were located near the James River and had many acres of low grounds in corn and hay, on which no fertilizer was applied and none was necessary. The same was true to a lesser extent on smaller farms on Slate River and Appomattox River. Most of these farms raised considerable livestock, and a large part of their income came from livestock. This of course meant that very little or no strictly cash crops were raised and the value of fertilizer purchased per acre of crops was very low. Thus we see that when the farm businesses for 1938 and 1940 are averaged together, those farms using the least fertilizer obtained a positive labor income and made the most efficient use of labor, while their size of business was about average for the farms studied and their crop index was 8 percent below the average for the region (Table 11). But we come to those farms using more than \$1.30 worth of fertilizer per acre, we find they are farms which depend to a large extent on cash crops, and here we find that those farms using most fertilizer had a larger labor income and a higher crop index, as well as an increase in labor efficiency and a larger size farm business.

Table 11 --- Relation of the value of purchased fertilizer per acre of crops to various factors on 28 farms in Buckingham County, Virginia.

<u>1938</u>						
Value of purchased fertilizer per acre of crops.	Number of farms	Value of fertilizer per acre	P.M.W.U.	Work units per man	Crop index	Labor income
<u>1938</u>						
Less than \$1.30	19	\$ 0.77	423	226	89	\$ 63
\$1.30 to \$1.69	6	1.40	272	116	98	-253
\$1.70 or more	3	2.39	327	184	104	-66
<u>1940</u>						
Less than \$1.30	22	\$ 0.65	352	195	96	\$-60
\$1.30 to \$1.69	4	1.39	386	236	87	77
\$1.70 or more	2	2.38	843	205	147	132
<u>1938 and 1940 averaged together</u>						
Less than \$1.30	20	\$ 0.71	387	210	92	\$ 2
\$1.30 to \$1.69	5	1.39	329	176	92	-88
\$1.70 or more	2	2.38	585	195	126	33

Labor Efficiency

The measure of labor efficiency used in this study was the amount of directly productive work accomplished per man by the labor force on the farm or the productive work units per man. A productive man-work unit is one 10-hour day of productive work. It does not include indirect work of caring for buildings, fences, work animals, etc., but only the direct labor of production such as plowing, planting and cultivating crops, or breeding, feeding and marketing productive livestock or their products. Cost data indicate that the production of 1.0 acre of tobacco requires 33 days of direct labor in its production and that a dairy cow whose milk is sold as sour cream requires about 16 days of direct labor per year. An acre of tobacco therefore, represents 33 productive man-work units, and a dairy cow, 16. Similar figures are available for other crops and livestock. Work units do not measure the amount of time the men worked, but the amount of productive work accomplished.

When the farms studied are divided into groups based on the amount of productive work accomplished per man, and the years 1938 and 1940 averaged together, we find that the labor income increases in every case as the amount of productive work per man increases. The farms on which the labor force accomplished less than 110 productive man-work units per man averaged -\$262.00 labor income per farm as compared to \$241.00 per farm for those with 190 or more productive work units per man (Table 12). The labor income increased for all groups consistently as the productive work accomplished per man increased.

The crop index does not increase consistently as the productive man-work units per man increases, but there is a consistent increase in the amount of productive work units per farm. The farm business should be large enough to furnish the operator and his family productive work the year around.

Table 12 --- Relation of the number of productive-man-work units per
man to returns and other factors in Buckingham County, Va.

Table 12--- Relation of the number of productive-man-work-units to returns on other factors on 28 farms in Buckingham County, Virginia

Productive man-work units per man	Number of farms	Work-units per man	Acres used for crops	P.M.W.U. per farm	Crop index
<u>1938</u>					
Less than 110	9	100	65	295	81
110 to 149	6	146	36	247	69
150 to 189	4	166	50	281	85
190 or more	9	253	82	586	108
<u>1940</u>					
Less than 110	2	84	24	178	78
110 to 149	5	135	61	244	142
150 to 189	7	175	67	335	100
190 or more	14	255	61	471	102
<u>1938 and 1940 averaged together</u>					
Less than 110	6	92	44	236	79
110 to 149	6	140	48	245	105
150 to 189	5	170	58	308	92
190 or more	11	254	71	533	105

(Continued on following page)

Table 12 - (Continued)

Productive man-work units per man	Receipts	Expenses	Labor income
<u>1938</u>			
Less than 110	\$ 1,438	\$ 1,216	\$ -67
110 to 149	612	663	-195
150 to 189	372	328	247
190 or more	2,013	1,273	215
<u>1940</u>			
Less than 110	\$ 161	\$ 531	\$-456
110 to 149	1,145	764	114
150 to 189	1,033	769	-147
190 or more	1,388	957	266
<u>1938 and 1940 averaged together</u>			
Less than 110	\$ 799	\$ 873	\$-262
110 to 149	878	713	-41
150 to 189	702	548	50
190 or more	1,700	1,115	241

Combined Effects of Labor Efficiency and
Rates of Production

When the combined effect of labor efficiency and rates of production are summarized for the two years studies, we find that those farms with higher labor efficiency made a higher labor income, regardless of whether their crop index was above average or below average for the region (Table 13). An increase in the number of work units per man from below average to average or above, where the crop index was below average, was associated with an increase in labor income amounting to \$115 per farm, as compared to \$409 per farm where the crop index was above average for the region. However, the increase in labor efficiency was almost four times as great on the farms with crop index above average. At the same time, we can see that those farms which were below average in crop index made a \$227 higher labor income than those farms with a crop index above average, where they made a more efficient use of labor. It is also apparent that a more efficient use of labor (more productive work units per man) was also associated with an increase in size of business. A given increase in labor efficiency was almost three times as profitable on farms having a better-than-average crop index as on farms with a crop index below the average for the region.

While it is true that in the case of both the farms above average and below average in crop index, an increase in labor efficiency was also associated with an increase in size of business, this does not minimize the effect of efficient use of labor. Increasing their size would be expected to result in increasing the size of the loss, were it not for the fact that increasing the size of business resulted in a

sufficient increase in labor efficiency to offset part of the loss caused by low rates of production. If production rates were so low that there was no gross income, increased labor efficiency could not be expected to make receipts exceed expenses. On these farms labor cost were about 33.81 percent of the total expenses including the value of the operator's time.

A combination of high rates of production and efficient use of labor was associated with a substantial increase in labor income. When we compare those farms low in both factors with those high in both factors, we see that there is a difference of \$297 in labor income and \$347 in return to capital and operator's time.

From this analysis it is apparent that efficient use of labor was more important than crop index. However, the production index (rates of production for both crop and livestock) could be so low that no matter how efficient the use of labor might be, there could be no profit.

When the maps of the farms used in the survey are studied, it is apparent that the efficiency in use of labor could be greatly improved in many cases by improving the physical layout. It is just as important for the operator and the unpaid laborers to make efficient use of their time as it is for the hired laborers.

Table 13 --- Combined effect of labor efficiency and rates of production on returns from 28 farms in Buckingham County, Virginia

Table 13 --- Combined effect of labor efficiency and rates of production on returns from 28 farms in Buckingham County, Virginia.

Crop-Index	Work units per man	Number of farms	Total productive man-work units	Work units per man	Return to capital
<u>1938</u>					
Below)	Less than 150	10	243	121	\$ 17
Average)	150 or more	7	334	230	173
Above)	Less than 150	3	209	85	-278
Average)	150 or more	8	415	321	511
<u>1940</u>					
Below)	Less than 150	3	259	125	\$ -41
Average)	150 or more	10	386	242	85
Above)	Less than 150	4	256	118	-89
Average)	150 or more	11	482	216	360
<u>1938 and 1940 averaged together</u>					
Below)	Less than 150	6	251	123	\$ -12
Average)	150 or more	9	360	236	129
Above)	Less than 150	4	232	101	-183
Average)	150 or more	9	448	268	435

Table 13 - (Continued)

Crop-Index	Interest on capital	Labor income	Farm furnished products used in household
<hr/>			
<u>1938</u>			
Below)	\$ 294	\$ -92	\$ 592
Average)	235	166	717
Above)	346	-307	847
Average)	613	282	1,227
<hr/>			
<u>1940</u>			
Below)	\$ 219	\$ -21	\$ 419
Average)	239	-49	508
Above)	214	-30	810
Average)	500	199	784
<hr/>			
<u>1938 and 1940 averaged together</u>			
Below)	\$ 256	\$ -56	\$ 505
Average)	237	59	612
Above)	280	-168	828
Average)	556	241	1,005
<hr/>			

Size of Business

The size of farm business cannot be measured by the number of acres in the farm, the number of acres in cultivation, or the number of cows kept. All farms grow crops of different degrees of intensity and keep different amounts of livestock in proportion to their acreage. A small farm growing intensive crops may actually be doing a larger business than a farm several times as large, which is doing an extensive type of farming. To take into account these differences, it is necessary to measure the size of business in terms of the amount of productive work accomplished on the farms in caring for all the crops raised and livestock kept on the farms. The size of the farm business in this study is measured by the amount of productive work accomplished on the farms during the year and is expressed as the total productive man-work units per farm.

When the farms used in this study are divided into three groups according to size of business, and results for the two years studied averaged together, we find that the labor income increased consistently with the size of business (Table 14). Increasing the size of a farm business will not, of course, increase the profit from the business unless the farm is operating at a profit. If a farm was operating at a loss, an increase in size of business would merely increase the loss, not considering the additional increase in interest on capital invested. However, as the size of business increased, there was also a large and consistent increase in the efficiency in use of labor (productive man work units per man). It has already been pointed out that labor costs amounted to about 33.81 percent of the total expenses on these farms,

and increasing the labor efficiency will greatly decrease the operating expenses.

The most important advantages of the large farm businesses were that the larger businesses obtained a consistent increase in work units per man, which over the two-year period gave a consistent increase in labor income.

Table 14 --- Relation of size of business to various factors on 28 farms
in Buckingham County, Virginia

Total productive man work units	Number of farms	P.M.W.U. per man	P.M.W.U.	Return to capital	Interest on capital	Labor income
<u>1938</u>						
Less than 200	7	147	106	\$ 85	\$ 165	\$ -71
200 to 269	5	212	225	144	185	227
270 or more	16	235	511	248	490	83
<u>1940</u>						
Less than 200	2	103	163	\$-427	\$ 49	\$-511
200 to 269	4	137	235	-258	153	-135
270 or more	22	218	446	110	395	37
<u>1938 and 1940 averaged together</u>						
Less than 200	4	125	134	\$-171	\$ 107	\$-291
200 to 269	5	174	230	-57	169	46
270 or more	19	226	478	178	442	60

Factors for Analyzing the Farm Business

In Table 15 is found a number of factors to enable all-day students of Vocational Agriculture in Buckingham, and others in this area, to compare their farm businesses with the average found in all-day classes in Vocational Agriculture. These factors are given for the years 1938 and 1940 as well as for the two years averaged together. This table, as well as others found in this study, will be put into charts and used in classroom instruction. The tables found here for the year 1938 have already been put into chart form and used by the author in his all-day classes in Vocational Agriculture at the Buckingham Central High School, Buckingham, Virginia. This material has been invaluable in furnishing local teaching data, in stimulating and maintaining interest in the survey of the boy's home farm as well as in connection with jobs associated with farm management. Students of Vocational Agriculture are much more interested in comparing the production, size of business, capital efficiency, etc. on their home farms with those of their neighbors and fellow students than in comparing them with the State or National averages. The author has found that useful information contained in this study could be used in connection with almost every farm job taught in the classroom and that the information is invaluable in determining what jobs need to be taught.

Table 15 --- Factors for analyzing the farm business in Buckingham County, Va.

Factor	Your farm	Average for 28 farms
1938		
Acres of Land (includes rented land)		
Crops-----		63.8
Woods-----		101.7
Cleared permanent pasture-----		37.2
Other-----		17.6
Total-----		<u>220.3</u>
Capital:		
Value of real estate-----		\$5,132
Value of working capital-----		2,058
Total-----		<u>7,190</u>
Percent return on capital-----		3.3%
Business Summary:		
Receipts-----		\$1,295
Expenses-----		988
Return to capital and operators' labor-----		<u>307</u>
Labor income-----		-52
Farm products used in household		818
Labor earnings-----		<u>766</u>
Crop Acres:		
Tobacco-----		2.0
Potatoes-----		0.5
Corn-----		15.5
Wheat-----		10.3
Hay-----		<u>24.9</u>
Crop Yields:		
Tobacco, pounds per acre-----		958
Potatoes, bushels per acre-----		79
Corn, bushels per acre-----		26.8
Wheat, bushels per acre-----		17.7
All crops, percent of average (Crop Index)		93.2
Livestock Kept:		
Dairy cows, average number-----		5.4
Brood sows, average number-----		1.7
Hogs raised, total number-----		5.7
Ewes and bucks, average number--		3.2
Hens, average number-----		93.3
Livestock Production, (average rates):		
Pounds milk (equivalent) sold and used per cow-----		3,986
Pigs weaned per sow-----		6
Lambs raised per ewe-----		.95
Sheep income per sheep-----		8.04
Eggs sold and eaten per hen-----		66
The Total Farm Business:		
Total P.M.W.U.-----		376.8
P.M.W.U. per man-----		197.8
1940		
Acres of Land (includes rented land)		
Crops-----		59.9
Woods-----		90.6

Table 15 - (Continued)

1940 Factor	Your Farm	Average 28 farms
Cleared Permanent Pasture----		32.7
Other-----		14.8
Total-----		198.0
Capital:		
Value of real estate-----		\$4,682
Value of working capital----		2,013
Total-----		6,695
Percent return on capital----		.4%
Business Summary:		
Receipts-----		\$1,169
Expenses-----		861
Return to capital and operators' labor-----		308
Labor income-----		-27
Farm products used in household Labor earnings-----		650 623
Crop Acres:		
Tobacco-----		2.3
Potatoes-----		0.5
Corn-----		14.3
Wheat-----		9.7
Hay-----		21.2
Crop Yields:		
Tobacco, pounds per acre-----		929
Potatoes, bushels per acre----		79.1
Corn, bushels per acre-----		32.9
Wheat, bushels per acre-----		15.3
All crop, percent of average (Crop Index)		
Livestock Kept:		
Dairy cows, average number----		5.4
Brood sows, average number----		1.7
Hogs raised, total number----		3.5
Ewes and bucks, average number		5.4
Hens, average number-----		60.2
Livestock Production, average rates:		
Pounds milk (equivalent) sold & used per cow -----		4,984 lbs.
Pigs weaned, per sow-----		4.2
Lambs raised, per ewe-----		.57
Sheep income, per sheep-----		4.37
Eggs sold and eaten per hen----		73.2
The Total Farm Business:		
Total Productive man work units		392
Productive man work units per man		201
1938 and 1940 averaged together		
Acres of Land (includes rented land)		
Crops-----		61.8
Woods-----		96.1
Cleared permanent pasture-----		34.9
Other-----		16.2
Total-----		209.1

Table 15 - (Continued)

1938 and 1940 averaged together

Factor	Your Farm	Average 28 farms
Capital:		
Value of real estate-----		\$ 4,907
Value of working capital--		2,035
Total-----		6,942
Percent return on capital-		3.6%
Business Summary:		
Receipts-----		\$ 1,232
Expenses-----		924
Return to capital and operators' labor-----		308
Labor income-----		-39
 Farm products used in household		 734
Labor earnings-----		794
Crop Acres:		
Tobacco-----		2.1
Potatoes-----		.5
Corn-----		14.9
Wheat-----		10.0
Hay-----		23.0
Crop Yields:		
Tobacco, pounds per acre----		943
Potatoes, bushels per acre--		55.9
Corn, bushels per acre-----		29.8
Wheat, bushels per acre-----		16.5
All acres, percent of average (Crop Index)		95.7
Livestock Kept:		
Dairy cows, average number---		5.4
Brood sows, average number---		1.7
Hogs raised, total number----		4.6
Ewes and bucks, average number		4.3
Hens, average number-----		76.7
Livestock production, average rates:		
Pounds milk (equivalent) sold & used per cow-----		4,485
Pigs weaned, per sow-----		5.1
Lambs raised, per ewe-----		.76
Sheep income, per sheep-----		6.2
Eggs sold and eaten per hen---		69.6
The total farm business:		
Total productive man work units		384.4
Productive man work units per man		198.4

SUMMARY AND CONCLUSIONS

Numerous problems in farm management are suggested by the data assembled. Among the more important are the following:

1. Crop yields are low (Table 7). Since the largest yields are produced on land of high quality but without the use of fertilizer it seems that the use of poor land and limited amounts of fertilizer may partly account for them. By the use of proper rotations, winter and summer cover crops, and a wise use of commercial fertilizer the crop index could be raised from 93.2 to over 100, as most of the soil in the county is of a type that takes improvement readily.

2. In a large number of individual cases too large a percentage of the farm income was from the sale of crops. By using a more diversified type of farming the amount of receipts obtained from these farms could be greatly increased and at the same time the fertility of the soil improved. The results of this study indicate that the more successful farmers have a better balance between livestock and crop enterprises.

3. Labor accounts for too large an item of expense on the farms studied and the efficiency in the use of labor was very poor (Tables 6 and 12). When the two years studied are averaged together we find that on nearly 50 percent of the farms less than 150 days of productive work was accomplished per man. Less than 250 productive man work units per man is considered poor labor efficiency. By using a more balanced type of farming a better seasonal distribution of labor could be secured and the labor efficiency on these farms greatly increased. This means that if a farmer is depending largely on cash crops as a source of income there will be times during the winter when the amount of productive work accomplished is small, but by introducing a fair

size poultry flock or some other suitable livestock enterprise, the amount of productive work accomplished during this period could be greatly increased. If this livestock enterprise is properly managed there should be a considerable increase in labor income.

4. The amount of feed bought accounts for too large an item of expense on the farms used in this survey (Table 6). If the livestock enterprises on a farm are to be conducted in the most profitable manner it is necessary, in so far as possible, to produce the feed consumed on the farm.

5. The average rates of production for dairy and poultry enterprises were very low (Table 8). Low rates of production for livestock enterprises can usually be accounted for by poor quality livestock or by poor feeding methods. The amount of income from these enterprises could be greatly increased by increasing the quality of the dairy herd and of the poultry flock or by feeding a more balanced ration. The quality of the dairy herd can be greatly improved over a period of time by the use of purebred sires and a gradual selling off of poor producers.

6. In many cases the value of fertilizer purchased per acre of crops was low (Table 11). The results of this study show that except in unusual cases, those farms using the most fertilizer per acre obtained a larger labor income. This does not mean that the more fertilizer you use the greater will be your farm income, but that except where the land is unusually fertile, an increase in the amount of fertilizer used, up to a certain point, will be profitable.

7. An increase in size of business would be profitable on at least one-third of the farms studied (Table 14). The size of farm business in this study is measured by the amount of productive work accomplished on the farm during the year. In order to increase the size of a farm business it is not necessary

to buy or rent more land. The size of the farm business may be increased by increasing the size of the dairy herd, increasing the size of the poultry flock, or by growing more intensely cultivated crops. By increasing the size of the farm business a more efficient use of labor is obtained and a corresponding increase in labor income.

8. The pasture land is poor in many cases as is shown by the fact that it is not capable of supporting enough animal units in proportion to the acreage. The pasture consists largely of natural vegetation and could be greatly improved by the addition of lime and fertilizer which would make it possible to secure a good stand of blue grass and white Dutch clover. Thus better pasture and a longer grazing period would be obtained. In many cases where lespedeza is used for pasture a longer grazing season could be obtained by seeding Italian Rye grass in the lespedeza in the fall. This would give earlier grazing in the spring before the lespedeza was ready to be grazed.

9. In many cases too large a percentage of capital is invested in buildings (Table 5). Most farming investigations have shown that not over 25 percent of the capital should be invested in buildings as they are not in the main productive. Of the 28 farms studied in this survey 39.3 percent of the total capital investment was invested in buildings. However, in the production of high quality milk and in poultry farming this figure can be raised. The criticism is not having buildings which are too good but not having enough productive farm investments to justify the buildings. When too much capital has been invested in buildings no more buildings should be constructed, unless absolutely necessary, until the productive farm investments will justify such a step.

As a result of this study of farm business in Buckingham County we find that the following crops are grown and livestock kept by the farmers in this area:

Crop Enterprises

Tobacco

Corn for grain

Corn for silage

Small grains

1- Wheat

2- Oats

3- Barley

4- Rye

Potatoes

Legumes hays

1- Lespedeza

2- Clover

3- Alfalfa

4- Soybeans

5- Peas

Mixed hays

Lespedeza for seed

Home orchard

Sorghum

Home garden

Pasture

Animal Enterprises

Dairy cattle

Beef cattle

Hogs

Sheep

Poultry

Mules and horses

As a result of the analysis of the farm records taken in this County certain factors are found to be of major importance in affecting the farm incomes. The three main factors affecting the incomes derived from these farms during the years 1938 and 1940 were efficiency in the use of labor, rates of production and size of business. There are other factors such as amount of fertilizer used, the layout of the farm business, quality of livestock kept and other minor factors which are important because of the way in which they effect the three major factors. Some farms with satisfactory rates of production needed to increase the size of business or improve the farm layout in order to secure a more efficient use of labor. Other farms making efficient use of labor needed to improve the crop index or the quality of the livestock kept. On many farms there was poor balance between livestock and crop enterprises, not enough emphasis being placed on livestock enterprises. The pasture land is poor in many cases and not capable of supporting enough animal units in proportion to the acreage. Few farms ranked low with respect to all these factors, and at least two farms ranked very good in practically all respects. From this it

is obvious that much time should be devoted by the Agriculture Instructor to teaching sound principles of farm management. While it is a common practice to teach farm management to third and fourth year students, the teacher should never miss an opportunity to bring out these principles when ever the opportunity arises in the class room or on the home farm.

Based on the results obtained from this study of farm management and land utilization in Buckingham County, the enterprises listed below should be included in the course of study in Vocational Agriculture in the Buckingham Central High School. These are divided according to their importance into major enterprises and minor enterprises. In formulating a course of study, special emphasis should be placed on major enterprises and more time devoted to these enterprises in class room instruction. In formulating a course of study the teacher must also give special emphasis to the major and minor enterprises as found in the practical supervised farming programs to be carried out by the students as a part of their work in vocational agriculture. However, in most cases the major and minor enterprises on the home farm are found to coincide with the major and minor enterprises found in the students practical supervised farming program.

Major enterprises

Tobacco

Corn (grain)

Wheat

Dairy cattle

Swine

Beef cattle

Lespedeza

Mixed hays

Clover

Barley

Oats

Pasture

Minor enterprises

Sheep

Home garden

White potatoes

Alfalfa

Corn (silage)

Sweet potatoes

Rye

Sorghum

Home orchard

Strawberries

Since Vocational Agriculture attempts to meet the local situation and needs, and, in so far as possible, to meet those needs as they arise, no attempt will be made here to group the enterprises according to the year in which they should be taught. It is entirely possible, and in some cases advisable, that a student may study certain jobs connected with producing tobacco or raising and caring for dairy cattle, and one or every one of the four years spent as a student of Vocational Agriculture. However, needless to

say, the jobs should be taught seasonally and in so far as possible the simpler jobs taught during the first and second years in class. Nor will any attempt be made to break the enterprises down to jobs since a department mimeograph for this purpose is published by the Agriculture Education Department, V. P. I., Blacksburg, Virginia.

When the factors affecting farm incomes in this area are studied a definite need for instruction in farm management is evident. Below are listed certain problems in farm management which should be given special attention in vocational agriculture classes in this County.

Farm Management

I. Relation of Size of Farm to Farm Efficiency

1. Is my farm as large or larger than the average in my community?
2. Is my farm of such a size as to secure the most efficient use of labor?
3. Is my farm of such a size as to secure the most efficient use of machinery?
4. Is my farm of such a size as to make for economy in buying and selling?
5. Is my farm of such a size as to make the most efficient use of capital invested?
6. Should I acquire more land or should I rent or sell some of my land?

II. Farm Labor

1. Am I making the most efficient use of my labor?
2. How can I provide work for my labor during bad weather?
3. How can I keep my labor busy during the winter months?
4. How can I adjust my farm business to secure season-
able distribution of labor?
5. How can I solve the shortage of labor problems on my
farm?

III. Capital

1. Is my capital suited to my farm needs?
2. Is the capital invested in my farm business properly
distributed?
3. Does my farm pay me for my labor and yet give a net
income of 5% on its fair valuation?

IV. The Farm Layout

1. Does my farm layout make for efficient use of labor?
2. How can I improve my farm layout?
3. Can I improve the plan of my farmstead and secure a more
convenient arrangement?
4. Are fences and pastures properly located?
5. Are my fields of ideal size and shape?

V. Balance

1. Is there a proper diversity of enterprises on my farm?
2. Are the livestock and crop enterprises so adjusted as to
maintain the fertility of the soil?
3. Should I increase or decrease the amount of livestock on
my farm?

VI. Production

1. Is my crop index as high or higher than the average for my community?
2. Is my production index as high or higher than the average for my community?
3. How can I economically increase my crop index and yet maintain the fertility of the soil?
4. How can I improve the quality of my dairy herd, poultry flock, and swine?
5. What is the value of a purebred sire?
6. What rotation best suits my farm and my type of farming?

VII. Farm Records and Accounts

1. Why should I keep farm records?
2. What kind of accounts should I keep?
3. What are the advantages of an annual inventory?
4. How can the results obtained from keeping these accounts help me to increase my income?

RECOMMENDATIONS

I. Teachers of Vocational Agriculture can make studies of a similar nature in their community, with certain definite advantages from such surveys. Some of the advantages to be derived from such a study are:

A. It aids in formulating a Course of Study in the following ways:

1. The instructor learns the major and minor enterprises in the community, and knowing these he can better determine the enterprises to be taught and the amount of time that can profitably be allotted to each enterprise.

2. The instructor learns the strong and weak points in local farm programs and is better able to determine the definite needs of the students, this information being based upon definite rather than general knowledge.

B. Definite teaching aids are secured by the instructor.

Some of these are:

1. The teacher is in a better position to guide the students in the selection of farming type to follow and enterprises to carry in his supervised farming program.

2. A large quantity of valuable local teaching data is secured. When the tables found in this study are put into chart form, they furnish excellent teaching material on Farm Management and may also be used in connection with most operative and manageable farm jobs.

3. Greater interest on the part of the students of Vocational Agriculture is obtained because actual figures on yields, incomes etc. are available. The student is much more interested in comparing his farm with that of his fellow student and neighbor than with State or National averages.

4. The teacher becomes more intimately acquainted with the students home farm and home situation as well as with the people of the community.

5. The results obtained from the survey may be used as effectively in teaching part-time and evening classes as in all-day instruction.

II. While it is hardly practical to expect teachers of Agriculture to be able to devote as much time and effort to making such an extensive study of farm management and land use as has been made here-in, it is the belief of the author that with certain modifications the teacher can profitably devote a certain amount of time to such a study. Since changes in farming types and practices must, as a rule, necessarily be slow, the results of such a study should be usable over a period of from five to ten years. It is believed that teachers of Agriculture in making such a study, might profit by the following suggestions:

1. That the study be made of the farm businesses for only a one-year period.

2. That the students of Agriculture be used, in so far as possible, in securing and analyzing the farm business records, since this furnishes excellent farm management exercises for the class.

3. That in order to be effective the study must include at least fifteen or twenty typical farms represented in all-day classes, and must include farms of all sizes and types found in these classes.

4. That the results obtained be put into chart form to be used as teaching material.

5. That on the basis of results obtained the students be asked to suggest jobs that need be taught, since the students will take a great deal more interest in studying the jobs which they themselves can see and feel a need for help in carrying out.

Bibliography

- I. Bulletin of United States Department of Agriculture
Virginia Farm Statistics, 1935-1936.
- II. Bulletin of United States Department of Agriculture
Virginia Farm Statistics, 1937-1938.
- III. Bulletin of Virginia Department of Agriculture
Virginia Crops and Livestock, 1937-1938.
- IV. Bulletin of Vocational Education, Virginia Polytechnic
Institute
Department Mimeograph, No. 45.
- V. Bulletin of Virginia Department of Agriculture
Crops and Markets
- VI. Report of the Robert E. Lee Soil Conservation District for 1941
A Program and Work Plan for the Robert E. Lee Soil Conser-
vation District.
- VII. Bulletin of Department of Agriculture Economics, V. P. I., 1937
An Economic Study of Farm Management and Land Utilization in
North Central Floyd County, Virginia
- VIII. Thesis by A. T. Lewark, majoring in Agriculture Education,
V. P. I. A Course of Study in Farm Management.
- IX. Thesis by E. G. Smith, majoring in Agriculture Education, V. P. I.
The Farm Survey and Its Use in Teaching Vocational Agriculture
in Virginia High Schools.