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To the Graduate Council:

I am submitting herewith a thesis written by Charles Harris, Jr. entitled "A Study to Determine Differences in Farm Machinery Maintenance on Selected Farms in Cheatham County, Tennessee According to Type of Farm Operated and Tenure Status of the Operator." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Education.

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Major Professor

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A STUDY TO DETERMINE DIFFERENCES IN FARM MACHINERY MAINTENANCE ON SELECTED FARMS IN CHEATHAM COUNTY, TENNESSEE ACCORDING TO TYPE OF FARM OPERATED AND TENURE STATUS OF THE OPERATOR

A THESIS

Submitted to
The Graduate Council
of
The University of Tennessee
in
Partial Fulfillment of the Requirements
for the degree of
Master of Science

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by

Charles Harris, Jr.

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CHAPTER I

THE PROBLEM

The problem was to determine differences in farm machinery, power tools, the use of power tools, machinery repair facilities, and machinery repairs made in the Cheatham County Central High School area according to:

1. tenure status
2. type of farming

For purposes of analysis, the problem was divided into five sub-problems:

1. What is the tenure status of the farm operators and the type of farming practiced?
2. How does the farmer meet situations requiring specific skills in farm machinery repairs?
3. What equipment is available for farm machinery repair and how adept is the farmer in using the equipment?
4. To what extent is storage and repair space available for farm machinery?
5. To what extent does the farmer adjust, lubricate, and repair farm equipment?

Definition of Terms

A "farm owner" as used in this study refers to any farmer who derives 50 per cent or more of his income from farming and owns the land he operates.

A "farm tenant" as used in this study refers to any farm operator who derives 50 per cent or more of his income from farming and does not own any farm land he operates.

A "combination owner-tenant" in this study refers to those farm operators who derive 50 per cent or more of their income from farming and who operate owned and rented land.

A "part-time owner" in this study refers to those farmers who derive less than 50 per cent of their income from farming and own the land they operate.

A "part-time tenant" in this study refers to farm operators who derive less than 50 per cent of their income from farming and rent the land from others.

"Farm mechanic jobs or skills" is defined as the farmer's ability to perform certain skills pertaining to certain jobs that are done on the farm in the maintenance, repair, and adjustment of farm machinery.

"Repair equipment" is defined as equipment such as welders, grinders, and electric drills used in the repair, maintenance, and adjustment of farm machinery.

"Farm equipment" as used in this study refers to such auxiliary equipment as plows, grain drills, and mowers that is used in the production of crops and livestock.

"Machinery storage space" as used in this study is defined as any roofed area, part or all of the space being used for the storage of farm machinery.

A "farm shop" is defined as a separate building, or part of a barn,

garage, or other farm building designated as the place for keeping farm repair tools and materials in which necessary farm repair and construction work may be done.

"Adeptness" in performing skills as used in this study is defined as the proficiency of the farmer to perform skills in farm machinery repair without additional knowledge or practice.

Need for the Study

In the field of Agricultural Education, teachers have followed prepared guides in the teaching of farm mechanics. According to some teachers, this was partly due to the limited time they have to collect and analyze data to enable them to set up a program to fit the needs of the students in a specific area.

In the area of instruction in farm mechanics, all students were taught the same things regardless of the type of farm they lived on or the tenure status of their fathers.

The analysis of the data in this study may show its applicability to the following:

1. Used as a partial basis in formulating a new program of farm mechanics for vocational agricultural students and adult farmers in Cheatham County Central High School.

2. It may be applicable to other vocational agricultural departments.

3. It may reveal the need for other related studies.

4. It may provide means of correcting weaknesses this study reveals

in other related studies.

5. It may provide information for course planning.

6. It may signify that present programs of farm mechanics are satisfactory in the light of the factors studied.

Scope of the Study

This study was limited to a selected group of farmers in the Cheatham County Central High School area. This group was selected from those who were a member of an adult agricultural class taught by the agricultural teacher or those who had a son studying vocational agriculture in high school.

Only selected areas in farm mechanics were used. These included:

1. A selected list of thirty-three farm mechanic skills.

2. Repair equipment available and the adeptness of the farm operator in using it.

3. Available facilities for storing and repairing farm machinery and future plans for providing storage and repair space.

4. The adjustment, lubrication, and repair of farm equipment.

Review of Literature

In a recent study, Brasfield[1] found that 20 per cent of the farmers in one particular area need instruction in servicing and adjusting farm

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[1]Dorace E. Brasfield, "Determining Some of the Jobs and Skills Needed by Farmers in the Hornbeak High School Service Area That Ought to be Included in an Instructional Program." (Unpublished Master's thesis, Department of Agricultural Education, The University of Tennessee, August 1955), 106 pp.

machinery. Fifty-eight per cent need instruction in overhauling common farm machines and do major repair jobs. Thirty-seven per cent need instruction in the use of a power grinder and drill while 20 per cent need instruction in doing minor repair jobs.

In this study it was found that 22 per cent could do simple electric arc welding, 17 per cent could do simple oxyacetylene welding and 10 per cent could operate a blacksmith forge. Of 283 pieces of equipment owned, fifty needed repairs, thirty-eight were in need of adjustment, sixty-six need lubricating and eight-one needed parts replaced.

Coggin[2] pointed out that shop equipment considered adequate a few years ago is far from adequate today. One of the factors he recommended for the selection of such equipment was the type of farming in the community.

Wakeman[3] stated that it is the conservative estimate of many successful farmers that the proper use of a well planned home farm shop has meant the difference of operating on a profitable basis rather than on a nonprofitable basis.

Cook and Byram[4] found that the type of farming done by farmers appears to be an irrelevant factor in determining either the extent of

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[2] J. K. Coggin, "Teacher's Farm Shop," Better Farming Methods, 21:51, July 1949.

[3] T. J. Wakeman, "Teacher's Farm Shop," Better Farming Methods, 23:54, June 1951.

[4] Glen C. Cook and Harold M. Byram, "Mechanical Activities of Selected Farmers in Michigan." (Unpublished nonthesis study, Michigan State College, 1952. Summaries of Studies in Agricultural Education, Bulletin No. 251, U. S. Department of Health, Education, and Welfare.)

performance, the desire for improvement or the practice of hiring mechanical activities done. He further stated that there is a relationship between farming status and experience in mechanical activities, with tenant farmers showing the least experience and farmers who both rented and owned land showing the most experience.

Ogles[5] found that 50 per cent of the young farmers who owned power equipment lubricate it, 20 per cent could adjust a carburetor but only 5 per cent could clean a carburetor. On ordinary farm equipment in regard to adjusting, repairing and lubricating, the range was 5 per cent for maintaining a row planter, up to 30 per cent for maintaining a rake. This author stated that at least 70 to 90 per cent of the farmers surveyed would do the work in farm machinery maintenance if they possessed the necessary skills to do the job.

Wakeman[6] stated that a simple adjustment of the carburetor using the operator's Manual can save as much as one dollar daily in fuel cost and the proper servicing of the air filter can prevent a valve and ring job. This writer further states that too little has been said and done about performing preventative maintenance, repair and adjustment of farm machinery during slack seasons thus increasing the possibility of the machine breaking down in the field.

Johnson[7] asked if vocational agricultural teachers can justify using

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[5]Charles M. Ogles, "Determining the Needs and Possibilities With Young Farmer Youth in the Gordonsville Community, Smith County, Tennessee." (Unpublished nonthesis, University of Tennessee, March 1952), 30 pp.

[6]Wakeman, op. cit., 25:47, July 1953.

[7]Paul Johnson, "The Farm Mechanics Program for Today," Agricultural Education Magazine, 27:238, April 1955.

time to teach forge work or should it be used to teach more on the use of the oxyacetylene torch and arc welder.

Wakeman[8] suggested that the teaching of tractor maintenance include the how and why of daily and periodic service of farm tractors which assures the owner many more hours of efficient, safe and satisfactory use but not include the major reconditioning of a tractor.

Wakeman[9] further stated that too many of us think of farm mechanics as a subject to itself and that essential manipulative activities have been omitted.

Solomon[10] found that 90 per cent of the farming in the Ottway, Tennessee area was done with machinery and few farmers possessed the skill to make needed repairs. Of Sixteen farmers surveyed, only one had experience in welding but all had some experience in toolfitting. However, all farmers expressed the desire to study both skills.

The preceding data was corroborated by Jones[11] where he found that 55 per cent of a selected group of farmers desired instruction in welding and 50 per cent desired instruction in toolfitting.

Gibson[12] discovered that there was inadequate work being done on

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[8]Wakeman, op. cit., 22:58, February 1950.

[9]Wakeman, op. cit., 22:62, September 1950.

[10]Clyde G. Solomon, "Planning A Course of Study in Farm Mechanics for an Adult Evening School at Ottway." (Unpublished nonthesis, University of Tennessee, December 1954), 15 pp.

[11]Ernest K. Jones, "Planning A Course of Study in Farm Mechanics in the Madisonville Community." (Unpublished nonthesis, University of Tennessee, July 1955).

[12]Henry E. Gibson, "Developing A Farm Shop Program for High School Boys in Farragut Community." (Unpublished nonthesis, University of Tennessee, August 1948), 30 pp.

farm machinery in the Farragut Community and most of the farmers let a machine run until it broke down or until it was worn out with rust and wear. This author found that approximately 60 per cent of the selected farmers did some farm machinery repair.

Roehl[13] believes that it is growing more and more imperative to have a farm shop on every farm to make it possible for farmers to do at home much of the work which was formerly done by artisans. He stated that farm shop work is a part of farming, and those farmers who have shops on their farms equipped with the tools which are necessary to do the ordinary repair work and have the required skill to do them, can carry on the farming business more economically and with greater personal satisfaction than those who need all their mechanical work done by others.

Assumptions

This study is based upon the following assumptions:

1. There is a need to determine the skills done and those that should be done in specified areas of farm mechanics on selected farms in the Cheatham County Central High School area.

2. There are differences in farm equipment and repair equipment in regard to types of farming and tenure status on selected farms in Cheatham County.

3. There is a need to determine the extent of repairs, adjustments and lubrication of farm machinery on selected farms in Cheatham County.

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[13]Louis M. Roehl, Farmer's Shop Book (Revised edition; Milwaukee: The Bruce Publishing Company, 1945).

4. The future program of farm mechanics in Central High School should be based upon the needs of the individual.

Procedure

The procedure followed was to make a review of literature devoted to the subject of farm mechanics practiced on the farm and taught to vocational agricultural students in high school. It was decided to prepare a survey consisting of five parts as follows:

1. To determine the tenure status and type of farm operated.

2. To determine the extent that specific jobs and skills in farm machinery maintenance and repair are performed.

3. To determine the equipment available for farm machinery repair and the operator's adeptness in using it.

4. To determine the storage and repair space available for farm machinery.

5. To determine the extent of adjustments, lubrication and repairs made on farm machinery.

Lists of skills in farm mechanics, repair equipment, and farm equipment were secured from the files of the Department of Agricultural Education at the University of Tennessee. With the assistance of the Agricultural Education Staff, the Agricultural Engineering Staff, selected graduate students enrolled in the University, and the writer's personal knowledge of the community where the data were collected, these lists were reduced to items deemed important to the study.

After consultations with personnel in the College of Business

Administration, it was decided to survey 50 per cent of the selected group. This group consisted of farms of one hundred twenty-seven vocational agricultural students and eighteen adult farmers enrolled in an evening class. This figure was reduced to one hundred thirty-eight farmers because of three pairs of brothers taking vocational agriculture, two adult students who had sons enrolled in vocational agriculture and two students who did not live on a farm.

An alphabetical list of one hundred thirty-eight farmers was made. Beginning with the first name and each second name thereafter, a list of farmers to be surveyed was compiled.

The writer surveyed 43 per cent of the group on their home farm. The remaining 57 per cent were surveyed with the assistance of selected vocational agricultural students using the following procedure.

With the help of the agricultural teacher, the selected group of students met with the writer during their regular vocational agricultural class period. The survey was discussed. Each student took a survey home and discussed it with his father. A second meeting was held to clear up any difficulties. The student then returned home and completed all parts of the survey with his father that they understood. The surveys were retained by the farmer until the writer could visit the farm and study each survey for completion. It is felt that the preceding procedure gave the farmer more time for accurate calculations and estimations, thus reducing hasty decisions.

After the surveys were completed, the data were tabulated and analyzed.

Organization

Chapter II presents the characteristics of the farms included in the survey.

Chapter III analyzes the data pertaining to available facilities and equipment and adeptness of the farmers in using the equipment for the repair of farm machinery.

Chapter IV analyzes the data pertaining to the skills and jobs performed.

Chapter V analyzes the data pertaining to the maintenance, lubrication and repair of farm machinery.

Chapter VI represents a summary of the study and conclusions.

CHAPTER II

CHARACTERISTICS OF A SELECTED GROUP OF FARMS LOCATED IN THE CHEATHAM COUNTY CENTRAL HIGH SCHOOL AREA

Historical Sketch of the Area

Central High School is located in Ashland City, Cheatham County, Tennessee. In 1955-56, this school had an enrollment of 440 students enrolled in grades nine through twelve. There were 127 students enrolled in Vocational Agriculture. Other vocational subjects taught were Home Economics and Industrial Arts.

Cheatham County adjoins Davidson County with the urban area of Nashville which offers employment for many of the local residents. The largest manufacturing concern in Cheatham County is a boat factory employing from two hundred to four hundred people.

Farming is the major occupation with dark fired tobacco the major crop. In 1950, 56 per cent of all farm income was from this crop.[1] Due to acreage controls, noted by the farmers in cooperation with the Production and Marketing Administration, the acreage devoted to this crop has been reduced 65 per cent in the past twelve years.[2] This has encouraged many farmers to lease their allotted tobacco acreage to other farmers and seek employment elsewhere. Many of these farmers remain on the farm and operate a general farm on a small scale. The 1954 Preliminary Census

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[1] United States Census of Agriculture (Washington: United States Government Printing Office, 1950), p. 119.

[2] Huffman Morse, Director of Cheatham County P.M.A. Office, Oral Report. June, 1956.

Report categorically groups these farmers together as residential farmers.

Some of these part-time farmers live as much as thirty miles from their place of employment. Reasons given that would compensate for this inconvenience included inheritance of a farm, an opportunity to escape the high cost of city living, desires children to be farm reared, and working to get a large enough farm to be fully occupied.

Characteristics of Farms

Table I shows the number, type of farm and tenure status of the selected group of farms included in the study. The classification of these farms to type was determined by the per cent income from specific crop and livestock enterprises.[3]

The farms operated by owners in this study comprised 58 per cent of all farms. Of all the farms in the county, 61.3 per cent were operated by owners in 1954.[4] Other comparative figures are 11.6 per cent of farmers surveyed being part-owners, whereas in 1954 there were 17.1 per cent. It was found that 30.4 per cent were tenants compared with 21.6 per cent tenancy on all farms in 1954. The sixty-nine farms surveyed represented 5.6 per cent of all farms in the county.

Table II shows the size of farms of the selected group according to tenure status and type of farming. For all farms in Cheatham County in

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[3] Types of Farming in Tennessee (Knoxville: University of Tennessee Experiment Station, Bulletin 169, April 1939), p. 29.

[4] U.S.D.A. Preliminary Agricultural Census Data (Washington: United States Government Printing Office, 1954), p. 1.

TABLE I

THE TENURE STATUS AND TYPE OF FARM OPERATED BY A SELECTED GROUP OF FARMERS IN CHEATHAM COUNTY, TENNESSEE IN 1956

Type of Farm	Tenure Status					
	Owners	Tenants	Combination Owner-Tenants	Part-Time Farmer Owners	Part-Time Farmer Tenants	Totals
Tobacco	28	12	8	3	2	53
General	1	0	0	6	6	13
Truck	0	0	0	2	0	2
Dairy	0	1	0	0	0	1
Totals	29	13	8	11	8	69

TABLE II

THE SIZE OF FARMS OPERATED BY A SELECTED GROUP OF FARMERS IN CHEATHAM COUNTY AS RELATED TO TENURE STATUS AND TYPE OF FARM IN 1956

	Type of Farm											
	Tobacco			General			Dairy			Strawberry			Totals		
Tenure Status	No.	Range	Avg. Acres	No.	Range	Avg. Acres	No.	Range	Avg. Acres	No.	Range	Avg. Acres	No.	Range	Avg. Acres
Owners	28	40-1200	177	1	400	400	0			0			29	40-1200	183
Tenants	11	72-450	170	0			1	150	150	0			12	72-450	168
Combination Owner-Tenant	9	80-520	266	0			0			0			9	80-520	266
Part-Time Farmers Owners	3	68-120	93	6	26-138	89	0			2	58-75	67	11	26-138	86
Part-Time Farmers Tenants	2	84-123	108	6	15-210	92	0			0			8	15-210	96
Totals	53	40-1200		13	15-400		1	150	150	2	58-75	67	69	15-1200	166

1954, the average size was 103.5 acres.[5] It is noted that part-time farmers operate farms smaller than the county average whereas all groups of fully employed farmers operate units about the county average. It will be noted that one farm owner operates a 1,200 acre unit. Since this is an unusually large farm in this locality, an average of 139.5 acres was obtained using the remaining twenty-seven farms in this group. The combination tenant-owner operated the largest average unit being 257 per cent larger than the average farm.

All acreages are in total land area and no data are available for determining the specific amount of cropland.

Table III presents the numbers and kinds of livestock, and the per cent of total income derived from livestock on the selected farms according to tenure status. It is noted that the smallest percentage of farmers who own dairy cattle, swine and poultry are the part-time tenant farmers, but in each case 62 per cent of these farmers own these types of livestock. Full time tenants were low in per cent of farmers having beef cattle. On many farms in this area these four groups of livestock are produced primarily for home consumption with small surpluses being sold.

Full-time owners received a greater per cent of their income from livestock than any other group which was 19.5 per cent. However, the part-time farmers received a larger per cent of their farm income from livestock. On this basis, the part-time tenant received 25.2 per cent and the part-time owner received 34.7 per cent of farm income from livestock.

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[5]United States Census, op. cit.

TABLE III

NUMBER AND KIND OF FARM ANIMALS AND PER CENT OF TOTAL INCOME FROM LIVESTOCK ON A SELECTED GROUP OF FARMS IN CHEATHAM COUNTY ACCORDING TO TENURE STATUS IN 1956

Tenure Status	Farmers	Dairy Cattle: Farmers Having	Dairy Cattle: Total Owned	Dairy Cattle: Total Income	Beef Cattle: Farmers Having	Beef Cattle: Total Owned	Beef Cattle: Total Income	Swine: Farmers Having	Swine: Total Owned	Swine: Total Income	Poultry: Farmers Having	Poultry: Total Owned	Poultry: Total Income	Total Income From Livestock
	Number	Per Cent	Number	Per Cent	Per Cent	Number	Per Cent	Per Cent	Number	Per Cent	Per Cent	Number	Per Cent	Per Cent
Owners	29	76	80	3.3	53	259	7.7	96	319	7.9	79	2331	0.6	19.5
Tenants	12	64	42	7.1	23	44	3.5	64	61	1.4	80	364	0	12.0
Combination Owner-Tenants	9	78	50	7.4	14	76	5.2	67	71	6.3	78	390	0	18.9
Part-Time Owners	11	82	42	5.5	55	39	1.8	100	150	4.5	63	530	0.9	12.7
Part-Time Tenants	8	62	11	2.5	12	26	3.1	62	18	0.9	62	168	0.4	6.9

Table IV shows the per cent of total farm income from crops produced. It is shown that small grains, hay and corn are produced on a large percentage of farms but the sale of these crops represents only a small part of the total income, thus indicating that most of these crops are produced primarily for livestock feed. From the standpoint of income, strawberries are relatively unimportant except for part-time owners who derive 6.4 per cent of their total income from this crop. Tobacco produces more income than any other crop on all groups of farms with tenants receiving the highest per cent of income from this crop representing 71.1 per cent of their total income.

The per cent of farm income from livestock is transferred from Table III thus showing total income from crops and livestock. It is noted that only one group of farmers receive 100 per cent of their income from farming. Some farmers lack the equipment to do specialized jobs such as seed cleaning, feed grinding, or combining grain thus hire a neighbor to do it for them.

TABLE IV

FREQUENCY OF OCCURANCE, SCOPE, AND PER CENT OF TOTAL INCOME FROM CROPS AND LIVESTOCK ON SELECTED FARMS IN CHEATHAM COUNTY IN 1956

		Tobacco			Strawberries			Small Grain			Corn			Hay			Totals		
Tenure Status	Farmers Per Cent	Farmers Having Per Cent	Total Acres Number	Total Income Per Cent	Farmers Having Per Cent	Total Acres Number	Total Income Per Cent	Farmers Having Per Cent	Total Acres Number	Total Income Per Cent	Farmers Having Per Cent	Total Acres Number	Total Income Per Cent	Farmers Having Per Cent	Total Acres Number	Total Income Per Cent	Income From Crops Per Cent	Income From Livestock Per Cent	Farm Income Per Cent
Owners	29	100	128.9	66.2	31	6.0	1.8	68	257	3.8	96	349	3.2	68	374	1.2	76.2	19.5	95.7
Tenants	12	100	71.2	78	9	0.5	0.5	67	88	2.5	100	125	1.4	73	89	0	75.6	6.3	81.9
Combination Owner-Tenants	9	100	63.0	71.1	0	0	0	100	128	5.4	100	188	4.2	89	233	0.8	81.1	18.9	100
Part-Time Owners	11	73	9.8	13.2	45	8.9	6.4	64	33	1.4	82	117	3.6	55	60	0	23.7	12.7	36.4
Part-Time Tenants	8	62	4.7	13.1	25	0.6	1.2	13	17	1.2	87	60	4.4	62	44	0.6	20.5	6.9	27.4

CHAPTER III

REPAIR EQUIPMENT, STORAGE AND REPAIR SPACE FOUND ON A SELECTED GROUP OF FARMS IN CHEATHAM COUNTY AND THE ADEPTNESS OF FARM OPERATORS IN THE USE OF COMMON FARM MACHINERY EQUIPMENT

Adeptness of Farm Operators in the Use of Specific Repair Equipment

Table V shows the adeptness of operators according to tenure status in using equipment. It should be pointed out that the writer was not concerned with picking out those who were experts in using the equipment, but was interested in determining how many had used the equipment and learned the basic skills to such an extent that they could use the equipment if it were available. Upon studying the percentages of farmers adept in using such power equipment and comparing the figures with those obtained in other related studies, these percentages may appear high.[1,2,3,4] A possible explanation follows: These farmers, most of whom have boys in high school, fall in one age group between thirty-five and forty-five years of age. Many of them served in the armed forces during World War II and were eligible for educational benefits under the G. I. Bill of Rights. Some of these farmers attended mechanical trade schools and many of them

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[1] Dorace E. Brasfield, op. cit.

[2] Clyde G. Solomon, op. cit.

[3] Ernest K. Jones, op. cit.

[4] Henry E. Gibson, op. cit.

TABLE V

ADEPTNESS OF SELECTED CHEATHAM COUNTY FARMERS IN USING MACHINERY REPAIR EQUIPMENT ACCORDING TO TENURE STATUS

Equipment	Tenure Status: Owners No.	Owners Per Cent	Tenants No.	Tenants Per Cent	Owner-Tenant No.	Owner-Tenant Per Cent	Part-Time Farmer Owner No.	Part-Time Farmer Owner Per Cent	Part-Time Farmer Tenant No.	Part-Time Farmer Tenant Per Cent	Totals No.	Totals Per Cent
Acetylene Welder	12	41.4	5	41.7	6	67	7	64	2	25	32	46.4
Electric Welder	8	27.6	3	25	4	44	6	54	5	62.5	26	37.7
Power Drill Press	14	48.3	6	50	7	78	9	82	5	62.5	40	57.9
Portable Electric Drill	23	79.3	8	66.7	7	78	10	91	8	100	56	81.1
Power Grinder	19	65.5	6	50	6	67	10	91	4	50	45	65.2
Sickle Grinder	12	41.4	5	41.7	6	67	6	54	4	50	33	47.8
Power Hacksaw	12	41.4	4	33.3	5	55	8	73	4	50	33	47.8
Air Compressor	15	51.4	2	16.7	5	55	9	82	5	62.5	36	52.2
Pressure Sprayer	21	72.4	5	41.7	8	89	10	91	5	62.5	49	71.0
Chain Hoist	13	44.8	3	25	6	67	10	91	4	50	36	52.2
Forge	14	48.3	4	33.3	6	67	7	64	3	37.5	34	49.3
Anvil	21	72.4	9	75	7	78	8	73	5	62.5	50	72.4
Other	4	13.8	1	8.3	0		2	18	1	12.5	8	11.6

were enrolled in the Institutional-On-Farm Training Program. Most teachers in this local program followed classroom study of farmshop work by setting aside one day each month for the actual repair of farm machinery and farm equipment in the vocational agricultural shop. At that time, the vocational agricultural shop had each item of equipment listed in addition to other power equipment. If the teachers were not adept at using specific equipment, students with special skills or lay persons were brought in to teach the use of the equipment. The writer believes that more interest was shown by the trainees in learning how to use the welders and cold metal working tools than any other.

In addition to specific equipment listed in Table V, farmers had an opportunity to check their adeptness at using other equipment. Those that checked other equipment mentioned their skill in using a power skill saw and other power woodworking equipment such as a jointer or planer.

Of the twelve pieces of repair equipment listed, it was found that all farmers averaged 53.3 per cent adeptness in using the equipment. As will be noted, part-time tenants are slightly above average with 54 per cent, combination owner-tenants average 62.4 per cent while part-time owners are more adept than any other group with 75.3 per cent. Fully employed owners were slightly below the average for all farmers with 50 per cent and fully employed tenants were least adept with 39.1 per cent.

Table VI presents the data pertaining to the adeptness in using equipment according to type of farming. With an average of 53.3 per cent for all farmers, it was found that tobacco farmers were below average with 48.8 per cent and that general farmers, who are primarily part-time farmers averaged 65.1 per cent proficiency. Other types of farms included

TABLE VI

ADEPTNESS OF SELECTED CHEATHAM COUNTY FARMERS IN USING MACHINERY REPAIR EQUIPMENT ACCORDING TO TYPE OF FARM OPERATOR

Equipment	Type of Farm							
	Tobacco		General		Other		Total	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Acetylene Welder	24	45.3	5	38.9	3	100	32	46.4
Electric Welder	16	30.2	7	55.5	3	100	26	37.7
Power Drill Press	29	54.8	8	62.2	3	100	40	57.9
Portable Electric Drill	40	75.6	13	100	3	100	56	81.1
Power Grinder	34	64.3	9	70.0	2	66.7	45	65.2
Sickle Grinder	25	47.2	8	62.2			33	47.8
Power Hacksaw	21	39.7	9	70.0	3	100	33	47.8
Air Compressor	24	45.3	9	70.0	3	100	36	52.2
Pressure Sprayer	35	66.1	11	85.6	3	100	49	71.0
Chain Hoist	23	43.5	10	77.8	3	100	36	52.2
Forge	23	43.5	8	62.2	3	100	34	49.3
Anvil	37	69.9	10	77.8	3	100	50	72.4
Other	5	9.5	2	15.6	1	33.3	8	11.6

only three farms which was 4.3 per cent of all farms surveyed showed a very high proficiency in the use of equipment with 84.6 per cent. Of these three farmers, two have worked in machine shops and one received training in the Institutional-On-Farm Training Program. It is doubtful if these three farms form a significant group nor would they represent a typical group in these farm types.

Availability of Repair Equipment to Farm Operators

Table VII presents the data on the availability of machinery repair equipment to the farm operators. It is noted that welders and power hack-saws were available in fewest numbers whereas anvils, pressure sprayers and electric drills were available in most cases. It was found that tenants, part-time tenants and combination owner-tenants were below the average for all farms in available equipment whereas owners and part-time owners were above average.

On the basis of the number of pieces of equipment available, it was found that an average of 2.55 pieces of equipment were available to all farmers. In contrast, tenants had 1.5 pieces, part-time tenants had 2.1 pieces and combination owner-tenants had 1.9 pieces available. Both groups of farm owners had more repair equipment available with fully employed owners having an average of three pieces of equipment and part-time owners an average of 3.5 pieces.

In Table VIII, it was found that all tobacco farms had an average of 2.17 pieces per farm. General farms were second with 3.61 pieces of equipment and other types had an average of 4.67 pieces of equipment for repairing farm machinery.

TABLE VII

AVAILABILITY OF EQUIPMENT ON SELECTED CHEATHAM COUNTY FARMS ACCORDING TO TENURE STATUS OF THE OPERATOR

Equipment	Tenure Status											
	Owners		Tenants		Owner-Tenants		Part-Time Owners		Part-Time Tenants		Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Acetylene Welder	1	3.5	0	0	0	0	2	18.2	0		3	4.2
Electric Welder	1	3.5	0	0	1	11.1	0		0		2	2.9
Power Drill Press	4	13.8	1	8.3	1	11.1	0		1	12.5	7	10.1
Portable Electric Drill	11	37.9	3	25	1	11.1	6	54	2	25	23	33.3
Power Grinder	6	20.7	3	25	0		5	45	2	25	16	23.2
Sickle Grinder	5	17.2	1	8.3	2	22.3	0		2	25	10	14.5
Power Hacksaw	1	3.5	1	8.3	0	0	1		0		3	4.2
Air Compressor	7	23.2	0	0	0	0	4	9	1	12.5	12	17.4
Pressure Sprayer	16	55.2	3	25	5	55.6	5	45	3	37.5	32	46.4
Chain Hoist	8	27.6	1	8.3	2	22.2	5	45	2	25	18	26.1
Forge	4	13.8	1	8.3	1	11.1	3	33	0		9	13.0
Anvil	18	62.1	4	33.3	2	22.2	6	67	3	37.5	33	49.3
Other	4	13.8	1	8.3	0		2	22	1	12.5	8	11.6

TABLE VIII

AVAILABILITY OF EQUIPMENT ON SELECTED CHEATHAM COUNTY FARMS ACCORDING TO TYPE OF FARM OPERATED

Equipment	Type of Farm							
	Tobacco		General		Other		Total	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Acetylene Welding	1	2	1	7.7	1	33.3	3	4.2
Electric Welding	2	4	0				2	2.9
Power Drill Press	5	9	2	15.4			7	10.1
Portable Electric Drill	15	29	7	53.9	1	33	23	33.3
Power Grinder	9	17	5	38.5	2	66.7	16	23.2
Sickle Grinder	7	13	3	23.1			10	14.5
Power Hacksaw	1	2	2	15.4			3	4.2
Air Compressor	8	15	3	23.1	1	33	12	17.4
Pressure Sprayer	24	46	7	53.9	1	33	32	46.4
Chain Hoist	11	20	4	30.8	3	100	18	26.1
Forge	5	9	3	23.1	1	33	9	13.0
Anvil	22	42	8	66.7	3	100	33	49.3
Other	5	9	2	15.4	1	33	8	11.6

Machinery Storage and Repair Facilities of Farm Operators

Some authors feel that the farm shop and storage space for farm machinery are of utmost importance in the maintenance and repair of the farmer's equipment.[5,6]

Table IX is a summarization of the available storage and repair space in regard to tenure status. In addition, information is presented showing the number of farmers who plan to provide storage and repair space.

It was found that 55.1 per cent have adequate storage space for farm machinery and an additional 26.1 per cent plan to provide storage space leaving 18.8 per cent who have no facilities nor plan to provide. This 18.8 per cent represents thirteen farmers, four of which are farm owners. On a comparative basis of all farmers with some degree of ownership which represent 71.0 per cent of all farmers; they have or plan to have storage space on 87.7 per cent of the farms. The tenants represent 29 per cent of the farmers and have storage space on 45 per cent of their farms. No tenants planned to provide storage space.

As noted, 26.1 per cent of all farmers have a farm shop, 57.9 per cent have a roofed area available for machinery repair and 11.6 per cent plan repair space, thus leaving only 4.4 per cent of all farmers who have no space nor plan to provide for machinery repair. The three farms representing other types of farming plan to provide or have storage and repair space.

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[5] T. J. Wakeman, op. cit.

[6] Louis M. Roehl, op. cit.

TABLE IX

PRESENT AVAILABLE SPACE AND PLANS FOR PROVIDING SPACE FOR STORING AND REPAIRING FARM MACHINERY ON SELECTED CHEATHAM COUNTY FARMS ACCORDING TO TENURE STATUS

Facilities	Tenure Status											
	Owners		Tenants		Owner-Tenants		Part-Time Owners		Part-Time Tenants		Totals	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Storage space available for all machinery and equipment	22	75.8	7	58.3	3	33.3	3	27	3	37.5	38	55.1
Have farm shop	10	34.5	3	33.3	2	22.2	2	18	1	12.5	18	26.1
Have roofed area available for farm machinery repair	15	51.7	8	66.7	7	78	6	54	4	50	40	57.9
Have no storage space but plan to provide	5	17.2	3	25	5	55.5	5	45	0	0	18	26.1
Have no repair space but plan to provide	3	10.5	0	0	1	11.1	4	36	0	0	8	11.6

Table X presents the data on storage and repair facilities in regard to types of farming. It is seen that a larger percentage of tobacco farms have storage space than general farms. A possible answer to this may be due to the reduced tobacco acreage giving some farmers the opportunity to use unused barn space for machinery storage. However, a larger percentage of general farmers plan to provide storage space, thus the total farmers who have storage space or plan to provide was 83 per cent of tobacco farmers compared to 69.2 per cent of general farmers who have or plan to provide storage space.

The percentage of tobacco and general farmers who have farm shops were practically the same and only one farmer in each group did not have or plan to have repair space.

On the other types of farms, all three farmers had storage and repair space for farm machinery or planned to provide it.

TABLE X

PRESENT AVAILABLE SPACE AND PLANS FOR PROVIDING SPACE FOR STORING AND REPAIRING FARM MACHINERY ON SELECTED CHEATHAM COUNTY FARMS ACCORDING TO TYPE OF FARM OPERATED

Facilities	Type of Farm							
	Tobacco		General		Other		Total	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Storage space available for all machinery and equipment	32	60.4	4	30.7	2	66.7	38	55.1
Have farm shop	13	24.5	3	23.1	2	66.7	18	26.1
Have roofed area available for farm machinery repair	35	66	4	30.7	1	33.3	40	57.9
Have no storage space but plan to provide	12	22.7	5	38.4	1	33.3	18	26.1
Have no repair space but plan to provide	4	7.6	4	30.7	0	0	8	11.6

CHAPTER IV

SKILLS OR JOBS PERFORMED ON SELECTED FARMS IN CHEATHAM COUNTY

This chapter pertains to specific skills or jobs common to many farms in the Cheatham County area and the extent to which the farmer does them. There were five ways the farmer responded to the question in regard to his practice, knowledge or opinion of the skill. These were:

1. The farmer performs the skill or job.
2. He knows how but tools are not available.
3. He would perform the skill or job if he knew how and tools were available.
4. He believes it should be done by an expert.
5. It does not have to be done on his farm.

Only one of the above five was checked but in some cases two answers were feasible. For example, one farmer posseses a certain skill and does not have the tools but feels that an expert could do the job quicker and cheaper.

In Tables XI, XII, XIII, XIV and XV are the data related to specific skills in farm machinery repair. In most cases, the majority opinion of one group of farmers correlated with the opinions of all other groups in regard to individual skills.

From 27.6 to 75 per cent of each group of farmers were of the opinion that putting new brushes in generators, adjusting the timing on tractors and installing new rings should be done by an expert. However,

TABLE XI

RESPONSE OF SELECTED CHEATHAM COUNTY FARM OWNERS
TO MACHINERY REPAIR SKILLS

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on this farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Dress a grinding wheel	5	17.2	3	10.5	5	17.2	2	7.0	14	48.3
Sharpen a twist drill	5	17.2	3	10.5	3	10.5	8	27.6	10	34.5
Sharpen a cold chisel	17	58.6	3	10.5	4	13.9	1	3.5	4	13.9
Sharpen a mower knife	17	58.6	3	10.5	1	3.5	3	10.5	5	17.2
Do forge welding	1	3.5	4	13.9	5	17.2	9	31.0	10	34.5
Temper a cold chisel	11	37.9	3	10.5	8	27.6	2	7.0	5	17.2
Draw out and temper a harrow tooth	8	27.6	2	7.0	10	34.5	2	7.0	8	27.6
Draw out and temper a cultivator shovel	4	13.9	4	13.9	11	37.9	3	10.5	6	20.7
Thread a bolt or nut	8	27.6	4	13.9	3	10.5	8	27.6	6	20.7
Rivet on mower knives	20	69.0	2	7.0	2	7.0	0	0	5	17.2
Rivet on guard plates	21	72.4	1	3.5	3	10.5	0	0	4	13.9
Make a brace from angle iron	9	31.0	3	10.5	6	20.7	1	3.5	10	34.5
Cut metal with a cold chisel	25	86.2	1	3.5	2	7.0	0	0	1	3.5
Cut metal with a hacksaw	26	89.7	1	3.5	1	3.5	0	0	1	3.5
Clean and dress belts	10	34.5	1	3.5	7	23.2	0	0	11	37.9
Lace and repair a belt	9	31.0	2	7.0	4	13.9	2	7.0	12	41.4

TABLE XI

RESPONSE OF SELECTED CHEATHAM COUNTY FARM OWNERS TO MACHINERY REPAIR SKILLS (Continued)

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on this farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Calculate pulley size and speed	3	10.5	0	0	6	20.7	4	13.9	16	55.2
Line up pulleys and shafts	10	34.5	1	3.5	4	13.9	2	7.0	11	37.9
Measure a belt	12	41.4	0	0	4	13.9	0	0	12	41.4
Use power take-off	19	65.6	3	10.5	1	3.5	1	3.5	5	17.2
Lubricate truck regularly	18	62.1	2	7.3	1	3.5	2	7.0	6	20.7
Lubricate tractor regularly	22	75.9	0	0	2	7.0	1	3.5	4	13.9
Clean and adjust truck carburetor	13	43.9	1	3.5	3	10.5	6	20.7	6	20.7
Clean and adjust tractor carburetor	13	43.9	2	7.0	2	7.0	8	27.6	4	13.9
Clean cooling system and air cleaner of tractor	22	75.9	0	0	2	7.0	1	3.5	4	13.9
Check tractor ignition system	14	48.3	1	3.5	5	17.2	5	17.2	4	13.9
Clean and paint tractor	7	23.2	4	13.9	5	17.2	8	27.6	5	17.2
Care for tractor tires	19	65.6	2	7.0	1	3.5	2	7.0	5	17.2
Prepare tractor for winter	21	72.4	1	3.5	1	3.5	1	3.5	5	17.2
Read and follow operators manual	25	86.2	0	0	1	3.5	0	0	3	10.5
Put new brushes in generator	7	23.2	1	3.5	3	10.5	13	43.9	5	17.2
Adjust the timing on tractor	6	20.7	1	3.5	5	17.2	13	43.9	4	13.9
Grind and adjust values	5	17.2	3	10.5	1	3.5	15	51.7	5	17.2
Install new rings	6	20.7	1	3.5	1	3.5	16	55.2	5	17.2

TABLE XII

RESPONSE OF SELECTED CHEATHAM COUNTY FARM TENANTS
TO MACHINERY REPAIR SKILLS

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on this farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Dress a grinding wheel	1	8.3	0		3	25	0	0	8	66.7
Sharpen a twist drill	1	8.3	1	8.3	2	16.7	2	16.7	6	50
Sharpen a cold chisel	9	75	1	8.3	1	8.3	0	0	1	8.3
Sharpen a mower knife	7	58.3	0		2	16.7	1	8.3	2	16.7
Do forge welding	1	8.3	0	0	2	16.7	2	16.7	7	58.3
Temper a cold chisel	6	50	2	16.7	1	8.3	1	8.3	2	16.7
Draw out and temper a harrow tooth	4	33.3	0		1	8.3	4	33.3	3	25
Draw out and temper a cultivator shovel	5	41.7	0		2	16.7	4	33.3	1	8.3
Thread a bolt or nut	3	25	3		1	8.3	4	33.3	1	8.3
Rivet on mower knives	8	66.7	2	16.7	0		0		2	16.7
Rivet on guard plates	9	75	1	8.3	0		0		2	16.7
Make a brace from angle iron	4	33.3	1	8.3	2	16.7	4	33.3	1	8.3
Cut metal with a cold chisel	10	83.3	1	8.3	0		0		1	8.3
Cut metal with a hacksaw	10	83.3	1	8.3	0		0		1	8.3
Clean and dress belts	2	16.7	2	16.7	1	8.3	0		7	58.3
Lace and repair a belt	1	8.3	1	8.3	2	16.7	0		8	66.7
Calculate pulley speed and size	2	16.7	1	8.3	1	8.3	0		8	66.7
Line up pulley and shafts	6	50	0		1	8.3	0		5	41.7

TABLE XII

RESPONSE OF SELECTED CHEATHAM COUNTY FARM TENANTS TO MACHINERY REPAIR SKILLS (Continued)

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on this farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Measure a belt	6	50	0		1	8.3	0		5	41.7
Use power take-off	8	66.7	0		0		0		4	33.3
Lubricate truck regularly	7	58.3	1	8.3	1	8.3	1	8.3	2	16.7
Lubricate tractor regularly	7	58.3			1	8.3			4	33.3
Clean and adjust truck carburetor	7	58.3			1	8.3	2	16.7	2	16.7
Clean and adjust tractor carburetor	5	41.7			1	8.3	3	25	3	25
Clean cooling system and air cleaner of tractor	6	50			1	8.3	1	8.3	4	33.3
Check tractor ignition system	5	41.7			1	8.3	2	16.7	4	33.3
Clean and paint tractor	4	33.3			2	16.7	2	16.7	4	33.3
Care for tractor tires	8	66.7							4	33.3
Prepare tractor for winter	7	58.3			1	8.3			4	33.3
Read and follow operator's manual	7	58.3					1	8.3	4	33.3
Put new brushes in generator	4	33.3			2	16.7	4	33.3	2	16.7
Adjust the timing on tractor	1	8.3			2	16.7	6	50	3	25
Grind and adjust valves	1	8.3	1	8.3	2	16.7	7	62.5	1	8.3
Install new rings	2	16.7			3	25	6	50	1	8.3

TABLE XIII

RESPONSE OF SELECTED CHEATHAM COUNTY FARM OWNER-TENANTS TO MACHINERY REPAIR SKILLS

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on this farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Dress a grinding wheel			2	22.2	1	11.1			6	66.7
Sharpen a twist drill		0	1	11.1	2	22.2	2	22.2	4	44.4
Sharpen a cold chisel	5	55.5	3	33.3	1	11.1	0		0	
Sharpen a mower knife	4	44.4	1	11.1	1	11.1	1	11.1	2	22.2
Do forge welding			2	22.2	1	11.1	2	22.2	4	44.4
Temper a cold chisel			1	11.1	2	22.2	3	33.3	3	33.3
Draw out and temper a harrow tooth	1	11.1	2	22.2	3	33.3	2	22.2	1	11.1
Draw out and temper a cultivator shovel	2	22.2	1	11.1	3	33.3	2	22.2	1	11.1
Thread a bolt or nut	3	22.2	1	11.1	1	11.1	4	44.4		
Rivet on mower knives	7	77.8							2	22.2
Rivet on guard plates	7	77.8							2	22.2
Make a brace from angle iron	4	44.4			2	22.2	2	22.2	1	11.1
Cut metal with a cold chisel	8	88.9							1	11.1
Cut metal with a hacksaw	8	88.9	1	11.1						
Clean and dress belts	1	11.1	1	11.1	2	22.2			5	55.5
Lace and repair a belt	1	11.1			1	11.1	2	22.2	5	55.5
Calculate pulley speed and size	2	22.2			3	33.3			4	44.4
Line up pulleys and shafts	3	33.3	1	11.1			3	33.3	2	22.2

TABLE XIII

RESPONSE OF SELECTED CHEATHAM COUNTY FARM OWNER-TENANTS TO MACHINERY REPAIR SKILLS (Continued)

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on this farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Measure a belt	3	33.3			3	33.3			3	33.3
Use power take-off	8	88.9							1	11.1
Lubricate truck regularly	8	88.9					1	11.1		
Lubricate tractor regularly	9	100								
Clean and adjust truck carburetor	4	44.4			3	33.3	2	22.2		
Clean and adjust tractor carburetor	4	44.4			2	22.2	3	33.3		
Clean cooling system and air cleaner of tractor	8	88.9			1	11.1				
Check tractor ignition system	6	66.7					3	33.3		
Clean and paint tractor	3	33.3			5	55.5	1	11.1		
Care for tractor tires	6	66.7	1	11.1			2	22.2		
Prepare tractor for winter	9	100								
Read and follow operator's manual	9	100								
Put new brushes in generator	2	22.2			2	22.2	5	55.5		
Adjust the timing on tractor	2	22.2	1	11.1			6	66.7		
Grind and adjust valves	2	22.2			1	11.1	6	66.7		
Install new rings	1	11.1			1	11.1	7	66.7		

TABLE XIV

RESPONSE OF SELECTED CHEATHAM COUNTY PART-TIME FARM OWNERS TO MACHINERY REPAIR SKILLS

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on the farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Dress a grinding wheel	1	9.1	1	9.1	4	36.4	1	9.1	4	36.4
Sharpen a twist drill	3	27.3			3	27.3	2	18.2	3	27.3
Sharpen a cold chisel	9	81.8	2	18.2						
Sharpen a mower knife	5	45.5	2	18.2	3	27.3	3	27.3		
Do forge welding			2	18.2	2	18.2	4	36.4	3	27.3
Temper a cold chisel	5	45.5	1	9.1	2	18.2	1	9.1	2	18.2
Draw out and temper a harrow tooth			2	18.2	3	27.3	3	27.3	3	27.3
Draw out and temper a cultivator shovel			1	9.1	5	45.5	3	27.3	2	18.2
Thread a bolt or nut	5	45.5	1	9.1	1	9.1	4	36.4		
Rivet on mower knives	6	54.6	1	9.1	2	18.2			2	18.2
Rivet on guard plates	7	63.6			1	9.1			3	27.3
Make a brace from angle iron	3	27.3	1	9.1	2	18.2			5	45.5
Cut metal with a cold chisel	8	72.7	2	18.2					1	9.1
Cut metal with a hacksaw	9	81.8	1	9.1					1	9.1
Clean and dress belts	7	63.6	1	9.1	1	9.1			2	18.2
Lace and repair a belt	6	54.6	1	9.1			2	18.2	2	18.2
Calculate pulley size and speed	4	36.4	2	18.2			1	9.1	4	36.4

TABLE XIV

RESPONSE OF SELECTED CHEATHAM COUNTY PART-TIME FARM OWNERS TO MACHINERY REPAIR SKILLS (Continued)

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on the farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Line up pulleys and shafts	5	45.5	1	9.1	2	18.2			3	27.3
Measure a belt	9	81.8			1	9.1			1	9.1
Use power take-off	9	81.8							2	18.2
Lubricate truck regularly	5	45.5	3	27.3	1	9.1			2	18.2
Lubricate tractor regularly	8	72.7			1	9.1			2	18.2
Clean and adjust truck carburetor	3	27.3	2	18.2			2	18.2	4	36.4
Clean and adjust tractor carburetor	5	45.5	1	9.1	1	9.1	2	18.2	2	18.2
Clean cooling system and air cleaner of tractor	5	45.5	1	9.1	2	18.2	1	9.1	2	18.2
Check tractor ignition system	6	54.6			1	9.1	1	9.1	3	27.3
Clean and paint tractor	3	27.3	3	27.3	0		2	18.2	3	27.3
Care for tractor tires	7	63.6	1	9.1					3	27.3
Prepare tractor for winter	7	63.6	1	9.1					3	27.3
Read and follow operator's manual	9	81.8	1	9.1					1	9.1
Put new brushes in generator	5	45.5	1	9.1			3	27.3	2	18.2
Adjust the timing on tractor	4	36.4	1	9.1	3	27.3	3	27.3		
Grind and adjust valves	5	45.5	1	9.1	1	9.1	2	18.2	2	18.2
Install new rings	5	45.5			1	9.1	3	27.3	2	18.2

TABLE XV

RESPONSE OF SELECTED CHEATHAM COUNTY PART-TIME TENANTS TO MACHINERY REPAIR SKILLS

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on this farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Dress a grinding wheel	1	12.5			3	37.5	2	25	2	25
Sharpen a twist drill	1	12.5			1	12.5	4	50	2	25
Sharpen a cold chisel	7	87.5			3	37.5				
Sharpen a mower knife	2	25	2	25	3	37.5			1	12.5
Do forge welding			1	12.5	2	25	3	37.5	2	25
Temper a cold chisel	3	37.5	1	12.5	3	37.5	1	12.5		
Draw out and temper a harrow tooth	2	25	1	12.5	2	25	3	37.5		
Draw out and temper a cultivator shovel	1	12.5	2	25	3	37.5	2	25		
Thread a bolt or nut	4	50			3	37.5	1	12.5		
Rivet on mower knives	4	50	1	12.5	2	25	1	12.5		
Rivet on guard plates	4	50	1	12.5	2	25	1	12.5		
Make a brace from angle iron	2	25	3	37.5	2	25	1	12.5		
Cut metal with a cold chisel	6	75	1	12.5	1	12.5				
Cut metal with a hacksaw	6	75			1	12.5	1	12.5		
Clean and dress belts	2	25	1	12.5	1	12.5	1	12.5	3	37.5
Lace and repair belts	2	25	1	12.5	2	25			3	37.5
Calculate pulley speed and size	3	37.5			1	12.5	1	12.5	3	37.5

TABLE XV

RESPONSE OF SELECTED CHEATHAM COUNTY PART-TIME TENANTS TO MACHINERY REPAIR SKILLS (Continued)

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on this farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Line up pulleys and shafts	3	37.5	1	12.5	1	12.5	1	12.5	2	25
Measure a belt	4	50	1	12.5	2	25	0		1	12.5
Use power take-off	7	87.5	1	12.5						
Lubricate truck regularly	4	50					3	37.5	1	12.5
Lubricate tractor regularly	6	75			1	12.5	1	12.5		
Clean and adjust truck carburetor	2	25					5	62.5	1	12.5
Clean and adjust tractor carburetor	3	37.5			2	25	3	37.5		
Clean cooling system and air cleaner of tractors	4	50					4	50		
Check tractor ignition system	2	25	2	25			4	50		
Clean and paint tractor	3	37.5					4	50	1	12.5
Care for tractor tires	4	50			1	12.5	3	37.5		
Prepare tractor for winter	6	75					2	25		
Read and follow operator's manual	7	87.5					1	12.5		
Put new brushes in generator	1	12.5	1	12.5	1	12.5	5	62.5		
Adjust the timing on tractor	1	12.5	2	25			5	62.5		
Grind and adjust valves	1	12.5	1	12.5			6	75		
Install new rings	1	12.5	1	12.5			6	75		

from 36.4 to 45.5 per cent of the part-time owners performed these skills. From 50 to 77.8 per cent of all farmers in all groups rivet on mower knives and guard plates and only one farmer felt that these two skills should be done by an expert.

This study may have corroborated the theory of Johnson[1] that forge welding is being replaced by electric arc and oxyacetylene welding. It was found that only two farmers do forge welding and a large percentage of those who needed this skill performed felt that it should be done by an expert.

There were 33 per cent of all farmers who practiced the skill of threading bolts and nuts but numerous farmers reported to the writer that this skill is quite menial and it is more economical to the farmer to buy the finished product, thus 30.4 per cent were of the opinion that this skill should be performed by an expert.

Tables XVI and XVII rearranges the preceding data with respect to the performance, knowledge and opinion of the specific skills as related to tobacco farmers and general farmers. It is pointed out that little difference exists in the performance of many skills but there appeared to be a trend for general farmers to perform more of the skills commonly done by experts such as adjusting the timing on a tractor, grinding and adjusting valves, and installing new rings. The range in per cent for these skills was 13.2 to 18.9 for tobacco farmers who do them in contrast to 30.8 to 38.4 per cent for general farmers who do them.

Table XVIII continues the analysis of the data presented in Tables XI through XVII. This table shows the average number of farmers in each

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[1]Paul Johnson, op. cit.

TABLE XVI

RESPONSE OF SELECTED CHEATHAM COUNTY TOBACCO FARMERS
TO SELECTED MACHINERY REPAIR SKILLS

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on this farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Dress a grinding wheel	6	11.3	5	9.4	10	18.8	4	7.5	28	52.6
Sharpen a twist drill	5	9.4	4	7.5	7	13.1	16	30.0	21	39.4
Sharpen a cold chisel	33	62.0	9	16.9	6	11.3	1	1.9	4	7.5
Sharpen a mower knife	27	50.7	6	11.3	6	11.3	5	9.4	9	16.9
Do forge welding	1	1.9	6	11.3	10	18.8	16	30.0	20	37.5
Temper a cold chisel	15	28.2	7	13.1	14	26.2	6	11.3	11	20.7
Draw out and temper a harrow tooth	12	22.6	4	7.5	16	30.0	11	20.7	10	18.8
Draw out and temper a cultivator shovel	10	18.9	6	11.3	18	33.8	11	20.7	8	15.0
Thread a bolt or nut	12	22.6	8	15.0	7	13.1	19	35.8	7	13.1
Rivet on mower knives	34	63.9	4	7.5	5	9.4	1	1.9	9	16.9
Rivet on guard plates	37	69.5	3	5.6	5	9.4	0	0	8	15.0
Make a brace from angle iron	15	28.2	5	9.4	12	22.6	3	5.6	18	33.8
Cut metal with a cold chisel	44	83.8	2	3.8	3	5.6	0	0	4	7.5
Cut metal with a hacksaw	44	83.8	4	7.5	2	3.8	0	0	3	5.6
Clean anddress belts	15	28.2	6	11.3	9	16.9	0	0	23	43.2
Lace and repair a belt	12	22.6	3	5.6	7	13.1	5	9.4	26	48.8
Calculate pulley speed and size	7	13.1	3	5.6	6	11.3	9	16.9	28	52.6

TABLE XVI

RESPONSE OF SELECTED CHEATHAM COUNTY TOBACCO FARMERS TO SELECTED MACHINERY REPAIR SKILLS (Continued)

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on this farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Line up pulleys and shafts	21	39.6	3	5.6	5	9.4	6	11.3	18	33.8
Measure a bolt	23	43.2	0	0	9	16.9	0	0	19	35.8
Use power take-off	38	71.4	3	5.6	1	1.9	1	1.9	10	18.8
Lubricate truck regularly	36	67.7	4	7.5	1	1.9	4	7.5	8	15.0
Lubricate tractor regularly	42	80.0	0	0	3	5.6	1	1.9	7	13.1
Clean and adjust truck carburetor	24	45.1	2	3.8	7	13.1	12	22.6	8	15.0
Clean and adjust tractor carburetor	23	43.2	2	3.8	6	11.3	16	30.0	6	11.3
Clean cooling system and air cleaner of tractor	38	71.4	0	0	5	9.4	3	5.6	7	13.1
Check tractor ignition system	27	50.7	1	1.9	7	13.1	11	20.7	7	13.1
Clean and paint tractor	13	24.4	6	11.3	11	20.7	15	28.1	8	15.0
Care for tractor tires	34	63.9	4	7.5	2	3.8	5	9.4	8	15.0
Prepare tractor for winter	39	73.3	2	3.8	2	3.8	2	3.8	8	15.0
Read and follow operator's manual	43	81.9	1	1.9	2	3.8	1	1.9	6	11.3
Put new brushes in generator	13	24.4	3	5.6	7	13.1	23	43.2	7	13.1
Adjust the timing on tractor	10	18.9	2	3.8	9	16.9	26	48.8	6	11.3
Grind and adjust valves	7	13.2	5	9.4	5	9.4	8	15.0	28	52.6
Install new rings	10	18.9	2	3.8	5	9.4	30	56.0	6	11.3

TABLE XVII

RESPONSE OF SELECTED CHEATHAM GENERAL FARMERS
TO SELECTED MACHINERY REPAIR SKILLS

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on this farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Dress a grinding wheel	2	15.4	0	0	5	38.5	1	7.7	5	38.5
Sharpen a twist drill	5	38.5	0	0	2	15.4	3	22.1	3	22.1
Sharpen a cold chisel	11	84.7	1	7.7	1	7.7	0	0	0	0
Sharpen a mower knife	4	30.8	2	15.4	2	15.4	0	0	5	38.5
Do forge welding	1	7.7	2	15.4	2	15.4	4	30.8	4	30.8
Temper a cold chisel	7	53.9	5	38.5	2	15.4	2	15.4	0	0
Draw out and temper a harrow tooth	3	22.1	3	22.1	3	22.1	3	22.1	1	7.7
Draw out and temper a cultivator shovel	1	7.7	2	15.4	5	38.5	3	22.1	2	15.4
Thread a bolt or nut	7	53.9	1	7.7	2	15.4	2	15.4	0	0
Rivet on mower knives	7	53.9	2	15.4	1	7.7	0	0	1	7.7
Rivet on guard plates	7	53.9	0	0	1	7.7	1	7.7	2	15.4
Make a brace from angle iron	5	38.5	3	22.1	2	15.4	1	7.7	1	7.7
Cut metal with a cold chisel	11	84.7	2	15.4	0	0	0	0	0	0
Cut metal with a hacksaw	12	92.4	0	0	0	0	1	7.7	0	0
Clean and dress belts	8	61.6	1	7.7	1	7.7	1	7.7	2	15.4
Lace and repair a belt	7	53.9	2	15.4	2	15.4	0	0	2	15.4
Calculate pulley speed and size	6	46.2	1	7.7	1	7.7	0	0	5	38.5
Line up pulleys and shafts	5	38.5	0	0	3	22.1	0	0	5	38.5

TABLE XVII

RESPONSE OF SELECTED CHEATHAM GENERAL FARMERS
TO SELECTED MACHINERY REPAIR SKILLS (Continued)

Job or Skill	I do it		I know how but tools are not available		I would if I knew how and tools were available		It should be done by an expert		Does not have to be done on this farm	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Measure a belt	9	69.3	1	7.7	2	15.4	0	0	1	38.5
Use power take-off	10	76.9	1	7.7	0	0	0	0	2	15.4
Lubricate truck regularly	6	46.2	2	15.4	0	0	3	22.1	2	15.4
Lubricate tractor regularly	7	53.9	0	0	2	15.4	1	7.7	2	15.4
Clean and adjust truck carburetor	4	30.8	1	7.7	0	0	5	38.5	3	22.1
Clean and adjust tractor carburetor	6	46.2	0	0	2	15.4	3	22.1	2	15.4
Clean cooling system and air cleaner of tractor	6	46.2	1	7.7	0	0	4	30.8	2	15.4
Check tractor ignition system	4	30.8	2	15.4	0	0	4	30.8	3	22.1
Clean and paint tractor	5	38.4	1	7.7	0	0	3	22.1	4	30.8
Care for tractor tires	7	53.9	0	0	0	0	2	15.4	4	30.8
Prepare tractor for winter	8	61.6	0	0	0	0	1	7.7	4	30.8
Read and follow operator's manual	11	84.7	0	0	0	0	0	0	2	15.4
Put new brushes in generator	5	38.4	0	0	1	7.7	5	38.4	2	15.4
Adjust the timing on tractor	4	30.8	0	0	1	7.7	5	38.4	3	22.1
Grind and adjust valves	5	38.4	1	7.7	0	0	5	38.4	2	15.4
Install new rings	5	38.4	0	0	1	7.7	5	38.4	2	15.4

TABLE XVIII

THE DEGREE OF PERFORMANCE, KNOWLEDGE OR OPINION OF FARMERS PERTAINING TO THIRTY-FOUR SKILLS ON SELECTED CHEATHAM COUNTY FARMS ACCORDING TO TENURE STATUS AND TYPE OF FARMING

	Average Number					
Tenure Status	I do it	I know how but no tools	Would if I could	Should be done by expert	Doesn't have to be done	Total farmers
Owners	14.5	2.4	4.4	4.9	7.8	29
Tenants	13.8	1.6	3.8	4.9	9.9	12
Owner-tenants	15.6	2.1	4.5	6.6	5.2	9
Part-time owners	16.1	3.5	3.9	3.8	6.7	11
Part-time tenants	13.5	3.1	5.3	9.3	2.8	8
Type of Farm						
Tobacco farmers	14.5	2.6	4.3	5.1	7.5	53
General farmers	16.3	2.8	3.5	5.3	6.1	13
Other type farms	17.3	1.3	2.8	2.3	10.3	3

tenure group and according to farm type who specified their performance, knowledge or opinion of the specific machinery repair skills.

In regard to tenure status, little difference is evident in the average number who perform those skills. The range was an average of 13.5 for part-time tenants to 16.1 skills performed by part-time owners. Column 3 in this table shows the range from 1.6 average as the number of skills that tenants know how to perform but lack the tools to 3.5 average number of skills for part-time owners. It is further noted that 3.8 was the average number of skills reported by tenants that they would do if they knew how and had the tools. The highest figure in this column was 5.3 skills for part-time farmers.

The range is wider in regard to the number of skills which farmers of different farm statuses believe should be done by an expert. In this category, part-time owners listed an average 3.8 skills that should be done by experts whereas 9.3 was the average number listed by part-time tenants. All other groups had averages between the preceding two.

For skills that did not have to be done, tenants and owners had averages of 9.9 and 7.8 skills respectively, whereas part-time tenants reported an average of only 2.8 skills per farm that did not have to be done. Since part-time tenants reported a significantly larger number of skills that should be done by an expert, a more thorough study may prove this data erroneous because of the limited number of cases studied.

There were little differences in any grouping when the comparison was made between tobacco and general farmers in regard to the average number of skills performed or in the other categories related to the knowledge or opinion of the farmers to the specific skills. Variations

were wider in all categories when the other type farmers were compared with tobacco and general farmers. However, because of the limited number of farms of other types, it is believed that this data is insufficient for the presentation of any conclusions.

CHAPTER V

THE ADJUSTMENT, LUBRICATION AND REPAIR OF AUXILIARY FARM EQUIPMENT ON SELECTED CHEATHAM COUNTY FARMS

Equipment Available On The Selected Farms

This chapter deals with the degree to which the farmer adjusts, lubricates and repairs his equipment. The data collected was whether he made all adjustments and repairs, part of them, or hired all adjustments and repairs done. In regard to the lubrication of farm equipment it was asked whether he did it or hired it done. There were no data collected to determine if the lubrication of equipment was adequate to prolong the usefulness of the equipment.

Table XIX shows the equipment found on the farms. As previously pointed out, this list included equipment common to the area. There were four pieces of equipment not specifically named in the list. These included one rotary hoe and three cultipackers which are listed under "other" equipment.

There were certain pieces of equipment that were found on more than 50 per cent of the farms in each type of farming. These include fertilizer drills, plows, disc harrows, row planters, cultivators and mowers. Equipment found principally on owner's farms included combines, haybalers, hammer mills, seed cleaners and manure spreaders.

The average number of pieces of equipment for all farms was 8.2 per farm. Part-time owners had the least number of pieces with an average of 6.1 followed by part-time tenants with 7.6 per farm. Renters

TABLE XIX

EQUIPMENT AVAILABLE TO SELECTED CHEATHAM COUNTY FARMERS
ACCORDING TO TENURE STATUS

Equipment	Owners No.	Owners Per Cent having	Tenant No.	Tenant Per Cent	Part-time tenants No.	Part-time tenants Per Cent	Part-time owner No.	Part-time owner Per Cent	Combination owner-tenant No.	Combination owner-tenant Per Cent	Totals No.	Totals Per Cent
Fertilizer Drill	21	72.4	10	83.3	6	75.0	6	54.6	9	100	52	75.4
Plows	29	100	12	100	8	100	11	100	9	100	69	100
Disc Harrow	25	86.2	11	91.7	7	87.5	6	54.6	8	88.9	57	82.6
Spiketooth Harrow	14	48.3	5	41.7	8	100	4	36.4	7	77.8	38	55.1
Planter (row)	24	82.8	9	75.0	6	75.0	8	72.7	7	77.8	55	79.4
Grain Drill	20	69.0	5	41.7	4	50.0	4	36.4	8	88.9	41	59.4
Cultivator	27	93.1	12	100	5	62.5	10	90.9	9	100	63	91.3
Cornpicker	2	7.0	0		0		1	9.1	0		3	4.3
Mower	23	79.3	7	58.3	5	62.5	7	63.6	9	100	51	73.9
Hay Rake	18	62.1	6	50.0	4	50.0	3	27.3	6	66.7	37	53.6
Hay Baler	6	20.7	2	16.7	1	12.5	0		1	11.1	9	13.0
Grain Binder	2	7.0	0		1	12.5	0		0		3	4.3
Combine	4	13.8	1	8.3	0		1	9.1	3	33.3	9	13.0
Hammer Mill	4	13.8	1	8.3	1	12.5	2	18.2	0		8	11.6
Seed Cleaner	4	13.8	0		1	12.5	1	9.1	0		6	8.7
Elevator	2	7.0	1	8.3	0		0		0		3	4.3
Ensilage Cutter	2	7.0	0		0		0		0		2	2.9
Manure Spreader	10	34.5	1	8.3	0		1	9.1	4	44.4	16	23.2
Transplanter	6	20.7	4	33.3	2	25.0			4	44.4	16	23.2
Tobacco Steamer	11	37.9	8	66.7	2	25.0	1	9.1	4	44.4	26	37.7
Other	1	3.5	2	16.7	0		1	9.1	0		4	5.8
Average Number Pieces Per Farm	8.2		8.0		7.6		6.1		9.8		8.2	

were slightly below average with 8.0 pieces per farm and owners had the same number as the average for all farms. Combination owner-tenants were highest with 9.8 pieces of equipment per farm.

The Adjustment, Lubrication and Repair of Equipment According to Tenure Status

Tables XX, XXI, XXII, XXIII and XXIV presents the data related to the degree in which the farmer adjusts, lubricates and repairs his equipment. There were no farmers surveyed who hired all adjustments made. All farmers with a degree of ownership made all adjustments on more than half the machinery they operated whereas all tenants made all adjustments on less than half the equipment they operated. Only one farmer, a tenant, hired his equipment lubricated. When this farmer was questioned, the writer found that he lived conveniently to a garage for this service.

Only five pieces of equipment are found on 75 per cent or more of the farms operated by owners. These were plows, disc harrows, row planters, cultivators and mowers. It will be noted in Table XX that owners make all the adjustments on these pieces of equipment in 62.1 to 92.8 per cent of the cases. In the cases of equipment considered more complex such as hay balers, side delivery rakes and combines, less than half the farmers made all adjustments. Only 40 per cent of the owners made all adjustments on manure spreaders with the possible explanation that because of the chemicals in manures which produces corrosion "freezes" the adjusting mechanisms thus requiring special equipment such as acetylene torches and bolt cutters for this job.

In the field of repairing farm machinery, it was found that

TABLE XX

THE ADJUSTMENT, LUBRICATION AND REPAIR OF FARM EQUIPMENT ON SELECTED CHEATHAM COUNTY FARMS OPERATED BY OWNERS

Equipment	Adjustments						Lubrication				Repairs					
	Make All		Make Part		Hire All		Do All		Hire All		Make All		Make Part		Hire All	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Fertilizer Drill	16	76.2	5	23.8	0	0	21	100	0	0	1	4.8	14	66.6	6	28.6
Plows	18	62.1	11	37.9	0	0	29	100	0	0	7	23.2	20	69.8	2	7.0
Disc Harrow	17	68	8	32	0	0	25	100	0	0	18	72	6	24.0	1	4.0
Spiketooth Harrow	13	92.8	1	7.2	0	0	14	100	0	0	6	42.8	7	50.0	1	7.2
Planter (row)	17	68	8	32	0	0	25	100	0	0	17	68	7	28	1	4
Grain Drill	14	70	6	30	0	0	20	100	0	0	7	35	12	60	1	5
Cultivator	18	66.7	9	33.3	0	0	27	100	0	0	11	40.8	14	51.8	2	7.4
Cornpicker	0	0	2	100	0	0	2	100	0	0			2	100		
Mower	14	60.9	9	39.1	0	0	23	100	0	0	3	13.0	19	82.7	1	4.3
Hay Rake	8	44.5	10	55.5	0	0	18	100	0	0	4	22.8	14	81.2		
Hay Baler	1	16.7	5	83.3	0	0	6	100	0	0			6	100		
Grain Binder	1	50	1	50	0	0	2	100	0	0			2	100		
Combine	1	25	3	75	0	0	4	100	0	0			4	100		
Hammer Mill	2	50	2	50	0	0	4	100	0	0	1	25	2	50	1	25
Seed Cleaner	3	75	1	25	0	0	4	100	0	0	2	50	2	50		
Elevator	2	100			0	0	2	100	0	0	1	50	1	50		
Ensilage Cutter	2	100			0	0	2	100	0	0			2	100		
Manure Spreader	4	40	6	60	0	0	10	100	0	0	1	10	9	90		
Transplanter	5	83.3	1	16.7	0	0	6	100	0	0	1	16.7	5	83.3		
Tobacco Steamer	9	81.8	2	18.2	0	0	11	100	0	0	2	18.2	9	81.8		
Other	1	100	0		0	0	1	100	0	0	1	100				

TABLE XXI

THE ADJUSTMENT, LUBRICATION AND REPAIR OF FARM EQUIPMENT ON SELECTED CHEATHAM COUNTY FARMS OPERATED BY TENANTS

	Adjustments						Lubrication				Repairs					
	Make All		Make Part		Hire All		Do All		Hire All		Make All		Make Part		Hire All	
Equipment	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Fertilizer Drill	3	30	7	70	0	0	9	90	1	10	2	20	6	60	2	20
Plows	5	41.5	7	58.5	0	0	12	100			2	16.7	9	75	1	8.3
Disc Harrow	5	45.5	6	54.5	0	0	11	100			1	9.1	8	72.7	2	18.2
Spiketooth Harrow	1	20	4	82	0	0	5	100			1	20	3	60	1	20
Planter (row)	4	44.5	5	55.5	0	0	9	100			1	11.1	7	77.8	1	11.1
Grain Drill	2	40	3	60	0	0	4	80	1	20	1	25	2	50	1	25
Cultivator	8	66.7	4	33.3	0	0	12	100			3	25	8	66.7	1	8.3
Cornpicker	0		0													
Mower	3	37.5	5	62.5	0	0	7	87.5	1	12.5	1	12.5	6	75	1	12.5
Hay Rake	3	50	3	50	0	0	6	100			1	16.7	5	83.3		
Hay Baler			2	100	0	0	2	100					2	100		
Combine			1	100	0	0	1	100					1	100		
Hammer Mill			1	100	0	0	1	100							1	100
Seed Cleaner			0													
Elevator			1	100	0	0	1	100					1	100		
Ensilage Cutter			0													
Manure Spreader			1	100	0	0	1	100					1	100		
Transplanter			4	100	0	0	4	100					3	75	1	25
Tobacco Steamer	5	62.5	3	37.5	0	0	8	100			4		3	75	1	25
Other	1	50	1	50	0	0	2	100					2	100		

TABLE XXII

THE ADJUSTMENT, LUBRICATION AND REPAIR OF FARM EQUIPMENT ON SELECTED CHEATHAM COUNTY FARMS OPERATED BY COMBINATION OWNER-TENANTS

	Adjustments						Lubrication				Repairs					
	Make All		Make Part		Hire All		Do All		Hire All		Make All		Make Part		Hire All	
Equipment	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Fertilizer Drill	4	44.5	5	55.5	0	0	9	100	0	0	2	22.2	6	66.7	1	11.1
Plows	6	66.7	3	33.3	0	0	9	100	0	0	2	11.1	6	66.7	1	11.1
Disc Harrow	5	62.5	3	37.5	0	0	8	100	0	0	1	12.5	7	87.5		
Spiketooth Harrow	4	57.1	3	42.9	0	0	7	100	0	0	1	14.3	6	85.7		
Planter (row)	3	42.9	4	57.1	0	0	7	100	0	0			7	100		
Grain Drill	5	62.5	3	37.5	0	0	8	100	0	0	1	12.5	7	87.5		
Cultivator	6	66.7	3	33.3	0	0	9	100	0	0	3	33.3	6	66.7		
Cornpicker	0															
Mower	6	66.7	3	33.3	0	0	9	100	0	0			9	100		
Hay Rake	3	50	3	50	0	0	6	100	0	0	1	16.7	5	83.3		
Hay Baler	1	100			0	0	1	100	0	0			1	100		
Grain Binder	0															
Combine	1	33.3	2	66.7	0	0	3	100	0	0			3	100		
Hammer Mill	0															
Seed Cleaner	0															
Elevator	0															
Ensilage Cutter	0															
Manure Spreader	2	50	2	50	0	0	4	100	0	0			4	100		
Transplanter	3	75	1	25	0	0	4	100	0	0			4	100		
Tobacco Steamer	3	75	1	25	0	0	4	100	0	0			3	75	1	25
Other	0															

TABLE XXIII

THE ADJUSTMENT, LUBRICATION AND REPAIR OF FARM EQUIPMENT ON SELECTED CHEATHAM COUNTY FARMS OPERATED BY PART-TIME OWNERS

Equipment	Adjustments						Lubrication				Repairs					
	Make All		Make Part		Hire All		Do All		Hire All		Make All		Make Part		Hire All	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Fertilizer Drill	5	83.3	1	16.7	0	0	6	100	0	0	3	50	3	50	0	0
Plows	6	54.5	5	45.5	0	0	11	100	0	0	3	27.3	8	82.7	0	0
Disc Harrows	3	50	3	50	0	0	6	100	0	0	2	33.3	4	66.7	0	0
Spiketooth Harrow	3	75	1	25	0	0	4	100	0	0	2	50	2	50	0	0
Planter (row)	5	62.5	3	37.5	0	0	8	100	0	0	4	50	4	50	0	0
Grain Drill	2	50	2	50	0	0	4	100	0	0	2	50	2	50	0	0
Cultivator	5	50	5	50	0	0	10	100	0	0	4	40	5	50	1	10
Cornpicker			1	100	0	0	1	100	0	0			1	100	0	0
Mower	3	42.9	4	57.1	0	0	7	100	0	0	1	14.3	5	71.4	1	14.3
Hay Rake	2	66.7	1	33.3	0	0	3	100	0	0	2	66.7	1	33.3	0	0
Hay Baler																
Grain Binder			1	100	0	0			0	0			1	100		
Combine			2	100	0	0	2	100	0	0			2	100	0	0
Hammer Mill	1	50	1	50	0	0	2	100	0	0	1	50	1	50	0	0
Seed Cleaner			1	100	0	0	1	100	0	0			1	100	0	0
Elevator																
Ensilage Cutter																
Manure Spreader			1	100	0	0	1	100	0	0			1	100	0	0
Transplanter																
Tobacco Steamer			1	100	0	0	1	100	0	0			1	100	0	0
Other	1	100			0	0	1	100	0	0			1	100	0	0

TABLE XXIV

THE ADJUSTMENT, LUBRICATION AND REPAIR OF FARM EQUIPMENT ON SELECTED CHEATHAM COUNTY FARMS OPERATED BY PART-TIME TENANTS

	Adjustments						Lubrication				Repairs					
	Make All		Make Part		Hire All		Do All		Hire All		Make All		Make Part		Hire All	
Equipment	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Fertilizer Drill	1	16.7	5	83.3	0	0	6	100	0	0	1	16.7	4	66.6	1	16.7
Plows	4	50	4	50	0	0	8	100	0	0	2	25	5	62.5	1	12.5
Disc Harrow	2	28.6	5	71.4	0	0	7	100	0	0	1	14.3	5	71.4	1	14.3
Spiketooth Harrow	2	25	6	75	0	0	8	100	0	0	4	50	3	37.5	1	12.5
Planter (row)	3	50	3	50	0	0	6	100	0	0	2	33.3	3	50	1	16.7
Grain Drill	1	25	3	75	0	0	4	100	0	0	1	25	2	50	1	25
Cultivator	2	40	3	60	0	0	5	100	0	0	2	40	2	40	1	20
Cornpicker			0													
Mower	1	20	4	80	0	0	5	100	0	0	1	20	2	40	2	40
Hay Rake	1	25	3	75	0	0	4	100	0	0	1	25	2	50	1	25
Hay Baler	1	100			0	0	1	100	0	0			1	100		
Grain Binder	1	100			0	0	1	100	0	0					1	100
Combine			0													
Hammer Mill	1	100			0	0	1	100	0	0					1	100
Seed Cleaner	1	100			0	0	1	100	0	0					1	100
Elevator	0															
Ensilage Cutter	0															
Manure Spreader	0															
Transplanter	1	50	1	50	0	0	2	100	0	0			2	100		
Tobacco Steamer	2	100			0	0	2	100	0	0			2	100		
Other	0															

equipment common to several farms that only the row planter and disc harrow were repaired in more than 50 per cent of the cases, whereas the fertilizer drill was the only piece of equipment where more than 25 per cent of the farmers hired all repairs done. It appears probable that being similar to the manure spreader in the use of corrosive materials, special tools and equipment are frequently needed for its repair.

On farms operated by tenants, the data in Table XXI show that more than 50 per cent of the tenants make all adjustments only on cultivators and tobacco steamers. In the repair of equipment, there were no pieces of equipment where the farmers made all the repairs in more than 25 per cent of the cases. It appears that the per cent of tenants who make all adjustments and repairs was much lower than the per cent of owners who did. A possible reason for this is because many landlords in this area furnishes the tenant with part or all of the equipment he uses thus when renters move from one farm to another, some equipment may be strange to them and more assistance is needed in adjusting and repairing it.

From a study of Table XXII, it was found that the percentage of combination owner-tenants was slightly higher than owners in making all adjustments to farm machinery, but fewer farmers made all repairs on their machinery. In only three cases did these farmers hire all repairs made to their equipment.

Table XXIII points out that the per cent of part-time owners making all adjustments averaged above 50 per cent on the more common equipment but tended to make only part of the adjustments on equipment more complicated. There appears to be little difference in the per cent of farmers in this group who made all repairs when compared with owners.

Only two pieces of equipment were listed by part-time owners as having hired all repairs made.

The skills performed by part-time tenants are presented in Table XXIV which shows that tenants do not appear as adept at adjusting and repairing farm machinery as those groups with a degree of ownership. In addition, it appeared that a larger per cent of these farmers hired their repair work done than any other group. For another comparison, it was found that all farm operators with some degree of ownership representing 71 per cent of all farmers in the group hired all repair work done on twenty-one pieces of equipment compared with tenants representing 29 per cent of all farmers who hired all repair work done on twenty-six pieces of equipment.

Adjustment, Lubrication and Repair of Equipment According to Type of Farm Operated

Table XXV presents the data related to differences in the adjustment of farm machinery according to farm types. It will be noted that no farmer in any group hired all adjustments made on any piece of equipment. In a comparison of tobacco and general farmers who made all adjustments on equipment, it appears that tobacco farmers were more adept at performing all adjustments on simple equipment common to many farms, but general farmers were more adept at adjusting the more complex equipment.

The writer believes that there were too few farms under "other" types for a significant comparison.

In the repair of equipment in relation to types of farming,

TABLE XXV

THE ADJUSTMENT OF FARM EQUIPMENT ON SELECTED CHEATHAM COUNTY FARMS ACCORDING TO TYPE OF FARM OPERATED

Equipment	Tobacco						General						Other					
	Make All		Make Part		Hire All		Make All		Make Part		Hire All		Make All		Make Part		Hire All	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Fertilizer Drill	24	58.5	17	41.5			3	37.5	5	62.5			1	33.3	2	66.7		
Plows	22	41.5	31	58.5			6	45.4	7	54.6			1	33.3	2	66.7		
Disc Harrow	16	34.8	30	65.2			3	33.3	6	66.7					2	100		
Spiketooth Harrow	17	65.4	9	34.6			7	70	3	30					2	100		
Planter (row)	24	53.3	21	46.7			6	66.7	3	33.3			1	100				
Grain Drill	19	59.1	13	40.9			3	50	3	50			2	66.7	1	33.3		
Cultivator	18	36	32	64			4	36.4	7	63.6			1	50	1	50		
Cornpicker			1	100					1	100					1	100		
Mower	18	45	22	55			3	33.3	6	66.7			1	50	1	50		
Hay Rake	13	48.1	14	51.9			3	37.5	5	62.5			2	100				
Hay Baler	2	28.6	5	71.4					2	100								
Grain Binder			0						2	100					1	100		
Combine	2	40	3	60			2	66.7	1	33.3			1	100				
Hammer Mill	2	40	3	60			1	50	1	50					1	100		
Seed Cleaner	2	66.7	1	33.3			1	50	1	50			1	100				
Elevator	1	50	1	50					1	100								
Ensilage Cutter	1	100							1	100								
Manure Spreader	4	26.7	11	73.3					1	100								
Transplanter	12	80	3	20					1	100								
Tobacco Steamer	18	75	6	25			1	100							1	100		
Other	2	66.7	1	33.3									1	100				

Table XXVI points out that there were no general farmers who hired all repairs on any equipment indicating that this group was more adept at repairing equipment than the other groups.

Although the group of "other" types is small, it is pointed out that all repairs were made on few pieces of equipment in this group and there was a larger percentage of the equipment where all repairs were hired done.

Table XXVII shows the per cent of farmers in each group to the degree of performance in adjusting, lubricating and repairing farm equipment as related to tenure status and type of farming engaged in. It is noted that combination owner-tenants were highest in per cent of farmers making all adjustments but this group was lowest in per cent of farmers making all repairs. From the standpoint of ownership, all farmers with a degree of ownership appeared to be more adept than tenants at adjusting and repairing farm equipment.

In regard to types of farming engaged in, tobacco farmers appeared to be more efficient in adjusting equipment than general farmers but the reverse was true in respect to repairing equipment. General farmers were the only group who made all or part of the repairs on all equipment.

In the lubrication of equipment, "other" types who hired 18.5 per cent of their lubrication done appears high but this included the equipment on one of three farms in this group and is probably insignificant.

TABLE XXVI

THE REPAIR OF FARM EQUIPMENT ON SELECTED CHEATHAM COUNTY FARMS ACCORDING TO TYPE OF FARM OPERATED

Equipment	Tobacco						General						Other					
	Make All		Make Part		Hire All		Make All		Make Part		Hire All		Make All		Make Part		Hire All	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Fertilizer Drill	5	12.2	27	65.9	9	21.9	3	37.5	5	62.5			1	33.3	1	33.3	1	33.3
Plows	34	64.2	14	26.4	5	9.4	5	38.4	8	61.6					3	100		
Disc Harrow	20	43.5	23	50	3	6.5	2	22.2	7	77.8					1	50	1	50
Spiketooth Harrow	19	73.1	5	19.2	2	7.7	7	70	3	30					1	50	1	50
Planter (row)	18	40	24	53.8	3	6.2	5	55.6	4	49.4					1	100		
Grain Drill	7	21.9	23	71.9	2	6.2	3	50	3	50					2	66.7	1	33.3
Cultivator	19	38.0	26	52.0	5	10.0	3	27.3	8	72.7			1	50	1	50		
Cornpicker	0		1	100	0				1	100					1	100		
Mower	3	7.9	31	81.5	4	10.6	2	22.2	7	77.8					1	50	1	50
Hay Rake	6	22.2	20	74.3	1	3.7	2	25	6	75			1	50	1	50		
Hay Baler	0		6	100	0				2	100							1	100
Grain Binder	0		0		0				2	100					1	100		
Combine	0		5	100	0		1	33.3	2	66.7							1	100
Hammer Mill	1	20	1	20	3	60	1	50	1	50					1	100		
Seed Cleaner	1	25	2	50	1	25	1	50	1	50								
Elevator	1	50	1	50	0				1	100								
Ensilage Cutter	0		1	100	0				1	100								
Manure Spreader	1	6.7	14	93.3	0				1	100								
Transplanter	1	6.7	13	86.6	1	6.7			1	100								
Tobacco Steamer	5	20.8	18	75	1	4.2	1	100									1	100
Other	1	33.3	2	66.7	0										1	100		

TABLE XXVII

DEGREE OF ADJUSTMENT, LUBRICATION AND REPAIR OF EQUIPMENT ACCORDING TO TENURE STATUS AND TYPE OF FARMING ON SELECTED FARMS IN CHEATHAM COUNTY

	Adjustments			Lubrication		Repairs		
Tenure Status	I make all of them Per Cent	I make part of them Per Cent	I hire it all done Per Cent	I do it Per Cent	I hire it all done Per Cent	I make all of them Per Cent	I make part of them Per Cent	I hire it all done Per Cent
Owners	63.5	36.5	0	100	0	33.5	60.4	6.1
Tenants	41.9	58.1	0	97.0	3.0	17.5	69.2	13.3
Combination Owner-Tenants	69.1	29.9	0	100	0	12.5	84.1	3.4
Part-Time Owners	52.2	47.8	0	100	0	34.8	62.3	2.9
Part-Time Tenants	39.3	60.7	0	100	0	24.6	54.1	21.3
Type of Farm								
Tobacco	50.8	49.2	0	100	0	32.2	58.4	9.4
General	43.0	57.0	0	100	0	36.0	64.0	0
Other	60.7	39.3	0	81.5	18.5	11.1	59.3	29.6

CHAPTER VI

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Summary

This study was made for the purpose of determining if there were major differences in farm machinery, the use of power tools, and the maintenance of farm machinery on farms of different types and according to tenure status. It was found in the review of literature that the proper maintenance and operation of farm equipment is of utmost importance in the economical operation of a farm. Furthermore, it is stressed that each individual farmer should learn basic mechanical skills and procure equipment and facilities for the maintenance of his equipment. Potentially, the teacher of vocational agriculture in a community is in a position to direct the learning processes of every farmer and future farmer in the area toward acquiring the skills.

Tentative plans were to analyze the data on the tenure basis of two groups, owners and tenants. It was also planned to analyze the data related to types of farms into four or more groups. However, after the procedure for selecting the individual farmers was followed, the data collected and the analysis begun, it was found that fifty-three farmers operated tobacco farms, thirteen operated general farms leaving only three farmers operating other types. This situation reduced the complexity of the study in regard to type of farm operated. The data related to tenure status was broadened into five groups for a more detailed analysis of the problem. Of the sixty-nine farmers in the

group, forty were full owners but were divided into two groups, twenty-nine who farmed full time and eleven who farmed part time. There were twelve full-time tenants, nine combination owner-tenants and eight tenants who farmed part time.

The study showed a trend in decreasing farm ownership[1] but showed an increase in the size of farm operated which correlates a previous study by Brimm.[2] Another trend that appeared evident was that the per cent income from tobacco has continued to rise and the per cent of income from livestock has continued to fall. Better cultural methods which increase yields and quality of tobacco, plus increases in prices, may account for this when coupled to the fact that livestock and livestock prices have been lowered in recent years.[3]

Tobacco was grown on sixty-three of the sixty-nine farms. Strawberries were produced on eighteen farms. Small grains were found on forty-five farms. Corn and hay were produced on sixty-five and forty-eight farms respectively. Dairy cattle, swine and poultry were found on 62 to 100 per cent of all farms in each group, but in many cases these livestock were maintained for home use. The number of farms in each group having beef cattle ranged from 12 to 55 per cent.

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[1]United States Bureau of Census, op. cit., 1950.

[2]J. W. Brimm, "Determining the Replacement Needs for Farmers in the State and Counties of Tennessee." (Unpublished nonthesis, University of Tennessee, September 1953).

[3]"Yearbook of Figures of the Livestock Trade," Chicago Daily Drovers Journal, 54th Edition, Corn Belt Publishers, Inc., Chicago, 1955, p. 5.

In this study, it was found that farmers were more adept in using repair equipment when compared with the adeptness of farmers in previous studies reviewed. More than one-fourth of all farmers could weld. Seven out of ten farmers were adept at using a pressure sprayer and eight out of ten could use a portable electric drill. Adeptness at using the equipment listed ranged from 26 to 81 per cent. Part-time owners were more adept than any other group followed by combination owner-tenants. According to the data, these part-time owners were adept in using 92 per cent more equipment on the average than the tenants who were lowest of all groups. Part-time tenants were slightly more adept than owners. On the basis of type of farm operated, general farmers were more adept than tobacco farmers, possibly explained because general farmers consisted of 46 per cent part-time farmers who were more adept than any other tenure group.

Part-time owners led all groups in having available equipment for farm machinery repair whereas tenants were again lowest of all groups. Owners who ranked fourth in adeptness in using equipment ranked second in having equipment available for farm machinery repairs. The comparison between types of farms operated showed that general farmers exceeded tobacco farmers by 78 per cent in the availability of repair equipment.

Farm owners were found to lead in per cent of farmers who have storage and repair space for farm equipment. There was little difference in the number of tenants and combination owner-tenants in having storage and repair space, these groups being followed by both part-time farmer

groups who were lowest in this respect. The degree of ownership was directly related to those who plan to provide storage and repair space. Most owners were planning to provide storage and repair space whereas only three tenants of seven planned storage space and none planned repair space. Tenancy in this area is usually on an annual rental basis which may explain this situation since most tenants probably could not justify the construction of new buildings or repair old buildings to be used only a short time by them.

Twice the per cent of tobacco farmers had storage space available than general farmers, but a larger per cent of general farmers who had no storage space planned to provide. All "other" type farmers had storage and repair space or planned to provide. Approximately the same percentage of tobacco and general farmers had farm shops but of those not having farm shops, tobacco farmers exceeded general farmers in having a roofed area available for machinery repair.

The analysis of the data related to skills and jobs performed appeared to show less variations throughout than any other part of the study. Part-time owners were slightly more adept than all other groups in performing the selected skills or knowing how to perform them. In addition, this group believed that fewer skills should be done by an expert. In performing or knowing how to perform the skills, part-time owners were followed by combination owner-tenants, owners, part-time tenants and tenants in that order. A wide difference of opinion appears in the number of skills that part-time tenants believe should be done by an expert when an average of 9.3 skills per farmer was checked whereas all other groups ranged from 6.6 down to 3.8 average

skills per farmer in this respect.

Agreement was uniform on simple skills such as sharpening a cold chisel, riveting mower knives and cutting metal with a hacksaw. Only one farmer in each group believed that these skills should be done by an expert. On more complex skills such as adjusting the timing on tractors, grinding and adjusting valves, and installing new rings, thirty-three, thirty-six and thirty-eight farmers respectively checked that these skills should be done by an expert.

In regard to types of farming, general farmers did or knew how to do an average of 19.1 skills per farmer compared with 18.6 skills for "other" type farmers and 17.1 skills for tobacco farmers. "Other" type farms reported fewer skills that should be done by an expert but this appears to be insignificant because more of these farmers checked a higher average number of skills that did not have to be done on their farm.

All farmers made part or all of the adjustments on all equipment. Combination owner-tenants made all adjustments on 69.1 per cent of the equipment they operated. These were followed by owners, part-time owners, tenants and part-time tenants in that order. The part-time tenants made all adjustments on 39.3 per cent of the equipment they operated. This order was partially reversed in the repair of farm machinery according to tenure status where it was found that all repairs were made on 12.5 per cent of the equipment operated by owner-tenants and other groups repaired from 17.5 to 34.8 per cent, the latter figure being the per cent of equipment operated by part-time farmers. In hiring all repairs done, tenants relied more heavily upon someone else than other groups. Tenants

hired all repairs done upon 13.3 per cent of the equipment they operated and part-time tenants 21.3 per cent. All farmers with a degree of ownership hired all repairs made on 2.9 to 6.1 per cent of the equipment they operated.

According to type of farm operated, "other" farmers were highest with 60.7 per cent of all equipment adjusted by the farmer. Tobacco farmers followed with 50.8 per cent and general farmers made all adjustments on 43 per cent of the equipment they operated. In the field of repairing equipment, all general farmers reported that no equipment had all repair work hired. Tobacco farmers reported the hiring of all repairs done on 9.4 per cent of the equipment and "others" reported 29.6 per cent in this respect.

Conclusions

1. In light of this study, the type of farm operated or the tenure status of the operator showed little difference in the kinds of auxiliary farm equipment operated.

2. As a whole, farmers with a degree of ownership were more adept at using repair equipment and made more adjustments and repairs to farm machinery than were tenants.

3. Farmers are growing more conscious of the need for machinery storage and repair space for the preservation and maintenance of farm machinery.

4. The type of farm operated or the tenure status of the operator showed little difference in the degree of performing farm mechanics skills.

5. The majority of farmers believe that all lubrication of auxiliary equipment should be done on the farm and the farmer possess the ability to make all or part of the adjustments on this equipment.

6. Further studies may be needed to validate or disprove the conclusions reached in this study.

Implications

It is hoped that this study will be of value to the vocational agricultural teachers in this area in setting up his farm mechanics program along the needs and attitudes of farmers as determined in this study.

In light of this study, the vocational agricultural teacher in this area should teach the farmers more about the size, location, repair equipment and use of a well planned farm shop. Many shops observed by the writer were tobacco barns, hay sheds and garages. Many had no electricity. All had dirt floors. In all cases observed, use as a farm shop was a secondary use of the building.

The differences in the field of farm machinery repair and maintenance as related to tenure status and type of farm operated does not show the feasibility of radically changing the vocational agricultural farm mechanics program to fit these individual groups. However, it is implied that within the separate groups are individual farmers possessing more complex auxiliary and repair equipment than others. Where departments of vocational agriculture have enrollments large enough to justify the division of one or more classes into sections for farm machinery

instruction, local data may show that one criterion for such a division be the similarity of machinery and equipment available or needed on a farm rather than a division according to tenure status or type of farm operated. A similar division in smaller vocational agricultural departments is recommended and feasible by the use of small group study with individual job calendars for shop work.

The number of farmers who reported to be adept at using repair equipment compared with the number who had the equipment available indicates that the teacher of vocational agriculture should strive to impress the farmers of the value of owning more repair equipment.

When the data of this study is compared with a similar study[4] in respect to the number of farmers who lubricated their farm equipment, it is believed by the author that an additional study is needed in this area to determine the effectiveness of machinery lubrication in prolonging the life of the equipment and the prevention of breakdowns caused by faulty or inadequate lubrication.

It is hoped that this brief study will be of value to the vocational agricultural teacher in the area studied in evaluating or revising his farm mechanics program to better fit the needs of the individual student.

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[4]Charles M. Ogles, op. cit.

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APPENDIX

APPENDIX

Survey Form: Skills or Jobs Performed

1. Tenant_____ Owner_____

2. Type of Farm (1)_____(2)_____(3)_____(4)_____(5)_____

Job or Skill	I do it	I know how but tools are not available	I would if I knew how and tools were available	It should be done by an expert	Does not have to be done on this farm
3. Dress a grinding wheel					
4. Sharpen a twist drill					
5. Sharpen a cold chisel					
6. Sharpen a mower knife					
7. Do forge welding					
8. Temper a cold chisel					
9. Draw out and temper a harrowtooth					
10. Draw out and temper a cultivator shovel					
11. Thread a bolt or nut					
12. Rivet on mower knives					
13. Rivet on guard plates					
14. Make a brace from angle iron					
15. Cut metal with a cold chisel					
16. Cut metal with a hack-saw					
17. Clean and dress belts					
18. Lace and repair a belt					
19. Calculate pulley size and speed					
20. Line up pulleys and shafts					
21. Measure a belt					
22. Use power take off					
23. Lubricate truck regularly					
24. Lubricate tractor regularly					
25. Clean and adjust truck carburetor					
26. Clean and adjust tractor carburetor					
27. Clean cooling system and air cleaner of tractor					

Skills or Jobs Performed (Continued)

Job or Skill	I do it	I know how but tools are not available	I would if I knew how and tools were available	It should be done by an expert	Does Not have to be done on this farm
28. Check tractor ignition system					
29. Clean and paint tractor					
30. Care for tractor tires					
31. Prepare tractor for winter					
32. Read and follow operator's manual					
33. Put new brushes in generator					
34. Adjust the timing on tractor					
35. Grind and adjust valves					
36. Install new rings					

Owner_____ Renter_____

Type of Farm_____ Size of Farm_____

Crop	Acres	% of Total Income	Livestock	No.	% of Total Income
Tobacco			Dairy		
Strawberries			Beef		
Small Grains			Swine		
Corn			Sheep		
Hay			Poultry		
Fruit			Other		
Other					

Do you do any work other than farming?_____
Yes No

If yes, what % of your income is derived from farming? _____

What % of this farm's products are consumed at home? _____

FACILITIES AND EQUIPMENT

Equipment	Available		Are you adept in using this	
	Yes	No	Yes	No
37. Acetelene Welder				
38. Electric Welder				
39. Power Drill Press				
40. Portable Electric Drill				
41. Power Grinder				
42. Sickle Grinder				
43. Power Hacksaw				
44. Air Compressor				
45. Pressure Sprayer				
46. Chain Hoist				
47. Forge				
48. Anvil				
49. Other				

Facilities	Yes	No	Do you plan to provide storage and repair space
50. Is storage space available for all machinery and equipment			
51. Do you have a farm shop			
52. If no (51), do you have a roofed area available for farm machinery			

MAINTENANCE AND REPAIR OF EQUIPMENT

Equipment	Adjustments (Check one)			Lubrication (Check one)		Repairs (Check one)		
	I make all of them	I make part of them	I hire it all done	I do it	I hire it done	I make all of them	I make part of them	I hire it all done
53. Fertilizer drill								
54. Plows								
55. Disc harrow								
56. Spiketooth harrow								
57. Planter (row)								
58. Grain drill								
59. Cultivator								

MAINTENANCE AND REPAIR OF EQUIPMENT (Continued)

Equipment	I make all of them	I make part of them	I hire it all done	I do it	I hire it done	I make all of them	I make part of them	I hire it all done
60. Corn picker								
61. Mower								
62. Hay rake								
63. Hay baler								
64. Grain binder								
65. Combine								
66. Hammer mill								
67. Seed cleaner								
68. Elevator								
69. Ensilage cutter								
70. Manure spreader								
71. Transplanter								
72. Tobacco steamer								
73. Other								