DIFFICULTIES IN SECURING FARM MACHINERY PROJECTS IN VOCATIONAL AGRICULTURE SHOPS

by

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PART I.

INTRODUCTION

The purpose of this study is to explore the reasons why vocational agriculture departments lack machinery maintenance jobs. Machinery maintenance and repair projects are considered desirable learning experiences in vocational agriculture. Many vocational agriculture instructors and supervisors believe that an insufficient amount of machinery maintenance work is being done in the high school vocational agriculture shops.

Many factors may be involved. Some possible reasons for the machinery shortage in vocational agriculture shops are:

1. Instructors may lack confidence in teaching machinery repair.
2. Instructor may make few parent contacts.
3. Training of the vocational agriculture instructor may be inadequate.
4. Students may dislike maintenance and repair.
5. Students may like other areas of work more than maintenance.
6. Parental attitude may be a factor.
7. Parent-student cooperation may be involved.
8. Schools may lack space and equipment.
9. Cost of maintenance and repair may deter interest on the part of parents.
10. Transportation to and from the farm may be difficult.

This is an exploratory study into the reasons why vocational agriculture departments lack machinery maintenance jobs. An inter-

esting note is that machinery dealers have the same problem of small amounts of machinery repair being done during winter months. This study includes a survey of machinery dealers experiences with getting farmers to bring in equipment for repair. An assumption was that their experiences might highlight vocational agriculture teachers problems.

Farm machinery maintenance is a definite part of the farm mechanics instructional program. Boys in the vocational agriculture program are potentially individuals who will remain in farming or a related phase of farming. Thus, to them, machinery maintenance becomes an integral part of their future business or occupation. This is especially true because mechanics play an important role on every farm.

Teachers may be easily blamed for lack of equipment in the vocational agriculture shop for repair and maintenance study. This study is designed to explore teacher difficulties to enable help to be given to teachers.

This study has been carried out cooperatively by two graduate students, namely, the author and Bob Howey. Mr. Howey cooperated on the study of machinery dealers. A second phase of the study will include a survey of the attitudes of students and parents to bringing into the school from the farm, machinery for repair and maintenance. Mr. Howey plans to conduct this latter study.

NEED FOR STUDY

The need for the present study is based on reports from teachers and supervisors that there is an insufficient amount of farm machinery projects, especially in the advanced high school vocational agriculture classes. This problem of securing from the home farm an additional amount of suitable projects in machinery and equipment for maintenance and repair purposes, is the foremost thought. Teachers of vocational agriculture are meeting this need to a varying degree —— some better than others.

METHODS OF STUDY

This study consists of:

1. A questionnaire survey of the agriculture teachers of Montana, as to their opinions and problems concerning a lack of machinery projects in vocational agriculture shops, and the extent of their present program.

2. A survey of the local machinery dealers (Bozeman) as to their experience and difficulties in getting machinery for repair.

REVIEW OF LITERATURE

A study of the literature in agricultural education indicates that extensive emphasis has been given to what should be taught in farm mechanics in a vocational agriculture program. There are many articles stating that increased instructional emphasis should be given to the care, operation and maintenance of mechanized power and equipment. Space is indicated as a limiting factor in vocational agriculture shops and programs. A small amount of emphasis has been given to the cause or difficulties in securing farm machinery for instructional purposes.

Literature reviewed in this study has been:

1. Vocational agriculture periodicals.
2. Vocational agricultural texts.
3. Previous studies.

Geiger 1/ cited that farmers devote most of their work in farm-shop to repair jobs, while agricultural teachers devote practically all of their teaching time to construction jobs. Few teachers give enough time to shop problems and the majority of departments do not have the necessary tools for doing all repair jobs.

1/ Geiger, A.J. A study of farm shop work in Florida. Thesis M.A. 1932, University of Florida. Pp. 106. Library, University of Florida, Gainesville.

Moses 2/ states, "that surveying the home farm will supply the student with more farm mechanics jobs than he can accomplish in a 1-year course." He indicates that farm mechanics instructional programs may be improved by:

1. Surveying the farm mechanics needs on the student's home.
2. Students working on their own mechanics problems instead of instructor assigned problems.

Crews 3/ indicates that, "one of the most desirable methods of building a logical farm mechanics program is by surveying the actual conditions on the farm. This will permit the instructor to become familiar with the home situation of each boy and fit his needs to his own farm mechanics situation."

Space is of major importance in arrangement of equipment in the farm mechanics shop to meet the training needs of a department. Bottoms 4/ points out that cleaning up and rearranging of shops may supply much additional space.

2/ Moses, H.A. Planning and developing a course in farm mechanics for eleventh-grade boys in vocational agriculture in the Mount Vernon-Ailey school. Problem, M.Ed., 1952. University of Georgia. 72 p. Library, University of Georgia, Athens.

3/ Crews, J.A. "A farm survey of farm mechanics." The Agricultural Education Magazine. 10:235, Oct. 1954.

4/ Bottoms, D.N. "The practical use of space." The Agricultural Education Magazine. 7:160-1, July, 1954.

Henderson 5/ indicated machinery repair and care was the most inadequate part of the farm mechanics program. The main reasons given for inadequate programs were lack of facilities, shop space, storage facilities, and instructor training.

In a study by Croom 6/ of the areas of farm mechanics emphasized, it was found that only 24 per cent of the teachers stated that their farm mechanics programs were adequate to train students in the knowledge and skills necessary to do most of the mechanical jobs on the farm. Croom also stated that, "teachers need more training especially in farm power, farm machinery, and rural electrification. The majority of teachers do not have an adequate number of books and other reference materials in farm mechanics."

Along with Croom's findings, Walker 7/ indicates adequate training of teachers of vocational agriculture for the future should include more training in farm mechanics, with less emphasis on construction work and more emphasis on operation, care, and repair of modern farm equipment.

5/ Henderson, H.D. Facilities and equipment for vocational agriculture in Iowa. Thesis, M.S., 1949. Iowa State College. 105 p. Library, Iowa State College, Ames.

6/ Croom, W.M. A study of the areas of farm mechanics emphasized in the all-day program of vocational agriculture in North Carolina with suggestions for improvement. Thesis, M. of Agr. Ed., 1948. North Carolina State College of Agriculture and Engineering. 104 p. Library, North Carolina State College, Raleigh.

7/ Walker, Clyde. Determining the content of farm-mechanics courses of study for Smith-Hughes agricultural departments in high schools. Thesis, M.S., 1931, University of Nebraska. p.80, Library, University of Nebraska, Lincoln.

In expressing the need for more instruction in farm mechanics, a study in Tennessee revealed that teachers were also in need of instruction in planning, conducting and evaluating their farm mechanics programs. This need and study was a result of many teachers saying they knew they did not possess sufficient skill to teach some of the common farm mechanics jobs as they would like to teach them. Some of the teachers did not teach skills they knew should be taught because they themselves did not know how to do them, 8/

Albrecht 9/ states that, "we must base our teaching in farm mechanics on the student's farming program needs and the needs of the home farm. It will be necessary for the teachers to do more planning on a long time basis. These things which we need to do point up a need for teachers to develop new methods of incorporating farm mechanics planning more thoroughly in supervised farming program plans and also to devise new ways of recognizing the opportunities for the student to develop his skills at the same time that he builds things which he can use on the home farm."

8/ Wiegers, G.W. "Helping teachers meet needs in teaching farm mechanics." The Agricultural Education Magazine. 8:183. Aug., 1951.

9/ Albrecht, C.F. "Developing and application of farm mechanics skills and judgments." The Agricultural Education Magazine. 3:68-69. Mar., 1952.

In a study of what farmers considered important in farm mechanics by Deyoe and Phipps 10/, most of the farmers desire to know more about maintenance, operation, and adjustment of their farm machinery. Farm safety and the repair and adjustment of farm machinery are ranked in either the number one or the number two position in all the communities surveyed.

Howell 11/ in his study, showed that the rank and importance of farm mechanics jobs, based on the number of times reported as done or should be done, were as follows:

1. Farm carpentry
2. Machinery repair
3. Tool fitting
4. Automobile mechanics
5. Electrical work
6. Painting and glazing
7. Plumbing and pipe work
8. Welding and cutting

Howell recommended that the teacher of vocational agriculture devote more time to the area of farm mechanics; that the instruction be based on the needs of the community; that emphasis be placed on building and equipping of a home farm shop; that the value of farm machinery and buildings be stressed; that additional studies be made in this area of farm mechanics; and that students in training for teaching vocational agriculture receive more training in farm mechanics.

10/ Deyoe, G.P., Phipps, L.J. "Determining farm mechanics content." The Agricultural Education Magazine. 2:36-37, Feb., 1953.

11/ Howell, E.L. Farm mechanics jobs performed on farms in an agricultural department patronage area in North Carolina, including those jobs which should be performed. Thesis, M. Agr. Ed., 1952, North Carolina State College. 101 p. Library, North Carolina State College, Raleigh.

A large number of instructors feel that their program in farm mechanics is the least effective phase of their training. Too often it becomes a haphazard sort of program with a decided lack of previous planning and organization. To aid in preventing a haphazard program the following objectives should be kept in mind in the selection of suitable projects: 12/

1. The project selected should require the application of numerous fundamental farm mechanics skills.
2. It should stimulate good work habits and develop good judgment.
3. It should train the student to do the unspecialized farm mechanics activities required in his farming program.
4. It should encourage each student to desire a home farm shop.
5. It should develop confidence on the part of the boys and create a desire for good workmanship.

Derr 13/ asks, "How can one stimulate boys to have projects?" Vocational agriculture teachers have demands of students in carrying a supervised farming program with good results. Derr asks, "Why not a supervised shop program?" It is his belief this would install and perpetuate a suitable farm mechanics program.

12/ Barton, P.S., Gilman, P.A. "Instruction in farm mechanics." The Agricultural Education Magazine. 9:207, Sept., 1951.

13/ Derr, L. "Use practical shop projects." The Agricultural Education Magazine. 3:63, Mar., 1953.

Phipps and Cook 14/ suggest that if desirable rapport is established between a teacher and the parents, and if good work is done in a school shop, parents will usually allow their boys to undertake construction projects and bring farm machinery from home to the shop for repair, maintenance, and adjustment.

A few of the ways a teacher may motivate valid farm mechanics jobs and projects in the school's farm shop are as follows:

1. Visit the boys and parents and plan with them worth-while jobs and projects which may be done in the shop.
2. Allow local newspapers to carry articles concerning the farm mechanics program.
3. Exhibit farm mechanics projects at county fairs, school fairs, and adult farmer classes.
4. Stencil department's name on each finished product.

Patterson 15/ studied difficulties in teaching farm mechanics in Negro vocational agricultural departments. His study indicated that transportation of machinery from farms to schools limited machinery projects in school shops. Lack of suitable shop space was a limiting factor.

SUMMARY

Directed work as to the kind and amount of farm mechanics in a vocational agriculture program has been broad and far reaching.

14/ Phipps, L.J., Cook, G.C. A handbook on teaching vocational agriculture. 1952. Pp. 701-702.

15/ Patterson, G.M. The teaching of farm mechanics in the Negro vocational agricultural departments in Oklahoma. Thesis, M.S., 1951, Oklahoma A. & M. College. 88 p. Library, Oklahoma A. & M. College, Stillwater.

What the program should include in its course content has been well established. The time to be spent in various areas of study in farm mechanics has been stated and accepted in general.

There is a lack of evidence of work on difficulties and methods of obtaining projects in a vocational agriculture farm mechanics program. Especially is there a lack of information on securing projects for machinery maintenance instructional purposes.

PART II.

SURVEY OF VOCATIONAL AGRICULTURE DEPARTMENT FARM MECHANICS PROGRAMS AND PROBLEMS

This survey of vocational agriculture teachers includes:

1. Teachers' reactions with their present machinery maintenance program.
2. Extent of the present program on machinery maintenance.
3. Teachers' opinions on lack of shop projects.

A 90 per cent response was received on the survey, or 54 returns from 60 instructors. The purpose of the following tables and information is to provide a summary of the work which is being carried out in the vocational agriculture departments in the state. This material covers one average teaching year.

TEACHERS' REACTIONS WITH THEIR PRESENT MACHINERY MAINTENANCE PROGRAM

A major question raised was, "Are you satisfied with the amount and kind of Farm Mechanics Projects your students bring to your shop and shop program?" This question is important to determine what percentage of the instructors are satisfied with the present supply of machinery for maintenance teaching purposes. Of the 54 instructors, nine, or 16.67 per cent replied, "Yes", and 45 or 83.33 per cent stated they were not satisfied.

TABLE I.

JOBS IN MONTANA VO-AG SHOPS
IN AN AVERAGE YEAR

Job Item	Total Jobs	Average per school	Range	Per cent of total
Construction Jobs				
1. Minor wood construction	968	17.92	0-253	21.00
2. Department and school construction	292	5.40	0-100	6.30
3. Major wood construction	149	2.75	0-12	3.21
4. Misc. construction and repair	93	1.72	0-29	2.00
5. Machinery construction	81	1.50	0-7	1.70
6. Concrete construction	4	.07	0-1	.08
7. Water and sewage construction	3	.05	0-1	.06
SUB TOTAL	1590	29.40		34.35%
Farm Repair Jobs				
8. Welding repair	842	15.50	0-220	18.30
9. Truck, car, and other repair	179	3.31	0-58	3.86
10. Machinery repair	66	1.22	0-12	1.42
11. Soldering repair	64	1.18	0-15	1.38
12. Engine overhaul	62	1.14	0-8	1.30
13. Tractor overhaul	31	.57	0-9	.60
14. Harness and bridle repair	30	.55	0-30	.64
15. Trailer repair	22	.40	0-9	.47
16. Combine repair	2	.03	0-1	.04
SUB TOTAL	1298	24.00		28.01%
Farm Maintenance Jobs				
17. Tool - sharpening and maintenance	1189	22.00	0-580	25.85
18. Equipment painting	212	3.90	0-40	4.50
19. Other machinery maintenance	178	3.29	0-30	3.80
20. Tractor maintenance	68	1.25	0-10	1.46
21. Glazing maintenance	39	.72	0-15	.84
22. Engine maintenance	36	.66	0-12	.77
23. Sheet metal	16	.29	0-16	.34
24. Electrical maintenance	4	.07	0-3	.08
SUB TOTAL	1742	32.20		37.64%
TOTAL	4630	85.70		100.00%

EXTENT OF THE PRESENT PROGRAM ON MACHINERY MAINTENANCE

For a summary of the machinery and equipment instructional repair program presently carried on in Montana high schools, see Table I.

Approximately 35 per cent of the jobs reported are of a construction nature, 35 per cent are maintenance, and 30 per cent are repair. Roughly 1/3 of the jobs are in each of the three areas.

The major construction, repair and maintenance projects were approximately as follows: (Taken from Table I).

25%	Tool - sharpening and maintenance
20%	Minor wood construction
20%	Welding repair
7%	Department and school construction
5%	Equipment painting
4%	Truck, car, other repair
4%	Other machinery maintenance
3%	Major wood construction
2%	Misc. construction and repair
10%	All other jobs
100 %	TOTAL

The following conclusions are indicated by the above survey:

1. The nature of the jobs being done are heavily in favor of very small projects. This is true of all three areas in construction, repair and maintenance.

2. The above tabulation lists approximately 75 per cent of the projects in a small area of work, namely tool maintenance and sharpening, minor wood construction, and welding repair. The 25 per cent of jobs remaining includes all other work completed, which is a small figure when there are still approximately 20 jobs not considered from Table I, such as machinery repair and maintenance.

3. The survey points to a shortage of certain jobs to complete a well rounded program of instruction in vocational agriculture.

The following are less common shop projects:

Per cent of total	Jobs
0.04	Combine repair
0.06	Water and sewage construction
0.08	Concrete construction
0.08	Electrical maintenance
0.34	Sheet metal
0.47	Trailer repair
0.60	Tractor overhaul
0.64	Harness and bridle repair
0.77	Engine maintenance
0.84	Glazing maintenance

1.30	Engine overhaul
1.38	Soldering repair
1.42	Machinery repair
1.46	Tractor maintenance
1.70	Machinery construction
2.00	Misc. construction and repair
3.21	Major wood construction
3.80	Other machinery maintenance
3.86	Truck, car, and other repair
4.50	Equipment painting

The above list compiles all machinery and equipment for both maintenance and repair purposes. Powered machinery maintenance and repair totals 10.90 per cent. Non-powered equipment maintenance and repair totaled 7.32 per cent. A complete total of all maintenance and repair is 18.22 per cent.

A significant shortage of instruction is in combine repair, water and sewage, concrete construction, and electrical maintenance.

4. In some instructional areas insufficient amount of jobs exists to effectively carry on farm mechanics instruction. Machinery maintenance and combine repair were practically nil. The average in the state for tractor overhaul, trailer repair, and engine maintenance was approximately one half job per department. The average in the state per department for engine overhaul, machinery repair, and tractor maintenance was approximately one job.

5. With the assumption that almost every farm having a tractor will have at least one and usually several pieces of non-powered equipment, as a disc, there will be a ratio of 1 to 1 plus between powered and non-powered, or between powered and other types of machinery. The survey showed powered machinery maintenance of

10.90 per cent and a non-powered maintenance figure of 7.32 per cent. Instruction jobs of non-powered equipment maintenance in the state is falling short of instruction jobs on powered pieces of equipment.

The percentage of all woodworking jobs is approximately 34.27 per cent, while the total machinery maintenance and repair is about 18.22 per cent. This indicates a ratio of approximately 2 to 1 for the woodworking.

TEACHER OPINIONS ON LACK OF SHOP PROJECTS

In aiding the problem of why vocational agriculture departments lack machinery maintenance jobs, instructors were asked, "What do you consider to be the reasons why many teachers have difficulty in getting students to bring in or line up farm mechanics projects?" Information on this part of the survey is summarized in Table II.

TABLE II.

REASONS STATED BY VOCATIONAL AGRICULTURE INSTRUCTORS FOR LACK OF SUFFICIENT MACHINERY AND EQUIPMENT PROJECTS IN VOCATIONAL AGRICULTURE SHOPS

		1/ No.	Per cent of total
1.	Insufficient parent, teacher and student cooperation	32	23.23
2.	Inadequate department facilities, also work and storage space	25	18.76
3.	Distances too great, causing difficulty in moving machinery to and from school	16	11.94
	Only one instructor sighted lack of department machinery trailer as a problem	1	.75
4.	Parents lack confidence in students' ability	15	11.29
5.	Students are not sold on value of machinery maintenance	9	6.82
6.	Too many non-farm or subsistance farm boys enrolled in vocational agriculture	6	4.58
7.	Parents lack confidence in instructor	5	3.83
8.	Adequate home facilities for repair and maintenance	5	3.83
9.	Students lack ambition or have too many other interests	4	2.99
10.	Instructor feels he lacks experience, skill, and ability of machinery maintenance and repair	4	2.99
11.	Farmer has sufficient finances to hire the work done	3	2.24
12.	Repair work cuts in on the local tax paying tradesman	2	1.50
13.	Farmer feels that expense of maintenance and repair is too great	2	1.50
14.	Many students move to town during the school year	2	1.50
15.	Too many projects made for the school	1	.75
16.	Too many wood working projects, which are easy to haul back and forth	1	.75
17.	Too many new machines on farms, and a frequent turnover of these machines	1	.75
	TOTALS	134	100.00%

1/ Number of responses given for reason.

The major reasons given by vocational agriculture teachers for lack of machinery and equipment for maintenance and repair projects are approximately as follows:

25%	Insufficient parent, teacher, and student cooperation.
20%	Inadequate department facilities and space.
13%	Distances too great for moving machinery.
10%	Parents lack confidence in students' ability.
7%	Students not sold on value of maintenance.
5%	Too many non-farm boys enrolled in vocational agriculture.
20%	All other reasons
100%	TOTAL

The principal reason given by teachers themselves for the lack of machinery was due to lack of teacher, pupil and parent cooperation. Approximately 25 per cent of the reasons listed a lack of cooperation with teacher, parent, student, or a bombination of any two. Approximately 7 per cent listed the students were not sold on the value of machinery maintenance. Cooperation of teachers, students and parents totally accounts for about one third of the difficulty in securing machinery projects.

The study revealed that adequate shop space is a major item in securing a good farm mechanics program. An interesting fact was that 12 per cent of the reasons listed distance to be a factor, and less than 1 per cent said lack of a machinery trailer

was a cause. It is quite possible most of the distance problems may be corrected with the aid of a trailer.

SUMMARY

Approximately 85 per cent of the vocational agriculture instructors are not satisfied with the kind and amount of farm mechanics projects that are brought into the school shops by the students.

Roughly 1/3 of the jobs are in each of the three areas of (1) construction, (2) repair, and (3) maintenance. The nature of the jobs being done are heavily in favor of very small projects. Tool maintenance and sharpening, minor wood construction, and welding repair account for approximately 75 per cent of the total work. Areas of maintenance and repair in which little or no work was done are combine repair, engine maintenance, machinery repair, tractor maintenance, and all other machinery maintenance. Farms have more powered than non-powered pieces of equipment brought into shops for maintenance work. School shops do approximately twice as many woodworking jobs as against the total machinery maintenance and repair jobs.

Approximately 1/3 of the difficulties in securing machinery, for maintenance teaching purposes, is the lack of cooperation between the instructor, parent, and the student. Twenty per cent of the difficulty is inadequate facilities and space in the vocational agriculture department, and 13 per cent is the distance factor between the farm and the school shop.

PART III.

STUDY OF THE LOCAL MACHINERY DEALERS

PURPOSE

This part includes an interview study of Bozeman, Montana farm machinery dealers. The purpose of this study was to determine what problems machinery dealers experienced in getting farmers to bring in machinery for repair. It was felt that this study might help the vocational agricultural teachers problem.

Personal interviews were conducted with six Bozeman farm machinery dealers during the 1954 winter months. The dealers were:

1. Otto Barclay Tractor Co.
2. Mountain Machinery, Inc.
3. Norine Motors Inc.
4. Owenhouse Hardware Co.
5. Bozeman Implement Co.
6. Allis-Chalmers Sales & Service.

RESULTS

The results of the interview survey with the machinery dealers are as follows:

I. Machinery sales:
   A. How many of the following pieces of equipment did you sell during the year of 1953?
      1. Tractors sold:
         98 gasoline units; 20 crawler units; and 9 diesel units.

2. Combines sold:
   51 self propelled units and 15 pull type units.

3. Balers sold:
   26 wire balers and 28 twine balers.

B. How many of the following machines do you have out in your sales area?
3047 tractors; 875 combines; and 682 balers.

How many, or what percentage of these machines are annually brought in for repair from your sales area?
249 tractors or 8.15 per cent; 12 combines or 1.37 per cent; and 40 balers or 5.86 per cent.

II. Maintenance:

A. When is your busy season in the sales of parts, and repair work?

1. Parts sales are heavy during June, July and August.

2. Repair work is busiest during April through October.

B. What forms do you use in Dealer-Farmer contact with sales and maintenance work?

	Form Letter	Personal Contact	Radio Contact	Machinery Day	Newspaper Contact
Machinery sales	100%	100%	84%	84%	84%
Maintenance	66%	66%	66%	84%	66%

C. Practices concerning operator vehicle service and service records:

1. 100 per cent of the dealers said they kept service records on outgoing tractors.

2. 100 per cent said the farmers did not aid in keeping this record.

3. 22 per cent said the farmers serviced their equipment to standard recommendations.

D. In your own mind, why aren't more machines brought in for repair?
In a composite statement from all of the dealers the trend was that 50 per cent of the farmers are negligent in bringing in their machines and the other 50 per cent consider the repair prices charged are too high.

E. How many men do you employ on your staff?
1. Sales men - averaged 2.33 men, ranged from 1 to 3 men.

2. Parts men - averaged 1.66 men, ranged from 1 to 2 men.

3. Shop men - averaged 3.16 men, ranged from 2 to 5 men.

4. Field men - averaged 1.83 men, ranged from 1 to 3 men.

F. Has instruction been improved so farmers are doing more and better maintenance?
Yes - 66 per cent of the dealers felt that farmers had improved their maintenance practices.

Why - Reasons for this are (1) simplicity of machines; (2) good machine manuals; (3) more mechanically minded young men are farming; (4) farmers a re doing it to keep up with the advancement of the machines.

G. Do you feel that the farmer is doing major or minor repair, some maintenance, or practically nothing?
Dealer opinion was that:
75% of the farmers are doing practically nothing.
15% were doing some maintenance.
10% were doing minor repair.
100% TOTAL
It was expressed by the dealers that farmers were doing practically no major repair.

H. Of your major repair parts what per cent are used in your own shop, what per cent go to other dealers' shops, and what per cent go to the farmers?
26.1% used in the dealers own shop.
4.1% go to other dealers' shops.
69.8% go to the farmers.
100.0% TOTAL

I. Do you have an implement trailer?
66 per cent of the dealers had an implement trailer.

How is machinery brought into the dealer's shop?
66% brought in by dealers' trucks.
22% brought in by the dealers' trailers.
8% hauled by the farmers.
4% towed in by dealer or farmer.
100% TOTAL

J. Whose machines are in the shop for repair now?
60% belong to the dealers.
40% belong to the farmers.
100% TOTAL

What is the nature of the repairs on these machines?
50% general repair and maintenance.
50% major overhaul.
100% TOTAL

K. Are you equipped for and interested in doing all types of machinery repair?
84 per cent of the dealers were equipped and interested,
16 per cent were not.
100% TOTAL

L. What machines are brought in for repair in order of their largest number?
Tractors first, balers second; and combines third.

III. Seasonal distribution of maintenance.

A. Do farmers bring a machine in for repair during its idle season?
68% of the dealers said the farmers did not.
32% of the dealers said the farmers did.
100% TOTAL

B. Do you feel that the farmer should do better machine maintenance?
100 per cent of the dealers felt that the farmer should practice better maintenance.

How could improved farmer maintenance be accomplished?
84% of the dealers felt that they had no control over the farmers' practices.
16% of the dealers suggested a plan similar to the new-car check up system.
100% TOTAL

SUMMARY

Bozeman farm machinery dealers get a small amount of machinery in for repair. Bozeman dealers get 8.15 per cent of the tractors; 1.37 per cent of the combines; and 5.86 per cent of the balers in annually for repair. The percentage is based on the total number of machines in their sales area. Most of this work is brought in to the dealers at a period when the farmer is also busy with his summer work, principally from April through October.

An interesting note is that 50 per cent of the dealers considered the farmers negligent in bringing their machinery in for repair, and 50 per cent of the dealers considered the repair costs were too high in the eyes of the farmer. Sixty-six per cent of the dealers believe that instruction has been improved so farmers are doing better and more of their own maintenance. Approximately 25 per cent of the farmers are practicing some maintenance work; this correlates with the figure of approximately 70 per cent of dealer's parts going to the farmer.

Approximately 90 per cent of the machines coming into the dealer shops for repair are transported by the dealer. One hundred per cent of the dealers did feel that the farmer should practice better maintenance but they did not suggest a policy which would establish this.

PART IV.

FINDINGS AND INTERPRETATIONS

This study indicates that 83 per cent of Montana vocational agricultural teachers are dissatisfied with the quality and extent of their program of instruction in farm machinery repair and maintenance. Some conclusions from the Vo-Ag teachers study are as follows:

1. Lack of teacher-parent and student cooperation was given as the major reason by Vo-Ag teachers for lack in numbers of machinery repair projects.

2. Lack of sufficient shop space for machinery repair projects was second in importance.

3. Difficulties in getting machinery projects transported to the shop was the third major reason for lack of machinery projects.

4. Small repair or building projects rather than work on farm machinery was the prevalent type of work done in high school Vo-Ag shops.

The machinery dealers study of their machinery repair program revealed the following related problems:

1. Machinery dealers were having great difficulty in getting farmers to bring in equipment for repair during the slack season.

2. Machinery dealers went out after the machinery rather than depend on farmers to bring them in.

3. Machinery dealers did practically no work in non-powered farm units as mowers, etc.

This study suggests the need for further work in studying student and parental attitude towards bringing in farm machinery

and maintenance projects to school shops. A follow-up study might consider what machinery repair projects students are or might be doing at home.

FARM MECHANICS

MAINTENANCE AND REPAIR PROJECTS

Are you satisfied with the amount and kind of Farm Mechanics Projects your students bring to your shop and shop program? _____or_____.
yes no

What kinds of Farm Machinery repair and maintenance projects are done by your students during an average year? (as paint tractor)

Kind	No.	Kind	No.
1.		6.	
2.		7.	
3.		8.	
4.		9.	
5.		10.	

What kinds of equipment building or repair jobs are done in your shop during an average year?

Kind	No.	Kind	No.
1.		6.	
2.		7.	
3.		8.	
4.		9.	
5.		10.	

What do you consider to be the reasons why many teachers have difficulty in getting students to bring in or line up farm mechanics projects?_____

_____

_____

_____

Remarks _____

_____

_____

I. Machinery sales:

A. How many of the following pieces of equipment did you sell during the year of 1953?

1. Tractors
   a. Gass_____
   b. Diesel_____
   c. Crawler_____
2. Combines
   a. Self propelled_____
   b. Pull type_____
3. Bailers
   a. Wire_____
   b. Twine_____

B. 1. How many of the following machines do you have out in your sales area?

2. How many of these machines are annually brought in for repair?
   a. tractors B1._____B2._____
   b. combines B1._____B3._____
   c. bailers B1._____B2._____

II. Maintenance

A. Busy season in
   1. Parts_____
   2. Repair_____

B. What forms of contact do you make
   1. Form letter
      a. Machine sales_____
      b. Maintenance_____
   2. Personal contact
      a. Machine sales_____
      b. Maintenance_____
   3. Radio material
      a. Machine sales_____
      b. Maintenance_____
   4. Machinery day
      a. Machine sales_____
      b. Maintenance_____
   5. Newspaper
      a. Machine sales_____
      b. Maintenance_____

C. Do you cooperate with farmers in the following?
   1. Do you keep records on outgoing tractors?_____
   2. Do the farmers aid in a service record?_____
   3. Do the farmers service equipment to standard recommendations?_____

D. In your own mind, why aren't more machines brought in for repair?_____
_____
_____

E. How many men are on your staff?
   1. Sales_____
   2. Parts_____
   3. Shop_____
   4. Field maintenance men_____

F. What is the trend of sales and maintenance with regard to assumed-
   1. Increased income
      a. Sales_____
_____

b. Maintenance_____

2. Added farm facilities
   a. Sales_____
   b. Maintenance_____

G. Has Instruction been improved so farmers are doing more of their own maintenance?_____
If yes, why?

H. Do you feel the farmer is doing major or minor repair, some maintenance, or practically nothing?

I. 1. Of your major repair parts, what % are used in your shop?_____
   2. What % go to other shops?_____
   3. What % go to the farmer?_____

J. 1. Do you have an implement trailer?_____
   2. How are implements usually brought in?_____

K. 1. Whose machines are in the shop now?_____
   2. What is the nature of the repairs on those machines?_____

L. Are you so situated and equipped to be interested in all types of machinery repair?_____

M. What machines are brought in for repair, in order of their largest number?
   1._____ 4._____
   2._____ 5._____
   3._____ 6._____

III. Season distribution of maintenance
   A. Do farmers bring a machine in for repair during its idle season?_____
   B. Do you feel that the farmer should improve his maintenance program planning?_____
   C. Do you think that you should cooperate more with the farmer in his maintenance program planning? How?

Department of Ag Education February, 1954

To: Montana Vo-Ag Teachers

From: Leo L. Knuti

Re: Research Studies--Two Surveys

We would like to have your cooperation in two research studies being conducted under our supervision. One study has to do with (1) "Farm Mechanics Repair and Maintenance Projects" and the other study on (2) "An Evaluation of Reference Books for Vo-Ag Students.

You are asked to complete a brief survey form. A return envelope is included for your convenience.

FARM MECHANICS STUDY

Supervisors and teacher trainers have observed that many Vo-Ag shops could have more work in Farm Mechanics Projects and on machinery repair or equipment building. Good to excellent work is observed in teaching basic farm mechanics skills.

A number of reasons may account for the lack of Farm Mechanics projects. Don Freebury and Robert Howey are working on one facet of the problem. They are investigating the farmers attitude and practices toward machinery repair and maintenence. To add to their study, the Agricultural Education Department of M.S.C. would like to secure data on the situation existing in local departments. Your cooperation is asked for in the attached survey. No names or departments will be mentioned in our report.

REFERENCE BOOK STUDY

Elmer Showman of Hardin has been making an evaluation of three texts as to their suitability for Vo-Ag reference material. He is analyzing the books and is getting the reaction of his students to the books.

To strengthen Elmer's study, the M.S.C. Agricultural Education Department asks your cooperation in completing the attached survey.

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