AN ABSTRACT OF THE THESIS OF

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There is a lack of available information concerning availability, usability and utilization of school-owned land in western Oregon, southwestern Washington and northwestern California. It would be helpful to know if land is available for agricultural use, how it is used, and ways that it can be used to give experience and background to students who wish to go into agricultural occupations. A survey was made of this area by sending questionnaires to high schools currently offering vocational agriculture in the school curriculum. Eighty-five percent of high schools receiving questionnaires returned them.

Ten schools in western Oregon were personally visited and a check list type of questionnaire was used to obtain specific information. Those schools visited were using school-owned land for maximum instructional purposes first, work experience programs second, and money-making projects third.

Most of the schools with large acreages of school land have a farm manager or the man with the most priority in the vocational agriculture department has released time to manage the school farm.

Production on the individual school farm is determined by the type of soil, availability of help to plant and harvest crops, and the type of equipment owned.

Trials are limited to small acreage except where fertilizer or spray programs are used. Two schools of the interviewed sample have land available for work experience programs. Schools using school land for money-making projects do this through the Future Farmers of America chapter. None of the sample schools visited have individuals using school land for their own monetary gain. Students in agricultural education who lack space or equipment for projects, use school-owned land for training and work experience.

Nine of the schools visited work with the local implement dealer in securing equipment to operate school farms.

Most instructors agreed that school farms should be used in the vocational agriculture department for instructional purposes. The school land should be close to school and used as part of the classroom instructional program. Work experience programs are ideal methods of teaching basic skills to non-farm students and should be a part of every high schools' vocational agriculture program. School farms should be used where the instructor is experienced, and the

school has a farm manager to over see daily tasks, relieving the instructor to devote his time to instructional purposes.

All instructors visited in the interview sample felt that the school should pay all bills and receive profit, if any, and that the school farm should become a part of the total instructional program in vocational agriculture. Departments using school land for Future Farmers of America chapter farms felt pressure from the community to pay for seed, fertilizer, and chemicals before harvest.

The Utilization of School-Owned Property in the Vocational Agriculture Curriculum

by

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CHAPTER I

INTRODUCTION

Programs in agricultural education are changing. This change is reflected in the broader offerings in the classroom, the laboratory, and other school-owned facilities.

The overall objectives of agricultural education are:

1. To develop agricultural competencies needed by individuals engaged in or preparing to engage in production agriculture.
2. To develop agricultural competencies needed by individuals engaged in or preparing to engage in an agricultural occupation other than production agriculture.
3. To develop an understanding of and appreciation for career opportunities in agriculture and the preparation needed to enter and progress in an agricultural occupation.
4. To develop the ability to secure satisfactory placement and to advance in an agricultural occupation through a program of continuing education.
5. To develop those abilities in human relations which are essential in agriculture occupations.
6. To develop those abilities needed to exercise and follow effective leadership in fulfilling occupational, social and civic responsibilities. (11)

The present trend is to not only prepare for the needs of production, but also prepare for those concerned with processing, supplying and servicing.

The shifts in population, giving students less opportunities to utilize the home farm facilities, make it more essential for the school to provide the needed experience. The school land laboratory is one of these developments.

With this shift from farm to urban home life, it is difficult for students to acquire a background in agriculture to meet employment demands, plus prepare themselves for new jobs being developed that will require a knowledge of agriculture.

Oregon Vocational Agriculture Departments are moving toward the use of school land-laboratories, greenhouses, and animal laboratories to supplement farm experiences that boys today are missing because they lack the opportunity to work with plants and animals at home. E. J. Johnson, Federal Agent, Agricultural Education, United States Office of Education, stated:

> Approximately 40 percent of the departments of vocational agriculture in the Pacific region operate and manage land or some other major instructional device. These devices can be grouped under three headings: namely, Farm, Observation or testing plots, and garden plots. (21)

With the increase in vocational agriculture departments using school land to supplement the teaching of basic skills and practices needed for understanding basic principles in agriculture and related fields of business and technilogy, "there is a need for an outline of what is being done by schools in the development and use of school land and suggestions for potential usage (11)."

Are basic principles and skills relating to agriculture available through training in high schools now offering vocational agriculture and its related subjects? Many high school districts like Milwaukie School District recognize the need and are in the process of developing new departments and upgrading their current agricultural programs.

The need for agricultural experiences and training for employment in the field of agriculture and its related occupations are greater today on the part of students in high school than ever before because of modern machinery and equipment.

Statement of the Problem

It was stated by the Department of Agricultural Education at Oregon State University that there is a lack of available information concerning availability, usability and utilization of school-owned land in western Oregon, southwestern Washington and northwestern California. It would be helpful to know if land is available for agricultural use, how it is used, and ways that it can be used to give experience and background to students who wish to go into agricultural occupations.

In order to develop methods of using school land, it is

necessary to determine the extent that secondary schools have available land that can be used in their agricultural curriculum.

Do high schools in western Oregon, southwestern Washington, and northwestern California have school land available and usable in the agricultural curriculum? If so, is it now being used and how?

Purpose of the Study

Basic information concerning schools owning land and how it is currently being used is not current or complete. The last survey was completed in 1960 by Darrell Lin Ward. At that time questionnaires were sent only to agriculture departments in the state of Oregon. The results showed a range of school land owned and used from one-half acre to 160 acres. Two departments operated in excess of 100 acres while six were in the range of zero to five acres. A number of departments reported using less than one acre for feeding projects, root-stock plantings, and other special programs of land use (33, p. 9).

The specific objectives of this survey are to bring together, into one source, information concerning secondary schools with vocational agriculture in their curriculum that have school-owned land available in the vocational agriculture program and add this information to the present available knowledge concerning school-owned land. Of the schools having land available, how are they

utilizing it and what is the size of acreage available?

With this information readily available to school departments interested in improving their methods of teaching agricultural skills, along with those schools now contemplating incorporating agriculture into their curriculum, a better understanding of ways to utilize their total facilities, buildings and school land, is obtainable. This basic information is needed if future studies are to be conducted for specific schools or for general information concerning ways school land can best be utilized in an agricultural curriculum.

A description of school-land usage of schools in the survey area will benefit other departments planning on obtaining land and using it in their agriculture program. Such decisions as size of land, location of the land in reference to other buildings, how the best land can be obtained, and what schools should acquire land are all pertinent questions. The list could include the kinds of projects to be used, but each project needs the basic information of what schools have land available and what is the present usage. The above questions concerning size, location, and type of land to obtain seem to justify the need of a preliminary survey of schools in this part of the Pacific Northwest.

Hypothesis

If the survey is valid, reliable and a true representation of the

area, the data gathered and tabulated will be an accurate picture of programs in the survey area having available and usable school-owned land.

Procedures

Research Design

The overall objectives of this survey study was to find out which schools have land for school usage, and if land is available, how they are now using this land.

This information was gathered by means of a survey questionnaire sent to secondary schools in southwestern Washington, western Oregon (west of the Cascades), and northwestern California having vocational agriculture in their curriculum. A sample of local schools reporting land usage has been visited to better complete the needed information on how they are using the land in their curriculum.

The population for the survey consisted of secondary schools with agriculture in their curriculum located in western Oregon (west of the Cascades), southwestern Washington, and northwestern California. A pilot study was run, and a sample questionnaire was submitted to agriculture teachers west of the Cascades in the lower Willamette area to check the individual questions for validity, clearness, and reliability.

The questionnaire covered four major areas: (1) secondary schools with agriculture owning land, (2) size of available land, (3) availability of land for class usage, and (4) present use of land. Additional information was gathered on the number of students enrolled in agriculture and the number of teachers in each department. These two factors are for general information only and are not part of the basic study of land availability and usage in that particular school.

The questionnaires were mailed on March 6, 1965, to 100 schools in the survey area of western Oregon (west of the Cascades), southwestern Washington, and northwestern California.

In June, 1967, personal interviews were conducted with agricultural teachers from ten high schools in western Oregon. Those schools visited were Albany, Banks, Central-Linn, Clackamas, Forest Grove, Hillsboro, Lebanon, Mollalla, Rainier and Sherwood.

Collection of Data

The collection of data needed to determine if school land is available and usable, or if the land is now in use by the agriculture department to aid in the teaching of the basic skills and principles needed in agriculture, was gathered by a questionnaire and interview.

To obtain this information the questionnaire was drawn up and submitted to the Department of Agricultural Education at Oregon State

University for suggestions. Then the questionnaire was submitted to the vocational agriculture teachers in the Columbia River District to determine reliability of the questions. Final revisions were completed and on March 6, 1965, they were mailed to the one hundred schools selected for the survey. (A copy of the questionnaire is in the Appendix.)

The schools selected to receive the questionnaire were ten schools in northwestern California, all schools (59) west of the Cascades in Oregon, and thirty-one schools in southwestern Washington now offering vocational agriculture in their high-school curriculums.

A check list type of questionnaire was developed and ten schools in western Oregon were visited to obtain specific information concerning how they are using school-owned land in their vocational agricultural programs. (A copy of the check list questionnaire is in the Appendix.)

Analysis of Data

The data from the questionnaires were tabulated first as to percentage of returns by states to be sure of having a high enough return to be a valid sampling of the survey area. As each questionnaire was returned, it was tabulated as returned and checked off against the mailing list to show what schools returned the questionnaires. They

were also tabulated as having land available or no land available for use in the agricultural program by states. After the returns were in, charts were developed by states to show number sent, number returned, those having land, and those schools with no land available. Each state was tabulated separately and also collectively with the rest of the survey area to show total returns, percentage of returns, percentage of schools having no land, and schools having land available for use in the vocational agricultural program. (See Table I.) After recording information from the questionnaires returned on Table I, another table was developed from the returned questionnaires showing land available and used in the curriculum, land owned but not available for usage, land owned but not usable in the vocational agricultural curriculum, land connected to school grounds, and total schools reporting land owned.

From these two tables and the questionnaires, the results of the survey were compiled into a visual summary of the surveyed area of schools reporting as to the availability, usability and current use of school-owned land.

The check list type of questionnaire questions were specific and dealt with how each of the ten schools visited were using school-owned land. Information from these specific questions were compiled by schools and are included in the findings of this study.

Definition of Terms

The following terms are defined for the purpose of this study to mean:

Available Land. This is land in which the school has title. It can be adjacent to the school buildings or a future building site, or a farm bought and paid for by the school district. It does not include leased, rental or donated land of which the school does not have clear title.

Usable Land. Land owned by the school that is usable as well as being available for use in the agricultural curriculum.

Land Usage. How the land is currently being used; whether for crops, grass, trials or weeds.

Public Law 88-210. This law, passed by the 88th Congress, supplements the Smith-Hughes law. This new law is concerned with the training or re-training of all ages, both male and female, for employment. In vocational agriculture use, it requires projects or work experience.

Schools with Agriculture. Those secondary schools now offering courses in agriculture in their curriculum.

Land Laboratories. Any land used by departments of vocational agriculture for instructional purposes, regardless of size, or use.

Limitations

The following limitations will be effective for this study:

1. Confined to western Oregon (west of the Cascades), southwestern Washington, and northwestern California.

2. Only secondary schools in the defined area having agricultural programs will be surveyed.

3. Will be concerned with the plant science part of the vocational program and not with animal laboratories.

Background

How to meet the needs of a community with proper varieties of crops grown in their locality has been the concern of the author since coming to Oregon in 1959 to work for Northrup King Seed Company at Albany. As Territorial Manager the area covered consisted of western Oregon (west of the Cascades) and northwestern California down the coast to Ukiah. The work consisted of selling lawn products, seeds and fertilizers, and all types of farm seeds except small grains. Valuable information in farm management was gained, and the need of upgrading the quality of crops grown and to improve farming practices in this area was apparent. This knowledge was obtained from many sources, first and foremost from good farmers in the area who were up to date and producing at a profitable

return on their investment. Second, from the company's research staff who are and were working on new and better crops and management methods, and from different state experiment stations--Southern Oregon Experiment Station at Medford, Red Hills Experiment Station out of Oregon City, and two of Washington state's experimental stations in western Washington, Oregon State University Experimental Station at Corvallis, and the United States Department of Agriculture Experiment Station at Corvallis.

While working for Northrup King it was the author's responsibility to establish new varieties of corn, alfalfa, grasses, clovers and hybrid sudans. This was accomplished by working with progressive farmers in each major farming area and establishing test plots on their land.

Some of the high school agriculture departments were helpful in their efforts to try new strains and varieties. It was during this time that the awareness of idle school land became apparent; however, some of the schools were using their land and making it pay in dollars and cents as well as teaching proper procedures and basic skills to the students. The placement of trials with farmers having boys enrolled in vocational agriculture was much easier.

After leaving the field of sales and services, valuable knowledge and experience was obtained from working as an intern at Clackamas High School with Norman Burgess, Vocational Agriculture

Instructor, who had established a school greenhouse and a land laboratory.

The author's present vocational agriculture department at Banks High School, has ground available that is connected to the school on which small trees are grown and a chemical spray trial is located. The majority of the area has been growing weeds, while some of the ground is under water during the winter months and is not suited to crop production. Another part of the ground is connected to the school shop and lawn area and is excellent soil. This latter area is in trees and summer-fallow for weed control. This past year all of the area not in trees was plowed and disked for weed control. This seemed to be typical of many schools reporting in the survey--that they had ground available but were only using part of it. They reported that the land was either growing weeds, poor soil, or they lacked equipment and time for management and development.

CHAPTER II

REVIEW OF RELATED LITERATURE

Throughout the United States, school systems are starting to realize the need for usage of school land in the agricultural curriculum. Some states have started programs to ascertain what land is available and usable. This will stimulate interest in follow-up studies to determine ways in which school land can be used.

There are individual school-land surveys for a specific school or area that have been completed, but to this date there is a lack of general information regarding school lands in western Oregon, southwestern Washington, and northwestern California.

Physical Facilities

Mr. Elwood M. Juergenson, Teacher Educator, University of California, stated:

> The importance of having physical facilities in a vocational subject cannot be over-emphasized if we are to teach on a truly vocational basis. Since many students do not possess adequate facilities for obtaining the necessary training in vocational agriculture, it is natural for the school and community to want to supply them (22, p. 88).

In Missouri, at Dexter High School, a school-land laboratory

has been in use for nine years, providing the students with work experience. If more schools had the support given to Dexter High School by school administrators, there would be a land laboratory at every school. This is exemplified by the statement, "The Superintendent said he and the official board feel that our school laboratory is the most worthwhile thing that the department has done (6, pp. 256-257)."

Purposes for School-Land Usage

Each year more farm boys enter occupations other than farming. As they move away from the farm, there is less available help for the farm operations. It is evident that agriculture is more than farming: it has become a tremendous science. With the decrease in farm numbers and help to run the farm, production remains slightly above past years' production. This is due to new technology and better farming methods. Ward (35) indicated that the purpose of school-land laboratories is to provide students that do not live on farms an opportunity to gain the basic skills and background needed in farming.

Rhonemus states that "the main educational value gained by students of vocational agriculture comes from the demonstration of

correct farm practices (28, p. 39)."

Woodburn High School in western Oregon has a school-land program. Ward (35, pp. 57-58) makes this statement:

> The purpose for the operation of the land at Woodburn High School was indicated in the following order: First, a teaching aid to supplement classroom work; second, a project area for non-farm boys; third, money raising for the Future Farmers of America chapter. Ninety-eight percent of the residents of Woodburn indicated the desire for the special farm project to be carried on, over three-fourths of the residents felt that it was the responsibility of the school district to continue the provision of land for the vocational agriculture department's use (35, p. 52).

The school farm has provided an excellent means of bringing about learning through doing. Cooperative activities are a good teaching tool for the improvement of supervised farming as well as a worthwhile device for teaching principles of cooperation (1, p. 205).

Other schools in Oregon are developing school-land laboratories and some now have greenhouses. Clackamas High School has a greenhouse adjacent to a small landscaping demonstration plot where students experiment with methods of planting ornamental shrubs. In 1964, they purchased a school farm which is set up as a land laboratory, giving students the opportunity to acquire agricultural background and skills needed in job placement in agricultural occupations.

Some states have programs in process which help pilot ideas

for using school land. Colorado is one of them. In Colorado school land laboratories are defined as ". . . any land used by departments of vocational agriculture for instructional purposes, regardless of size (15, p. 1)." In addition to clarifying the meaning of school-land laboratories, Foster stated:

> The selection of the land area was given as an important consideration for the planning phases of the school land laboratory. Two sizes were recommended; a unit large enough to use standard farming practices with a full-time manager, or a limited area for demonstration plots ranging from one to three acres. In any event, the literature was in accord that the land should be located near the school, average or better in quality, and the buildings and other facilities above average but typical to the community. The costs of operating the land laboratory were considered a district obligation and it was recommended that the agriculture teacher not have a financial interest in the venture. (15, p. 1)

Folger states that "more school land in Oklahoma is used for experimental plots than for any other purpose (14, p. 36)."

School farms are being used as laboratories for the "majority of pupils to participate in skills and practices taught in the department of vocational agriculture (9, p. 14)."

The greater the part students have in planning and management of the school farm, the more educational it will be to them. The more varied the problems solved by the students, the more worthwhile experiences they have (20, p. 57).

> The term "school farm" defies criticism. In practice it is a great morale booster for both instructor and students; it develops interest and pride in doing good work on the part of the student and is an excellent public relations medium (4, p. 79).

When schools do provide ground for the agriculture department, it is important that the farm or test plots are operated as practically as possible, and as Spilsbury (34, p. 40) stated, "It should not be as a show place or experimental farm but as a farm laboratory for the purpose of instructing high school students, who plan to make agriculture their way of life (34, p. 88)." Since the training of students for proficiency in farming is one of the major responsibilities of vocational agriculture teachers, it is desirable that teachers devise aids which will be helpful in encouraging students to adopt improved practices and efficient methods. "Demonstrations conducted by the students themselves which show the results from the use of certain practices can be a very effective aid (3, p. 7)." Unfortunately, however, a number of situations exist where boys do not have home environment favorable to large scale projects or supervised farming programs. In most states there is an increasing number of boys from part-time farming situations who enroll in our high school agriculture programs.

The school farm could provide educational work experience to

meet the specific needs of students lacking in such training (23, p. 116). The use of school-land laboratories by agricultural departments to supplement classroom study provides a core of common problems and situations close at hand for use in instruction, including observation, demonstration, and student participation. School farms and test plots aid in introducing new crop enterprises or varieties and particularly to demonstrate their adaptability to the types of farming, soils, moisture and climatic conditions of the local community (23, p. 116). Loreen, Supervisor and Teacher Education Director in Washington State, ties the use of the school farm even more for the use of farm and non-farm boys in his statement, "The school farm could provide specific work experience for boys who might not otherwise get the desired kind of work experience (23, p. 116)."

Land laboratories or a school farm have great value as a teaching aid and should be considered by any school with equipment and land available.

School farms should be "maintained as a part of the instructional program (31, p. 278)." Snell (33, p. 198) gives a good outline for the purpose of school farms in the state of Maine,

> The major purposes and use of school farms and group farming enterprises, and the only ones for which they may be justified, are as follows:

1. To provide worthwhile experience for students which will assist in developing operational and managerial proficiency as farmers: the justification for such enterprises being that more experience, or better experience can thus be provided than through individual farming programs alone.

2. To demonstrate recommended practices.

3. To provide experience in cooperation.

4. To provide opportunities for individual farming programs for students with inadequate opportunities elsewhere (31, p. 196).

Public Relations

Many times we fail to realize the importance of public relations between the agriculture department, the school, and the community.

> Good public relations are one of education's important duties today. During times such as we are experiencing now when the educational plants and facilities are costly, it is ever more important to stress good public relations (30, p. 93).

To create good relations with the school and the community one may use field days at school where the students, parents and others interested in what is being done are invited to participate in a day at school where the students explain what they are working on. This will help to improve the interest of the community and as Crandall (10, p. 89) states:

> In addition to the experience and information obtained by the pupils in the Vo-Ag department, a field-day for parents and other members of the community was held for public relations and to present information gained by the test plots.

When interest comes from without the department, it is time to take a good look at what you are or are not doing. Some schools believe they cannot participate in a school farm or laboratory-type program because of costs, management and time. This was the same idea held at New London, Wisconsin. They felt "duty bound to provide as many learning experiences as possible." They also felt that "it is not feasible in our community," but

> . . . the Board of Education purchased 27 acres that is being used in test plots for grain, alfalfa variety trials, corn variety plots, fertilizer demonstration plots on corn, weed control plots and plots for cultivation demonstrations (19, p. 56).

School farms should not be attempted without the whole hearted backing of the school board and the administration. The instructor must be willing to spend long hours, especially at peak seasons.

Demonstration Plots

Not all schools have large areas for utilization. Some lack ground for production, but they can usually find room for a small test plot of varieties, production tests, or fertilization trials. In Spencer, Iowa, test plots give the students an opportunity to work and see the difference between varieties of crops and the increase in

production possible by using various rates and kinds of fertilizer (26, pp. 211-212).

Unfortunately, some school land is a weed patch. This is wasteful. Not using this land in the agricultural curriculum is similar to having an unused school building.

Good demonstration plots will serve the school, community and the students in the following ways: (1) it will be an example to all, (2) it will be a challenge to the community to clean up and improve their areas, (3) it will give students enrolled in vocational agriculture an opportunity to secure practical experiences and direct applications of class-room study, (4) it will afford an opportunity for classes in botany, biology, general science and agriculture to study nature first hand, (5) it can help encourage students and the community in which it is located to have more interest in nature and help to see the need for new and better plants (13, p. 237).

The value of demonstration plots can best be explained in the statements of Ashby (2, pp. 244-245).

> I was made aware of the great value of demonstration plots as teaching aids when such plots are established by the vocational agriculture students. In every community it seems that there are the innovators and early adopters that hasten to put into use the new techniques and practices that are being developed. However, among a great many farmers, there seems to prevail a "wait and see" attitude. This often results in a time lag between the first awareness of a new practice and the adoption of such a practice on a farm.

To partially eliminate this time lag from awareness to practice, the school farm demonstration plots can help by bringing into the area new and improved materials to show what it will do under local conditions. Ryder states, "Making use of demonstration plots in an FFA crop project is a way of securing some of the improved practices in the boy's own crop projects at home (22, p. 32).

The question now to consider is just how big of an area and how intensive should one go in setting up demonstration plots? This is answered by McPheron in his statement "I suggest you go ahead and try to set up two to four good experiments and carry the experiments to completion (25, p. 230)." This is good advice for it is easy to get too involved to where nothing is completed and evaluated. The statements made by Pfleiderer (27) and Gentry (16) explain the exact role of the school demonstration plots, "When we speak of a demonstration, we in Ohio refer to the trial of one or more approved practices (27, p. 21)." "The major role of the school farm is its use as a laboratory for the demonstration of improved farm practices (16, p. 33)."

One of many improved practices being taught in agriculture classes is the proper use of fertilizers. Fertilizer test plots are very worthwhile in an agricultural education department. The program should be set up to show differences in rate of application and types of materials. Try to have area where it can be viewed by the

community conveniently. "Through trials the vocational agriculture department can render an important community service and improve public relations (38, p. 16)" by showing the people of the community what happens when fertilizers are applied to crops and lawns. By using different rates they can evaluate for themselves which of the applications will best fit into their program and planning. In order that every student in the department has an opportunity to participate in this work, "school class time should be used in establishing the test plots (29, p. 32)."

Large Areas

The use of demonstration plots can and should continue over into the larger areas of production as the next step in checking for proper varieties, fertilizer application rates and proper management of crops.

When schools are large and can afford a large farm, one that will be self supporting and one which will justify a farm superintendent or manager, this should be used to give the students the actual practice of farm management and on-the-job experiences. This is being done at many schools throughout the country and each one has set up standards and goals for which they are working towards. One such school is the Bristol County Agricultural High School, located in the township of Dighton in southeastern Massachusetts. It is

> . . . one of very few schools on the high school level in the United States to utilize its own school farm as a practical farm laboratory to introduce students to various farm practices and to develop their skills in farm operations (18, pp. 275-276).

This school has 235 acres on their school farm where "each student has the opportunity of participating in all of the seasonal operations of the farm." How better can they learn proper methods and ways of doing than by actual experience? Their high school farm would put many a college operation to shame for they have a large variety of materials for student use. Their 235 acres of land is divided into seven divisions: (1) poultry, 1500 laying hens, 150-200 turkeys, both for production and breeding purposes; (2) farm crops division, used to produce feed for animal husbandry division and consists of producing pasture, hay, grass and corn silage. It covers 75 acres and produces an average of 75 tons of grass silage, 150 tons of corn silage, and 75 tons of hay; (3) the market garden and orchard division consists of about 11 acres with eight acres in potatoes and corn and a variety of other vegetables grown commercially in the area. The rest of the acreage is in apple orchards; (4) the animal husbandry department has 25 dairy cows, replacement heifers, Hereford beef stock, Shropshire sheep, Yorkshire brood sows, and other dairy animals; (5) their greenhouse has 5,000 square feet under glass for floriculture and greenhouse work. The big growth is in the landscaping and home grounds department where they practice ground

layout, beautification, ornamental planting and maintenance (18, pp. 275-276).

Smith's Agricultural School of Northampton, Massachusetts has set up a school farm for the purpose of giving the students the practical experiences of learning by doing. The farm consists of 93 acres of ground inside the city limits of their city of 30,000 people.

The school farm is well equipped and provides excellent opportunity for practical training and experiences. "The cows and poultry are better than average, yet not of such high value that inexperienced boys are denied the practice of working with them (32, pp. 65-66).

What about large cities? How can they offer agricultural classes and use a school-land laboratory? The Los Angeles City Schools have one of the largest and oldest agriculture programs in operation. In 1908 agriculture became part of the school curriculum in the Los Angeles City Schools (24, p. 20). With the increased urbanization and industrialization they found that less opportunity was afforded students to have agricultural experiences which normally come from living in rural environments.

> Therefore, today's students have little appreciation of the importance of agriculture in their every day lives. It was upon this basis that agriculture was and is today an important part of the Los Angeles City School system.

When looking at the "why's," for agriculture, it is easier to

see the need for a basic survey of the high schools in the area of this research paper and to see what can be done to better community relations and enhance school instruction in this important part of our economy. These ideas are best stated by the supervisor of secondary agriculture, Los Angeles City School District (24, p. 20):

> The basis upon which our agriculture program is founded may be divided into two categories. First, there is the area of general education:
>
> 1. Agriculture is basic to life which should be understood by all students.
>
> 2. It develops in the student understanding and appreciation of agriculture and its relationship to all citizens.
>
> 3. Agriculture applies the basic facts, knowledge and skills in the plant and animal sciences.
>
> 4. It develops in students good work habits, proper attitudes and ability to accept responsibility.
>
> 5. Students of all abilities may find opportunities for self-expression and creativity.
>
> 6. Agriculture teaches students appreciation for nature and the creation of more attractive home environment.
>
> Secondly, there is the role of agriculture in the American way of life:
>
> 1. Every citizen is dependent upon agriculture for food and fibre.
>
> 2. Greater understanding between city and farm people is essential to the solution of American economic and social problems.
>
> 3. Forty percent of the U. S. work force is employed in occupations directly related to agriculture.

4. For each job in production agriculture there are six jobs in related agriculture fields.

5. As the potential for supplying the needs of agriculturally trained people decreases in the rural areas, the greater is the need to search out and train urban and suburban students to meet these needs.

Based upon the above statements, the Los Angeles City Secondary Schools recognized the following basic interests of boys and girls as a foundation for planning our general agriculture program:

1. Natural curiosity in living and growing things.

2. Desire to explore.

3. Desire for self-expression.

4. Eagerness to demonstrate ability.

5. Desire to achieve success.

6. Desire for recognition.

7. Desire for confidence of others.

8. Desire to be happy and receive enjoyment from what they do.

9. Desire to be practical rather than theoretical.

10. Desire for immediate application of their learned skills.

Having recognized these interests of students, we established broad educational objectives which the general agriculture program can accomplish. They are to help the student:

1. Appreciate living things.

2. Appreciate beauty.

3. Develop proper attitudes.

4. Accept responsibility.

5. Develop useful skills.

6. Develop good work habits.

7. Improve their knowledge of the three "R's" through the application of these fundamentals.

8. Develop the spirit of cooperation.

9. Develop appreciation for outdoor living as a part of a healthful life.

10. Develop good citizenship.

11. Develop avocational interests.

12. Develop vocational interests.

The curriculum developed to accomplish these objectives includes junior and senior high school courses of study with a continuity of instruction from the seventh through the twelfth grades.

The manner in which the Los Angeles City School District achieve their aims and goals is by having students, boys and girls, working in rose gardens, arboretums, flower variety gardens, and vegetable gardens on their school-owned lands. Of 68 junior and 49 senior high schools, 50 junior and 30 senior high schools have agricultural programs. Six of the 30 high schools have a vocational agriculture department with seven teachers. They have a total of 83 agricultural teachers with an average of 20,000 students a year enrolled in one semester or more of agriculture. Their average class enrollment in junior high school is 26.9 percent and in the

senior high schools 25.1 percent of total enrollment. The success of their agriculture program indicates the possibilities for our area (24, p. 22).

School-land laboratories cover many areas which include greenhouses, lath houses, including potting room and hot frames, nurseries, small fruits, vegetables and truck crops, turf plots, lawn and putting greens, arboretum and picnic areas, wildlife refuges, forests, and field crop demonstration areas. There laboratories run from small plots to large acreages but most of them average one and one-half to two acres (5, p. 18).

At Alvirne High School in Hudson, New Hampshire (4, p. 79), the number of hours spent on the school farm per student vary from 100 to 600 hours per year. All students have an opportunity to work at various enterprises during the years spent in high school. They have dairy, poultry, forage crops, vegetable gardening and forestry. Hagenbuck (17, p. 132) explains how each should be handled. "The boys do not do farm chores beyond the learning stage and jobs are rotated from day to day." This helps to eliminate the drudgery of day after day working at the same job.

Disadvantages of a School Farm

One should realize that land usage is not always the ideal thing for his specific school. The major disadvantages of a school farm

are given by Warren (36, p. 49).

1. Teacher vulnerable to financial liability.
2. Requires too much of the teacher's time.
3. Too much responsibility for one teacher's time.
4. Located too far from school to be used effectively.
5. Requires too much of students' time.
6. Causes friction between the teacher and the school administrator.

Along with the lack of finances, equipment, time, and students not available when needed to do the work, there is always the problem of administration and community backing.

Evaluation of a School Farm

How should one go about evaluating a land laboratory or school farm, or even test plots? This is one of the hardest parts of the entire program; that of true evaluation.

Welborn (37) gives one of the answers to this problem in his statement, "The success of the school farm should not be judged by profit and loss alone. Education and the 'learning process' should be the primary purpose of the school farm (37, pp. 79-80)."

CHAPTER III

COLLECTION OF DATA AND UTILIZATION OF SCHOOL-OWNED LAND

Collection of Data

School-Land Questionnaire

The collection of data useful in determining school-land usage started March 6, 1965. At that time a tentative questionnaire was formulated and submitted to the Agricultural Education Department at Oregon State University for suggestions. The revised questionnaire was then submitted to Vocational Agriculture instructors in the Columbia River District to determine reliability and singleness of thought of each question. Final revisions were made and the questionnaire was mailed to 100 high schools having agriculture in their curriculum at time of mailing in western Oregon (west of the Cascades), southwestern Washington, and northwestern California. A copy of the questionnaire is included in the appendix. The random sample was suggested by the State Directors of Vocational Agriculture in Washington and California.

Information received from the questionnaire dealt mainly with whether the high schools with vocational agriculture had land available and if so, was it available and usable in their vocational agriculture program?

Of the one hundred questionnaires sent to vocational agriculture departments, 85 were returned with the majority reporting land available to them for usage in their vocational agriculture curriculum.

Analysis of Data

Mr. Byron J. McMahon, Chief, Bureau of Agricultural Education and Director of Vocational Agriculture in California, selected ten high schools that he felt would best represent the area. Questionnaires were then mailed to each.

The acreage reported available and usable in the vocational agricultural curriculum ranged from 20 acres to 100 acres. The usage of the land varied as well as the acreage. The schools answering the questionnaire reported that the land was being used in test plots, row crops, small grains, alfalfa, irrigated pasture, Christmas trees, and timber. One of the new departments reported that the land could be used if they had water. Three of the four schools reported that the land was connected to the school ground; the fourth school said that the land was only three miles away.

In southwestern Washington 31 schools were selected with the aid of Mr. Bert L. Brown, Director of Agricultural Education, Olympia, Washington. The schools reporting land available and usable ranged from one-half acre of school lawn for grass management and fertilizer trials to 75 acres of school forest in Douglas fir and alders. One of the new schools reported that they were in the

process of obtaining 70 acres of state school land on an 88-year lease to be used for pasture and a forestry laboratory. Most of the school land in western Washington reported on the questionnaire was being used for forestry, pasture, grass and clover trials, and alfalfa variety trials. Only one of the nine schools reported fruit trees and cane crops along with nursery or forest plantings.

In western Oregon (west of the Cascades) all schools with vocational agriculture currently in their curriculum received questionnaires. See Table I.

TABLE I

RETURNS FROM QUESTIONNAIRES

State	No. Sent	No. Returned	No Land	Land Available	Percentage Returned with Land Available
California	10	7	3	4	57.1
Oregon	59	54	17	37	68.5
Washington	31	24	15	9	37.5
Total	100	85	35	50	58.58

The return of 85 percent of questionnaires mailed indicated that over half the schools have school land available for usage in the vocational agricultural curriculum. Not all of the schools reporting land available have access or usage of the land owned by the school district.

The acreage ranged from two and one-half acres in weeds to 120 acres in grain production. The distance from the school ranged from 0 to 18 miles away. Of the schools in western Oregon reporting land usage, the largest number of acres was in small grains and the least acreage was shared by fruit trees and dairy farm.

Table II lists the breakdown of how the land was being used and the approximate acreage in each category.

TABLE II

WESTERN OREGON SCHOOLS REPORTING LAND USAGE*

No. of Schools Reporting	Land Usage	Approximate Acreage
12	Small Grains	335
6	Evergreens	223
5	Alfalfa and Grain Trials	90
3	Alfalfa Hay	58
2	Pasture	49
2	Crop Diversion Programs	39
2	Row Crops	23
2	Grasses	20
4	Weeds and Native Grasses	14
1	Fruit Trees	5
1	Dairy Farm	5

Table III shows how many of the schools reporting land available are using it and schools reporting land owned but not available or usable in the vocational agriculture curriculum. One school reported land available but no equipment. They plan future use in pasture and fruit trees.

Reasons given for land not being usable in the curriculum consisted of too far from school, in trees, all brush, too steep, no top soil, poor drainage, and lack of water for sustaining plant growth.

Land not adjacent to school grounds ranged from two to three miles away, with some as high as 18 miles. This makes it difficult to use the land in the school curriculum with only 55 minutes of class time. Most of the time would be spent in travel to and from the land, leaving little time for work experience. A weekend or half-day program would be needed to travel the distance and accomplish anything of instructional value.

Findings

The returned questionnaires show that most schools in the surveyed area have school land and are using it in their vocational agricultural program. Ten schools reporting land owned and used in their vocational agricultural program were visited. The purpose of the second questionnaire and personal visitation was to obtain specific information concerning:

TABLE III

HOW SCHOOLS REPORTED CONCERNING THE SCHOOL-OWNED LAND

State	Land Available and Used in Curriculum	Land Owned But Not Available for Usage	Land Owned But Not Usable in Curriculum	Land Connected to School Grounds	Total Schools Reporting Land Owned
California	3	0	1	3	4
Oregon	28	4	5	25	37
Washington	7	1	1	4	9

The way land was being used and to determine the extent of involvement of students, instructor, or farm manager on each of the crops or projects undertaken by the department of vocational agriculture.

What percentage of the school land is being used in the instructional part of the program?

How much, if any, of the land is used for work experiences for non-farm students and the number of non-farm students being involved with the program.

What is the usage of school land if not in the instructional part of the agricultural program?

Are trials being used in the program? Are they concerned with chemicals and fertilizers? If so, what are the rates and materials being applies and who applies them?

What type of land is owned? (good, fair, poor) What are the limiting factors that determine the program on that specific field or area?

Is the land irrigated? What type of irrigation is used?

Schools visited were selected with assistance from the Department of Agricultural Education at Oregon State University.

A second questionnaire was developed (see appendix). Information gathered was specific and to the point. The first question asked how many instructors were in the school teaching vocational

agricultural subjects. Of the ten schools visited seven had one instructor; one school reported one and one-half men in the department; and two schools had two and one-half men. (See Table IV.) One of the schools reporting two and one-half men actually have four and one-half men--three of them are in the department half-time, with two teaching other subjects the rest of the day, the third man teaches vocational agriculture one-half day and is farm manager the other half.

Question two dealt with a farm manager. Four of the schools reported a hired farm manager other than the instructor. In two schools not having a farm manager, the first man teaches part-time and has released time to manage the school farm.

Questions concerning land connected to school grounds, acres rented, owned and total acres used in the department can be seen in Table IV. It is interesting to note that schools are using much of the school-owned land for money-making projects for the Future Farmers of America. One school requires each Future Farmer to work four hours per year on the school farm. This work can be done any time. Five of the schools have land available for non-farm boys' projects where they can learn by doing. Table IV shows that none of the ten schools are using school ground for individual student projects. Schools reporting acres used for non-farm student projects do so on a work experience program; the land remains in the department.

TABLE IV

RESULTS OF PERSONAL INTERVIEW OF TEN HIGH SCHOOLS REPORTING SCHOOL-OWNED LAND

	Schools										Total
	Albany	Banks	Central-Linn	Clackamas	Forest Grove	Hillsboro	Lebanon	Molalla	Rainier	Sherwood	
Number of instructors	1	1	1	2 1/2	1	1	1 1/2	2 1/2	1	1	13 1/2
Farm manager	No	No	Yes	Yes	No	No	Yes	No	Yes	No	
Land connected to school ground. If no, how far away.	Yes	Yes	Yes 27a No 26a 15 m	No 3m	Yes	No 3m	No 3m	No 1 & 3m	No 3-4	Yes 3 No 30 1/4m	
Acres owned	0	6	27	28	10	48		35		33	187
Acres rented	11	0	26		6		34	85	5		167
Total acres	11	6	53	28	16	48	34	120	5	33	354
Acres used in ag. dept. for instruction	11	6	53	28	16	48	34	120	3-4	33	353
Acres used for non-farm student proj.		1/2	5	28	2		10				45 1/2
Number non-farm student projects		1	2	5	1		8				17
Acres used by FFA for money-making proj.			47		10	48	5	120	5	33	268
Acres used by individual students											
Other uses of school	To be used for dist. work exp.	Work exp. in class Tractor driving	Student work exp. Tractor driving & survying Orchard	Non-farm boys work exp. Pigs 100 Sheep 34 Beef 14	Trees Berries	Tractor driving	Tractor driving Picnic area Pasture 11 sheep 32 pigs	Tractor driving Pasture 5 cows & calves 13a	Non-farm boy work exp.	Tractor driving Spraying and equip. handling	

Materials grown are sold or used by the vocational department. One school raises grain as a Future Farmers of America money-making project and then sells the grain to the Future Farmers for their livestock projects. Some of the school land is being used as pasture for livestock: chapter beef, sheep or swine chain animals. (See Table IV.)

Albany High School is now in the planning stages. They have ground on a 99-year lease with sprinkler irrigation. The condition of the ground is good, but tile is needed. Albany has plans to purchase machinery to till and work the ground.

Banks High School has six and one-half acres connected to the school grounds which can be farmed. The soil is poor with heavy clay six to eight inches deep. Since the land is low, each year half of the area is flooded with runoff water from higher areas. This past year wheat was planted prior to fall rains. Plans were made for 350 pounds of 20-20-20 per acre. Weeds are a big problem. Spray trials are in their third year to see what type of material and what amount per acre are most effective on Canadian thistle. These trials are under the direction of the county agent and plans are to continue them one more year to see how much regrowth there will be. (There are 22 plots ten by 100 feet with five different materials.) Closer to the school there is a half acre in trial plots: 30 rows of grasses, 12 rows of clovers and three rows of alfalfa. One-half acre of trees were planted four years ago. Students do half the work on school

land, leaving half to be done by the instructor. Part of the land is used each year to teach freshmen how to drive a tractor and operate basic farm equipment. Equipment owned by the school consists of a 1967 John Deere 1020 tractor, plow, disk, harrow, and a leveler that was built by the agriculture construction class.

Central-Linn High School's rented land is good, but the land owned by the school district is poor. The land being used is non-irrigated with limiting factors of wet soil and lack of lime. Seven acres of wheat received 600 pounds of fertilizer--16-20 at time of planting and 21-0-0 applied in the spring. The same fertilizer program was used on five acres of fall barley. On 22 acres of spring barley 250 pounds per acre of 21-0-0 was used at time of seeding. On four acres of orchard grass for seed the same fertilizer program was followed as on the fall grain. The same amounts were applied on eight acres of Harding grass seed. In Brownsville four acres of fescue hay received 200 pounds of 16-20 and 200 pounds of 21-0-0. At Shed five acres of fescue hay received 225 pounds of 21-0-0. Carmex is used for weed control at different rates. The following results were obtained:

Wheat	2 pounds per acre	poor results
Barley	1/2 pound per acre	good results
Orchard grass	3 pounds per acre	good results
Harding grass	4 pounds per acre	poor results

The spraying was done by a commercial company about the same time

of year. Other than spraying, farm work is done by students. Other uses of school land consist of tractor driving, surveying, tilling, ditching, and an orchard consisting of 18 walnut trees. The Future Farmers of America chapter finances two boys with a project consisting of eight and one-half acres of filberts. Six and one-half percent interest is earned on the money. Central-Linn's equipment consists of a 1967 Case 430 tractor, plow, disk, auger, roller, leveler, harrow, trailer, and combine.

Clackamas High School will have a new school farm next year. The farm now in use by the agriculture department is three miles away; the new farm will be approximately six miles from the school. The total acreage is being used for a district work experience program. They have eight acres of wheat fertilized with 200 pounds of 16-20, 18 acres of pasture with 400 pounds of 5-10-10, and six acres of oats and vetch with 200 pounds of 16-20 per acre. The work on the farm is done on a fifty-fifty basis. Students do half and the farm manager and instructor do the other half. The nursery plot consists of three-fourths of an acre of azalea cuttings and 200 plants of eight different tomato varieties. Six different fertilizers are used on the tomato variety trials. Work on the trials is being done by students. The land is not irrigated and would have to be classified as poor because of a heavy clay layer 12 inches deep. The land needs lime, which is being applied at the rate of two tons per acre. Their

equipment consists of a 1967 Case 430 tractor, loader, rotavator, side delivery rake and cultipacker, all for the 1967 Case tractor, and a cultivater and two sprayers which have been at the school for years.

Forest Grove's high school farm is non-irrigated and only fair because of weeds. They have four and one-half acres of wheat and ten acres of barley. Fertilizer was applied at 300 pounds per acre of 16-20 at time of seeding. Christmas trees are on one and one-half acres and cane berries on one-half acre. Students do most of the farm work. The equipment owned consists of a 1967 John Deere 1020 tractor, plow, fertilizer spreader, drill, harrow, disk, spring-tooth harrow, and a rotatiller.

Hillsboro High School has 23 acres of wheat on which 250 pounds per acre of 10-20-20 and 16-20 are used at time of seeding. One hundred ten pounds per acre of 45-0-0 is applied in the spring. On 23 acres of barley they use 250 pounds per acre of 10-20-20 and 16-20 at time of seeding. In the spring 75 pounds per acre of 45-0-0 was applied. The school has two acres of filberts. Trials consist of fertilizer rates on the wheat and barley. Students do the work on the school farm. Part of the land is used for instruction in tractor driving. The land is non-irrigated and classified as good with limiting factors of wet soil in one corner.

Lebanon High School has an area which provides an opportunity

for many programs. Their soil varies from rocks to good soil and from clean farming ground to timber. On the farming ground they are producing the crops shown in Table V.

TABLE V

CROPS BEING GROWN ON LEBANON HIGH SCHOOL FARM

Crop	Acres	Fertilizer	Amount per Acre	Work done by	
				Boys	Farm Manager
Grain	3	16-20	300	1/2	1/2
Corn	1	10-20-10	300	3/4	1/4
Pasture	6	16-20	200	1/2	1/2
Garlic	3/8	16-20	400	1/2	1/2
Black Raspberries	3/8	5-20-20	300	All	
Strawberries	1/2	10-20-10	10-20-10	All	
Fruit Trees	2	Still to be planted			
Timber Forest	20			All	
Tree Nursery	400 trees			All	
Horticulture Nursery	1/2			1/2	1/2

Other uses of the school farm are: recreation areas, fire control stations, picnic area, and pasture for 11 sheep and 32 pigs.

Molalla Union High School has one of the larger farms in the surveyed area. The land is non-irrigated, ranging from fair to good soil. The limiting factors are rocky spots and weeds. They are producing the crops listed in Table VI. Their Future Farmers of

TABLE VI

CROPS BEING GROWN ON MOLALLA HIGH SCHOOL FARM

Crop	Acres	Fertilizer	Amount per Acre	% of Work done by	
				Boys	Instructor
Fall Grain	57	7-23-17	450	90	10
Spring Grain	32	10-20-20	400	90	10
		33-0-0	100		
Grass Hay	6	33-0-0	400	90	10
Pasture	25	Nitro-pills	400	90	10
Timber					
Douglas fir	13			100	
Christmas trees	7			100	

America chapter requires four hours of work from each chapter member per year on the farm. The livestock on the farm consists of five cows with calves and four yearlings on 13 acres of pasture. One boy is responsible for the animals' care and in return has one of his animals on the farm. Their equipment consists of a 1967 Massey-Ferguson 135 tractor, plows, disk, harrow, back blade, grain drill, fertilizer spreader, subsoiler, implement trailer, and a Swedish spring tooth harrow.

Rainier High School's farm consists of five acres of good irrigated soil. The irrigation is done with sprinklers. The limiting factors are wet ground in the lower end and quack grass. They have one-half acre of blackberries and one and one-half acres of blueberries which make a border on two sides of the field which is

fertilized with 33 percent ammonia at the rate of one-half pound per bush. Three-fourths of an acre is divided equally between tomatoes, carrots, cucumbers, peas, beans, and corn. These are fertilized with 640 pounds per acre of 20-20-20. The work is accomplished on a fifty-fifty basis between the boys and the instructor. They have a 1950 David Bradley garden tractor and equipment.

Sherwood High School has 33 acres of school farm which is non-irrigated. The soil runs from poor to fair, being run down is the limiting factor. There are 18 acres of wheat fertilized with 100 pounds per acre of 18-18-18 at time of seeding and 100 pounds per acre of 46 percent nitrogen in the spring. Fertilizer applied at time of seeding is according to soil tests and recommendation of the county agent. Work on the school farm is done on an 80 percent students and 20 percent instructor basis. Other uses of the farm consists of tractor driving, equipment operation and spraying. Their equipment consists of a 1967 Oliver 500 tractor with plows, disk, field cultivator and a harrow.

The type of equipment being used on each school farm visited depends on the local implement dealer and his willingness to work with the school.

The following question was asked of each instructor, "Would you recommend that all vocational agriculture departments have land and use it in their program?" The results were in the majority

"yes," but with qualifications. Listed below are the qualifications that were given by the different instructors for having a school farm.

Yes, if:

> Only if real close to school and it must have the school's support.
>
> If organized properly.
>
> Providing the teacher has proper experiences.
>
> If student-work experiences are for those not having the opportunity at home.
>
> If you have time to supervise it properly, otherwise it is too many headaches.
>
> In laboratory situation.

Three of the schools gave an unqualified "yes" to the question. Only one teacher gave a negative answer to the question and qualified it as follows: "Unless they use it effectively. How is it used in the classroom? Who keeps records on it?"

Some additional comments were: "How is it financed? Who is responsible for bills? Who pays the insurance? Who determines what to grow? What about instructor's liability? Who gets the profits, if any?" A majority of the instructors in the ten schools visited feel school farms are good and should be used in the vocational agricultural program to give students the opportunity to gain experiences in farm management and operation.

Methods of Utilizing School-Owned Land in the Vocational-Agriculture Curriculum

Lawns

Some schools are limited to school lawn areas. This area can be used to demonstrate types, mixtures, and rates of fertilizer applications on a section of the school lawn. The area should be large enough for each application to be free of leaching or running together of different materials and rates of application. A fertilizer plot should be at least three feet square and preferably five feet by eight feet to allow better evaluation of the center of the test plot.

When plots are laid out they should be in three separate locations, each area the same as the other to check for soil and water differences. When selecting test sites or trial areas, the failure to consider cuts, fills and back fill around the school buildings may mean good results or failure of the test if they are all in one area.

Another variable that must be considered when working with fertilizer tests, is watering. Is each foot of lawn area receiving the same amount of water at the same time of day, or is one nozel plugged, larger, or applying more water than the others? The rate of application, time of day and amount of sun or shade will affect the results of any type of test on lawn areas.

When selecting trial areas, try to obtain a true sampling of

the area under normal conditions. This is needed to obtain positive results and to show the need of fertilizers on lawns for proper growth and color. Care must be taken in selecting areas in the shade. They should be shaded at the same time and the same length of time each day.

Fertilizer can usually be obtained free for trials from local feed and seed stores or county agents and fertilizer companies. These organizations are looking for places to demonstrate the products they are selling. Time of application of fertilizers should be as close as possible to what is the local practice.

The biggest problem with using fertilizer trials in the area of the survey is rain and leaching. Fertilizer should be put on in three applications. The first application should be soon after school opens in September. This application should be low in nitrogen and high in phosphate for slow top growth and good winter root development and food storage.

During winter, classes should check the area for growth, color, winter kill and diseases. Early spring application of high nitrogen after the heavy rains but prior to the last rain, will give the lawn a good spring start and help get it ahead of weeds, diseases and insects. After spring application students should compare the different areas for responses in growth, recovery from diseases and insect damage, color, texture of lawn, smoothness of growth, thickness of

stand, and recovery after mowing.

The third or summer application of fertilizer is usually the most difficult to apply and may even be eliminated due to lack of labor at the end of the school year; it should be applied in early summer prior to hot weather. This application should be lower in nitrogen than the spring application but should be a complete fertilizer. Phosphoric acid and potash are needed by plants for proper growth and conversion of nutrients into plant usage. A good balanced fertilizer will help keep the lawn greener throughout the summer with less water than if no fertilizer is used. Care should be taken each time fertilizer is applied to see that it is washed from the grass blades and not left to burn the grass by pulling moisture out of the grass blades.

In connection with fertilizer trials in an established school lawn, one should set up cutting demonstrations to show students and the community proper height for cutting lawns. To some, this may appear to be of little value and time consuming; however, the University of California at Davis has extensive trials on individual grass varieties used for lawns in California. They have planted trials eight feet by ten feet side by side and run lawn cutting height trials across the plots, cutting at one-half, one, one and one-half, and at two inches from the ground. Trials such as this will show the proper heights for cutting lawns in three ways: One, the plots cut too short

will take more moisture and fertilizer to keep them as green as areas cut at a higher level; two, diseases will come into varieties weakened because of too close of cutting; and three, varieties that are designed to be cut at higher levels will soon die out, leaving bare ground for weeds and undesirable grasses to move in.

Clipping trials should be included with fertilizer and mowing trials. This means grass clippings when mowed are left to be watered down around the base of the plants to decay and become mulch to stop evaporation. Students should see a big difference in growth, color and lack of weeds in areas where clippings are left. Evaluation should be made just before school lets out in the spring and especially when they return in the fall. Boys without area at home for projects, who live close to the school, could use this as a project and run evaluations through the summer and report their findings when school convenes in September.

Variety Grow-Out Trials

Variety grow-out trials can be utilized on small areas as well as on a large-scale basis. The main thought or question when using variety trials is, what are we trying to prove, or what are we trying to see? It is easy to say we are testing variety A against B and C, but what are the standards being used to evaluate the results?

The grow-out trial plots should be large enough (3 feet by 5 feet) for center-of-plot evaluation. The reason for using the center of the plot for evaluation is to eliminate any contamination or variations on the edges of plots. The results of a plot may be completely different from what would be obtained under ideal field conditions. Run the trials several years before deciding on a specific variety as best for they will vary from year to year. Whenever possible have variety trials in the middle of a production field so each of the varieties in the trials will receive proper moisture and protection from sun and wind. Trials should receive fertilizer at the same rate and time as the field they are growing in. Trials should not be placed on the end or along one side of the field if accurate results are expected. The ends and edges of fields are usually not worked as well as the rest of the field due to compaction by running over with equipment while the field is being prepared and seeded. Repeat trials in several areas of the field as many times as possible for greater accuracy and a truer evaluation of trial varieties.

Most of the surveyed area use sprinkler irrigation. This adds another problem for trials grown on the edge or end of fields. To obtain proper moisture in the trial areas at ends or edges of fields is a big problem due to wind and lack of sprinkler overlap.

Don't overlook the small, short-row trials, three feet or less in length. They can be used to show different kinds and varieties of

crops, grasses, and trees grown in the local school area. Plan to plant some of the non-adapted varieties in the grow-out trials to show why it is unwise to send to another part of the country for advertised seeds that haven't been proven adapted to your area. They usually won't mature in time for harvest and are of no value production wise, yet they demonstrate an important principle that crops have to be area-climated if you expect to harvest a crop. On the other hand one may find new varieties that do better under your conditions.

A good, small variety trial was located on the southern coast of Oregon, below Port Orford, where a farmer had obtained enough seed to plant rows two feet long. Several varieties of grasses were used to see which were best under his conditions. He had fifteen grass varieties growing in rows twelve inches apart and much was learned from this small variety trial for that area.

Banks High School started a row trial program this last school year. Early last fall the students in plant science planted 52 varieties of grasses and legumes in rows twenty-four inches apart and 60 feet long. Along with the 52 separate varieties, they planted 28 plots (10 feet by 20 feet) of grasses used in our area for lawns. Some of the plots are straight varieties while others are common mixtures used locally.

In the spring the boys fertilized across the rows and plots with different kinds of fertilizer materials and varied the rates to see

which responded best under our conditions. In the lawn grass plots of 10 feet by 20 feet, mowing height trials are being run by boys this summer. Some of the area will be cut at a height of one-half inch, other areas at one, two, and three inches. Clippings will be allowed to fall to the ground and remain there to decompose and become part of the soil structure in all but one strip area. When school starts next fall, the boys will evaluate each individual plot in terms of growth, color, stand, and weed and disease resistance. They will check for differences in short cutting compared to those areas cut two and three inches above the ground.

Grass-Variety Trials

A pasture grass varieties trial should include common rye, perennial rye, orchard, alta fescues, and in some areas reeds canary grass, along with the new tetraploid grass varieties. Each variety should be staked and labeled so differences in germination, seedling vigor, leaf development, and seed-head production can be observed and recorded. Each of these periods are important to the producer as they should be timed to his program of pasturing or seed harvest. Different varieties reach their maximum production at different times of the year. A person planting a new pasture should keep in mind the time of year pasture is needed most and then plant a mixture of varieties which reach maximum production at that time.

The varieties needed can be selected from those in the row trials which correspond with his needs. If a late summer pasture is desired, you would not want an early variety that has set seed before the time it is needed, nor do you want a variety of low palatability unless it is the only one that will produce under the conditions present.

Fertilizer Trials

Fertilizer trials can be a big help in teaching the need for fertilizer if properly laid out.

Fertilizers banded at time of seeding two inches to the side and two inches below the seed are showing best results for fertilizer applications.

When planning fertilizer trials, be sure to have areas with no fertilizer. Plan to overlap plots a foot or more to show a difference where the two rates are together or when two different materials are used. If it is a trial for rate of application only, it is quicker and easier if they are lapped. A third application is the lapped area.

Fertilizer trials should be long enough to allow cross strips of lime, broadcasted and also drilled in rows at different application rates. Lime is one element which should be included in every fertilizer trial since it is becoming more important each year with the rapid movement of legumes onto sub-marginal lands. In western Oregon rates on lime for legumes range from two to eight tons per

acre, depending on the past history of the field.

In the Newport area lime was drilled with the seed and fertilizer all together. They used 200 pounds lime, 200 pounds of super phosphate and seed for one acre. All three ingredients were mixed in a concrete mixer and then put into a grain drill and seeded. It was found that the seed and phosphate prevent the lime from bridging over in the drill, allowing proper flow out of the drill when seeding. The results of the trials show that 200 pounds of lime drilled with the seed equal four tons broadcasted and worked into the ground prior to seeding. For areas interested in legume trials, this is by far the most economical method of lime application.

Variety grow-out trials are excellent ways to domonstrate properly the need for adequate balanced fertilizers. Run fertilizer strips across variety rows to show differences in varieties under different fertilizer application rates and mixture. When using fertilizer trials do not hesitate to run one application that will be more than plants may need or utilize to show effects of over fertilization. Each trial needs one or more areas without fertilization for a controlled check. Most seed companies, county agents and local seed and fertilizer dealers will help supply the seeds and fertilizers needed for a grow-out trial.

Chemical Trials

Chemical trials will be of more value if visable from a road or school room. Last year Banks High School put in chemical spray trials on Canadian thistles. Because of their location back of the school grounds, they are of little value in the program since they are only visited two or three times a year. This is not enough to show the important differences in chemicals and rates of application. The rate and time of kill is important and unless evaluation is made often, little difference in killing power of the different materials used is visable if evaluated only once a year. County agents will outline materials and application rates for your area.

Stress proper handling of chemicals. Students should be taught to read all of the label and do according to the manufacturer's suggestions for use and proper disposal of empty containers. Have them check and see if warning signs are needed around the area and remind them to let the people of the community know in advance for proper relations and education.

Size of Teaching Unit

The size of the unit can vary from lawn trials to large farms, but utilize each opportunity of teaching students the value of doing the job correctly regardless of size.

In the state of Washington at Centralia High School, they are utilizing the only ground available by running fertilizer and mowing heights tests on parts of the school lawn.

Clackamas High School, on the other hand, has a greenhouse area by the shop and a land laboratory two and one-half miles away where they have sheep, cattle and pigs, along with nursery stock, permanent pastures for the livestock and areas where students can grow grain crops on a percentage basis.

The smallest plots reported used were on school lawn cutting trials ten feet square; the largest reported consisted of over 100 acres in producing cash crops.

Principles can be taught as well on small plots as on large acreage and it may be easier on the instructor.

CHAPTER IV

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary of Findings

There is a lack of available information concerning availability, usability and utilization of school-owned land in western Oregon, southwestern Washington and northwestern California. It would be helpful to know if land is available for agricultural use, how it is used, and ways that it can be used to give experience and background to students who wish to go into agricultural occupations. A survey was made of this area by sending questionnaires to high schools currently offering vocational agriculture in the school curriculum. Eighty-five percent of high schools receiving questionnaires returned them. Fifty reported land owned by the school district, but not all of these schools have access or usage of the land for the vocational agriculture curriculum.

In northwestern California ten schools were surveyed. Seven returned questionnaires with four schools reporting land owned but only three schools had it available for use.

Southwestern Washington returns were much different than those of California and Oregon. Of the 31 schools surveyed, 24 questionnaires were returned with only nine reporting land owned by the school. Of these nine only seven reported it to be available and usable in their curriculum.

In Oregon (west of the Cascades) 59 schools were surveyed and

54 schools returned the questionnaire reporting 37 schools with school-owned land. Twenty-eight of the schools have available and usable land, four have land available but not usable, and five have land owned but not available for use in the vocational agriculture curriculum.

The largest acreage reported on the questionnaire was in small grains. Evergreens, mainly Christmas trees with some timber areas were second in acreage. Even though a smaller number of acres were involved, more schools reported the use of trial areas and test plots on their school land.

Other uses reported were: raising grains, alfalfa, irrigated pasture, row crops, timber, grass trials, fertilizer trials and chemical weed control plots. One school in Oregon reported the recent purchase of a five-acre dairy farm and the smallest area reported used was in western Washington where one school used the school lawn for fertilizer trials, weed control and mowing heights.

Those schools reporting land available but not usable in the vocational agriculture curriculum stated distance from school as the main problem. Others given were: in trees, no equipment, no water, no topsoil, used for play grounds, too steep and hilly, or unaccessible.

Most of the schools reporting land owned and usable also stated that the majority of the land was connected to the school ground. In California three of the four schools reporting stated the land was connected to the school grounds; western Oregon reported 25 of 37 schools having the available land connected to the school grounds; while western Washington reported four of nine with land connected

to school grounds. The majority of schools owning usable land connected to their school grounds have better usage of their land in the vocational agricultural curriculum where the travel time is held to a minimum.

Time to outline, plan, develop and use school-owned land in the vocational agriculture program along with students being available to do the work would be a big factor, since most students find work before or as soon as school is out, leaving the instructor to take care of and complete the projects started during the school year. The care of the school land along with project visits, fairs, contests, new program development, and self improvement in summer school and night school occupies the time of the vocational agriculture teacher to a great extent.

Conclusions

1. Before a vocational agriculture department and the school decide on using a land laboratory or the purchase of ground to be used in the agricultural curriculum, the following important points should be considered.
   a. The agriculture instructor must be willing to spend extra time after school, weekends and during the summer seeing that what students start have a chance to mature and be of

some educational value

b. The question, who will pay the bills, and to whom will profits go, if any? should be answered in writing.

c. Before any extensive work is done on a field there should be a written long-term agreement between the department, school or land owner to insure that one or two years of clean up and build up by the agriculture department will not end or be taken over for other uses about the time projects start to show profit or one can see results of proper management or conservation practices.

d. An assistant or farm superintendent can see that things are taken care of when they should. This helps release the load from the agriculture teacher and free him for supervision.

2. Any use of land by the school should be based upon approved educational principles.

3. Land use should be for all students in the curriculum and not just for a few boys to make money.

4. The land expenses should be paid by the district and any profit should return to the same for this is to be part of the total learning process in the agriculture program.

5. Students should be used in all phases of the program as much as possible, but their use should be in terms for education, not as workers. When the jobs cease to be educational and learning

ceases, work starts. Boys should not be forced to work on a project past the point of learning without pay.

6. The instructor's time is important and should be chiefly managerial.
7. Students grasp concepts best when learning and doing are together.
8. Test plots develop interest in three major ways. First, they create interest among students and parents in watching the outcome. Second, they show how testing is done by experimental stations. Third, when students take part they are more enthusiastic about applying the practice at home.
9. The most common problems encountered in school-land use are excessive use of teacher's time, lack of equipment, inadequate finances and labor not available when needed.
10. The increase in schools using land in their curriculum in the surveyed area does not mean they are recommended for all schools, but it does indicate they are meeting the apparent educational needs of the community.
11. The effectiveness of the operation depends upon the ability, attitude and vision of the instructor.

Recommendations

1. With the rapid increase in schools developing land laboratories there should be a follow up study regarding the use of the land laboratory after several years compared to previous beliefs as to the benefits in the program. After evaluating the returns to see if there was a difference of opinion as to the value of the land laboratory or experimental plots, the follow up study should be aimed at seeking out the true value of the use of land in the agricultural curriculum.
2. Other studies could determine which type of project, trial plots, animal laboratories, small acreage, greenhouses, nurseries or large farm operations are providing the greatest learning situation for the majority of the students in the program.
3. The possibility of all schools using land to supplement their agriculture program would be in error. The attitude of the instructor, his total teaching load in school and the amount of help and support from the school staff and administration along with that from the community should determine whether or not there should be land usage in his program. It is recommended that a true evaluation of attitudes, interests, availability and cooperation

of school personnel and community be researched and studied before a decision is made for the use of land in the agriculture curriculum.

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APPENDIX

Clackamas High School
13801 S. E. Webster Road
Milwaukie, Oregon
March 5, 1965

Mr.
Voc. Ag. Instructor

Dear

School-owned land either benefits or detracts from school buildings, depending on what is grown. If not in use, they sometimes become weed patches, fire hazards, or eye sores.

I would appreciate your taking a few minutes of your time to answer the enclosed questionnaire in respect to your school and ag department. The questionnaire is being used to determine which high schools have land available. It will emphasize the size and methods of use by ag departments in southwestern Washington, northwestern California, and western Oregon.

If you do not have school-owned land now in use, please state below and return by March 20, 1965. I would appreciate receiving the enclosed questionnaire by this date also if you do have school land.

No land available_____

Compiled forms of this questionnaire will be made available. If you would like a copy, please mark here so sufficient copies can be made. _____

Sincerely,

/s/ Melvin Atwood

Melvin B. Atwood
Vo. Ag. Intern

Enclosure

SCHOOL LAND USE INVENTORY

1. How long has ag. department been in operation?_____years
2. How many men in your ag. department? 1/2 ☐, 1 ☐, 2 ☐, 3 ☐, _____
3. How many students do you have enrolled in ag?_____
4. Do you have school-owned land that could be used in your ag. curriculum? Yes ☐ No ☐
5. Is this land connected to your school grounds? Yes ☐ No ☐
6. If not connected to school grounds, about how far away is it? _____miles
7. Is the land usable for your curriculum? Yes ☐ No ☐ If not, why? _____
8. How much land do you have available and usable in your ag. curriculum? 1/10, 1/4, 1/2, 1, 3, 5, 10 acres, _____
9. How is the available land now being used, if it is not being used in the agricultural curriculum? Weeds ☐ Grass ☐ Playing area ☐ Native grasses ☐ Other _____
10. How are you now utilizing available land in the ag. curriculum?

A. Production	Varieties	Acreage
☐ 1. Alfalfa		
☐ 2. Small grains		
☐ 3. Corn		
☐ 4. Root crops		
☐ 5. Gardens		
☐ 6. Mint		
☐ 7. Cane crops		
☐ 8. Vine crops		
☐ 9. Nursery or forest		
☐ 10. Other		

B. Variety Trials	Varieties
☐ 1. Alfalfas	
☐ 2. Corns	
☐ 3. Grains	
☐ Wheat	
☐ Barley	
☐ Oats	
☐ Sorghum	
☐ Other	
☐ 4. Cane crops	
☐ 5. Vine crops	
☐ 6. Seed crops	
☐ 7. Flowers	
☐ 8. Nursery plants	
☐ 9. Other	

C. Fertilizer Trials

	Formula N P K	Rate/acre	Crop	Results
Example:	20-20-20	200 lbs/acre	Gains wheat	80 bu/a
	Check			50 bu/a

D. Chemical or Weed Control Tests

	Material used	Rate of Application lb/a (actual)	Type of Crop	Type of Application	Control Desired
Example:	Atrazene	2 lbs	Corn	Sprayed on rows	Annual weeds (pigweed)

E. If other methods of utilizing school-owned land are used at your school, please list them on the reverse side along with any suggestions you have.

CHECK LIST QUESTIONNAIRE

NAME OF SCHOOL _____

Number of Instructors 1/2____ 1____ 2____ 3____ 4____

Do you have a farm manager? Yes____ No____

Is the ground connected to the school grounds? Yes____ No____
If not, how far away? _____

Acres owned _____ Acres rented _____ Total acres _____

Acres used by ag. department for instruction. _____

Acres used for non-farm student projects. _____

Number of non-farm student projects. _____

Acres used by FFA for money-making projects. _____

Acres used by individual students. _____

USAGE OF SCHOOL LAND

Crop	Acres	Fertilizer				Work done by	
		Yes	No	Amount	Kind	Student	Instructor
Alfalfa							
Clover							
Grain							
Corn							
Grass							

TRIALS

Kind	Scope	Work done by Student	Work done by Instructor

Other uses of school land by ag. department? (Such as tractor driving)

Would you recommend that all vocational agriculture departments have land, and use it in their program?

Yes_____ No_____

Equipment owned by department

Kind	Model	Year

Is land irrigated? Yes____ No____

Type of irrigation. Flood____, Furrow____, Sprinkler____, Other____

Condition of ground. Good____, Fair____, Poor____

Limiting factors. Rocks____, Wet____, Timber____, Brush____, Playground____, Weeds____, Lack of lime____, Other_____

_____