THE FARM MECHANICS CURRICULUM IN KANSAS HIGH SCHOOLS

by

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INTRODUCTION

This study was developed on the premise that education had become the symbol of hope and confidence in the future of mankind. It was the observation of the author that in most of the discussion of the problems faced--problems concerning the achieving of world peace, human brotherhood, personal happiness, as well as others of a political, social, and economic nature--someone sooner or later observed that education can lead the way to a better world.

Garris[1] in his writing pointed out that in the United States, vocation agriculture had become important in many states in the Union before the passage of the Smith-Hughes Act in 1917. Since that date, the Smith-Hughes and George-Barden Acts have had certain basic requirements for the states to meet that have given a thread of unity to the total program in the United States. On the other hand, each state had much latitude in designing an educational program that would best serve its own needs.

Garris further indicated that a teacher in vocational agriculture had a variety of teaching opportunities in the class-room, in the farm mechanics shop, and on the farms of

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[1]E. W. Garris. Teaching Vocational Agriculture. McGraw-Hill Book Company, Inc. New York. 1954. p. v.

the community. He was called upon to give instruction to farm youth, young farmers, and adult farmers. His course of study needed to be so designed that it would fill the educational need of farm people as they were trying to become established. In short, a teacher of vocational agriculture had to be proficient in group and individualized instruction, had to have a working knowledge of public relations, had to be a skilled mechanic, and had to be able to meet all other problems common to public school teachers.

This study was developed with the belief that after World War II, many countries in the world tried to raise their standard of living. Thailand was considered for the purpose of this study to be a developing country. In such a country it was assumed in the study that the basic requirement of the government was to provide knowledge in agriculture to their people for increasing the farm incomes, that would be a national income in the end.

It was an observation of the writer that the government has been striving, by several means, to carry modern knowledge to the farmers. For example, it has established twenty-two agricultural schools in different parts throughout the country. The idea behind this was to promote education among the farming population; to produce young and adult farmers to be eficient men in the future. In addition, many teachers were sent to further their study abroad. Many experiment stations were established to search for useful research findings, and

many extension offices were scattered throughout the country to transmit those findings to the people.

There were altogether twenty-two vocational agricultural schools in Thailand, but education in agriculture was not developed as the program was planned. There were many problems which faced the teachers immediately. Examples were the lack of good well qualified graduate teachers, the school curricula did not represent the needs and the interests of the people and the communities and so on.

The writer felt the need to study the way Kansas High School Teachers organized the farm mechanics curricula for developing and providing the necessary skills to the students in vocational agriculture schools. He also desired to take back to his country, the data acquired and to study the feasibility of using some of the methods or techniques there.

Statement of Problem

The purpose of this study was

(1) to determine how the vocational agricultural teachers organized the Farm Mechanics course into instructional areas.

(2) to determine how many instructional areas there were in Farm Mechanics.

(3) to determine why the vocational agriculture teachers selected certain courses.

(4) to determine the methods that vocational agriculture

teachers used in determining the lessons to teach in each instructional area in Farm Mechanics

(5) to determine the satisfaction of the vocational agriculture students.

In this study the vocational agriculture teachers in Kansas High Schools in the year 1964 were selected for study. The purpose of the study was also to study ways to adapt the Farm Mechanics curriculum in Kansas High Schools for use in the vocational agriculture schools in Thailand.

Limitation of the Study

1. This study was limited to the Farm Mechanics curriculum in Kansas High Schools in the year 1964.

2. The study was also limited to fourteen vocational agriculture teachers who were selected in a geographical area within a thirty-five mile radius of Manhattan and seventy students enrolled in those Kansas High Schools in 1964.

Definition of Terms Used

Vocational Education

For the purpose of this study the definition selected was one given by Prosser and Allen[2] who stated that vocational education became that part of the experiences of an individual

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[2]Phipps, J. Lloyd. Handbook on Teaching Vocational Agriculture. p. 1.

whereby he learned successfully to carry on any gainful occupation.

Vocational Agriculture Education

Vocational education in agriculture[3] was defined as those educational experiences designed to train present and prospective farmers for proficiency in farming.

Curriculum

Krug[4] defined the curriculum in his writing as a content of courses of study and lists of subjects and courses and was comprised of all the experiences which were offered to learners under the auspices or direction of the schools.

Farm Mechanics

Phipps[5] defined Farm Mechanics in vocational agriculture: Farm Mechanics involved the development of the mechanical abilities of students in performing farm shop activities; in operating, maintaining, repairing, and adjusting farm machinery; in constructing and maintaining farm buildings; in installing and maintaining electrical system; and in performing the mechanical activities in soil and water management program.

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[3] Ibid. p. 14

[4] Krug A. Edward. Curriculum Planning.

[5] Phipps, op. cit., p. 659.

Farm Shop Work

The authors of Farm Mechanics Text and Handbook[6] stated that farm shop work included any of these things when comprised of the selection, sharpening, care and correct use of shop tools and equipment; woodwork and simple carpentry; sheet metal work; elementary forge work; electric arc and oxyacetylene welding; pipe fitting; simple plumbing repairs; rope work.

Farm Power and Machinery

The authors of Farm Mechanics Text and Handbook[7] indicated that Farm Power and Machinery included any of those things which was concerned with selection, management, adjustment, operation, maintenance and repair (excluding major repairs, requiring specialized equipment and services) of farm gas engines, tractors, trucks and the principles farm machines.

Farm Buildings and Conveniences. Included were:

Any of those things concerned[8] of elementary scale drawing and plan reading; farmstead layout; functional requirements of farm houses, shelters, and storages; water systems; septic tanks and sewages disposal, heating.

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[6]Phipps J. Lloyd, McColly F. H, Scranton L. L. and C. G. Cook. Farm Mechanics Text and Handbook. p. 14.

[7]Ibid. p. 14.

[8]Ibid. p. 14

Soil and Water Management. Included were:

Any of those things comprised[9] of elementary leveling, land measurement and farm mapping; farm drainage; farm irrigation; terracing, contour farming, and strip cropping (emphasis on various phases to be varied in accordance with local or regional needs).

Rural Electrification. Included the:

Utilization[10] of electricity ;in the home and in the productive farm enterprises; selection, installation, operation, and maintenance of electrical equipment.

Review of Selected Literature

A review of literature was conducted in order to determine the scope of farm mechanics in the vocational agriculture schools in Thailand and in the United States. Selected readingswere reviewed in connection with this study. Those reviewed herein included those which appeared to be most pertinent to the study. The review of literature was divided into three areas. Area one had to do with the vocational agriculture schools in Thailand. Area two had to do with the importance of farm mechanics in the United States, and area three had to do with the objectives of farm mechanics and the five areas of farm mechanics.

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[9] Ibid. p. 14.

[10] Ibid. p. 14.

I. The Vocational Agriculture Schools in Thailand

Harold L. Kugler[11] reported after a more than 30 year period during which vocational agriculture in Thailand had been established, the program could not be considered as successful yet. There were some problems to consider, research to be completed and decisions to be made upon the solutions to be applied.

From this report it was assumed that one of the most important problems was a suitable curriculum for the vocational agriculture schools. It was already assumed to be well known that a curriculum was necessary and followed as a principle or guideline in order to educate the students. It had to be considered carefully by the educators to determine what subjects needed to be taught to the different individuals. There was also the question of how should the curriculum be functional and affect the life of the individual students so that desirable characters, good attitudes and personality could be developed. Careful consideration had been given by those who organized the curriculum. In order to achieve the goal or objectives of the curriculum it would also be necessary that it be made in the same manner as other vocational branches. This meant that first there should be a Terminal Course for those who wanted to seek knowledge in

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[11]Harold L. Kugler. Some Opinions on the Planning of the Policies for the Vocational Agriculture Education in Thailand. p. 3.

various branches of agriculture in order to earn their living or to improve their occupation. There would be no limit in sex, race, religion, age, and differences in socio-economic status of the students of this type. It also meant that another one was the Regular Course given for those who have two aims, i.e., to be a government official and to enter the farming occupation.

It was the observation of the writer that the vocational agriculture schools in Thailand had a main objective to raise the standard of living of farmers so they could support themselves and their families and increase the income to Thailand. It seemed advisable to give them training in special fields for agricultural occupations for those who had the ability and wanted to further their study in the agricultural field.

According to a report by Pitta Bunnag[12] the instructional areas of Farm Mechanics curriculum included five majors areas to be taught in the vocational agriculture schools in Thailand as follows:

> 1. Shop Tools and Skills concerned with selection, use, sharpening, tempering and maintenance of hand and power tools; hot and cold metal work including soldering and welding; elementary electricity.
>
> 2. Farm Structures and Utilities concerned with reading blueprints and sketches; drawing and planning buildings and equipment; selection of materials; figuring bill of material and costs; principles of construction; concrete; electrical installation; painting; roofing; use

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[12]Pitta Bunnag. Proposed Curriculum in Vocational Agriculture for Thailand. pp. 15-17.

of native materials.

3. Soil and Water Conservation and Management was comprised of water and its relation to humans, crops and animals; sources, distribution, storage and disposal of water; principles of pump operation; windmills; water lifts; surveying and mapping the farm; determining elevations; construction and maintenance of terraces, waterways, outlets, diversion ditches, check dams, storage reservoirs; erosion control.

4. Farm Power concerned with design and use of man, wind and animal power; selection, operation, adjustment and maintenance of internal combustion and diesel engines; electric motors; truck and tractor operation, maintenance and repair; safety.

5. Farm Machinery concerned with application of simple hand tools of farm work; selection, operation, adjustment and maintenance of farm machines; brazing, welding, hardsurfacing, use of carbon arc torch in construction and maintenance of farm machines; safety.

II. Importance of Farm Mechanics in the United States

W. A. Ross[13] stated in the editor's foreword in the Shopwork on the Farm that the growing of crops, the raising of animals, and the marketing of agricultural products included an increasing number of mechanical jobs. Such jobs had to be well performed in order to reach a satisfactory standard of production and financial return. Along with those responsibilities was that of maintaining an efficient and satisfying farm home and surroundings. Involved were the mechanical planning and skill to repair, replace, recondition, and construct which make the American farmer an unspecialized mechanic.

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[13]Mack M. Jones. "Editor's Foreword by W. A. Ross". Shop Work on the Farm. p. xiv.

Ross further indicated that since mechanical work had to be performed with the aid of tools and the power, a well-planned and appropriately equipped shop was a necessity on every farm, ranch, and plantation. The continuing increase in mechanization and the trend toward more power tools and equipment bore testimony to the important place of mechanics and shopwork in most agricultural operations. The modern agricultural business had to be kept in good running condition; otherwise feed and food production costs became excessive. Time, inconvenience, and money were saved with a good shop, properly used.

Walter M. Arnold[14] wrote a forward in the Instruction in Farm Mechanics that vocational education in agriculture had for half a century been a major force in the educaticnal life of America; but, as the recent shift of families from rural areas to urban centers developed, together with new technological developments, it became essential to revamp programs to keep them in step with the changing educational structure.

Arnold further indicated that the decline in the number of small farms and increase in out-put from multiple farming enterprises had made farming, to a great extent, a mechanical-electrical industry. There was almost total dependence on power farming--both motor and electric--to make each farm

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[14]A. H. Hollenberg and E. J. Johnson. "Foreward by Walter M. Arnold" Instruction in Farm Mechanics. p. v.

unit more productive. Much of the power equipment was farmer-owned, but some was owned by cooperatives and private farm service business, and often was operated by skilled hired hands. In some cases, due to capital requirements, there was an increasing amount of equipment leased or rented for special jobs, and some jobs were being contracted out, such as terracing, land leveling, ditching, plowing, spraying pesticide and herbicide chemicals, feed processing, and harvesting.

The changing American farm was described in the writing by Hollenberg and Johnson.[15] There were in the colonial days 85 per cent of the people who gained their living from working the soil. Today, with the per capita consumption of farm products much higher, the rural farm population of 7.5 per cent produced an abundance of many food and fiber items. That increased productivity per farm worker was a result of improved agricultural technology, including mechanization on the larger farms. All of these developments made agriculture as a big business. During World War I each farm worker had an average of five horsepower at his command, while at the time of this study it approached fifty horsepower. During this same period the productivity per worker had more than quadrupled and an average farm worker provided food and fiber for twenty-seven persons.

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[15] A. H. Hollenberg and E. J. Johnson. Instruction in Farm Mechanics. pp. 1-7.

Hollenberg and Johnson further indicated in the writing that in 1964, with fewer farmers on the land, there was a compensating increase of workers employed in agricultural occupations, other than in farming. The farm boy, with his experience of rural life and work on the farm, had a distinct advantage for gainful employment in the broad field of agriculture. Unlimited opportunities existed in most localities for agriculturists to serve as custom operators who apply lime, insecticides, pesticides, fumigants, and fertilizers; processors of dairy products, animal feeds, and meats; constructors of irrigation ditches, drainage ditches, terraces, and farm reservoirs; and assistants in the marketing, transportation, and distribution of farm produce. Other jobs would include gardening and landscaping to meet the needs of home owners, business firms, and highway departments. Nearly all of these agricultural occupations required evidenced experience in one or more areas of farm mechanics.

They also further stated that in the next decade those who operate the land will have a greater dependence on power farming--both motor and electric. Much of the power equipment will be farmer-owned and may be operated by him or by hired operators. There will be a continuing need for an adequate program to train high school farm youth, young farmers, and adult farmers in the selection, operation, proper use, and maintenance of farm tools, machinery, and other mechanical equipment. There will be a continuing need

to keep farmers advised of new types of farm machines and equipment and for training them in their use. In some cases equipment will be rented for special jobs and some jobs will be contracted. Types of jobs that may be contracted are terracing, land leveling, ditching, dam construction, sewage system installation, logging, rock removal, tiling, plowing, spraying pesticide and herbicide chemicals, processing, and harvesting.

Hollenberg and Johnson further pointed out that until World Wor II the mechanical instruction in vocational agriculture was mainly in the area of farm shopwork. Today the program had been expanded to meet the needs of mechanized agriculture. Training involved five areas--farm power and machinery, soil and water management, farm buildings and conveniences, farm electrification, and farm shopwork.

Hollenberg and Johnson also described the development in the area of farm power and machinery. They indicated that there had been more progress in farm mechanization during the past thirty years than during the previous recorded history. Farm mechanization was reasonable for many new and improved practices. They also referred to facts from the United States census report which showed a production of 3,697,190,984 bushels of corn. From this figure they reasoned that if a man husking corn by hand in a field harvested 100 bushels per day, it would require approximately 474,000 men working at the same rate throughout the months of October, November and

December to harvest the Nation's corn crop. The task of hand harvesting had been partically replaced by the easier and faster mechanical method. The 1960 census reported 792,379 mechanical corn pickers on farms.

Hollenberg and Johnson described the history of the combine harvester-thresher which followed closely the development of other modern farm machinery of major importance. The combine, having many adjustments and several attachments, can cut and thresh almost any grain crop.

The same census reported that the number of pick up balers on farms in the United States had increased from 25,135 in 1942 to 679,776. Hollenberg and Johnson then pointed out that with the increased mechanization of the farm, it was not unusual for a farmer to have as much invested in farm power, machinery, and equipment as in the land. On well-managed farms, machinery was not merely a self-gratifying exhibit, but a practical production tool that must pay its own way. In order to select field machinery efficiently, one should consider implement performance, power availability, trained labor, timeliness, and costs to obtain optimum economic returns. A generally accepted principle was that farm mechanization was only as successful as the maintenance given to it.

In writing about Soil and Water management Hollenberg and Johnson reported that irrigation practices were expanding rapidly and were used in all sections of the United States.

Power farming had made possible the installation of approved drainage practices to reclaim much land as a part of modern farming. Progress was being made to further control wind and water erosion, and to develop water storage for livestock, crops, and recreation. Strip cropping, terracing, and the practice of contouring was expanding each year as a part of a sound conservation program.

In reporting about farm buildings and conveniences, Hollenberg and Johnson wrote that since farming has changed in its mechanical phases from animal power to mechanical power, many farm buildings were obsolete. These farm buildings were often reconstructed to make them functional for mechanized agriculture. New ones were also being constructed to meet the needs of modern agriculture. These designed and new farm structures were equipped with many conveniences, such as elevators, hay and grain driers, conveyors, running water, and mixers for feeds and fertilizers.

Concerning farm electrification, Hollenberg and Johnson wrote that electric power lines had been extended to make electricity available to more than ninety-nine per cent of the Nation's farms. A multitude of practical uses had been developed for this power, both in the home and on the farm. Electric power had developed to be a necessity to farmers rather than a luxury.

Hollenberg and Johnson also reported concerning farm shopwork. They pointed out that agriculture was taught in

some schools prior to the passage of the Smith-Hughes Act in 1917. At that time a few high schools also taught farm mechanics. In the early days farm mechanics instruction was mostly farm shopwork. At the time of this study the farm shopwork program had been expanded to include the five areas discussed in this study.

III. The Objectives of Farm Mechanics

The authors [16] of a Farm Mechanics Text and Handbook wrote in the "Understanding and Using of Farm Mechanics" that

> There were many values which every student should receive from farm mechanics instruction. Some of the objectives of the instruction were:
>
> 1. To help the students discover their farm mechanics aptitudes.
> 2. To develop dependable judgement in farm mechanics activities.
> 3. To develop basic skills in farm mechanics.
> 4. To develop self-confidence in performing mechanical operations.
> 5. To understand the underlying principles of mechanical processes.
> 6. To be able to recognize quality work in farm mechanics.
> 7. To develop interest in and willingness to do farm mechanics jobs.
> 8. To understand and determine what mechanical activities can be done more economically by someone else.
> 9. To provide opportunities for learning by doing.
> 10. To develop abilities necessary for doing the unspecialized farm mechanics jobs that a farmer needs to be able to do.
> 11. To develop the ability to work cooperatively and effectively with others in a school farm shop.

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[16] Lloyd J. Phipps, H. F. McColly, L. L. Scranton and G. C. Cook. Farm Mechanics Text and Handbook. p. 15.

Area A. Objectives in Farm Power and Machinery

A. H. Hollenberg and E. J. Johnson[17] wrote the objectives of Farm Power and Machinery that concerned with the developing ability to

1. Recognize and identify the fundamental principles involved in machines and the relationship of mechanisms and systems to processes and functions.
2. Select power units and machines with regard to cost, to adapting systems of machines to types of farming, and to coordinating individual machines with other components of the machinery system; consider size and number of power units, hours of utilizations, annual cost, and availability and cost of dealer service and custom rental.
3. Operate, adjust, service, and maintain spark-ignition and diesel type farm tractors.
4. Operate, adjust and service field machines: lubricate; recognize malfunction; make operating adjustments; hitch implements properly; and calibrate planting, fertilizing, and spraying equipment.
5. Locate and remedy common operating troubles due to wear of parts, breakage, misalinement and other causes.

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[17]A. H. Hollenberg and E. J. Johnson. Instruction in Farm Mechanics. pp. 14-15.

6. Plan and execute a program of preventive maintenance, including protection shelter, rust prevention, periodic inspection and adjustment to compensate for wear, and repair in anticipation of breakage and improper function.
7. Understand the principles and operation of small gasoline engines. Make repairs and replace parts correctly.
8. Recognize the need for repairs involving the use of specialized tools and equipment, and determine appropriate methods of getting such work done by a qualified service agency.
9. Adapt and modify machinery to satisfy local conditions, such as trash-cover control, hillside operation, specialized crop use, and multiple hitching.
10. Determine and use safe operating practices with special emphasis on proper speed, protection from moving parts, and stopping the machine to adjust and remove obstructions and for refueling.

Area B. Objectives of Soil and Water Management

Develop ability to:[18]

1. Make land surveys, locate corners, read soil survey and aerial maps and run levels and contours by

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[18] Ibid. p. 16.

using the farm level. Locate and place grade stakes, and make contour maps.

2. Plan terracing and farm drainage systems. Estimate costs of construction and maintenance.
3. Plan and layout typical irrigation systems, considering the advantages and limitations of the various systems.
4. Maintain irrigation and drainage systems, including the upkeep of terraces, spillways, and ditches; service overhead irrigation layouts, and correct defects in both drainage and irrigation systems; apply fertilizers in irrigation water.
5. Plan and layout farm ponds and reservoirs, including the selecting of the appropriate site; calculate the expected flow and capacity; determine the procedure in pond and reservoir construction; construct adequate spillways; provide outlets; and use practices that preserve earthen reservoirs and embankments.
6. Relate equipment and tillage practices to soil erosion control.

Area C. Objectives Farm Buildings and Conveniences[19]

The instructional areas in Farm Buildings and conveniences develop ability to:

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[19] Ibid. p. 17.

1. Lay out a farmstead and plan a coordinated farm improvement program; evaluate existing buildings; analyze the need for new or reconditioned structures; plan new buildings; develop a maintenance and improvement program recognizing basic requirements for farm structures.
2. Plan buildings for utilities and production equipment to meet the operating needs of the farmer, such as elevators and conveyors; select, install, and maintain water distribution and disposal systems, light and power, feed-storage, handling, and processing devices.
3. Recognize and meet requirements of farm animals and poultry for environmental and sanitation control, such as temperature, ventilation, light, and moisture.
4. Select suitable building materials for specific uses, including durability, fire resistance, functional performance, strength, ease of application, availability, economy, and appearance. Recognize standard commercial units and grades; estimate quantities; and determine construction costs.
5. Recognize good construction methods and standard building materials.
6. Select lumber, hardware, and other building materials, and calculate cost of material.

7. Supervise and assist with construction and maintenance of farm buildings and equipment.
8. Do painting and glazing. Apply wood preservatives, and control damaging pests.
9. Construct and maintain adequate farm fences.
10. Recognize and be prepared to correct common occupational hazards to life and properly; fire, accident, wind, water, lightening.

Area D. Objectives of Farm Electrification

Develop ability to:[20]

1. Plan wiring systems for adequacy, convenience, and safety, including determination of probable future electric loads. This may necessitate rewiring.
2. Provide adequate illumination by selecting lighting equipment and locating it in the yards, lots, buildings, and work areas.
3. Select electrical home appliances and farm equipment, including motors and controls. Consider safety, quality, energy consumption, life of appliances, and servicing.
4. Adapt electricity to the farm activities, coordinating the equipment with the size and arrangement of the farm buildings.
5. Repair, service, and maintain electrical equipment.

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[20] Ibid. p. 18.

Locate and correct troubles and hazards in connection with fuses, controls, switches, fixtures, cords and wiring, motors, heating appliances, and lamps.

6. Install electrical equipment taking into consideration power transmission, equipment ventilation, servicing and safety.
7. Perform maintenance jobs and simple wiring installations which can be done safely.

Area E. Objectives of Farm Shop Work.

Develop ability to:[21]

1. Promote the establishment of a well-equipped home farm shop or farm service center.
2. Supervise and assist in planning, equiping, arranging, managing, and maintaining a school farm mechanics shop. Recognize shop terminology and names of working equipment and supplies.
3. Select hand and power tools and shop equipment for the school agricultural mechanics shop and home farm shop, including makes, models, sizes, quantities, and grades.
4. Sharpen, repair, maintain, and safely use the common shop tools and equipment.
5. Install, safely use, service, and maintain power

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[21] Ibid. p. 19.

tools found in the agricultural mechanics shop.

6. Do electric arc and oxyacetylene welding, including cutting, bronze welding, and hard surfacing.
7. Do hot metal work, including bending, shaping, and heat treating.
8. Do cold metal work, including cutting, drilling, filing, tapping, threading, riveting and bending.
9. Do sheet metal work, including cutting, bending, soldering, and fastening.
10. Do pipe and tubing work and make simple plumbing repairs.
11. Do concrete work, including building forms, testing materials, preparing mixes, placing, finishing, and curing; and laying concrete and masonry building units.
12. Recognize and guard against dangers and hazards connected with the use of tools and equipment.

Procedure

After selecting the topic of this report, the Farm Mechanics Curriculum in Kansas high schools in the year 1964, the writer consulted Dr. Ray J. Agan, major professor, about the information of this study. The major professor suggested that all information about this study could be obtained from the vocational agriculture teachers in Kansas high schools and the students enrolled in the vocational agriculture departments

by interview.

Fourteen vocational agriculture teachers in Kansas high schools and seventy students enrolled in those vocational agriculture departments in the fourteen high schools were selected. The schools were within a thirty-five mile radius of Kansas State University, Manhattan, Kansas.

A check list questionnaire for interviewing the Kansas vocational agriculture teachers and vocational agriculture students was developed by the writer. The check list was comprised of questions to obtain information from the teachers concerning how they organized the farm mechanics curriculum, the instructional areas in farm mechanics, the reasons they felt that the farm mechanics curriculum was based on the need of the students, and the satisfaction of the vocational agriculture students enrolled in the farm mechanics curriculum of Kansas high schools.

The writer, with the help of the major professor, sent an appointment letter to each teacher for an appointed time for interviewing. Fifty-six students or eighty percent, of the seventy vocational agriculture students selected the fourteen high schools responded to the interview check list.

The seventy students were selected by a random selection of five students from each of the classes in vocational agriculture in the fourteen schools.

PRESENTATION OF DATA

General Information Concerning the Vocational Agriculture Teachers

The Kansas State Plan for Vocation Education Section II 1960[22] pointed out in section 2.43 the Qualifications of teachers in vocational agriculture schools in Kansas and further indicated in section 2.43-1 the Professional Preparation of agriculture education, in section 2.43-2 the Technical preparation in agriculture, in section 2.43-3 the experience in Farming, and in section 2.43-4 the Conditions to be met by teachers prepared at out-of-state institutions. The analysis of the data from this study indicated that fourteen vocational agriculture teachers had college preparation as a teacher of vocational agriculture. The responses of the fourteen vocational agriculture teachers concerning the feeling about having more preparation in the area of vocational agriculture was presented in Table I. Twelve teachers or 85.71 per cent of the vocational agriculture teachers wanted to have more preparation in vocational agriculture. All the vocational agriculture teachers indicated that they felt they had inadequate knowledge to meet most situations. Some of the vocational agriculture teachers, 14.29 per cent, did not respond

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[22]The Kansas State Plan for Vocational Education, Section I. p. 24, 1960.

to the questions. They were satisfied with their present knowledge and experience in vocational agriculture.

The data in Table II summarized the responses from the vocational agriculture teachers included in the study. Concerning tenure more than one-third, 35.31 per cent, of the vocational agriculture teachers had taught 1-5 years while 28.57 per cent of the vocational agriculture teachers had taught more than 15 years. There was 21.53 per cent of the vocational agriculture teachers who had taught vocational agriculture 6-10 years and 14.49 per cent of the teachers had taught for 11-15 years.

TABLE I

General Information Concerning

the Fourteen Vocational Agriculture Teachers

Information	Responses of Vocational Agriculture Teachers					
	Yes	Per cent	No	Per cent	Undecided	Per cent
The teachers had college preparation in vocational agriculture.	14	100	0	0	0	0
The teachers felt the needed to have more preparation in vocational agriculture.	12	85.71	0	0	2	14.29

TABLE II

Tenure of the Fourteen Vocational Agriculture Teachers

Numbers of Years	Teachers	
	Numbers	Per cent
1-5	5	35.31
6-10	3	21.53
11-15	2	14.29
16-over	4	28.67

The data in Table III revealed that there were three schools located in the area of this study which contained over five hundred students. The size of the schools was determined by the total enrollment of the students. There were ten schools had 50-200 students, while one school had 201-500 students. The average number of students enrolled in the fourteen high schools in this study was 357.93 students per school.

The average number of students enrolled in the vocational agriculture departments was 39.14 students or 11.17 per cent of the total school enrollment. The data as shown in Table III indicated that the number of the vocational agriculture students ranged from 15 to 60 students. Five schools were in the category of 15 to 30 students, eight schools were in the category of 31 to 45 students, and one school was in the 46 to 60 student bracket.

The vocational agriculture area to be taught by the vocational agriculture teachers in the fourteen Kansas high schools interviewed were comprised of six major areas: livestock, crops, farm mechanics, agricultural economics, non-technical agriculture and Future Farmer of America. The data in Table IV showed that the fourteen vocational agriculture teachers (100 per cent) taught the six areas of vocational agriculture.

TABLE III

Students Enrolled in the Vocational Agriculture Departments and Total School Enrollment

Enrollment	Number of Schools	Average Number of Students
a. Vocational Agriculture		
15-30	5	
31-45	8	
46-60	1	
		39.15
b. Total School		
50-250	10	
201-350	1	
351-500	0	
501-over	3	
		357.93

TABLE IV

The Vocational Agriculture Areas

Taught in the High Schools

Courses	Schools	
	Number	Per cent
Livestock	14	100
Crops	14	100
Farm Mechanics	14	100
Agricultural Economics	14	100
Non-Technical Agriculture	14	100
Future Farmer of America	14	100

The Instructional Areas in Farm Mechanics

The data in Table V showed that a hundred per cent of the fourteen vocational agriculture teachers interviewed taught the five major instructional areas of Farm Mechanics. They were Farm Shop Work, Farm Power and Machinery, Farm Buildings and Conveniences, Farm Electrification and Soil and Water Management.

These instructional areas were distributed to the different classes and assigned a different number of periods in the Agr. I, Agr. II, Agr. III, and Agr. IV classes. The average number of periods for teaching farm mechanics in the high schools interviewed was 277 periods per academic year.

Farm Shop Work allotted 80 periods, Farm Power and Machinery 82 periods, Farm Buildings and Conveniences 40 periods, Farm Electrification 46 periods and Soil and Water Management 29 periods that made the total 277 periods, as shown in Table V.

TABLE V

An Average Distribution of Instructional Areas of Farm Mechanics

Instructional Areas	Number of Periods				Total Periods
	Agr. I	Agr. II	Agr. III	Agr. IV	
1. Farm Shop Work	28	23	16	13	80
2. Farm Power and Machinery	3	38	14	17	82
3. Farm Buildings and Conveniences	1	26	8	5	40
4. Farm Electrification	14	29	9	4	46
5. Soil and Water Management	1	19	6	3	29
TOTAL	47	135	54	38	277

The time plans generally used in teaching farm mechanics in the fourteen high schools were given as the 1-1-1-1, 1-1-1-2, 1-1-2-1, and 1-2-1-1 plans. The four numbers in each of the plans given indicated the number of hours per day during which vocational agriculture was taught.

For example the 1-2-1-1 plan indicated that vocational agriculture was taught in the first year one period per day, in the second year two periods per day, in the third year one period per day, and in the fourth year one period per day. Farm mechanics was taught a portion of that time according to the need felt by the teachers of the vocational agriculture. This study did not attempt to ascertain the portion of the instructional time devoted to Farm mechanics by the vocational agriculture teachers. However, a study of the data in Table V showed that 30.79 per cent of the instructional periods were devoted to the farm mechanics areas. The responses of the fourteen vocational agriculture teachers in the interview check list for this study indicated that three-fourths of the teachers (71.43 per cent) used the 1-2-1-1 plan in teaching farm mechanics. One-fourth of the vocational agriculture teachers (21.43 per cent) used the 1-1-1-1 plan, while the others (7.14 per cent) used the 1-1-2-1 plan in their teaching as shown by the data in Table VI.

Time allotted in the instructional areas in farm mechanics in the fourteen high schools had been increased and decreased according to the needs of the communities and the interest of the vocational agriculture students. The data in Table VII revealed that 92.86 per cent of the vocational agriculture teachers desired to increase the time for teaching farm shopwork and farm electrification. Thirty-five point seventy per cent and 21.45 per cent wanted to increase the

teaching time in the areas of farm power and machinery, and soil and water management respectively. Fifty per cent of the teachers felt that the area of farm buildings and conveniences had adequate time for their present curricula in farm mechanics. They did not want to increase the time for teaching, while 50 per cent of them wished to decrease the time in the area of farm buildings and conveniences. There were 71.41 per cent and 64.26 per cent of the teachers who wanted to teach soil and water management, and farm power and machinery the same amount of time that they were teaching currently. Some (7.14 per cent) of the teachers desired to decrease the time for teaching in the area of soil and water management.

TABLE VI

Time Plans for Teaching in Farm Mechanics

Time Plan	School	
	Numbers	Per cent
1-1-1-1	2	21.43
1-1-1-2	0	0
1-1-2-1	1	7.14
1-2-1-1	11	71.43

TABLE VII

Time Desired by Teachers in Instructional Areas in Farm Mechanics

Instructional Areas	Responses of the Teachers					
	Increase Time		Decrease Time		Undecided	
	No.	%	No.	%	No.	%
1. Farm Shopwork	13	92.86	0	0	1	7.14
2. Farm Buildings and Conveniences	0	0	7	50.00	7	50.00
3. Farm Power and Machinery	5	35.70	0	0	9	64.26
4. Farm Electrification	13	92.86	0	0	1	7.14
5. Soil and Water Management	3	21.45	1	7.14	10	71.41

How the Vocational Agriculture Teachers Organized Farm Mechanics

In order to organize the farm mechanics curriculum for vocational agriculture students in the fourteen Kansas high schools, the data presented in table VIII showed that two teachers used advisory councils. This council, as a committee of the whole, studied the needs of a community and recommended a program and courses of study to meet the needs. The fourteen vocational agriculture teachers interviewed had the major responsibility for organizing the farm mechanics curriculum

The vocational agriculture students (42.84 per cent) who faced problems from their supervised farming programs, also had participated in organizing the curriculum.

TABLE VIII

The Major Responsibility for the Organization of the Farm Mechanics Curriculum

Major Responsibility	Responses of the Teachers	
	Number	Per cent
1. Teacher	14	100
2. Students	6	42.84
3. Advisory Council	2	14.28
4. School Committee	0	0
5. School Principal	0	0

Methods Used in Determining the Instructional Areas

Methods used in determining the instructional areas in farm mechanics taught by the vocational agriculture teachers in the fourteen Kansas high schools and based on the needs of the vocational agriculture students and communities were; advisory committee, review of the students supervised farming program records, farm survey, observation of economic conditions in the community, check list for interviewing the vocational agriculture students, review of

research and others.

The teachers were asked to name the methods used. Their responses were presented in Table IX and indicated that 57.12 per cent of the fourteen vocational agriculture teachers used the observation of economical conditions in the communities and the farm survey. The method of review of the students supervised farming program records was used 49.98 per cent by the vocational agriculture teachers included in this study. A check list for the interviewing of the vocational agriculture students was used. The results of this questionnaire showed that this method was used by 21.43 per cent of the vocational agriculture teachers. Advisory committees were used and represented many facets of agriculture and presented many of the problems of the communities. Fourteen point twenty-eight per cent of the fourteen vocational agriculture teachers used the advisory committee method and review of research method. One vocational agriculture teacher, (9.14 per cent) used other methods in determining the instructional areas to be taught in farm mechanics.

TABLE IX

The Methods Used in Determining the Instructional Areas

Methods	Teachers Using	
	Number	Per cent
1. Observation Economical Conditions in the Community	8	57.12
2. Farm and Land Use Survey	8	57.12
3. Review Student Farming Program Records	7	49.98
4. Check List for Interviewing of the Students	3	21.43
5. Advisory Committee	2	14.28
6. Review of Research	2	14.28
7. Others	1	7.14

Farm Mechanics Depends on the Needs of Students

It was an observation of the writer that basing a program on the needs of the community and the individuals enrolled appealed to the democratic attitudes prevalent in most communities. It assured the vocational agriculture teachers who planned the farm mechanics curriculum and the people in a community that the program would not be determined autocratically as they might at first expect because of their previous experience with vocational agriculture

schools. Allowing students an opportunity to share in determining the content of a course of study usually created good will and increased interest.

The vocational agriculture teachers interviewed responded to the questionnaire by listing reasons why they felt that the farm mechanics curriculum was based on the needs of the vocational agriculture students. The data obtained from the teachers was presented in Table X. The most common reasons that the vocational agriculture teachers gave for their feeling that the curriculum was based on needs was that the community desired such study to be made, the students were interested in assisting with the planning, and there were evident areas which needed improvement in the students supervised farming program records. Ninety-two per cent of the teachers listed the farm and land use survey as one of their reasons for feeling that the curriculum was based on needs; 85.68 per cent gave "increase of machinery on farm", 71.43 per cent gave "modern farming used more mechanical work", 85.68 per cent gave "the needs for farm workers", and 57.12 per cent gave other reasons.

TABLE X

Reasons Why the Teachers Felt That the Instructional Areas Were Based on the Needs of the Students

Reasons	Teachers	
	Number	Per cent
1. The community desired such study to be made.	14	100
2. The students were interested in.	14	100
3. The evident areas which needed improvement in the students superivsed farming program records.	14	100
4. Farm and land use survey.	13	92.86
5. Increase of machinery on farms.	12	85.68
6. Modern farming used more mechanical work.	11	71.43
7. The needs for farm workers.	12	85.68
8. Others.	8	57.12

The Satisfaction of the Students

It was the assumption of the study that the good well-planned curriculum had to depend upon the needs of the community and the interest of the students. The author studied the satisfaction of the vocational agriculture students to evaluate the farm mechanics curriculum used in the fourteen high schools

where the teachers and the students were interviewed. The interview check list was used to present questions concerning the projects and tasks which the vocational agriculture students did in the areas of farm mechanics at home and at school.

The data presented in Table XI showed that 66.07 per cent of the vocational agriculture students had a farm shop at home, and 33.93 per cent of them did not have a farm shop at home. They used the school shop. Most of these vocational agriculture students who did not have a home shop lived in town.

The vocational agriculture students had five major improvements as shown in Table XII which were made to their farm shops at their homes. For each of the five major improvements there was an average of 43.40 students (95.35 per cent) who made the improvement at their home shop. All of the students made improvements with the tools in the area of farm shopwork, 87.71 per cent of them made improvements in the area of farm power, and 76.99 per cent made the improvement in the area of farm electrification. The per cent of the vocational agriculture students who made improvement in the areas of farm buildings and conveniences was 63.44 per cent and for soil and water management it was 55.68 per cent.

TABLE XI

Vocational Agriculture Students Who Had Home Shops

Number of Students	Responses of Students	
	Had Shop at Home	Did Not Have Shop
56	37	19
Per cent	66.07	33.93

TABLE XII

Improvements that Vocational Agriculture Students Made in Farm Shop

Improvements	Responses of Students	
	Number	Per cent
1. Tools in Farm Power	49	87.71
2. Tools in Farm Buildings and Conveniences	36	63.44
3. Tools in Farm Shopwork	56	100
4. Tools in Farm Electrification	43	76.99
5. Tools in Soil and Water Management	32	55.68

*An Average of 43.4 students (95.35 per cent) made improvements in their home shops.

The data presented in Table XIII indicated the scope of the farm mechanics tasks which the vocational agriculture students completed at home. Of this scope, home farm shop equipment was completed by all of the students, tasks from crops were completed by 85.92 per cent of the students, beef and dairy cattle by 94.08 per cent, swine by 58.33 per cent, farm equipment by 25.06 per cent, home conveniences by 16.11 per cent and tasks in poultry were completed by 4.58 per cent of the students.

The scope of the farm mechanics projects that the vocational agriculture students made in school shop was presented in Table XIV. Of this scope, home farm shop equipment was completed by all students, beef and dairy cattle were completed by 94.87 per cent, crops by 66.07 per cent, farm equipment by 55.68 per cent, swine and home conveniences by 22.48 per cent for each, and no school projects were completed by the students in the area of poultry.

The data in Table XV showed the number of the students who participated in the Lincoln Farm Welding and State Farm Mechanics Contest. Five per cent participated in the Lincoln Farm Welding Contest and 46.44 per cent of the students in State Farm Mechanics Contest.

TABLE XIII

Farm Mechanics Tasks Vocational Agriculture Students Completed at Home

Farm Mechanics Tasks	No. of Students Completing	Per cent
1. Crops	48	85.92
2. Poultry	2	4.58
3. Beef and Dairy Cattle	52	94.08
4. Sheep	43	76.78
5. Swine	27	58.33
6. Farm Equipment	14	25.06
7. Home Conveniences	9	16.11
8. Home Farm Shop Equipment	56	100.00

TABLE XIV

Farm Mechanics Projects that Vocational Agriculture Students Made in School

Farm Mechanics Projects	No. of Students	Per cent
1. Crops	37	66.07
2. Poultry	0	0
3. Beef and Dairy Cattle	53	94.87
4. Sheep	35	62.50
5. Swine	12	22.48
6. Farm Equipment	32	55.68
7. Home Conveniences	12	22.48
8. Home Farm Shop Equipment	56	100.00

TABLE XV

Vocational Agriculture Student Participation in the Lincoln Farm Welding and State Farm Mechanics Contest

Contest	Student Participation	
	Numbers	Per cent
Lincoln Farm Welding	3	5.35
State Farm Mechanics	26	46.44

SUMMARY

This study of the Farm Mechanics Curriculum in Kansas high schools was mainly based on information given by the fourteen vocational agriculture teachers interviewed in their high schools. The survey conducted with the teachers included questions concerning the instructional areas in farm mechanics, how they organized the farm mechanics curriculum, the methods they used in determining instructional areas in farm mechanics, the reasons they felt that the curriculum was based on the needs of the students, the satisfaction of their students who were enrolled in the farm mechanics curriculum.

The fourteen vocational agriculture teachers in the high schools interviewed had college preparation in vocational agriculture. Twelve teachers (85.71 per cent) said they felt

the need for more knowledge in preparation for teaching vocational agriculture, while 14.29 per cent of them were satisfied with their present knowledge and experience in vocational agriculture.

One-third of the vocational agriculture teachers had been teaching 1-5 years, while 29 per cent had taught more than 15 years. Twenty-one per cent had taught vocational agriculture 6-10 years and 15 per cent had taught for 11-15 years.

The average number of students enrolled in the fourteen high schools was 358 per school, and the average number of students enrolled in the vocational agriculture departments was 39 students or 11 percent of the total school enrollment.

There were six major vocational agriculture areas taught in these schools: livestock, crops, farm mechanics, agricultural economics, non-technical agriculture, and Future Farmer of America.

There were five major instructional areas taught in farm mechanics: farm shopwork, farm power and machinery, farm building and conveniences, farm electrification, and soil and water management.

The total number of periods for teaching farm mechanics in the high schools where the teachers and students were interviewed was 277 periods for four academic years. Of this: farm shopwork was 80 periods, farm power and machinery 82

periods, farm buildings and conveniences 40 periods, farm electrification 46 periods, and soil and water management 29 periods.

Most of the fourteen vocational agriculture departments used the 1-2-1-1 plan in teaching farm mechanics. The vocational agriculture teachers interviewed wanted to increase teaching time in the areas of farm shopwork, farm electrification, farm power and machinery, and soil and water and management, while they wanted to decrease time in farm buildings and conveniences.

The vocational agriculture teachers had the major responsibility for the organization of the farm mechanics curriculum. The students enrolled in the vocational agriculture departments and the advisory council also participated in organizing the curriculum for teaching farm mechanics.

The methods which the vocational agriculture teachers used in determining the instructional areas in farm mechanics included the observation of economic conditions in the community, farm and land use survey, finding needs by check lists with the vocational agriculture students, review of the student supervised farming program records, getting information from the advisory committee, from interviews and from research.

The farm mechanics curriculum in the fourteen high schools interviewed was based on the needs of the community and the interest of the vocational agriculture students. The

teachers studied the community and the students' needs by observation of the school projects, study of the students' interests, the community survey, the use of check lists to determine needs of the students, review of the students supervised farming program records, observing the increasing use of machinery on farms, study of farm and land use surveys, an analysis of the need for more farm workers, observing the use of more labor saving equipment, and for using the community desire for study.

Sixty-six per cent of the vocational agriculture students interviewed had a shop at ome, while thirty-four per cent did not.

Ninety-five per cent of the vocational agriculture students had improvement program in farm mechanics. Improvement in the area of farm power and machinery was completed by eighty-nine per cent of the students. In farm shopwork, improvement tasks were completed by each student. In farm electrification improvement tasks were completed by seventy-seven per cent, in farm buildings and conveniences, sixty-three per cent, and in soil and water management, fifty-six per cent.

Sixty-six per cent of the vocational agriculture students had shops at their homes. The tasks completed in these shops listed in order of their frequency of completion were: home farm shop equipment construction and repair, beef and dairy cattle tasks, crops, swine, farm equipment tasks,

home conveniences, and tasks in poultry production.

Most of the vocational agriculture students completed projects in the school shop. The tasks completed in order of their frequency of completion were: home farm shop equipment construction and repair, beef and dairy cattle tasks, crops, swine tasks, farm equipment tasks, home conveniences tasks, and tasks in poultry production.

Five per cent of the vocational agriculture students participated in the Lincoln Welding Contest and fourty-seven per cent in State Farm Mechanics Contest.

SUGGESTED PLAN FOR INSTRUCTION IN FARM MECHANICS IN THAILAND

Time Allotted for Instructional Areas in Farm Mechanics

Enterprises	Number of Periods				Total
	Ag. I	Ag. II	Ag. III	Ag. IV	
1. Farm Shopwork	38	27	18	22	106
2. Farm Buildings and Conveniences	12	12	16	19	59
3. Soil and Water Management	8	10	11	18	47
4. Farm Power and Machinery	8	16	14	8	46
5. Farm Electrification	4	5	11	2	22
6. Miscellaneous	2	2	2	2	8
	72	72	72	72	288

Units of Instruction in Each Enterprise and Allotted Time

Enterprises	Units	Time				Total
		Ag. I	Ag. II	Ag. III	Ag. IV	
I. Farm Shopwork	1. Sketching and Drawing	2	2	-	-	4
	2. Tools Identification	2	2	-	-	4
	3. Tools Reconditioning and Repairing	6	4	-	-	10
	4. Carpentry	6	4	4	6	20
	5. Sheet Metal	6	4	6	4	20
	6. Cold Metal	6	4	2	2	14
	7. Hot Metal	4	2	-	2	8
	8. Welding (Gas)	4	2	2	4	12
	9. Welding (Arc)	2	1	2	3	8
	10. Plumbing	-	2	2	2	6
		38	27	18	23	106
II. Farm Buildings and Conveniences	1. Farm Carpentry	6	4	6	4	20
	2. Painting	2	2	2	3	9
	3. Concrete and Masonry	-	4	7	6	17
	4. Planning and Equipping the Farm Service Center	2	1	-	2	5
	5. Construction and Repair Building	2	1	1	4	8
		12	12	16	19	59

Enterprises	Units	Time				Total
		Ag. I	Ag. II	Ag. III	Ag. IV	
III. Soil and Water Management	1. Principle of Soil and Water Management	3	1	-	-	4
	2. Surveying	2	3	3	6	14
	3. Terracing	2	2	2	4	10
	4. Drainage	1	2	2	2	7
	5. Irrigation	-	2	2	2	6
	6. Farm Ponds and Raising Fish Ponds	-	-	2	2	6
		8	10	11	18	47
IV. Farm Power and Machinery	1. Fundamental Principle of Engines	2	-	-	-	2
	2. Operating and Lubricating Small Gas Engines	4	2	-	-	6
	3. Maintaining Fuel, Carburation, Colling electrical and Ignition System	2	4	2	-	8
	4. Repairing Small Gas Engines	-	10	6	-	16
	5. Operating and Maintaining Tractors	-	-	6	8	14
		8	16	14	8	46

Enterprises	Units	Time				Total
		Ag. I	Ag. II	Ag. III	Ag. IV	
V. Farm Electrification	1. Electrical Sources and Terms	4	2	-	-	6
	2. Wiring the Farmstead	-	3	3	-	6
	3. Selecting, Using and Maintaining Motors	-	-	8	2	10
		4	5	11	2	22

Teaching Calendar

Vocational Agriculture I

Week	Enterprises	Periods	Units	Month
1	Soil and Water Management	3	Principle of Soil and Water Management	May (Rainy Season)
2	" "	1	Water Drainage	
3	Farm Shopwork	2	Sketching and Drawing	
4	" "	2	Tools Identification and Safety	
5				
6				
7	Farm Shopwork	6	Tools Conditioning	June
8				
9				
10	Farm Shopwork	6	Sheet Metal	July
11				
12		6	Cold Metal	
13				
14				
15	Farm Shopwork	4	Hot Metal	August
16				
17				
18	Farm Shopwork	6	Carpentry	Sept.
19				
20		4	Gas Welding	
21	Farm Shopwork	2	Arc Welding	Nov.
22	Farm Power and			
23	Machinery	6	Fundamental Principle of Engines, Operating and Lubricating Small as Engines	
24				
25	Farm Power and	2	Fuel and Caburation	Dec.
26	Machinery			
27	Farm Electrification	4	Electrical Sources and Terms	
28				

Week	Enterprises	Periods	Units	Month
29				
30	Farm Buildings and	6	Carpentry	
31	Conveniences	2	Painting	Jan.
32		2	Planning and Equiping Farm Services Center	
33		2	Construct and Repair Buildings	
34	Soil and Water			Feb.
35	Management	2	Surveying	
36		2	Terracing	
		2	Clean-up Shop and Final Examination	

Teaching Calendar

Vocational Agriculture II

Week	Enterprises	Periods	Units	Month
1 2 3	Soil and Water Management	1 2 2	Principle of Soil and Water Management Drainage Irrigation	May
4 5 6	Farm Shopwork	2 2 4	Sketching and Drawing Tools Identification and Safety Tools Conditioning and Repairing	June
7 8	Farm Shopwork	4	Sheet Metal	
9 10 11 12	Farm Shopwork	4 2	Cold Metal Hot Metal	July
13 14 15 16	Farm Shopwork	2 1 2 4	Gas Welding Arc Welding Plumbing Carpentry	August
17 18 19 20	Farm Power and Machinery	2 4	Operating and Lubricating Small Gas Engines Maintaining Caburation, Coiling and Electrical System	Sept.
21 22 23 24	Farm Power and Machinery	10	Repairing Small Gas Engines	
25 26 27 28	Farm Electrification Farm Building and Conveniences	2 3 4	Electrical Sources and Terms Wiring and Farmstead Carpentry	Dec.

Week	Enterprise	Periods	Units	Month
29		4	Concrete and Masonry	
30	Farm Buildings and Conveniences			Jan.
31		2	Painting	
32		1	Planning and Equipping	
33	Farm Buildings and Conveniences	1	Constructing and Repairing Buildings	
34		3	Surveying	
35	Soil and Water Management	2	Terracing	Feb.
36		2	Clean-up and final Examination	

Teaching Calendar

Vocational Agriculture III

Week	Enterprise	Periods	Units	Month
1	Soil and Water Management	2	Water Drainage	
2		2	Irrigation	
3		2	Farm Ponds and Raising Fish Ponds	May
4	Farm Shopwork	2	Sheet Metal	
5		4	Sheet Metal	
6	Farm Shopwork	2	Gas Welding	June
7		2	Cold Metal	
8				
9		2	Arc Welding	
10	Farm Shopwork	2	Plumbing	July
11		4	Carpentry	
12				
13		2	Maintaining Carburation and Ignition	
14	Farm Power and Machinery			August
15		6	Repairing Small Gas Engines	
16				
17				
18	Farm Power and Machinery	6	Operating and Maintaining Tractor	Sept.
19				
20	Farm Electrification	2	Wiring and Farmstead	
21		1	Wiring and Farmstead	
22				
23	Farm Electrification	8	Selecting, Using, Maintaining Motor	Nov.
24				
25				
26	Farm Buildings and Conveniences	6	Carpentry	
27				Dec.
28		2	Painting	
29				
30	Farm Buildings and Conveniences	7	Concrete and Masonry	Jan.
31				
32				

Week	Enterprise	Periods	Units	Month
33	Farm Buildings and Conveniences	1	Construct and Repair Building	
34	Soil and Water Management	3	Surveying	Feb.
35		2	Terracing	
36		2	Clean-up and Final Examination	

Teaching Calendar

Vocational Agriculture IV

Week	Enterprises	Periods	Units	Month
1		2	Water Drainage	
2	Soil and Water	2	Irrigation	May
3	Management	4	Farm Ponds and Raising Fish Ponds	
4				
5		4	Sheet Metal	
6	Farm Shopwork			June
7		2	Cold Metal	
8		2	Hot Metal	
9		4	Gas Welding	
10	Farm Shopwork			July
11		3	Arc Welding	
12		2	Plumbing	
13				
14	Farm Shopwork	6	Carpentry	Aug.
15				
16				
17				
18	Farm Power and	8	Operating and Main-	Sept.
19	Machinery		taining Tractor	
20				
21	Farm Electrification	2	Selecting and Main- taining Motor	
22				Nov.
23	Farm Buildings and	4	Carpentry	
24	Conveniences	3	Painting	
25				
26	Farm Buildings and	6	Concrete and Masonry	Dec.
27	Conveniences			
28		2	Planning and Equip- ping farm	
29	Farm Buildings and	4	Surveying	
30	Convenience			Jan.
31	Soil and Water	4	Terracing	
32	Management			

Week	Enterprises	Periods	Units	Month
33 34 35 36	Soil and Water Management	6	Surveying	Feb.
		2	Clean up and Final Examination	

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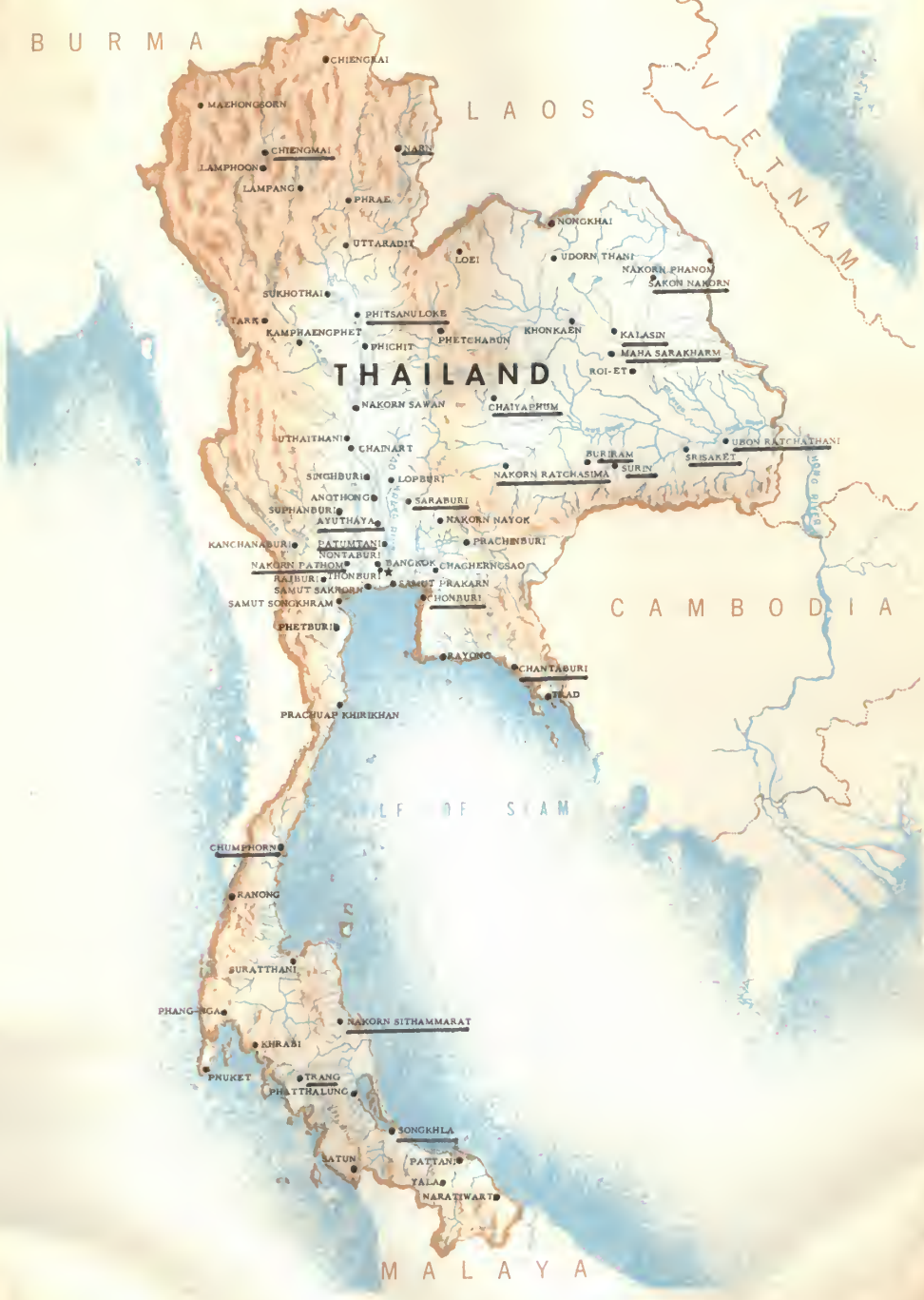
APPENDIX

KANSAS FOURTEEN HIGH SCHOOLS INTERVIEWED 1964

1. Alma
2. Alta Vista
3. Chapman
4. Clay Center
5. Eskridge
6. Herrington
7. Manhattan
8. Randolp
9. Roseville
10. Riley
11. Silver Lake
12. St. Mary
13. Wamego
14. Westmoreland

Twenty-two Vocational Agriculture Schools in Thailand



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THE FARM MECHANICS CURRICULUM IN KANSAS HIGH SCHOOLS

Check list for interview the teachers in Kansas Vo-Ag Schools

1. Have you had college preparation in vocational agriculture?

   yes_____; no_____.

2. Do you feel that you should have more preparation in the area of vocational agriculture? yes_____; no_____.

3. How many courses do you teach in vocational agriculture? Please check

   _____ Crop production
   _____ Livestock
   _____ Horticulture
   _____ Farm Mechanics
   _____ Farm Law
   _____ Future Farmers of America
   _____ General Agricultural Occupations
   _____ Others
   a. _____
   b. _____
   c. _____
   d. _____
   e. _____

4. How many years have you taught in the vocational agriculture? _____ years.

5. How many students are there in the department of vocational agriculture? _____; total school enrollment _____.

6. What are the instructional areas that you teach in the Farm Mechanics?

   ____ Farm Power and Machinery
   ____ Farm Building and Convenience
   ____ Farm Shop Work
   ____ Farm Electricity
   ____ Soil and Water Management
   ____ Others

7. At what grade level do you teach each of the following instructional areas in farm mechanics?

Instructional area	Grade 9	10	11	12
a. Farm Power and Machinery	—	—	—	—
b. Farm Building and Convenience	—	—	—	—
c. Farm Shop Work	—	—	—	—
d. Farm Electricity	—	—	—	—
e. Soil and Water Management	—	—	—	—
f. Other	—	—	—	—

8. How much time is allotted to teach in the classes and in the shop?

a. Ag. I_____ hr. in class; _____ hr. in shop.
b. Ag. II_____ hr. in class; _____ hr. in shop.
c. Ag.III_____ hr. in class; _____ hr. in shop.
d. Ag. IV_____ hr. in class; _____ hr. in shop.

9. How much time time allotted to teach in each area of farm mechanics?

	Ag. I.	Ag. II.	Ag. III.	Ag. IV
a. Farm Power and Machinery	—	—	—	—
b. Farm Building and Convenience	—	—	—	—
c. Farm Shop Work	—	—	—	—
d. Farm Electricity	—	—	—	—
e. Soil and Water Management	—	—	—	—
f. Others	—	—	—	—

10. Should there be more time spent for the farm mechanics?

yes_____; no_____.

If yes, list those which should be increased and list those which should be decreased.

	increase	decrease	undecided
a. Farm Power and Machinery			
b. Farm Building and Convenience			
c. Farm Shop Work			
d. Farm Electricity			
e. Soil and Water Management			
f. Others			

11. Who has the major responsibility in selecting the instructional areas to be taught in the farm mechanics? Please check.

_____ Teacher

_____ Students

_____ School Committee

_____ Teacher after conference with the committee

_____ Administration

_____ Others (names)

_____

_____

_____

_____

_____

12. Do you feel that the instructional areas of the farm mechanics are based on the needs of the students and community?

yes _____; no _____

Why? Give the reasons.

a. _____

b. _____

c. _____

d. _____

e. _____

13. What methods are used in determining the instructional areas to be taught in the farm mechanics?

___ a. Advisory committee suggestion

___ b. Determine needs from advisory committee

___ c. Determine needs by using of check list about students farming program

___ d. Observe the economic conditions of community

___ e. Review the records of the students farming program

___ f. Farm survey

___ g. Land used survey

___ h. Interview resource from the research

___ i. Others (list)

14. What are the lessons you teach in Farm Power and Machinery?

	Grade level			
	Ag. I	Ag. II	Ag. III	Ag. IV
___ Farm Power Development and Utilization	___	___	___	___
___ Fundamental Terms Relating to Heat Engines	___	___	___	___
___ Engine Parts	___	___	___	___
___ Internal-Combustion Engine Principles	___	___	___	___
___ Valves and Engine Timing	___	___	___	___
___ Cylinder Arrangements	___	___	___	___
___ Fuels and Combustion	___	___	___	___
___ Carburation and Carburators	___	___	___	___
___ Ignition Methods	___	___	___	___
___ Diesel Engines	___	___	___	___
___ Fundamentals of Electric Engine Ignition	___	___	___	___
___ Electric Cells	___	___	___	___
___ Electric Spark Ignition	___	___	___	___
___ Magneto Ignition	___	___	___	___
___ Starting and Lighting System	___	___	___	___
___ Governors and Governor Control	___	___	___	___
___ Engine Cooling	___	___	___	___
___ Lubrication	___	___	___	___
___ Bearing and Bearing Lubrication	___	___	___	___
___ Engine Troubles	___	___	___	___
___ Tractor Types	___	___	___	___
___ Clutches	___	___	___	___
___ Transmissions	___	___	___	___
___ Air Cleaners	___	___	___	___
___ Spark Arresters	___	___	___	___
___ Engine and Tractor Repair	___	___	___	___
___ Tractor and Engine Testing	___	___	___	___
___ Tractor Selection and Management	___	___	___	___
___ Tractor Members	___	___	___	___
___ Power Measurement	___	___	___	___
___ Others	___	___	___	___

15. What are the lessons you teach in farm building and convenience?

Grade level

___ Blueprints and Working Drawings
___ The Farmstead
___ Farmstead Utilities
___ Environmental Requirements and Control
___ The Machinery Storyage and Farm Shop
___ Storage of Small Grains
___ General Barns
___ Building the Hogs House
___ Poultry Laying House
___ Brooder and Broiler House
___ Farm House
___ Wood and Wood Product
___ Wood Construction
___ Concrete Construction
___ Masonry Construction
___ Metals
___ Plastics
___ Others

_____
_____
_____

16. What are the lessons you teach in Soil and Water Management?

Grade level

___ Using Contour Farming
___ Using Strip Cropping
___ Using Grassed Waterways
___ Homemade Equipments
___ Terracing to Control Soil Erosion
___ Farm Drainage
___ Farm Irrigation
___ Others (names)

_____
_____
_____

17. What are the lessons you teach in Farm Shop Work?

Grade Level

___ Planning and Equiping a Home Farm Shop
___ Sketching and Drawing
___ Wood work and Farm Carpentry
___ Power Wood Working Saws
___ The Jointing
___ Painting, Finishing, and Window Glazing
___ Sharpening and Fitting Tools
___ Rope Work
___ Leather Work
___ Concrete Work
___ Soldering and Metal-Sheet Work
___ Cold Metal Work
___ The Metal Working Lathe
___ Farm Blacksmithing
___ Pipe work and Simple Plumbing
___ Electric Arc Welding
___ Oxyacetylene Welding and Cutting
___ Repairing and Reconditioning Machinery
___ Maintaining Electrical Equipment
___ Others (names)

_____
_____
_____

18. What are the lessons you teach in Farm Electrification?

Grade Level

___ Understanding Electrical Sources and Terms
___ Wiring the Farmstead
___ Selecting and Maintaining Motors
___ Others (names)

_____
_____
_____

THE FARM MECHANICS CURRICULUM IN KANSAS HIGH SCHOOLS

Check list for interview the vo-ag students of Kansas High Schools.

1. In what grade are you in school? (9)__(10)__(11)__(12)__

2. Do you have a shop at home? (yes)_____; (no)_____.
   If yes, how many years have had the shop? _____ year.

3. Please list the improvements you have made on your shop.
   (1) _____.
   (2) _____.
   (3) _____.
   (4) _____.
   (5) _____.

4. What farm mechanics task do you commonly do at home? List;
   (1) _____
   (2) _____
   (3) _____
   (4) _____
   (5) _____

5. What farm mechanics projects have you made? List
   (1) _____
   (2) _____
   (3) _____
   (4) _____
   (5) _____

6. Have you ever entered the Lincoln Farm Welding Contest?
   yes _____; no _____.
   Give the reasons for yes or no.

7. Have you ever participated in the State Farm Mechanics Contest at Manhattan, Kansas? yes_____; No _____.

8. How did you do when you participated in the State Farm Mechanics Contest?

9. Have you shcwn farm mechanics projects at the State Farm Mechanics Contest? yes _____; no_____.

10. If yes in the item No. 9, list the projects

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

_____

THE FARM MECHANICS CURRICULUM IN KANSAS HIGH SCHOOLS

by

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B.S., Kasetsart University, Thailand, 1959

AN ABSTRACT OF A MASTER'S REPORT

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requirements for the degree

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Manhattan, Kansas

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The purpose of this study was (1) to determine how vocational agriculture instructors in Kansas high schools organized the instructional areas in Farm Mechanics (2) to survey the instructional areas being taught in Farm Mechanics (3) to determine why the teachers selected certain instructional areas (4) to determine the methods that teachers used in determining the lessons to teach in each instructional areas in Farm Mechanics and (5) to survey the satisfaction of the students enrolled in Farm Mechanics.

Data for this study was obtained by interviewing fourteen vocational agriculture teachers in Kansas high schools and fifty-six students enrolled in the vocational agriculture departments. An interview check list was used based on factors considered the problems in Farm Mechanics.

There were five major instructional areas taught in farm mechanics: farm shopwork, farm power and machinery, farm building and conveniences, farm electrification, and soil and water management.

The total number of periods for teaching farm mechanics in the high schools where the teachers and students were interviewed was 277 periods for four academic years. Of this: farm shopwork was 80 periods, farm power and machinery 82 periods, farm buildings and conveniences 40 periods, farm electrification 46 periods, and soil and water management 29 periods.

The teachers interviewed wanted to increase teaching

time in the areas of farm shopwork, farm electrification, farm power and machinery, and soil and water and management, while they wanted to decrease time in farm buildings and convenience.

The teachers had the major responsibility for the organization of the farm mechanics curriculum. The students enrolled in the vocational agriculture departments and the advisory council also participated in organizing the curriculum for teaching farm mechanics.'

The methods which the vocational agriculture teachers used in determining the instructional areas in farm mechanics included the observation of economic conditions in the community, farm and land use survey, finding needs by check lists with the vocational agriculture students, review of the student supervised farming program records, getting information from the advisory committee, from interviews and from research.

The farm mechanics curriculum in the fourteen high schools interviewed was based on the needs of the community and the interest of the vocational agriculture students. The teachers studied the community and the students' needs by observation of the school projects, study of the students' interests, the community survey, the use of check lists to determine needs of the students, review of the students supervised farming program records, observing the increasing use of machinery on farms, study of farm and land use surveys,

an analysis of the need for more farm workers, observing the use of more labor saving equipment, and for using the community desire for study.

Ninety-five per cent of the vocational agriculture students had improvement program in farm mechanics.

Sixty-six per cent of the vocational agriculture students had shops at their homes.

Most of the vocational agriculture students also completed projects in the school shop.