

COMPARATIVE STUDY OF AGRICULTURE CURRICULUM FOLLOWED IN HIGH
SCHOOLS OF THE STATE OF KANSAS AND GUJARAT

by 866

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A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

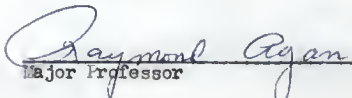
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INTRODUCTION

Most authorities who study the world situation have agreed that agriculture is an important industry in all countries—developed or undeveloped. Bliss¹ in his study of world extension programs pointed out that the foundation of any permanent civilization must rest on the partnership of man and land. He further pointed out that agriculture which is a growing, dynamic and national industry, is the foundation of the economy of the nation. In an underdeveloped country, the most important thing is to develop agriculture in order to be self-sufficient in food requirements and to supply raw materials to industries.² Agriculture is not a simple and static field. It is complex and ever-changing. The farmer should be learned having knowledge of scientific principles and factors affecting agriculture. This is a field having competition, not only among the states of the country, but among the countries of the world.³ Kelsey⁴ pointed out in his writings that a

¹R. K. Bliss and others, The Spirit and Philosophy of Extension Work, (Washington: Graduate School, United States Department of Agriculture and the Epsilon Sigma Phi, National Honorary Extension Fraternity, 1952), p. 172.

²Government of India, Planning Commission, The New India - Progress Through Democracy, (New York: The MacMillan Company, 1958), pp. 42-43.

³Harold M. Byram, Guidance in Agricultural Education, (Danville, Illinois: The Interstate, 1959), pp. 12-13.

⁴Lincoln David Kelsey and Cannon Chiles Hearne, Cooperative Extension Work - Third Edition (Ithaca, New York: Comstock Publishing Associates, 1963), p. 11.

modern farmer must be a good manager of his land, labor and capital. He must study agronomy, entomology, pathology, breeding, engineering, mechanics, weather, marketing, management, public affairs, production outlook, consumer demands and government.

Byram further wrote that there are unlimited opportunities in agriculture for improvement through well-trained men and women and this can be achieved by lifting agriculture to a highly technical business involving scientific knowledge and management ability.⁵ The country can hope to develop an economy so buoyant as to stimulate all aspects of national progress, and by developing agriculture. This is also necessary for human welfare and social justice.

The Agricultural Production Team, sponsored by the Ford Foundation, explained in a report on India's food crisis and steps to meet it that success in agriculture would depend on a nation's ability to attract that talented youth to agriculture, the resourcefulness with which we would train them and the zeal, vision, and dedication that would be instilled in them. Thus today's program of agricultural education will determine the quality of all work and progress in the agricultural sector of tomorrow. The basic strength and quality in agricultural education programs is essential for progressive improvement in any branches of agricultural production, research, extension, vocational skill, and

⁵ Byram, op. cit., p. 15.

administrative understanding.⁶

Mr. M. S. Randhwa, Vice-President of the Indian Council of Agricultural Research, New Delhi, has given opinion in the forward to the publication titled as "Agricultural Education in India" written by Dr.

K. C. Naik that

The effectiveness of future development of the country will depend upon the strength of agriculture. No education is of greater importance to the country than the agricultural education, as the medium of achieving a high level of competence in the farmer, scientist and extension worker and the administrator.⁷

Man faces problems right from birth till his non-existence in this world because man is less adjusted by nature to the physical and social environment than any other animal. Human beings should be educated to develop ability for acquiring new knowledge and techniques to maintain harmony with the changes in their social and physical environment. Agriculture is very much concerned with natural environment. Changes in environment as well as in social environment affect agriculture greatly. Some help or assistance is required by the human being for this. Education is the most important helper to the human being to get himself well adjusted to the changes going on in physical and social environment.⁸

⁶Ford Foundation - Agricultural Production Team, Report on India's Food Crisis and Steps to Meet It, (New Delhi: Ministry of Food and Agriculture, Government of India, 1959), pp. 42-43.

⁷K. C. Naik, Agriculture Education in India, (New Delhi: Indian Council of Agricultural Research, 1961), p. 5.

⁸William Heard Kilpatrick, Philosophy of Education, (New York: The Macmillan Company, 1952), pp. 41-42.

Galbrith in his writings pointed out that the rate of economic progress is influenced by the system of education. Benefits to be derived from education depend on the system of education. Economic development naturally makes growing demands on human resources and in a democratic set-up it calls for values and attitudes in the building up in which the quality of education is an important element.⁹

It was the opinion of Naik that the children of the age group eleven to sixteen are considered to be at the level where education should be given related to training the students for their future professions or occupations, because they are receptive at this stage and also many students may not be able to continue higher education in college after graduating from high school. Therefore agricultural education in high schools is as important as the education imparted in other branches of education.¹⁰

IMPORTANCE OF AGRICULTURAL EDUCATION

The State of Kansas

According to Agriculture 1962-63—a report published by the State Board of Agriculture—in the State of Kansas, agriculture was one of the important industries not from the point of view of total persons employed in farming, but from the point of view of income, farm production and

⁹J. K. Galbrith, Economic Development in Perspective, (Cambridge: Harvard University Press), p. 57.

¹⁰Naik, op. cit., p. 41.

investment.

Kansas was among the six leading farm states in the United States of America.¹¹ Two out of every five workers in Kansas were employed in farming or farm related industries. Agriculture contributed up to 30 per cent to the personal net income received by the Kansans. Some seven billion dollars were invested in farm real estate, machinery and livestock for an average investment of more than \$45,000 per farm worker. This investment per farmer in agriculture was three times more than the investment per worker in the nation's manufacturing industry. Kansas farmers paid 77.8 dollars each year as property taxes, out of this more than 65 million dollars were for real estate. In Kansas 37 per cent of all real estate taxes were paid by farmers.¹²

In Kansas agriculture played an important role to help industries. Kansas Agriculture 1962-63 showed that more than four thousand firms were engaged exclusively in manufacturing and supplying products for or from the farms. Considering only implements being used on the farms of Kansas, valuation came to about a billion dollars including 175,000 tractors, 124,000 motor trucks, and 71,400 combines.¹³

In Figure 1 is presented the extent to which Kansas farming has

¹¹ Kansas State Board of Agriculture, Kansas Agriculture 1962-1963, (Topeka: Kansas State Board of Agriculture), p. 5.

¹² Ibid., p. 6.

¹³ Ibid., p. 7.

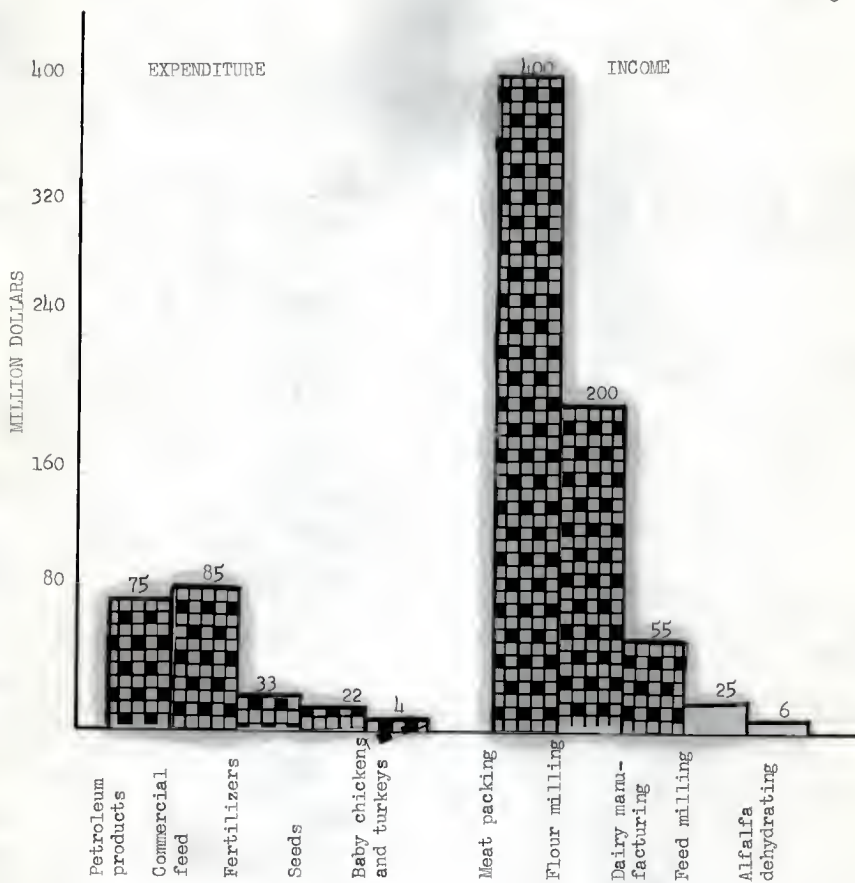


FIGURE 1

ANNUAL TURN OVER IN TERMS OF MAJOR RECURRING EXPENDITURE AND
RECEIPT FROM THE MAJOR PRODUCTS OF THE FARMS
OF KANSAS 1962-1963

(Data collected from Kansas Agriculture 1962-1963, 46th. Report
to the Kansas Legislature published by the Kansas State Board of
Agriculture, Topeka.)

played a role in turnover of money each year in terms of major recurring expenditures of farming and income from major farm products. Expenditures on major purchases came to 214 million dollars per annum. This covered only recurring expenditures on purchases of petroleum, commercial feed, fertilizers, seeds, baby chickens and turkeys, while income by way of important major products came to 865.5 million dollars per annum.¹⁴

In Figure 2 is indicated Kansas' share of the United States of America's total for selected farm items during 1962. The per cent of United States production produced on Kansas farms was 46, 39, 32, 25, and 19 in respect to sorghum silage, bromegrass seed, sorghum forage, sorghum grain and wheat (all) respectively.¹⁵

During 1962, Kansas was ranked first among the states of United States of America in respect of wheat production, flour milled, production of sorghum silage, production of bromegrass seed, and production of sorghum forage.¹⁶

In 1962 the number of Kansas farms decreased to 105 thousand, about one-fifth less than a decade earlier, while the average size reached the state's all time high of 477 acres.¹⁷

Complexity of agriculture has increased and for this well-trained and more educated farmers are required. High investments, increases in the size of farms, increases in the use of machinery, all have increased

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Ibid., p. 3F.

¹⁷ Ibid., p. 10F.

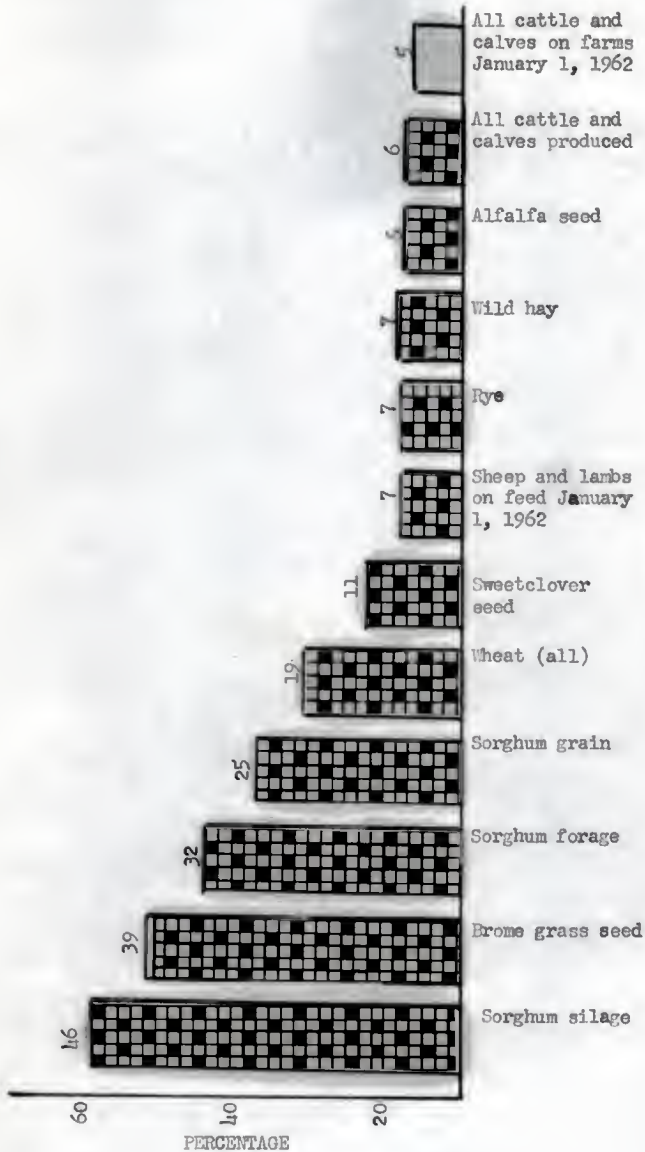


FIGURE 2

KANSAS'S SHARE OF THE UNITED STATES OF AMERICA TOTAL FOR SELECTED FARM ITEMS 1962

(Data collected from Kansas Agriculture 1962-1963, 166th, Report to the Kansas Legislature published by the Kansas State Board of Agriculture, Topeka.)

the demands for educated and skilled farmers. Students are also required to be trained to take the place of farmers who are retiring every year and also for farm related industries.

The State of Gujarat

Gujarat State is one of the states of the Indian Union. It is situated on the western coast on the northern side of Bombay. The State of Gujarat came into being in May, 1960. Until its formation as a separate state, it was part of the bilingual State of Bombay.

The Editor, Nanporia, wrote that agriculture was one of the most important industries employing the major portion of the population. Out of a total population of 11,834,929, the agriculture population was 9,402,256 and non-agriculture population was 6,859,879.¹⁸

Details about population classified according to livelihood classes is shown in Figure 3. Classification shows that 57.8 per cent of total population was depending directly on farming.¹⁹

In Figure 4, it is shown that agriculture played an important role in total income generated within Gujarat State during 1954-1955.²⁰ Agriculture had contributed up to 44.9 per cent of total income of that year.

A government publication has explained that the State of Gujarat

¹⁸ N. J. Nanporia (ed.), The Times of India Directory and Year Book, (London 3: Bennett, Collman & Co. Ltd.), p. 380.

¹⁹ Ibid.

²⁰ Ibid., p. 379.

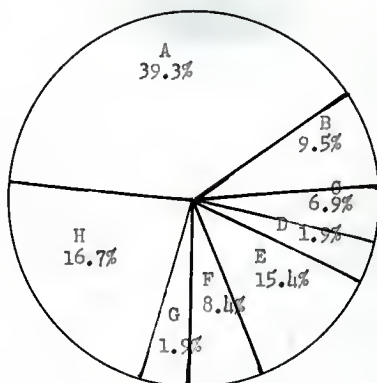


FIGURE 3

POPULATION OF THE STATE OF GUJARAT CLASSIFIED ACCORDING
TO LIVELIHOOD CLASSES 1955

(Data collected from the Times of India Directory and
Year Book including Who's Who.)

Livelihood Class	Population
A=Cultivators of land wholly or mainly owned and their dependents.....	6,396,959
B=Cultivators of land wholly or mainly unowned and their dependents.....	1,553,246
C=Cultivating laborers and their dependents.....	1,130,326
D=Non-cultivating owners of land--rent receivers and their dependents.....	321,325
E=Production other than cultivation.....	2,447,647
F=Commerce.....	1,371,712
G=Transport.....	313,559
H=Other sources.....	2,726,961

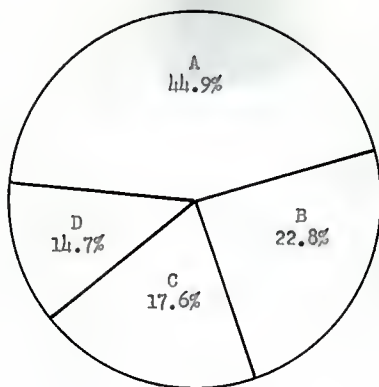


FIGURE 4

SOURCES OF INCOME GENERATED WITHIN THE STATE OF GUJARAT
1954-1955
(Data collected from the Times of India Directory and
Year Book including Who's Who.)

Sources of Income	Income Millions rupees (One dollar=4.79 rupees)
A=Agriculture, animal husbandry and ancillary activities.....	2,095
B=Mining, manufacturing and small enterprises.....	1,066
C=Commerce, transport and communications.....	810
D=Other sources.....	689

has had a deficit of eighteen lakhs (one lakh-one hundred thousand) tons of food grains per annum.²¹ Thus increase in production of food grains was to be achieved. In Gujarat State two institutions, viz., Gram Panchayat and Cooperative Society are working at the village level—the first one performing the job of village administration and the second one performing the job of advancing credit; procuring and supplying materials required by the farmers and other rural population. Persons who are responsible for smooth and successful working of these two institutions should have a knowledge of agriculture. Development of the village depends upon these two institutions. Knowledge of improved machinery, improved seeds, insecticides, fungicides, chemical fertilizers, laws and acts affecting agriculture is important to be able members and secretaries of these institutions. This will enable them to be useful to cultivators.

From these writings it would appear that for economic development and to make the State self-sufficient in food production, agriculture is required to be put on a more scientific basis. For this, educating students in agriculture to enable them to become established in farming is essential.

In summary, it can be seen that agriculture, at the time of this study, is important in the states of Kansas and Gujarat. It plays an important role in economic conditions as well as in providing employment

²¹Government of Gujarat, Khedut Diary 1962, (Ahmedabad: Government Department of Publicity), p. 246.

in farming and farm related industries. Therefore agricultural education in both states is essential.

Gujarat State has been trying to develop agriculture to become self-sufficient in food production and to increase the standard of the agriculture class. In the State of Kansas, agriculture has been more fully developed. One of the important factors for the development of agriculture has been the imparting of vocational agricultural education at the high school level. In Gujarat State, a beginning has been made to teach agriculture in the high schools.

This had created a desire in the writer to make a comparative study of the curriculum of agriculture followed in the high schools of the State of Kansas, where agriculture had been developed, and that followed in the high schools of the State of Gujarat, where agriculture was being developed.

HISTORY OF AGRICULTURAL EDUCATION

The State of Kansas

American education originated with private schools in colonial days. Agricultural education also originated with the private school. The initiative for promoting agricultural education was taken by the communities, then by the states and finally by the Federal Government. Public fairs, publications and farmers' institutions were used during most of the nineteenth century and beginning of twentieth century for the dissemination of agricultural information.

Agriculture was first taught in a public school in a Massachusetts community in 1858. More than thirty states had legislation to promote agricultural education in the public schools, and more than 3,000 high schools were teaching agriculture before the first national vocational education act was passed.²²

The information given below has been collected from the unpublished document--'History of Vocational Agriculture in Kansas 1917-1958' written by Professor A. P. Davidson.²³

Vocational agriculture was taught in Kansas State before the passage of the Smith-Hughes Act in 1917. Two types of secondary schools-- (1) the county high school and (2) school of agriculture, which was located on the campus of the Kansas State Agriculture College--were having programs of instruction in agriculture. A few of the consolidated high schools and some of the rural high schools were offering instruction in agriculture which was referred to as vocational agriculture.

The program referred to as Normal Training Agriculture was offered by a high percentage of the high schools in Kansas. This was intended to prepare persons to teach in agriculture in the elementary grades.

Professor Davidson mentioned in the History of Vocational Agriculture in Kansas 1917-1958 that:

²²Herbert M. Hamlin, Public School Education in Agriculture, (Danville, Illinois: The Interstate Printers & Publishers, Inc., 1962), p. 5.

²³A. P. Davidson, "History of Vocational Education In Kansas 1917-1958," (Mimeographed).

An article in the 21st Biennial Report, 1917-1918, of the Kansas State Board of Agriculture, by Professor J. W. Zahnley stated that 15 of the 600 high schools in Kansas were offering vocational agriculture.

L. B. Pollom, while supervisor of vocational agriculture in Kansas wrote an article entitled "Vocational Agriculture in Kansas" for the 29th Biennial Report of the Kansas State Board of Agriculture, 1933-1934. In this article, Mr. Pollom stated that the first vocational agriculture departments established in Kansas High Schools under the Smith-Hughes Act were six in number in the year 1917.²⁴

According to the State Plan prepared after passage of the Smith-Hughes Act, 1917, vocational agriculture would be taught in a half-day or three-hour period. The class would spend the equivalent of six hours per week in farm shop. Each boy enrolled in vocational agriculture would carry at least one productive project for a period not less than six months.

After the passage of the George Dean Act of 1936, high school program of vocational agriculture in Kansas was re-shaped as shown in Table I.²⁵

TABLE I

PLAN OF OFFERING VOCATIONAL AGRICULTURE IN THE
ALL DAY SCHOOL IN KANSAS

Years	No. 9	No. 10	No. 11	No. 12
I	60"	120"	120"	60" 12 credits; 6 units
II	60"	120"	120"	— 10 credits; 5 units
III	—	120"	120"	60" 10 credits; 5 units

²⁴ Ibid.

²⁵ Ibid.

It was emphasized that $3/5$ of the time be allotted to agriculture and $2/5$ of the time for farm mechanics.

The programs mentioned above were modified from time to time. At the time of this study full-time vocational agriculture programs in Kansas were based on one two-hour period for either sophomore or juniors. A required full-time program included a one hour period for freshman or for seniors, or for both.²⁶

In Table II is given information about acceptable class scheduling for full-time department.²⁷

TABLE II
CLASS SCHEDULING FOR FULL-TIME DEPARTMENTS

Options	Freshman (hr)	Sophomore (hr)	Junior (hr)	Senior (hr)	Young Farmer	Adult
1	1	2	2			
2		1	2	2		
3	1	2	2	1		
4		2	2	1		
5	1	2	1	1		
6	1	1	2	1		
7	1	2	1		1	
8	1	2			2	
9	1	2			1	2
10	1	1	1	1	1	
11	1	1	1		2	
12	1	1	1		1	2

²⁶ Kansas State Board for Vocational Education, "Vocational Agriculture in the Public High Schools of Kansas, Series A-1, Revised," (Topeka: Kansas State Board for Vocational Education, 1961), p. 7.

²⁷ Ibid.

Teaching vocational agriculture for five hours a day was required to qualify for a full-time program. Shop instruction and field study were essential to a well-rounded vocational agriculture program.²⁸

Provisions have been made for half-time agricultural departments in high schools having insufficient farm boys enrolled to justify a full-time department of vocational agriculture.

The passage of the Perkin's Act, 1963, broadened the scope of teaching vocational agriculture. It made provision to prepare the students not only to become established in farming but also to prepare them for off-farm-agricultural occupations, i.e., jobs concerned with the production, distribution, merchandising and sales of agricultural commodities or agricultural products. This was necessary because the number of persons employed on farms was decreasing and size of farm was increasing. Thus it was necessary to prepare sons of farmers for off-farm-agricultural occupations.²⁹

At the time of the study the agricultural courses were taught from the ninth grade to the twelfth grade. The course of study suggested by the State Board of Vocational Education was as follows:

The basic philosophy regarding the course of study is:

1. This course of study has been developed on a modified cross-sectional plan. (A modified cross-sectional plan may be defined as a course of instruction in which a certain phase or phases of instruction such as livestock or crops receive central emphasis in each course.)

²⁸ Ibid.

²⁹ Sar A. Leviton, Vocational Education and Federal Policy, (Kalamazo, Michigan: The W. E. Upjohn Institute for Employment Research, 1963), p. 26.

2. The major emphasis of the course for the students of ninth grade shall be to teach the lessons which are essential in motivating a boy with a worthwhile farming program and a basic knowledge of the Future Farmers of America and farm mechanic skills.

3. The major emphasis of the course for the students of tenth grade shall be given to livestock production and information related to livestock production.

4. The course for the students of eleventh grade will emphasize on crops, soils, insects, and diseases that are related to crop production.

5. The study for the students of twelfth grade will emphasize on farm management. This statement is based on plan in which daily one period of one hour will be for agriculture in grade nine, eleven, and twelve, while in the tenth grade there will be two periods daily.

6. This course of study is based on a six weeks period. Of the thirty day period, twelve days will be spent on farm mechanics instruction, two days will be spent interrupted for some other course and sixteen days will be used to teach technical agriculture.

7. It is assumed that a minimum of two class periods per six weeks will be needed to teach lessons which would answer day-to-day current problems of students' farming programs or other timely topics.

8. This course of study does not plan to involve the students of ninth and tenth grades in Future Farmers of America District contests. Crops, soils, and entomology team will be selected from the students of eleventh grade, Livestock judging teams will be selected from the students of twelfth grade.

9. To prepare a boy adequately in the field of farming, study course of vocational agriculture consists of three or four-year course of five units.³⁰

The teaching of lessons was generally on a seasonal basis for vocational agriculture.

³⁰Area Conference, January, 1961. (Mimeographed handout)

The program of instruction for the first year vocational agriculture student (ninth grade) would be designed to accomplish the following major objectives.

1. To give student a general orientation into vocational agriculture. (a) Procedure of operation, (b) How pupils are evaluated, (c) Setting of individual goals and objectives, etc.
2. To acquaint the student with the function, purposes, and opportunities provided in the Future Farmers of America Organization.
3. To teach the student selection of the enterprises and systems of production to start his farming program.
4. To teach use of the record book.
5. To teach basic farm mechanics skills.³¹

The suggested program for the first year of vocational agriculture included the following recommendations:³²

General. Becoming acquainted with the other students; organization of classroom notebooks; and the planning of the parents' meeting.

Future Farmers of America. An historical sketch of the Future Farmers of America Organization; parents' meeting; highlights of the National Future Farmers of America Convention; basic aims, purposes of Future Farmers of America; Future Farmers of America Creed; requirements for membership of Future Farmers of America; studies of parliamentary procedure abilities in Future Farmers of America Organization; final preparation for becoming a green hand; and preparing for the Future Farmers of America banquet.

³¹ John W. Lacey, "A Suggested Program of Instruction for a Beginning Student of Vocational Agriculture in Kansas," (Topeka: State Board of Vocational Education). (Mimeographed)

³² Ibid.

Swine. Selection of type and breeds of swine; determining the adaptability of Kansas and county as a swine-producing area; observing a successful sow and litter program; field study of the swine program; the probable financial outcome of sow and litter program; two-litter system of swine production; financing the swine project; housing and equipment for swine; selecting breeding stock; judging picture class of swine; care of the sow during pregnancy; and care of the sow and litter at farrowing time.

Farming program. The place of supervised farming program in vocational agriculture and study of improvement and supplementary practices.

Farm accounting and record books. Importance of keeping farm records; use and purpose of the expenses page; study of receipts pages in record book; summary of receipts and expenses; purposes and reasons for an inventory and taking inventory; study of the networth statement and livestock breeding pages; livestock feed and labor pages; crop operation record; use of diary and agreement; preparing a permanent farm record book; placing the inventory and net worth statement in permanent record book; the farming program agreement; writing the crop agreement; and the use of the land records and farm maps.

Beef production. Determining possibilities with beef cattle; breeds of beef cattle for the farm; winter care of deferred fed steers; budget for deferred feeding project; selection of breeding stock; and summer management of deferred steers.

Sheep production. Sheep as a major enterprise in Kansas; field

trip to ewe and lamb program; choosing a breed for the farm flock; farm flock calendar; budget for ewe and lamb project; judging breeding ewes and fat lambs; selecting western ewes; and summary of approved practice in sheep production.

Dairying. Possibilities of dairying in the students' community; field trip to a dairy project; selection of breeds of dairy cattle--fitting in farming operations; and selection of individual animals for dairy.

Poultry production. Determining the possibilities of poultry as a farming program enterprise; possibilities of the broiler project; budget for broiler production; field trip to commercial broiler project; and the suitability of the laying flock into farming program.

Sorghum production. Selection of variety; preparing the seed bed for grain sorghum production; and growing sudan grass for temporary pasture.

Soils. Control of soil erosion in field.

Crop production. Planning the farm garden; planning for a cash crop--wheat; seed bed preparation for wheat; selecting best suitable variety of wheat for planting; selecting seed variety for production of grain and forage sorghum.

Agricultural mechanics. Orientation to, selection of, and operating of an arc welder; striking an arc and running a bead; selection and use and care of files (clean and oil files); selection, use, and care of grinding wheels and stones; sharpening a cold chisel; measuring

and marking wood; sawing wood with a hand saw; getting acquainted with wood-working tools; sharpening auger bits; sharpening a plane iron and reconditioning a screw driver, hardware, nails and lumber; lumber selection; lighting and adjusting the acetylene torch and use of equipment and running a bead; forge exercise (gata hook); tempering a cold chisel; basic lesson in soldering; selection, mixing, and application of factory-made paint including care and cleaning of the paint brush; care and selection of brushes; selection and care of rope; knot tying; use of electricity; cost of electricity used per month; repairing and making extension cord; splicing electric wire; study of fuses and circuit breakers; planning the farm shop; tour to farm shop; and cleaning up of shop.

Included was the practice of arc welding, carpentry, tool conditioning oxyacetylene welding, forge work, and soldering.³³

The course of study for the students of Agriculture II (tenth grade) was based on the following objectives:

- A. To teach the skills and abilities necessary to carry out a profitable livestock production system including:
 1. The biology and related science of reproduction and approved breeding practices.
 2. The science involved in the study of feeds for livestock and the related science of the digestion and use of feeds by various classes of livestock.
 3. The approved methods and practices used in feeds and feeding including balancing rations.

³³ Harold Shoaf, "Ag. 1 Farm Mechanics," (Topeka: Kansas State Board for Vocational Education), (Mimeographed)

4. Complete study of all major livestock enterprise which are of economic importance in the community or have possibilities of becoming importance. The study of each enterprise will include:

- a. Approved practices of production.
- b. Systems of production within each enterprise.
- c. Management methods.
- d. Efficiency factors.³⁴

Beef production. Principles of animal production; improving livestock through breeding practices; approved practices in buying and wintering deferred steers; approved practices in putting deferred steers on full feed; approved practices in summer phase of deferred feeding; balancing ration for full fed steers; factors determining the date to sell deferred steers; suitability of creeping feeding system in farming program; suitability of cow and calf system in the farming program; approved practices in managing the breeding herd; practices to be followed in castrating and dehorning; system to be followed in handling plain grade beef cattle; wintering calves for spring sale; wintering and summer grazing system; study of seasonal index of beef cattle prices; approved practices in winter full feeding; variations in deferred full feeding; control of lice and grubs in wintering cattle; judging beef cattle; controlling flies in beef cattle herd.

Swine production. Managing sows at farrowing; approved practices in caring for baby pigs farrow to weaning; approved practices in castrating and vaccinating pigs; approved practices in care of pigs weaning to market; balancing rations for fattening pigs; studying seasonal price

³⁴Vocational Agriculture Number 10 Course of Study (Livestock Production) (1-1-62). (Mimeographed)

index of swine; controlling diseases and parasites; certified little and meat-type boar program in Kansas; judging swine; controlling round worms and lice in the swine herd; keeping hogs cool during summer months; and preparing hogs for show and showmanship.

Sheep production. Care to be provided for ewe flock at lambing time; docking and castrating lambs; approved practices in creep feeding; balancing rations for lambs; controlling diseases and parasites of ewes and lambs; controlling bloat and overeating diseases judging sheep; selecting and obtaining western ewes for ewe flock; flushing ewes to ensure a 100 per cent lamb crop; care of ram during breeding season; and deciding best date to market spring lambs.

Feeds and feeding. Instruction regarding food nutrients; digestion and absorbing feed by ruminants; factors in preparation of feed affecting its value; source of protein feed; feeds and feeding field trip; sources of carbohydrates and fats; and importance of vitamins and minerals in livestock feeding.

Dairy production. Judging of dairy cows; feeding and managing the dairy herd; balancing rations for dairy cows; practices to be followed in producing grade A milk and raising replacement stock; control of mastitis in dairy cows; loose housing and conventional housing; providing supplemental pasture for dairy cows; control of brucellosis in dairy cows; and judging dairy products.

Poultry production. Approved practices in management of poultry flock; best practices in feeding laying flock; studying caged layer system; candling eggs for interior quality; hatchery flock selection;

and culling hens for egg production.

Crops and soils. Weed identification field trip; approved practice in seeding wheat; and approved practices in sorghum production.

Miscellaneous. Special magazine reports; highlights of the National Future Farmers of America Convention; record book completion; and farm safety.

Agricultural mechanics.³⁵ The State plan for Vocational Agriculture in Kansas provided for two-fifths of the instruction to be given in the area of farm mechanics and recommended instruction as follows:

(A) Farm shop work. Making floor plans for building; making out a bill of materials; writing specifications; selecting and using grinders and stones for sharpening; selecting and using drilling equipment; sharpening twist drill and plane irons; sharpening hoes, spades, and shovels. Arc welding-- understanding electric welder construction; selecting electrodes for farm welding; controlling distortion; cutting with shielded electrode; joining steel flats with butt weld in flat position--(a) double vee on round stock, and (b) single vee; multiple pass horizontal fillet weld; joining pipes--vee butt weld, and tee fillet weld; building up weld on round stock; and bronze weld carbon arc torch. Gas welding--bronze welding; cutting with oxyacetylene flame and identifying metals by the spark test.

(B) Farm power and machinery. Safety hazards in operating farm

³⁵P. M. Stevenson and C. O. Jacobs, "Suggested Plan for Instruction in Agricultural Mechanics II and III." (Mimeographed)

machinery; principles of operations, maintenance and adjustments of internal combustion engines; farm power and machinery safety; and maintenance and adjustment of tillage and harvesting equipments.

(C) Farm buildings and conveniences. Concrete and masonry construction--selecting materials for making concrete; designing trial mix; forming and placing concrete; finishing and curing concrete; and concrete masonry. Farm carpentry--reading building blue prints; laying out and cutting rafters; selecting roofing materials; and laying out a farm building.

(D) Rural electrification and processing. Fundamentals of electricity--fuses and circuit breakers. Farmstead wiring--reviewing electrical terms and costs; tracing electrical circuits; polarizing in electrical circuit; types of entrance boxes and outlets; lighting the farmstead; types and uses of electrical controls; electricity for heat; and special electrical equipment.

(E) Soil and water management. Surveying--setting up and leveling the level; use and care of farm level; keeping field notes and contour maps. Terracing--running contours and terraces and maintaining farm terraces.

The following objectives were considered in planning and organizing the course of study for the students of agriculture III (eleventh grade):

- A. To teach the skills and abilities necessary for carrying out profitable crop programs and soil conservation.
 1. The approved practices for each crop of economic importance in the community.
 2. The science involved in soil testing and fertilizer requirement.
 3. The approved methods of soil conservation practices.

B. To train boys and enter the following Future Farmers of America District and State contests:

1. Crops
 2. Land judging and range management.
 3. Entomology.
 4. Speech.
- C. To teach advanced Future Farmers of America information.
- D. Building the program of work.
- E. Record keeping.³⁶

Soil conservation. Instruction relating to setting up the farm level; keeping field notes in determining unknown elevations; field trip for observing running unknown elevations with the farm level; the technique of land judging; field trip in range management; laying out and running a terrace; planning a grassed waterway and terrace outlets; and strip cropping and contour farming.

Wheat. Selection of variety; preparing seed bed; date, seedrate, and depth of planting wheat; procedure in cleaning and treating seed wheat; field trip to observe planting of wheat and barley; precautions to be considered in pasturing winter wheat control of pest of farm stored wheat; and insects of wheat crop and diseases of wheat and barley.

Miscellaneous. Planning the program of work; National Future Farmers of America Convention; safety in community; and state contest.

Corn. Instruction regarding approved practices in seed bed

³⁶ Soils and Crops Course of Study Ag. 3. (1-1-62) (Mimeographed)

preparation, selecting a variety; fertilizer requirement for corn; control of insects attacking corn crop; commercial grading of corn; and analyzing a corn project.

Crop rotation. Instruction regarding use of legumes or commercial fertilizers in crop rotation.

Barley. Seed bed preparation; selecting improved variety; fertilizer needs; planting date and seed rate of seeding; control of insects and diseases of barley crop; and seed analysis of barley.

Brome. Date of planting; seed rate; variety to be selected; and method of seeding.

Oats. Instruction regarding selection of variety; cultural practices; and seed analysis of oats.

Insects. Control measures of locally important pests such as chinch bugs in corn, sorghum and small grains; identification of sixty-five Kansas insects; type of damage done by them; their feeding habit and their control.

Fruit trees. Pruning of trees.

Weeds. Controlling weeds on farm; control of bindweed, Johnson grass; identification of prohibited and restricted noxious weeds, identification of common weeds; and suitable type of field chemical applicators.

Fertilizer. Planning fertilizer needs; liming soil; soil testing with regard to nitrogen, phosphorous, potash, and lime.

Sorghum. Selecting variety of grain and forage sorghum; seed bed preparation date, rate, depth and method of planting; seed treatments for controlling seed borne diseases; control of insects attacking sorghum

crop; seed analysis of grain sorghums and commercial grading of sorghums.

Supplemental pastures. Approved practices in growing sudan grass.

Legumes. Selection of variety and cultural practices to be followed in planting alfalfa; commercial grading of alfalfa hay; seed analysis of alfalfa; approved practices for planting soya beans; control of diseases of soya beans; approved practices for planting sweet clover.

Garden. Garden plans to meet the needs of vegetables for home use; control of pests of garden crops.

Crops contest. Identification of forage crops; grain crops and plant disease; review for state crops contest.

Agricultural Mechanics.³⁷

(A) Farm shop work. Arc welding--horizontal single vee butt weld; vertical welds in both the positions- "up" and "down"- (a) Stringer, (b) Butt, and (c) Fillet; joining sheet metal with arc welder, welding cast iron machinery parts.

(B) Farm power and machinery. Tractor maintenance and adjustment cleaning the tractor; checking compression; adjusting carburetor, fuel and air systems servicing; tractor lubrication; servicing the cooling system; care and maintenance of spark plugs; battery care and maintenance; adjusting brakes; checking tire and tire slippage; hitching to belt driven equipment; wintering the farm tractor; maintenance and adjustment of seeding equipment.

³⁷P. N. Stevenson and C. O. Jacobs, "Suggested Plan for Instruction in Agri. Mechanics II and III." (Mimeographed)

(C) Farm buildings and conveniences. Planning and equipping the farm service centre--planning the farmstead layout; remodeling farm buildings; planning and equipping the farm service center; water distribution and waste disposal--planning the farm water system.

(D) Rural electrification and processing. Electric motors and controls--selecting electric motors; comparing types; installing an electric motor; operation, maintenance, and lubrication procedure for electric motors.

(E) Soil and water management. Terracing--measuring angles and laying out a building foundation; irrigation--planning an irrigation system; checking an irrigation system; leveling field for irrigation; laying out supply ditches and figuring their capacity.

Objectives for the study course in vocational agriculture IV for the students studying in twelfth grade were as follows:³⁸

1. To enable the student to go directly into the business of farming.
2. To develop skills, abilities, understanding, attitudes, work habits, and appreciation sufficient to enable the student to enter some part of the agricultural program.
3. To provide effective learning situations which will enable the students to choose an agricultural career and seek advanced training.

Future Farmers of America. Leadership training; information of Future Farmers of America Organization; parliamentary procedure; program of work planning; public speaking; parent and son banquet; advanced

³⁸State Board for Vocational Education, "The Business of Farming for 12th Grade Vocational Agriculture Students," (Topeka: State Board for Vocational Education, 1962). (mimeographed)

livestock and dairy selection.

Career opportunities. Related to careers open to high school graduates; agricultural careers available to those with additional training beyond high school; agricultural careers available for college or university graduates; and how to get started in farming.

Farmsteads. A field trip to make a drawing of a farmstead; reorganizing the farmstead to improve arrangement; planning farm building for efficiency; and construction of farm buildings at a reduced cost by saving labor.

Rural living. Surveying community; listing the advantages of rural and urban living.

Real estate. Possibilities of owning land in Kansas; procedure for obtaining accurate land measurements; procedures for appraising farms; problems in renting farms; best way for renting a farm; method of testing a farm lease for fairness; and father-son operating agreements.

Farm credit. Way of using credit by farm families; filling out credit forms for applications; cost of getting credit; guides useful in using consumer credit; banker or loan representative to discuss credit; functions of commercial banking system.

Insurance. Kinds of insurances needed for business and for the farm family.

Farm taxation. Filing an income tax return; best method of accounting; way to reduce tax liability; best method of figuring depreciation knowing about social security; assessment of personal and property tax; filing a federal income tax return and a state income

tax return.

Farm accounts and records. Equipment needed in the business center in the home; type of filing system; setting up and starting a filing system; livestock and crop records; using the Extension Service account book; completing the farming program records; starting the Extension Service account book; making the final analysis of the farming program records.

Farm planning. Observation of a typical farm for the area (students be divided into groups—each group planning a different livestock program); livestock systems; livestock production and disposal; feed and pasture requirement; crop production and disposal; seed and supplies needed; taxes, interest, rent, etc.; summary of the farm business; distributing the farm income; machinery needs; final analysis of the plans; comparison of the different programs.

Marketing. Knowledge necessary for marketing; how prices are established; choices in selecting a market; practice in giving market report; improving methods of buying and selling crops; improving methods of buying and selling livestock.

Government programs. Soil conservation and acreage control.

Farm organizations. Reporting on the different farm organizations; purposes of each farm organization.

Farm law. Avoiding legal difficulties and losses; laws affecting particularly agriculture; knowledge of legal terms; laws and regulation concerning livestock, crops, feeds and fertilizers.

Agricultural Mechanics.

(A) Farm shop work. Arc welding--hard surfacing with arc welding equipment; welding "hard-to-weld" steels with the electric arc, applying hard surfacing with an electrode to carbon arc; butt weld high carbon steel; hard surfacing with oxyacetylene.

(B) Farm power and machinery. Mechanomics--cost of owning and operating farm machinery; selecting farm machinery. Tractor maintenance and adjustments--care and maintenance of spark plugs; battery care and maintenance; wintering the farm tractor. Maintenance and adjustments of chemical applicators.

(C) Farm buildings and conveniences. Water distribution and water disposal--disposing of waste properly.

(D) Rural electrification and processing. Farmstead wiring--electricity for heat; special electrical equipment.

(E) Soil and water management. Water storage--farm ponds; weed control and fertilization to ponds.

The State of Gujarat

The information given below was collected from the Report of the University Education Commission, December, 1948 to August, 1949.³⁹

For the presentation of the history of the development of agricultural education in India, it was necessary to review the last 175 years. In the past, the village structure was a self-sufficient unit.

³⁹ Manager of Publication, Report of the University Commission, December, 1948 to August, 1949, Vol. 1, (Delhi: Manager of Publication).

But British Rule and industrial revolution made changes in this structure. For studying Indian Agriculture, Dr. J. A. Vodeker of the British Royal Agriculture Society was sent to India by the society in 1889. He wrote that:

Certain it is that I, at least have never seen a more perfect picture of careful cultivation, combined with hard labor, perseverance, and fertility of resource than I have seen at many of the halting places in India in my tour.⁴⁰

As a result of Dr. Vodeker's recommendations, a post of agricultural chemist at the Government of India level, an Inspector General of Agriculture and a Mycologist were added. In 1903 an Entomologist was appointed. Pusa Research Institute was established receiving donation of 30,000 pounds from Henry Phips of Chicago. This institute at the time of this study was named as the Indian Agricultural Research Institute, New Delhi, which is a leading institute in agricultural research and education. The Indian Societies Act of 1904 and the expansion of the central and provincial department of agriculture marked the next stage of development. The Royal Commission of Agriculture in India was appointed in 1928 to study agriculture and rural life. Its main recommendation was for establishing a research institute. The Imperial Council of Agricultural Research was the outcome of this recommendation.

The economic depression of 1929-1930, made the plight of the farmers worse. With independent India coming into being, the Indian Council of Agricultural Education was formed in 1951.

⁴⁰ Ibid., p. 197.

Radhakrishnan University Education Commission studied the pattern of agriculture in the United States of America and made valuable suggestions for its adoption to the agricultural policy of India.⁴¹

The University Education Commission recommended that

1. Agricultural education be recognized as a major national issue.
2. Since in a democratic country, sound agricultural policy must rest on understanding and participation of those engaged in agriculture, the study of agriculture in primary, secondary and higher education be given priority in national economic planning.
3. So far as possible, agriculture education be given in rural setting, so that it shall include direct participation in and experience with agricultural life practices.
4. Experimental farms representing all types of soils, crops, climate and topography be developed in association with school or college.⁴²

A commission was appointed during the First Five Year Plan to consider fully the present system of secondary education. Report of this commission was presented in 1953.⁴³ The basic shortcomings of the secondary schools observed at that time were the curricular and the traditional teaching methods of that time. By that student was not getting sufficient insight into the everyday world in which they lived.

⁴¹ L. S. S. Kumar, "Progress of Agricultural and Veterinary Education in India," Indian Journal of Agriculture and Veterinary Education, 1:1, p. 7, August, 1958.

⁴² Manager of Publication, op. cit., p. 203.

⁴³ Planning Commission, Second Five Year Plan, (New Delhi: Planning Commission, Government of India, 1956), p. 508.

The Commission wrote:

The Secondary Education Commission made proposals for bringing about a greater diversity and comprehensiveness in educational courses and providing more comprehensive courses which would include both general and vocational subjects. The commission recommended establishment of multipurpose schools, of technical schools separately or as a part of multipurpose schools and special facilities for agricultural education in rural schools.⁴⁴

In the report of the Food Grains Enquiry Committee (1957), it was mentioned that community development activities which aim to make cultivators more receptive to improved methods of cultivation, should be supplemented to a much higher degree by giving an agricultural bias to education in rural areas, particularly at the secondary education stage.⁴⁵ The Secondary Education Commission stressed the necessity of providing much greater opportunities for agricultural education. The All India Council for Secondary Education formed a syllabus for agricultural high schools. The council recommended that every Tehsil (Taluka--unit smaller than district unit) should have at least one agricultural high school; and that as far as possible all secondary schools in rural areas should adopt the syllabus of agricultural bias.⁴⁶

The beginning of teaching agriculture subject in high schools of the State of Gujarat was made during 1939 when it was part of Bombay

⁴⁴Ibid.

⁴⁵Government of India, Report of the Food Grains Enquiry Committee (New Delhi: Publication Division, Government of India, 1957), p. 116.

⁴⁶Ibid.

State.⁴⁷ In 1948, the Bombay Government appointed an Agricultural Schools Committee. As a result of the recommendations of this committee the agriculture subjects were taught from standard eight to eleven in high school and the students could use an agricultural subject for the purpose of passing the Secondary School Leaving Certificate Examination.

Conversion of schools into multipurpose schools started from 1954.⁴⁸ At the secondary stage, in addition to the core curriculum which would include languages, social studies, general science and compulsory crafts—a child could select one of the following diversified courses to be provided in reorganized multipurpose schools: humanities, science, technical, commerce, agriculture, fine arts or home science.

In Gujarat State, the courses were prescribed by the Government Department of Education. Students started to learn agriculture from the standard eighth. In the State of Gujarat, high school study was considered as over in the standard eleventh.

Examinations both external and internal were taken. The internal examinations were conducted by schools from time to time for grading and evaluating the progress of pupils, for encouraging their progress and for promoting them to higher standard. Examination taken at the end of

⁴⁷Department of Education, *Krishi Vanchanmal-Part I*, (Poona: Department of Education, Bombay State, 1953), p. 1.

⁴⁸N. J. Nanporia (ed), The Times of India Directory and Year Book Including Who's Who 1960-61, (London 3: Bennett, Collman & Co. Ltd.), p. 380.

each year was considered as a most important test. Students were promoted to higher classes on the result of this test.

Mukherji described the examination program as follows:

At the end of final year of high school, the external examination is taken. This examination is known as Secondary School Leaving Certificate Examination and is conducted by the Board known as Secondary School Leaving Certificate Examination Board.⁴⁹

This external examination system has great effect on high school education. The schools' freedom, the teacher's zeal, the headmaster's initiative and the pupils' love for learning are sacrificed at the altar of that examination.⁵⁰

The details of courses prescribed by the Government Department of Education for teaching agriculture subjects in high schools were as follows:

Courses taught to the students studying in eighth standard were as follows:⁵¹

Soils. Rocks, minerals and elements; formation of rocks; types of rocks--igneous, aqueous, and metamorphic; minerals and elements; study of important rocks of the State of Bombay and Gujarat, viz., trap, laterite, granite, gneiss, sandstone, limestone, and shals; soil formation, disintegration of rocks; study of sedentary soils and soils of transport; methods of taking samples; physical analysis of soil-sand, silt, and clay; organic matter in soil; classification of soils of Bombay

⁴⁹S. N. Mukherji, Education in India-Today and Tomorrow, (Baroda: Acharya Book Depot, Raojura Road, 1960), p. 138.

⁵⁰Ibid.

⁵¹Government Department of Education, Krishi Vanchanmala Part I, (Poona: Government Department of Education, 1953). (Gujarati language)

State; soils of Gujarat State; soil survey and classification of soils for land assessment; classification of soils on the basis of color and crops; classification of soils from the point of view of tillage; soils and plant growth; soils and animal life; soils and industry; soils and agriculture; and soils--National wealth.

Tillage. Preparatory tillage--digging by hands, ploughing, breaking clodes, harrowing and leveling land; sowing--different methods of sowing, viz., broadcasting, dibbling, drilling, transplanting, and raising seedlings; tillage after sowing--gap filling, mulching, inter-culturing, hand weeding, earthing up, and to stop lodging.

Botany. Study of seed and its parts; characteristic of ideal seed; seed germination; conditions required for seed germination; and viability of seeds; plant and its parts--root and its functions, stem and its functions, modifications of roots and stems, leaf and its types, functions of leaf, flower and its parts, types of flowers, pollination, fruit formation; fruit, its parts and functions.

Animal life. Study of parts of animals, viz., cow buffalo, sheep, goat, and fowl and their relation to agriculture.

Practical work for the students of the eighth standard would include recognition of important rocks and minerals of the State of Gujarat; field examination and recognition of important local soils; handling and use of local implements and hand tools; methods of sowing; raising of seedlings and plantings; drawing parts of plant and their important variations; study of different stages of germination of different types of seeds; study of different stages of development and types of

fruits and seeds; acquaintance with the common farm animals like bullock, cow, buffalo, sheep, goat and fowl; handling and use of carpentry and smithy tools.

Courses of agriculture taught to the students studying in ninth standard were as follows:⁵²

Soils. Texture and structure of soil; classification of soils according to texture; effect of soil structure and texture on crops; soil moisture and its movement; importance of organic matter; soil colloids; soil temperature and aeration.

Tillage. Tillage by plough; types of indigenous and improved ploughs; study of tractor; study of land leveller, harrow, and ridger; study of seed drills--indigenous and improved; implements used for interculturing; variations in tillage operations due to soil, climatic conditions and crop requirements; soil tilth.

Irrigation lifts. Study of different types of irrigation lifts--bullock driven, viz., moht and ranht, power driven, viz., centrifugal pumps run by oil engine and electric motor, and other water lifts; unit of irrigation.

Soil management. Tillage; study of weeds and its control; water holding capacity of soil; drainage of soil (percolation in soil); rotation of crops; manures--different types of manures and their usefulness, farmyard manure, compost manure, green manure, chemical fertilizers,

⁵² Government Department of Education, Krishi Vachanamala Part II, (Poona: Government Department of Education, 1953). (Gujarati language)

methods of using manures and fertilizers; dry farming--leveling of land, contour bunding, dry farming practices, sowing operations in dry farming, use of early maturing variety.

Botany. Flowering and non-flowering plants; important families of crops, viz., cereals, leguminous, and malvaceae; dispersion of seeds; methods of vegetative propagation; food requirements of plants; factors affecting plant growth.

Crop production. Classification of crops according to requirement of tillage; classification of crops on the basis of soils and season; fruit trees of the State of Bombay; fruit trees of the State of Gujarat importance of increasing raising of fruit trees.

Insect pests and diseases of plants. Insect and its classification, study of life cycle of insect; control measures against important pests diseases of plants and their control measures.

Animal life. Study of important breeds of cattle--Kankrej, Gir, Sindhi, Krishnavalley, Amritmahal, Khilar, Dangi, Nimar; study of milch cattle and work cattle; study of important breeds of buffaloes--Surti, Mehshana, Jafarbadi, Delhi, and Pandharpuri; study of important breeds of sheep--Kathiyawadi, Dakshani, Karnataki, and Marino; study of important breeds of goats--Golwadi, Surti or Patdi, Nagri or Nashiki, and Janneri or Jannapuri; study of important breeds of fowls--White Leg Horn, Rhode Island red, Black Minorca; improvement of local breed of fowls; importance of poultry keeping as side business in agriculture.

Practical work for the students enrolled in standard ninth would include study of the cylinder method of grading soil separates; capillary

rise; percolation and water-holding capacity of soils; evaporation of moisture; handling and use of improved implements; demonstration of the working of water lifts; drawing important characteristics of families of crop plants; mechanism of seed dispersal; recognition of local weeds; demonstration of (1) the intake and loss of water by plants, (2) respiration in plants, (3) importance of light to development of chlorophyll; field observation and collection of specimens of important insect pests, and diseases of locally grown crops; use of plant protection appliances; study of insecticides and fungicides; demonstration of irrigation and dry farming methods; recognition of manures and chemical fertilizers and their application; preparation of compost and farmyard manure.

Courses of agriculture taught to the students studying in tenth standard in high school were as follows:⁵³

Botany. Advantages of vegetative propagation; different methods of vegetative propagation--budding, grafting, layering, cutting, gootie, etc.; fruits--their classification; crop improvement--selection method (1) individual, and (2) mass selection; crop improvement by cross breeding; harmful plants--striga.

Crop production. Study of food grain crops--sorghum, bajri (Pennisetum typhoidum), paddy (rice-Oryza sativa), wheat (Triticum sativum); vegetable crops--preparing seed beds and raising seedlings, irrigating seed beds; study of vegetable crops--cabbage (Brassica

⁵³ Government Department of Education, Krishi Vanchanmala Part III, (Poona: Government Department of Education, 1953). (Gujarati language)

oleracea), csuliflower (Brassica botrytis), beans, peas, tomatoes, egg plant, baby okra, cucurbite, pumpkin, and cucumber; study of fruit crops-- banana, papaya (Carica papaya), mosambi (sweet lime), mango (Mangifera inchica).

Animal life. Study of cattle useful in farming, milch cattle, work cattle, sheep, goate and fowls; judging animals--characteristics of purebred cow, bull, bullock, sheep, gost and fowl; general care; and tour in the division to show crop and livestock production.

Courses of agriculture taught to the studente studying in the eleventh standard in high school were as follows:⁵⁴

Animal life. Feeding cattle--types of cattle feeds--roughages and concentrates; scales of feeding; importance of feeds; production of fodder--dry and green; raising alfalfa and bareeen; raising graeses; preparing silage; feeding adult animal; feeding milch cattle; feeding work cattle; feeding bull and pregnant snimale; feeding newly born calves; study of eimple diseasee of cattle--sprain, fracture of bone, skin diseasee, injuries, etc.; epidemic of diseasee of cattle and its control measuree--foot and mouth, small pox, black quarter or black leg, and anthrax.

Crop production. Study of crops of spices--turmeric, giner, onion, garlic, capsicum (Capeicum annum); study of vegetable crope--potato, sweet potato, leafy vegetables, beans, carrot, and radish; study of cash

⁵⁴ Government Department of Education, Krishi Vancahn mala Part IV, (Poona: Government Department of Education, 1953). (Gujarati language)

crops--sugarcane, cotton, and tobacco; study of oil seeds crops--peanut, safflower (Carthamus tinctorius), and castor (Ricinus communis); study of pulse crops--gram (Cicer arietinum) and arhar (Cajanus cajan); study of fruit crops--guava (Psidium guajava), grape, sapota (Achras sapota); fruit preservation; marketing fruits.

Cooperation and village economy. Study of Bombay State and Gujarat State from point of view of population, soils, and agricultural conditions; study of agricultural conditions in different districts of Gujarat; agricultural statistics of Gujarat; distribution of land and crops; land holding per individual; land holding per pair of bullocks; farming and its management; improvement in agricultural practices; co-operative farming; land tenures; farm accounts; field boundaries; study of the Department of Agriculture, Co-operation and Revenue and their working; land survey and record of rights; and ideal village.

Practical work for the students of eleventh standard would cover recognition of fodders and feeds; actual growing of two important crops--one kharif and one rabi-by each student on an area of 1/2 guntha each, and keeping periodical notes of all processes and recording observations thereon; some important crops should also be grown by the whole class on a common area about three acres with suitable rotations and mixtures for studying the cost of cultivation of crops; preparation of rations and feeding of farm and dairy animals; milking and clean milk disposal; silage making; treatment of livestock for simple ailments such as wounds, indigestion etc.; grading of school farm produce; maintenance of important farm records; visit to model village a demonstration farm,

and a multi-purpose co-operative society to study the working thereof.

OBJECTIVES

This study was made with two main objectives. They were:

1. To study the courses of agriculture taught in the high schools of the State of Kansas and Gujarat (India).

2. To study to what extent the teaching of agriculture in the high schools helped in

(i) Developing an effective ability to make a beginning and advance in farming.

(ii) Providing training in agriculture and related occupations.

(iii) Providing a medium for improving school and community relationship.

(iv) Providing the required background of knowledge for continuing further study in college in agriculture.

(v) Developing the ability to participate in rural leadership.

(vi) Developing the ability to be a good citizen.

DEFINITIONS

Curriculum: For the purposes of this study the curriculum was a design or plan of institutionalized education. It was also assumed that the curriculum consisted of the actual learning opportunities provided at a given time and place. In other words the curriculum was considered as an instrument for bringing about psychological changes in learners

as a result of their activities in educational institution.⁵⁵

Dibbling: Dibbling was referred to as one type of the sowing methods. Sowing of seed was done in this method by putting more than one seed at one place by hands, i.e., sowing of seeds at hills. This method was followed in the crops sown at a very wide distance.

Agricultural Related Occupations: For the purposes of this study this term was divided into two groups. One group of occupations included the actual on the farm production of food and fiber, the growing of plants, and the raising of animals. Jobs of farm managers, herdsmen, gardeners or farm hands were also included in this category. Occupations which are off-farm, were included in second category. Such occupations were related to sales and services to farmers, marketing and processing farm products, etc.⁵⁶

Supervised Farming: The term supervised farming as used in this study consisted of all the farming activities of educational value conducted by pupils enrolled in vocational agriculture and for which systematic instruction was provided by their teachers and parents.

The purpose of supervised farming program was considered to be to help the students to become established in farming. The teacher organized his instruction in such a manner as to assist the student in

⁵⁵ John I. Goodland, "Curriculum: The State of the Field," Review of Educational Research, p. 185, June, 1962.

⁵⁶ Norman K. Hoover, Handbook of Agricultural Occupations. (Danville, Illinois: The Interstate Printers and Publishers, Inc., 1963), pp. 5, 6.

his farming project. There were three main groups in which the activities under supervised farming were classified:

1. Supervised Farm Practice (Production Projects): This was meant to be conducted for experience and making profit. The pupils had managerial responsibility. Minimum duration was the time represented by a production cycle of a farm enterprise. Students had also financial responsibility.

2. Improvement Projects: The pupils had no financial responsibility and they were also not to have full managerial responsibility. The purpose was to improve the real estate value of the farm, the efficiency of the farm business, or of a farm enterprise or living conditions on the farm.

3. Supplementary Farm Practices: This was meant to be conducted for getting additional experience or skill by the student, or for improving the efficiency of the farm. The students undertook jobs outside of those already included as managerial parts of a student's productive and improvement projects.

The supervised farming program was carried out by the students on their own farms or on land of other farmers on partnership basis or rental basis.

It was considered essential to execute an agreement between the father and the son or student and the farmer on whose land the farming project was carried out.⁵⁷

⁵⁷ Lloyd J. Phipps and Charles Cook, Handbook on Teaching Vocational Agriculture, (Danville, Illinois: Press of the Interstate, 1959), p. 234.

District: In India each state was divided into several areas for the convenience of administration. In the State of Gujarat each unit was known as a district.

Taluka (Tehsil): In Gujarat State, each district was divided into units. Each unit is known as a Taluka (Tehsil).

Plot Work: The plot work was defined for the purposes of this study as the farming practices done by the students enrolled in agriculture. This was performed on school farm. The students had no financial as well as managerial responsibility. Plot work was carried out under the supervision of the teacher. The students put into practice the knowledge they obtained in class.

Gram Panchayat: This term is referred to in the study was an organization in the State of Gujarat at village level. Gram (Village) Sabha was formed by adults who lived in the village. The members of Gram Panchat were elected by the Gram Sabha.

The village panchayat under the Panchayat Act, executed the work related to public health and sanitation, water supply, street lighting, maternity and child welfare, registration of births and deaths, village defense, education and the recreation of the villagers, construction and repairs of roads, tanks, wells, and bunds, arranging relief of the victims of floods and famine, developing agriculture, improving livestock and promoting cottage industries and setting up of village cooperatives.⁵⁸

⁵⁸ L. S. S. Kumar and others, Agriculture in India, (New York: Asia Publishing House, 1963), pp. 1, 2.

Leadership: Leadership was defined as the activity of influencing high to cooperate toward found goal which they came to find desirable.⁵⁹

PROCEDURE FOLLOWED

Courses in agriculture taught in the high schools of the State of Kansas and Gujarat were studied and compared. The study was limited to study and to make comparisions of courses taught in the best ten high schools of each state. Selection of the best ten high schools was done as follows:

The State Supervisor, Agricultural Education, State Board for Vocational Education, Topeka, was requested to supply information regarding names of the best ten high schools teaching agriculture, judged by his office on the basis of evaluation or other methods vide letter dated May 5, 1964 (Appendix A). This letter was sent through the office of Dr. R. J. Agan, the Major Advisor. The information was received from him via his office letter dated June 9, 1964. According to list supplied by him, the best ten high schools named below were selected for collecting information of courses in agriculture taught in those high schools.

- | | |
|----------------|----------------|
| 1. Beloit | 6. Ellinwood |
| 2. Clay Center | 7. Garden City |
| 3. Columbus | 8. Paola |
| 4. Concordia | 9. Stockton |
| 5. Effingham | 10. Winfield |

⁵⁹ Ordway, Tead, The Art of Leadership, (New York: McCraw-Hill Book Company, Inc.), 1935.

The check list (Appendix C) was prepared and sent to the agriculture teachers of the above high schools in the first week of June, 1964, along with the forwarding letter written by Mr. David Mugler under whom work was carried out during summer as Dr. R. J. Agan, Major Advieor, was at the time in Costa Rica. Information from all the ten high schools was received.

The State Supervisor, Agricultural Education, was also requested to supply a copy of the publications prepared to give guidance to the teachers of agriculture in the matter of curriculum to be followed in the high schools and the information regarding the qualification and the experience prescribed for the recruitment of agriculture teachers in the high schools. The information was received under his office letter dated May 13, 1964.

Information of the agricultural courses taught in the best ten high schools of the State of Gujarat was collected by sending a survey form (Appendix B) to the Director of Agriculture, Gujarat State, Ahmedabad along with the forwarding letter from Dr. R. J. Agan. Selection of the best ten high schools was done by the Director of Agriculture, Gujarat State, who sent the survey forms to the Head Masters of the selected high schools. The Director of Agriculture, Gujarat State, requested also the District Agriculture Officers to help the Head Masters to fill in the survey form so that the information could be collected in time. Information from the below mentioned nine high schools was received.

1. D. S. & B. B. Model Multipurpose Higher Secondary School, Abrana Taluka Navsari, District Bulsar.

2. H. K. Vidyamandir, Bavla, Taluka Dholka, District Ahmedabad.
3. Shri Vijay Vidya Mandir, Avidha, Taluka Jhagadia, District Broach.
4. Multipurpose High School, Wadhwan, Taluka Wadhwan, District Surendranagar.
5. Palitana High School, Palitana, Taluka Palitana, District Bhavnagar.
6. Sir Pratap High School, Idar, Taluka Idar, District Sabarkantha.
7. Vividhlaxi Vinay Mandir, Aliabada, Taluka Jamnagar, District Jamnagar.
8. The M. P. Pandya Multipurpose High School, Jetalpur, Taluka Dascroi, District Ahmedabad.
9. Sheth M. R. High School, Kathlal Taluka, Kapadvanj, District Kaira.

The writer of this report was working as the District Agriculture Officer before he came to Kansas State University for higher study. He had inspected the high schools teaching agriculture, while working as the District Agriculture Officer. The experience obtained by the writer was also used in writing this report.

The check list prepared for the collection of information about the courses taught in the high schools of the State of Kansas and the survey form prepared for the collection of information of the courses taught in the high schools of the State of Gujarat varied in content. This was due to different patterns of education and the use of different terms, viz., the word "grade" was used in Kansas to show the level of

education while the word "standard" was used in Gujarat to indicate the same thing.

COMPARATIVE STUDY

Level of Starting to Teach Agriculture

In the State of Kansas, a word "grade" was used to indicate the level of education while in the State of Gujarat, a word "standard" was used for the same purpose. In all the ten high schools of the State of Kansas, which were studied, the teaching of agriculture was started from the ninth grade. In the nine high schools agriculture was continued to be taught up through the twelfth grade, while in one high school it was taught up through the eleventh grade. In the State of Gujarat, in all the nine high schools for which information was received, the teaching of agriculture was begun from the eighth standard and completed in the eleventh standard. At the time of this study the high school education was completed in the eleventh standard in the State of Gujarat. In the State of Kansas the student was considered as a high school graduate on the completion of the study in the twelfth grade.

To simplify terminology and to avoid confusion, the terms of agriculture I, agriculture II, agriculture III, and agriculture IV were used instead of grade and standard in further discussion.

Agriculture I was used to denote the ninth grade in the high schools of the State of Kansas and the eighth standard in the high schools of the State of Gujarat.

Agriculture II was used to denote the tenth grade in the high

schools of the State of Kansas and the ninth standard in the high schools of the State of Gujarat.

Agriculture III was used to denote the eleventh grade in the high schools of the State of Kansas and the tenth standard in the high schools of the State of Gujarat.

Agriculture IV was used to denote the twelfth grade in the high schools of the State of Kansas and the eleventh standard in the high schools of the State of Gujarat.

Time Devoted in Teaching Agriculture

The time devoted per week to teach the agricultural subject in the selected high schools was as per the information tabulated in Table III.

In the high schools of the State of Kansas, which were studied, more time was allotted in agriculture II and III compared to that allotted in agriculture I and IV. In one high school having two teachers of agriculture, one teacher gave more time, as much as fifteen hours per week, in agriculture III and IV.

In the State of Gujarat, seven high schools allotted equal time in agriculture I, II, III, and IV. An increase in the allotment of time in the higher classes was found in two high schools.

The selected high schools were classified on the basis of allotment of time for class teaching and shop work (the practical work) as shown in Table IV.

TABLE III
TOTAL TIME PER WEEK ALLOTTED TO TEACH AGRICULTURE

Number of Schools	Time allotted per week in minutes			
	Agriculture			
	I	II	III	IV
<u>Kansas</u>				
1	300	600	600	600
4	300	600	300	300
1	300	300	600	300
1	300	600	600	300
1	300	600	600	--
1	300	300		---600---
				(Combined)
1 (Two teachers)	300	600	300	300
		600	900	900
<u>Gujarat</u>				
4	280	280	280	280
1	210	210	210	210
1	330	360	360	390
1	80	80	80	80
1	350	350	350	350
1	175	175	210	280

It was found that in the State of Kansas, nine high schools divided time for class teaching and shop work as 60 per cent and 40 per cent, respectively. In the State of Gujarat, six high schools kept equal time for class teaching and practical work. The time for practical work was more compared to that allotted for class teaching in one high school and the time was varying at each level.

TABLE IV
 PERCENTAGE OF TIME ALLOTTED TO CLASS TEACHING
 AND SHOP WORK (PRACTICAL WORK)

Number of Schools	Percentage of time allotted in							
	Agriculture I		Agriculture II		Agriculture III		Agriculture IV	
	Class	Shop	Class	Shop	Class	Shop	Class	Shop
<u>Kansas</u>								
1	50	50	50	50	50	50	50	50
9	60	40	60	40	60	40	60	40
<u>Gujarat</u>								
6	50	50	50	50	50	50	50	50
1	65	35	65	35	65	35	65	35
1	35	65	40	60	40	60	45	55
1	60	40	60	40	60	40	60	40

The School Farm

The number of high schools out of ten high schools of the State of Kansas having a school farm were found to be two, while all the nine high schools of the State of Gujarat had a school farm. The size of the school farm in all cases was below fifty acres.

Time Spent by the Teacher of Agriculture in Teaching Subjects Other Than Agriculture

The situation regarding the time spent by the teacher of agriculture in teaching subjects other than agriculture in the selected high schools was found as per the information given in Table V.

The teachers of agriculture of five high schools of the State of

Kansas were not responsible for teaching subjects other than agriculture, while the teachers of the remaining five high schools devoted time from two to four hours in teaching the subjects, viz., physical science, junior shop work, and junior college welding. Out of the nine high schools of the State of Gujarat, the teachers of agriculture in two high schools were not teaching other subjects except agriculture, and the teachers of agriculture in the remaining seven high schools were found to spend from eight hours and forty minutes to one hour and forty-five minutes in teaching other subjects.

TABLE V

THE TIME SPENT BY THE TEACHER OF AGRICULTURE TO TEACH THE
SUBJECTS OTHER THAN AGRICULTURE

Number of schools	Time spent in teaching subjects other than agriculture	
	Hours	Minutes
<u>Kansas</u>		
1	4	00
3	3	00
1	2	00
<u>Gujarat</u>		
1	8	40
1	6	40
1	6	00
1	4	00
1	3	20
1	2	20
1	1	45

The Staff Employed to Teach Agriculture

The teacher and the other staff employed to teach agriculture in the selected high schools of the States of Kansas and Gujarat were found to vary especially in the high schools of the State of Gujarat. The details as tabulated in Table VI were found.

TABLE VI

THE STAFF EMPLOYED FOR TEACHING AGRICULTURE IN THE HIGH SCHOOLS

Number of schools	Staff employed
<u>Kansas</u>	
8	One teacher
2	Two teachers
<u>Gujarat</u>	
1	One teacher and three assistants
1	Two teachers and two assistants
3	One teacher and two assistants
3	One teacher and one assistant
1	One teacher

In the State of Kansas, two high schools had two teachers, while eight high schools had one teacher. In the State of Gujarat, eight high schools had assistants varying from one to three in addition to teachers. There was one high school out of nine, having only one teacher.

The Numbers of the Students Enrolled and Load per Teacher of Agriculture

The load in terms of the numbers of students per staff employed to teach agriculture in the high schools under study was found as shown in Table VII.

TABLE VII
STUDENTS ENROLLED AND LOAD PER STAFF TEACHING AGRICULTURE

Name of school	Number of students enrolled	Student load per staff member
<u>Kansas</u>		
Paola	60	30
Effingham	57	57
Garden City	56	56
Columbus	52	26
Concordia	50	50
Clay Center	40	40
Stockton	38	38
Beloit	38	38
Ellinwood	34	34
Winfield	30	30
<u>Gujarat</u>		
Kapadvanj	300	75
Avidha	189	63
Bavla	166	55
Idar	144	72
Jetalpur	137	68
Abrana	134	67
Alisbada	90	90
Wadhwan	84	28
Palitana	76	38

The maximum load in terms of number of students per staff employed to teach agriculture was fifty-seven and the minimum were twenty-six in the selected high schools of the State of Kansas, while in the high schools of the State of Gujarat, the maximum load was ninety and the minimum was twenty-eight.

The Selection of Students for Admission to Learn Agriculture Subject

Out of the nine high schools included in the study, none in the State of Gujarat had conducted a selection of the students before admitting them to study the agriculture subjects. In the State of Kansas out of the ten high schools, seven high schools had selected students having access to a farm, while three high schools had not made any such selection.

Teaching Different Subjects in Agriculture I, II, III, and IV.

The teachers of the schools in the State of Gujarat and the State of Kansas were asked to indicate the levels at which certain agricultural subjects were taught to their students. Some variation was noted between the programs of the institutions teaching agriculture in the two states. Details regarding the number of schools teaching the same course at different levels were found as shown in Table VIII.

Situation Found in the Selected High Schools of the State of Kansas and Gujarat. General agriculture: All the high schools of Kansas were found to be teaching farmers' organization in agriculture I. The same course was also taught in agriculture II, III and IV by 70 per cent of the schools of Kansas. In Gujarat, percentage of the schools teaching this course in agriculture III and IV was 11.1. No school of Gujarat taught this course in agriculture I and II. Parliamentary procedure was not taught in Gujarat. The percentage of the schools of Kansas teaching this course in agriculture I, II, III, and IV was 90, 80, 60 and 60, respectively. Rural living was taught by 60 and 66.6 per cent

TABLE VIII

TEACHING DIFFERENT SUBJECTS IN AGRICULTURE I, II, III, AND IV

Subjects	Number of schools ¹ teaching subject in							
	Agriculture							
	I		II		III		IV	
	K ²	G ³	K	G	K	G	K	G
I. General Agriculture								
1. Farmers' organization	10	-	7	-	7	1	7	1
2. Parliamentary procedure	9	-	8	-	6	-	6	1
3. Rural living	-	-	-	-	3	1	3	5
II. Crops								
1. Seed germination	3	6	7	2	3	1	-	2
2. Fertilizers	1	1	4	7	7	5	1	4
3. Green manuring	1	1	3	5	6	3	1	3
4. Mixed farming	-	-	1	4	1	3	-	4
5. Rotation of crops	1	-	5	3	7	3	1	3
6. Identification and classification of weeds and control measures	1	4	7	4	8	2	2	5
7. Identification of forage crops	1	-	5	-	7	4	2	5
8. Identification of grain crops	1	3	5	1	7	8	2	6
9. Grain grading	1	-	4	-	6	4	2	2
10. Study of horticulture crops	1	-	4	1	2	9	2	7
11. Fruit preservation	-	-	1	1	-	3	-	6
12. Study of crops--important and locally grown	2	2	7	5	7	8	-	7
13. Study of vegetable crops	2	1	2	1	1	9	-	7
14. Study of insects pests and disease of crops and control measures	1	-	7	7	7	6	-	6

TABLE VIII (continued)

Subjects	Number of schools ¹ teaching subject in Agriculture							
	I		II		III		IV	
	K ²	G ³	K	G	K	G	K	G
III. Animal Husbandry and Veterinary Sciences								
1. Swine enterprise ⁴	8	-	6	-	2	-	-	-
2. Sheep enterprise	5	3	7	7	1	2	-	2
3. Cow enterprise	6	4	8	8	2	3	1	2
4. Buffalo enterprise	-	4	-	7	-	3	-	3
5. Poultry enterprise	2	4	3	7	3	5	-	3
6. Dairy enterprise	4	-	6	-	1	8	-	2
7. Technical aspect of silage making	1	-	3	-	4	2	2	8
8. Feeds and feeding and figuring rations	-	1	7	1	2	7	1	8
9. Poultry culling	3	-	6	1	3	4	1	1
10. Live market poultry grading	1	-	7	1	3	1	1	-
11. Dressed market poultry grading	1	-	7	-	3	-	1	-
12. Egg grading	2	-	7	-	3	3	1	1
13. Livestock production testing and genetics	-	-	5	-	5	2	2	2
14. Milk testing	1	-	3	-	1	5	-	3
15. Wool grading and marketing	-	-	5	1	1	3	-	-
16. Livestock and dairy selection	5	-	9	-	6	6	3	-
17. Meats identifi- cation	-	-	4	-	3	-	3	-
18. Meats selection	-	-	1	-	4	-	3	-
19. Meats grading	-	-	2	-	3	-	3	-
20. Study of animal diseases	2	-	6	-	3	3	3	9
IV. Farm Mechanics								
1. Farm mechanic skills	10	-	9	5	4	1	3	2
2. Farm mechanic skills-construction	1	-	9	-	8	2	4	-
3. Farm mechanic skills-repairs	-	3	8	4	9	4	5	4

TABLE VIII (continued)

Subjects	Number of schools ¹ teaching subject in							
	Agriculture							
	I	II		III		IV		
K ²	G ³	K	G	K	G	K	G	
4. Rural electrification	1	-	8	-	6	-	2	1
5. Irrigation	-	-	2	7	5	7	2	4
V. Soils								
1. Classification of land	1	4	6	4	8	-	1	2
2. Factors of land classification	1	4	4	4	7	-	2	-
3. Soil testing	1	4	4	3	6	-	-	-
4. Operating the farm level	-	1	5	3	7	1	-	2
5. Contour farming	-	-	4	5	7	1	-	2
6. Terracing	-	-	4	5	7	2	-	-
VI. Farm management								
1. Farm accounting	9	-	8	-	8	1	7	9
2. Farm cooperatives	-	-	2	-	4	5	8	6
3. Farm laws	-	-	-	-	1	6	9	5
4. Insurance	-	-	-	-	1	-	9	-
5. Farm taxes	1	-	1	-	1	-	10	-
6. Financing and credit	2	-	2	-	3	2	9	3
7. Marketing	1	-	4	-	4	2	9	5
8. Farm safety	9	-	9	-	8	3	6	2
9. Farmstead beautification	1	-	3	1	4	3	5	-

¹Total = 10 for Kansas; 9 for Gujarat

²K = Kansas

³G = Gujarat

⁴Enterprise means a complete project including selection of breed, breeding, rearing, etc.

of the schools of Kansas and Gujarat, respectively. Equal percentage of the schools (30 per cent) in Kansas taught this course in agriculture III and IV, while in Gujarat 55.5 per cent of schools taught it in agriculture IV.

Crops: The highest percentage of the schools of Gujarat found to be teaching seed germination in agriculture I was 66.6. In Kansas 70 per cent of the schools were found teaching this course in agriculture II. In Gujarat, teaching about fertilizers was done in agriculture II, III and IV by 77.7, 55.5 and 44.4 per cent of the schools respectively. In Kansas 40 and 70 per cent of the schools taught this course in agriculture II and III, respectively. More than 50 per cent of the schools of Gujarat and Kansas taught green manuring in agriculture II and III, respectively. Equal percentage (20) of the schools of Kansas was found to be teaching mixed farming in agriculture II and III while in Gujarat the percentage of schools teaching this course in agriculture II, III and IV was 44.4, 33.3 and 33.3, respectively. Horticulture crops were taught by 100 per cent of the schools of Gujarat in agriculture III and 70 per cent in agriculture IV. In Kansas 40 per cent of the schools taught this course in agriculture II. Fruit preservation was taught by 10 per cent of the schools of Kansas. In Gujarat 60 and 30 per cent of the schools were found to be teaching this course in agriculture IV and III, respectively. Identification of weeds, forage crops, grain crops, cultivation of important crops and its pests and diseases were taught by more than 50 per cent of the schools of Kansas in agriculture II and III. These courses were taught in agriculture IV by more than 55 per cent of the

schools of Gujarat.

Animal husbandry and veterinary sciences: The number of courses found to be taught by more than 50 per cent of the schools of Kansas in agriculture I, II, III, and IV was five, sixteen, four and one, respectively. In Gujarat five courses were taught in agriculture I by less than 45 per cent of the schools. More than 55 per cent of the schools taught five courses in agriculture II, five courses in agriculture III and three courses in agriculture IV. In Kansas, buffalo enterprise was not taught. In Gujarat six courses, viz., swine enterprise, meats identification, meats grading, meats selection, live market poultry grading and dressed market poultry grading were not taught.

Farm mechanics: All the schools of Kansas were found to be teaching farm mechanic skills in agriculture I and the percentage of schools found to be teaching this course in agriculture II, III, and IV was 90, 40, and 30, respectively. In Gujarat more than 50 per cent of the schools taught this course in agriculture II. Farm mechanic skills—construction—were taught in agriculture II and III by 90 and 80 per cent of the schools of Kansas, respectively. In Gujarat the teaching of this course was done by 22.2 per cent of the schools in agriculture III and at no other level was it taught. Farm mechanic skills—repairs—were taught by 44.4 per cent of the schools of Gujarat in agriculture II, III, and IV while in Kansas 80 and 90 per cent of the schools taught this course in agriculture II and III, respectively. Rural electrification was not taught in Gujarat. In Kansas it was taught by 80 and 60 per cent of the schools in agriculture II and III, respectively. Irrigation was

taught by 77.7 per cent of the schools of Gujarat in agriculture II and III. In Kansas 50 per cent of the schools taught this course in agriculture III.

Soils: In Kansas six courses related to soils were taught by more than 60 per cent of the schools in agriculture III, while in Gujarat three courses were taught in agriculture I by more than 44 per cent of the schools and four courses were taught by the same percentage of the schools in agriculture II.

Farm management: Farm accounting was taught in agriculture I, II, III and IV by 90, 80, 80, and 70 per cent of the schools of Kansas. In Gujarat 100 per cent of the schools taught in agriculture IV and 11.1 per cent of schools taught this course in agriculture III. Insurance and taxes were not taught in Gujarat. In Kansas 90 per cent of the schools taught farm law, and insurance in agriculture IV and 100 per cent of the schools taught taxes in agriculture IV. Farm cooperatives were taught in agriculture III and IV by 55.5 and 66.6 per cent of the schools of Gujarat, respectively. In Kansas 80 per cent of the schools taught this course in agriculture IV. Marketing was taught in agriculture IV by 90 and 55.5 per cent of the schools of Kansas and Gujarat, respectively. Farm safety was taught by 90 per cent of the schools of Kansas in agriculture I and II and 80 and 60 per cent of the schools were found to be teaching this course in agriculture III and IV, respectively. In Gujarat 33.3 per cent and 22.2 per cent of the schools were found to be teaching this course in agriculture III and IV, respectively. Farmstead beautification was taught by 50 per cent of the schools of

Kansas in agriculture IV, while 33.3 per cent of the schools of Gujarat was the maximum per cent found to be teaching this course and it was taught in agriculture III.

Spread of Teaching Different Subjects

From a study of the data presented in Table VIII, it was noted that there was variation in the pattern used by the various schools in the distribution of the teaching of different agricultural subjects, i.e., source schools taught all about a given subject in one year while other schools spread the instruction over two, three or four years. The spread of teaching each subject was found as per the information given in Table IX.

Courses about the farmers' organization and the parliamentary procedure were taught in all the four years by 50 per cent of the high schools of the State of Kansas. The course--rural living--was taught by six high schools and in each case in one year. The course of farmers' organization and the rural living was taught in one and two years by two and four schools, respectively, of the State of Gujarat.

Out of fourteen courses related to crops, ten and seven courses were taught over a period of one year in more than 50 per cent of the schools of Kansas and Gujarat, respectively. More than 50 per cent of the schools of both states were teaching three courses over a period of two years. In Gujarat, 33.3 per cent of the schools taught three courses over a period of three years. Less number of the schools of Kansas taught mixed farming, fruit preservation and vegetable crops.

TABLE IX
SPREAD OF TEACHING DIFFERENT SUBJECTS

Subjects	Number of schools ¹ teaching subjects for							
	One year		Two years		Three years		Four years	
	K ²	G ³	K	G	K	G	K	G
I. General Agriculture								
1. Farmers' organization	2	2	-	-	3	-	5	-
2. Parliamentary procedure	1	-	3	-	1	-	5	-
3. Rural living	6	4	-	1	-	-	-	-
II. Crops								
1. Seed germination	7	8	2	-	-	-	-	-
2. Fertilizers	8	4	1	1	1	3	-	1
3. Green manuring	7	7	2	1	-	1	-	-
4. Mixed farming	2	6	-	1	-	1	-	-
5. Rotation of crops	8	7	1	1	-	-	1	-
6. Identification and classification of weeds and control measures	3	5	6	3	1	-	-	1
7. Identification of forage crops	6	5	3	2	1	-	-	-
8. Identification of grain crops	6	4	3	5	1	-	-	1
9. Grain grading	5	4	5	1	-	-	-	-
10. Study of horticulture crops	5	1	1	8	-	-	-	-
11. Fruit preservation	1	6	-	2	-	-	-	-
12. Study of crops--important and locally grown	5	2	4	3	1	3	-	1
13. Study of vegetable crops	3	2	1	6	-	-	-	1
14. Study of insect pests and diseases of crops and control measures	5	2	5	4	-	3	-	-

TABLE IX (continued)

Subjects	Number of schools ¹ teaching subjects for							
	One year		Two years		Three years		Four years	
	K ²	G3	K	G	K	G	K	G
III. Animal Husbandry and Veterinary Science								
1. Swine enterprise	4	-	6	-	-	-	-	-
2. Sheep enterprise	7	7	3	2	-	-	-	-
3. Cow enterprise	4	6	5	1	1	-	-	2
4. Buffalo enterprise	-	6	-	-	-	1	-	2
5. Poultry enterprise	8	5	-	1	-	1	-	2
6. Dairy enterprise	8	5	1	2	-	-	-	-
7. Technical aspect of silage making	8	6	1	2	-	-	-	-
8. Feeds and feeding and figuring rations	10	1	-	7	-	1	-	-
9. Poultry culling	6	3	2	1	1	-	-	-
10. Live market poultry grading	7	-	1	1	1	-	-	-
11. Dressed market poultry grading	7	-	1	-	1	-	-	-
12. Egg grading	6	4	2	-	1	-	-	-
13. Livestock production testing and genetics	8	5	2	-	-	-	-	-
14. Milk testing	3	6	2	1	-	-	-	-
15. Wool grading and marketing	5	2	-	1	-	-	-	-
16. Livestock and dairy selection	-	6	7	-	1	-	1	-
17. Meats identification	6	-	1	-	-	-	-	-
18. Meats selection	2	-	4	-	-	-	-	-
19. Meats grading	4	-	2	-	-	-	-	-
20. Study of animal diseases and control measures	6	6	4	3	-	-	-	-

TABLE IX (continued)

Subjects	Number of schools ¹ teaching subjects for							
	One year		Two years		Three years		Four years	
	K ²	G ³	K	G	K	G	K	G
IV. Farm mechanics								
1. Farm mechanic skills	2	6	4	1	1	-	3	-
2. Farm mechanic construction	2	2	4	-	2	-	2	-
3. Farm mechanic repairs	2	-	3	8	5	-	-	-
4. Rural electrification	4	-	5	-	1	-	-	-
5. Irrigation	7	3	1	3	-	3	-	-
V. Soils								
1. Classification of land	5	6	3	2	2	-	-	-
2. Factors of land classification	5	5	3	2	1	-	-	-
3. Soil testing	9	3	1	2	-	-	-	-
4. Operating the farm level	8	5	2	1	-	-	-	-
5. Contour bunding	9	6	1	1	-	-	-	-
6. Terracing	9	5	1	1	-	-	-	-
VI. Farm Management								
1. Farm accounting	1	7	-	2	1	-	7	-
2. Farm cooperatives	7	4	1	5	1	-	-	-
3. Farm laws	10	4	-	3	-	-	-	-
4. Insurance	10	-	-	-	-	-	-	-
5. Farm taxes	8	-	1	-	-	-	-	-
6. Financing and credit	8	3	-	1	-	-	2	-
7. Marketing	5	6	3	-	1	-	1	-
8. Farm safety	1	3	2	1	1	-	6	6
9. Farmstead beautification	6	2	1	1	-	-	1	-

¹Total = 10 for Kansas; 9 for Gujarat

²K = Kansas

³G = Gujarat

Courses related to animal husbandry and veterinary sciences numbered twenty. Out of this twelve and ten courses were taught over a period of one year by more than 50 per cent of the schools of Kansas and Gujarat, respectively. In Kansas three courses were taught over a period of two years by more than 50 per cent of the schools and in Gujarat, one course was found to be in this category. Buffalo enterprise was not taught in Kansas while six courses, viz., swine enterprise, live market poultry grading, dressed market poultry grading, meats identification, meats grading, and meats selection were not taught in Gujarat.

There were five courses related to farm mechanics in the list. Out of this, one course was taught by more than 50 per cent of the schools of Kansas over a period of one year and three courses were taught by more than 40 per cent of the schools over a period of two years. The course of farm mechanics--repairs--was taught over a period of three years by 50 per cent of the schools. In Gujarat, rural electrification was not taught. Farm mechanic skills were taught by 66.6 per cent of the schools over a period of one year and 88.8 per cent of the schools taught farm mechanics--repairs--over a period of two years.

Out of six courses related to soils, three, one, and two courses were taught over a period of one year by 90, 80, and 50 per cent of the schools, respectively, in Kansas. In Gujarat, five courses were taught over a period of one year by more than 55 per cent of the schools.

There were nine courses related to farm management. In Kansas two, three and two courses were taught over a period of one year by 100, 70, and 50 per cent of the schools, respectively, and two courses

were taught over a period of four years by 60 per cent of the schools. In Gujarat, farm safety was taught over a period of two years by 66.6 per cent of the schools. More than 50 per cent of the schools in Gujarat were teaching two courses over a period of one year and one course was taught over a period of two years by 55.5 per cent of the schools. Courses, viz., insurance and taxes were not taught in Gujarat. Farm laws were taught in 44.4 per cent of the high schools of Gujarat over a period of one year and 33.3 per cent of the schools taught this course over a period of two years.

The Supervised Farming Program and the Plot Work

Supervised farming programs were undertaken by all the students of vocational agriculture in Kansas during their study. Main types of the programs were rearing of animals, raising of crops, farm mechanic skills, improvement projects and supplementary projects. Average number of these projects undertaken by the students of the schools that were studied was found as per Table X.

While studying the courses taught it was found that in Gujarat the supervised farming programs were not undertaken by the students, but they were doing plot work, i.e., raising crops on the allotted area of a school farm. The students of vocational agriculture in Kansas were found to have supervised farming programs.

Some of the names of breeds reared by the students were Hereford and Angus cattle, Hampshire hog, Cross bred hog, and quarter bred horse.

TABLE X
SUPERVISED FARMING PROGRAMS

Average number per student				
Animals reared	Crops raised	Farm mechanic skills	Improvement projects	Supplementary projects
23	2	3	3	3

Some of the crops raised were wheat, corn, milo, and alfalfa.

Farm mechanic skills were related to basic metals, farm carpentry, machinery conditioning, tractor maintenance, tool conditioning, welding, mineral feeds, hog troughs, hog sheds, sheep holders, trailers, feed bunks, hog houses, bleachers, salt boxes, show boxes, hay feeders, gates, hog panels, barrel stands, tire racks, and garbage can stands.

Improvements projects such as improving the farm shop, building hog sheds, painting farm buildings and farm machines, planting of trees, cleaning farm sheds, terracing, laying out contour terraces, exhibiting farm animals at fairs were carried out by the students.

Supplementary practices consisted of fixing fences, training calves, preparing calves and hogs for shows, culling hens, repairing farm machinery, and farm buildings.

In one school, two students were working on farms owned by other farmers, under a farm placement scheme. They were working on the farm for eight to twelve hours per week during the winter months.

The students enrolled in agriculture in the schools of Gujarat were found to be doing plot work. The distribution of schools on the

basis of the level at which students started plot work was according to figures shown in Table XI.

TABLE XI
PLOT WORK DONE BY STUDENTS ON A SCHOOL FARM

Number of schools	Level at which plot work was done	Average area allotted per student for plot work
5	Agriculture I, II, III, and IV	2 gunthas*
1	Agriculture II, III, and IV	2 gunthas
2	Agriculture III and IV	1 guntha
1	Agriculture IV	20 gunthas

*One acre = 40 gunthas

Crops grown by the students were cereals such as Bajri (Pennisetum typhoides), Sorghum, and Wheat; pulses⁶⁰ such as green gram (Phaseolus aureus), black gram (Phaseolus mungo), gram (Cicer arictinum), arhar (Cajanus cajan), cash crops such as cotton and peanuts; vegetable crops such as egg plant, capsicum, cucurbit, baby okra, tomatoes, and cucumber.

Field Trips and Teacher's Visits to the Students' Home Farms

The plot work was done by the students at all levels in 50 per cent of the schools of Gujarat.

⁶⁰ Pulses are leguminous crops.

Also of interest in this study was field trips made by the class and number of home visits made by the teacher.

The information regarding the number of field trips organized and the number of teacher's visits per year to the students' farms were found as per Table XII.

TABLE XII
NUMBER OF FIELD TRIPS ORGANIZED AND NUMBER OF TEACHER'S VISITS TO THE STUDENTS' FARMS PER YEAR

Name of school	Number of trips per year for each level of agriculture				Number of teacher's visits
	I	II	III	IV	
<u>Kansas</u>					
Paola	4	7	14	5	2-3
Concordia	6	14	8	6	4-6
Stockton			Not given		
Clay Center	10	15	30	12	3
Winfield	10	14	21	14	3
Garden City	7-10	7-10	7-10	7-10	3.5
Columbus	10	10	10	10	5
Beloit	2	3	9	3	2.5
Effingham	4	12	5	5	2
Ellinwood	6	5	7	7	3
<u>Gujarat</u>					
Abrana	4	4	4	4	-
Avidha	-	-	10	-	-
Wadhwan	5	5	5	5	-
Bavla	3	3	3	3	-
Palitana	-	-	-	1	-
Idar	-	-	1	-	-
Aliabada	-	-	1	-	4
Jetalpur	-	1	1	-	-
Kathlal	10	10	10	10	-

It was found that in Gujarat, the teachers teaching agriculture were not visiting the students' farms. The number of field trips were also less, compared to those organized in schools of Kansas. Maximum numbers of field trips were organized in agriculture II and III by 60 per cent of the schools of Kansas. Maximum numbers of field trips were thirty in agriculture III. In Gujarat 44.4 per cent of the schools had organized field trips at four levels and the same percentage of the schools had field trips at one level. Maximum number of field trips organized were up to ten. In Gujarat, the teacher at one high school was found to visit students' farms. In Kansas, the teacher of the ten selected schools visited students' farms two to six times in a year.

Factors Considered and the Agencies Consulted in Deciding Courses

One of the items of this study was to know the main important factors considered and the agencies consulted by each of the selected schools for deciding the courses to be taught. Few important factors and agencies were listed in the check list and survey forms and the teachers were requested to put (x) against the factor considered and the agency consulted by them. The factors considered and the agencies consulted in deciding courses to be taught were found as mentioned in Table XIII.

All of the ten high schools of Kansas had considered the needs of the community and had consulted with the farm families. The opinion of the past students and the school administrative staff was considered by eight and five schools, respectively, for deciding the courses to be

taught.

In the State of Gujarat, the courses prescribed by the Government Department of Education were followed. In addition opinion of the school administrative staff was considered by four high schools. Three schools had considered the needs of the community, opinion of the members of advisory committees, and opinion of the farm families.

TABLE XIII

FACTORS CONSIDERED AND THE AGENCIES CONSULTED IN DECIDING COURSES TO BE TAUGHT

Factor or Agency	Number of high schools	
	Kansas	Gujarat
Needs of community	10	3
Opinion of the members of advisory committee	2	3
Opinion of the past students	8	1
School administrative staff	5	4
Employees of the students	3	-
Farm families	10	3
Educational consultant	2	3
As per syllabus prescribed by the Department of Education	-	5

Use of Resource Persons to Aid in Teaching

The teachers of the selected schools were asked about the use of specialists or persons considered to be experienced and competent in a particular field, to aid class teaching. The selected high schools were

found to use resource persons to aid in teaching as per data tabulated in Table XIV.

TABLE XIV

USE OF RESOURCE PERSONS OF THE COMMUNITY TO AID CLASS TEACHING

Resource persons	Number of high schools	
	Kansas	Gujarat
Specialist	9	1
Man from business	7	-
Man from industry	7	-
County agent or extension staff	9	3
Others:		
Cooperative personnel	2	-
Bank personnel	1	-

In the State of Kansas, local resource persons, viz., subject matter specialists and county agents were used by 90 per cent of the schools. Men from business and industry were used by 70 per cent of the schools. In the State of Gujarat, the use of resource persons was found to be less. Three schools were found to use extension staff.

USEFULNESS OF TEACHING AGRICULTURE IN HIGH SCHOOLS

The second objective was to study to what extent teaching of agriculture in high schools helps in (i) developing effective ability to make a beginning and advance in farming, (ii) providing training in the agricultural related occupations, (iii) providing medium for improving

school and community relationship, (iv) providing required background of knowledge for continuing further study in college in agriculture, (v) developing ability to participate in rural leadership, and (vi) developing ability to be a good citizen.

Objectives listed in Vocational Agriculture Monograph 21, United States Department of Education are as follows:

1. Make a beginning and advance in farming.
2. Produce farm commodities efficiently.
3. Market farm products advantageously.
4. Conserve soil and other natural resources.
5. Manage a farm business.
6. Maintain a favorable environment.
7. Participate in rural leadership.⁶¹

As per the study made by Dale B. Douglas, the primary objective considered was the first one listed above, while remaining six were considered to be subsidiary to the first objective. Douglas found that majority of the respondents included in his study expressed the following objectives to be considered for vocational agriculture.

1. Make a beginning and advance in an agricultural vocation.
2. Apply the principles of science, management, economics, and mechanics to the efficient production of farm products.
3. Apply the principles of science, management, economics, and mechanics to the efficient marketing of farm products.

⁶¹Dale B. Douglas, "An Evaluation of the Educational Objectives of Vocational Agriculture by Idaho School Administrators," Agricultural Education Magazine, 35:13, July, 1962.

4. Manage and use wisely soil, water and other natural resources.
5. Assist the students in becoming socially adjusted to their environment.
6. Assist the students in learning how to manage a farm as a business.
7. Participate effectively in school and community affairs.
8. Appreciate the industry of agriculture, its social and economic importance.
9. Plan and prepare for post high school education in agriculture.
10. Develop through growing plants and animals an understanding of the basic principles of life.⁶²

The six objectives which were considered in this study cover practically the above objectives as mentioned in Monograph as well as mentioned by the respondents in study made by Douglas. The teaching of agriculture in high school was considered to help to achieve six major objectives as follows:

Developing Effective Ability to Make a Beginning and Advance in Farming

Supervised farming programs and plot work were the most important learning experiences in which students get opportunities to apply what they learn in class room and laboratory. In farming programs the students had to encounter rural problems and they found solutions which were successful in farming by reading, studying in class room and laboratory, and discussion. Solutions found were put into practice by undertaking farming programs. Thus they practiced thinking reflectively regarding

⁶² Ibid.

problem situations and farming practices. The long time farming programs were developed so that farming programs of sufficient size provided the student with a full-time occupation upon the completion of study in high school. Teaching of farm accounts also helped the students in maintenance of farm records of his farming or plot work. From these records the students could know what progress they made in becoming established in farming. Future Farmer of America sponsored activities also helped the students to start and become established in farming.

H. T. Lester conducted a study to know the importance of the agricultural education in high school for becoming established in farming. He found that the high school graduates who had studied agriculture in high schools had one-third more income from farm than the non-high school graduates.⁶³

Providing Training in Agricultural Related Occupations

In addition to working on a farm, i.e., actual farming, other occupations which are non-farming but are related to agriculture become increasingly important. The tractor mechanic, artificial inseminator, forest worker, butter maker, feed and seeds salesman, etc. were illustrations of such occupations which needed a good agricultural background. The teaching of farm mechanics; grading farm products; judging of livestock,

⁶³ H. T. Lester, "Establishing Young Men in a Farm Business," Agricultural Education Magazine, 34:42-44, August, 1961.

crope, grains; soil testing; etc., helped to train the studente for non-farm agricultural related occupations. The study of farm management, farm laws and rural living qualified the student for employment as a farm manager. Production projects and improvement projects undertaken by the students under the supervised farming program also helped the students in acquiring skill for non-farm agricultural related occupations. The study of farm management, farm laws and rural living qualified the student for employment as a farm manager. Production projects and improvement projects undertaken by the students under the supervised farming program also helped the students in acquiring skill for non-farm agricultural related occupations. A sheep project prepared the student for such employment as shshep shearer. Improvement projects such as maintaining dairy herd records qualified the student for employment as supervisor in dairy herd improvement association.

Mr. Ralph R. Royster studied high school vocational agriculture graduates to make analysis of non-farming agricultural occupations of boys having training in vocational agriculture. He found the studente having training in vocational agriculture employed in the following concerns:

1. Farm implements salss and service companiee.
2. grain elevators and feed companiee.
3. Meat cutters, produce managers, workers and buyers for supermarkete and groceries.
4. Lumber and farm supply bueines.
5. Milk pick-up routes and milk proceseing plants.

6. Agricultural research farm.
7. Nursery and garden.
8. Meat packing and processing companies.
9. Livestock oommission firms.
10. Livestock delivery truckers.
11. Livestock equipment companies.
12. Farmers gas and oil supply companies.
13. Hatcheries.
14. Park feeding plants.
15. Vegetable processing and canning company.
16. Fruit and vegetable market.
17. Grain inspectors for government.
18. Assistant to veterinarian.⁶⁴

Royster found that a little over 55 per cent of the employers rate their employees with background in vocational agriculture as being above average. Regarding the adjustment to their work, 44 per cent of the high school graduates having vocational agriculture were found well adjusted, 25 per cent exceptionally well adjusted, 30 per cent were just average and 3 per cent were below average.⁶⁵

⁶⁴ Ralph R. Royster, "Voc-Ag Graduates in Non-farm Agricultural Occupations," Agricultural Education Magazine, 33:257-58, May, 1961.

⁶⁵ Ibid.

Providing Medium for Improving School and Community Relationship

Educational institutions were the public institutions studied. This public relations were found to be of greater service to school. The vocational agriculture program in high school was a good means of establishing and maintaining public relations. Such activities as considering the needs of local farming, consulting farm families, consulting employers of students, members of the advisory committees for deciding courses to be taught, helped in establishing and maintaining good public relations. Future Farmers of America activities such as speech contest, judging contest, conducting adult and young farmers classes helped to have a good public relations by making the public familiar with the activities carried out in the school. Field trips, visiting home farms by the teacher, inviting local resource persons such as men from industry and business, progressive farmers, extension workers and subject matter specialists to aid class teaching were the means for maintaining good public relations.

Providing Required Background of Knowledge for Continuing Further Study in College in Agriculture

The matter regarding success of vocational agriculture students in college has been studied by different persons. Some results of these studies have been given in an article--Vocational Agriculture and Success in College--written by Fred J. Pumper and George W. Sledge. The results

given in an article are as follows:⁶⁶

Fay examined record of 526 freshmen students in agriculture in college and concluded that a greater percentage of boys entering the college of agriculture after having studied vocational agriculture in high school, were successful in their first year of college work, than boys who entered with an academic high school preparation, or those who had included non-agricultural vocational studies in their high school courses.

Bender of Ohio has published the results of comparative study of four hundred students with high school vocational agriculture and four hundred without this program. It was found that 50 per cent of the vocational students were in the top one-third of their high school graduating classes compared to 35 per cent of the non-vocational students.

Studies carried out between 1929 and 1958 showed that the vocational group did better than the non-vocational group in 53.8 per cent of findings; in 36.6 per cent of findings, the vocational group did as well as the non-vocational group.

In 1960 such type of study was conducted at the University of Wisconsin. It was found that 2.99 and above grade points were obtained by 68.2 per cent of vocational agriculture students, while percentage of non-vocational agriculture students getting 2.99 and above grade points was 50.2.

⁶⁶ Fred J. Pumper and George W. Sledge, "Vocational Agriculture and Success in College," Agricultural Education Magazine, 34:42-44, August, 1961.

Thus the knowledge acquired and the interests created through production projects and the experiences the students got during their high school study in vocational agriculture helped to prepare good background and also to explore possibilities of going to an agricultural college.

Developing Ability to Participate in Rural Leadership

A wide variety of programs were launched by the Governments for increasing agricultural production. The farmers were considered as co-partners for the execution of these programs. Understanding of these programs by the rural people was essential. This was done on a farmer to farmer basis as well as in informal meetings. Good leaders were required for this task. To develop the ability and confidence to ask an intelligent question at a meeting, to explain a point to a neighbor, to read and to understand a piece of information in the publication were all considered as marks of leadership.⁶⁷

In supervised farming programs, the students got the experience of putting the material they learn to practical application, and applying the information to local situations. This helped the students to become leaders. Teaching and training boys to speak played a very important role in developing leadership in farm boys. Speaking contests, speaking at public meetings, school groups, farm organizations, etc. offered

⁶⁷ George H. Nelson, "Training for Leadership," Agricultural Education Magazine, 34:207-208, March, 1962.

opportunities to train boys for rural leadership.⁶⁸

Teaching of parliamentary procedures helped the students to get acquainted with the organization and its principles. This enabled them to join the organizations in their local areas and also to work on committees of these organizations efficiently.⁶⁹ They acquired knowledge of conducting meetings and knowledge to direct a group of people in a democratic manner.

In Gujarat State, the students of agriculture in high schools did not get such experiences as found during this study.

Developing Ability to be a Good Citizen

For developing ability to be a good citizen, organization such as Future Farmers of America played a very important role. The students as members started to think of the importance of the need for understanding of rural problems and the Creed of Future Farmers of America pointed out what each member could do for his part in solving the rural problems. While being a member of Future Farmers of America, the boys got enough courage to become a state officer or the head of some local organization such as grange, farm bureau or milk association, etc. This was considered as good leadership as well as good citizenship. Because boys performed duties of a good citizen in helping the community to prosper and thrive, by taking part in such organizations, they found

⁶⁸ Ibid.

⁶⁹ Ibid.

there was need for their very existence.⁷⁰

Information received for the selected high schools of Kansas showed that 31.9 per cent of the students of vocational agriculture became established in farming, 31.3 per cent were employed in the non-farm agricultural related occupations and 25.9 per cent of the students joined college for higher study. Exact information for 10.8 per cent of the students was not available.

This also showed that students who studied vocational agriculture in high school, got background for becoming established in farming, for joining non-farm agriculture related occupations and also to join the college for further study.

SUMMARY AND CONCLUSIONS

From the number of students enrolled in agriculture in the high schools, it was observed that there was a necessity for agricultural education in high schools and especially in the State of Gujarat. More boys from the farmers' families were attracted by providing the agricultural education at the high school level. Courses such as parliamentary procedure, farmers' organization like Future Farmers of America, farm laws, rural living, rural electrification, farm mechanics, especially maintenance and repairs of farm machineries, were taught to a lesser extent in Gujarat. It was found that generally the courses prescribed by

⁷⁰James Rose, "Contribution of the FFA to Preparation for Citizenship," Agricultural Education Magazine, 33:209-210, March, 1960.

Government Department of Education were followed. Thus courses taught were less flexible compared to the flexibility of courses taught in Kansas. In the State of Gujarat the use of local resource persons to aid class teaching was found less. The agricultural teachers of high schools of Gujarat were found not to be visiting home farms of the students. In the State of Kansas, supervised farming was undertaken by the students, while in Gujarat, students were found to do plot work during their study. In the State of Kansas seven high schools out of ten high schools had selected students having access to a farm, before admitting them to study the agriculture subject. The teachers of 50 per cent of the schools of Kansas were found to spend time in teaching subjects other than agriculture while in the State of Gujarat 77.7 per cent of the teachers spent time in teaching subjects other than agriculture.

The following conclusions were arrived at as a result of this study:

1. Supervised farming practices were worthwhile to the Kansas programs and should be introduced in the high schools of the State of Gujarat.
2. The teachers of Gujarat high schools could make agricultural education better if they would visit home farms and would teach on the basis of requirements of local farming.
3. In Gujarat the students would be better trained for leadership by making them the members of some organizations like Future Farmers of America.

4. In Gujarat there was scope for improving public relations by consulting farmers, members of the advisory committees, past students, employers of the students, etc. for determining the courses to be taught.

5. More flexibility regarding selection of courses according to local conditions and needs would attract more students of rural community. Special study and periodic review of the curriculum in agriculture would also be useful.

6. It was found that in Gujarat and Kansas, the teachers of agriculture had to teach other subjects. If teachers were relieved from this duty, they could devote more time for farm visits and on-farm instruction to the individual student.

7. In Gujarat, the number of students per teacher was greater. Teaching of agriculture demands more individual teaching and supervision and hence the maximum limit of numbers of students per teacher should be limited to a number which would facilitate the teaching of agriculture.

8. The use of oil engines, electric motors for pumping out water from wells, use of tractors, use of improved implements could be increased by teaching farm mechanics such as maintenance and repairs of farm machinery, construction and layout of farm buildings such as cattle barns, laying out of irrigation channels and drains, etc.

9. In view of the democratic decentralization of administrative machinery and the powers granted to the local village Panchayats of the State of Gujarat, persons well trained in parliamentary procedure would be required. Thus teaching of parliamentary procedure would greatly

help in the administration of democratic institutions—village Panchayats and Cooperative society.

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APPENDICES

APPENDIX A

From:

Date: May 5, 1964

D. N. Pandya,
Graduate Student,
c/o Professor Dr. R. J. Agan,
Professor of Agriculture Education,
School of Education, Kansas State University,
Manhattan, Kansas.

Dear Sir,

I, the undersigned, D. N. Pandya, am a graduate student studying in agriculture education at the Kansas State University.

With the approval of Dr. R. J. Agan, Professor of Agriculture Education, I have selected the subject to study and compare the agriculture curriculum followed in the high schools of the State of Kansas and Gujarat. Gujarat is one of the states of India.

I want to collect information for ten best high schools of the State of Kansas for my study. I would be very much thankful if you kindly arrange to supply list of ten best high schools of the State of Kansas on the basis of evaluation made or any other basis which is considered by your office.

Further I am to request you to kindly arrange to supply any publication meant for giving guidance to the agriculture teacher relating to agriculture curriculum to be followed in the high schools and the information regarding qualifications and experience prescribed for the

recruitment of agriculture teachers for high schools.

Thanking you.

Yours faithfully,

(D. N. Pandya)

To:

Mr. C. C. Eustace,
State Supervisor, Department of
Vocational Agriculture Education,
Topeka, Kansas.

Submitted through Dr. R. J. Agan, Professor of Agriculture,
Education, Kansas State University, Manhattan.

APPENDIX B

Date: May 5, 1964

From:

D. N. Pandya,
Graduate Student,
c/o Professor Dr. R. J. Agan,
Professor of Agriculture Education,
School of Education, Kansas State University
Manhattan, Kansas State, U.S.A.

To:

The Director of Agriculture,
Gujarat State, Ahmedabad.

Subject: Teaching agriculture subject in high schools.

Sir,

I am to state that I have undertaken the work of carrying out comparative study of Agriculture Curriculum followed in high schools of the State of Gujarat and Kansas as approved by Dr. R. J. Agan, Professor of Agriculture Education, Kansas State University.

I am enclosing herewith the survey form to collect the information from agriculture teachers of high schools. I, therefore, request to kindly get the information collected through the District Agriculture Officers for one best high school of each district in which agriculture is taught. Twenty copies of forms for survey are being sent separately by book-post.

I am sending letter addressed to the Director of Education, Gujarat, State, Ahmedabad in duplicate requesting him to supply the information regarding pattern of staff appointed for teaching agriculture

in high schools, qualifications prescribed for recruiting teachers, in-service training given to agriculture teachers, etc.

I request you to kindly do needful at an early date so that I can get information as early as possible.

Yours faithfully,

(D. N. Pandya)

Submitted through Dr. R. J. Agan, Professor of Agriculture Education, Kansas State University, Manhattan.

Date: May 5, 1964

From:

D. N. Pandya,
Graduate Student,
c/o Professor Dr. R. J. Agan,
Professor of Agriculture Education,
School of Education, Kansas State University,
Manhattan, Kansas, U.S.A.

To:

The Director of Education,
Gujarat State, Ahmedabad.

(Through the Director of Agriculture, Gujarat State, Ahmedabad)

Subject: Teaching agriculture subject in high school.

Sir,

I, the undersigned, D. N. Pandya, am an officer of the Department of Agriculture, Gujarat State. At present I have been deputed to the Kansas State University, Manhattan, U.S.A., for higher study in agriculture education. I want to study the agriculture courses taught in the high schools of the State of Gujarat.

I would be very much thankful if you kindly arrange to supply the copy of curriculum of agriculture prescribed for high schools giving details of courses to be taught in different standards and time allotted per week for teaching agriculture in class and on fields, i.e., practicals;

and also information about staff pattern and the qualifications prescribed for teachers of agriculture to be appointed in high schools, inservice training given to agriculture teachers, etc.

Thanking you.

Yours faithfully,

(D. N. Pandya)

SURVEY FORM FOR COLLECTING INFORMATION REGARDING
COURSES IN AGRICULTURE TAUGHT IN THE
HIGH SCHOOLS OF GUJARAT STATE

1. Name of high school.
2. Name of town or city of high school.
3. Name of taluka.
4. Name of district.
5. Qualifications of agriculture teacher.
6. Designation and qualification of other staff appointed in addition to agriculture teacher for giving instructions in agriculture.
7. Standard at which agriculture instruction is begun in high school.
8. Time allotted per week for theory (class work) and for field work, i.e., practicals.

Standard	Time allotted per week.
For Theory	For practical.
9. Area of school farm in acres. (If no school farm, please mention accordingly.)
10. Number of classee of young farmere and adult farmers organized by the agriculture teacher in high school per year in addition to regular high school classes.

Number of young farmers' classes organized per year:

Number of adult farmers' classes organized per year:

11. Time per week spent by agriculture teacher in teaching subjects other than agriculture.

12. Number of visits paid by the agriculture teacher to home farm of each agriculture student in high school, in a year.

13. Number of field trips organized per year in each standard.

Standard	Number of field trips organized per year.
----------	---

14. Teacher's load:

Number of students in agriculture subjects per year per teacher of agriculture (Total number of students of all standards).

15. Factors considered and the agencies consulted in deciding courses to be taught. (Please put X against factor which is considered or agency which is consulted for deciding courses to be taught)

- | | |
|--|-------|
| 1. Needs of community (ascertained by survey) | _____ |
| 2. Opinion of the members of advisory councils or education committee. | _____ |
| 3. Opinion of passed students. | _____ |
| 4. The school administrative staff. | _____ |
| 5. Employers of students. | _____ |
| 6. The farm family. | _____ |
| 7. Educational Specialists. | _____ |
| 8. Others. (Please mention.) | _____ |

16. Use of resource persons of the community to aid teaching. (Please put X against the resource person invited to school to aid class teaching.)

1. Specialist of different technical subjects of agriculture _____
 2. Man from business related to agriculture. _____
 3. Man from industry. _____
 4. Extension workers. _____
 5. Others (please mention) _____
17. Details of subjects taught in different standards. (Please put X against the subject under the standard in which it is taught. If the same subject is taught in more than one standard, mark X should be put under the standards in which the same subject is taught.)

Details of subject	Standard in which it is taught					
--------------------	--------------------------------	--	--	--	--	--

	7	8	9	10	11	12
--	---	---	---	----	----	----

- | | | | | | | |
|---|--|--|--|--|--|--|
| 1. Farm accounting. | | | | | | |
| 2. Supervised farming.
(farming by student on his own farm under the supervision of agriculture teacher) | | | | | | |
| 3. Farmers' organization
(Bharat Krishak Samaj) | | | | | | |
| 4. Parliamentary procedure. | | | | | | |
| 5. Study of breeds of sheep. | | | | | | |
| 6. Study of breeds of cows. | | | | | | |
| 7. Study of breeds of buffaloes. | | | | | | |
| 8. Poultry enterprise. | | | | | | |

9. Dairying - handling of milk,
preparing different products from milk.
10. Study of crops important and
locally grown.
11. Farm mechanic skills.
12. Technical aspect of silage making.
13. Feeds and feeding cattle, sheep, poultry,
etc., and figuring rations.
14. Poultry culling.
15. Live market poultry grading.
16. Dressed market poultry grading.
17. Egg grading.
18. Livestock production testing, and
genetics.
19. Milk testing.
20. Wool grading and marketing.
21. Livestock and dairy selection.
22. Farm mechanics construction.
23. Seed germination.
24. Operating the farm level.
25. Contour farming.
26. Terracing.
27. Classification of soils.
28. Factors of soil classification.

29. Soil testing.
30. Fertilizers.
31. Green manuring.
32. Mixed farming.
33. Rotation of crops.
34. Identification and classification of
weeds and control.
35. Identification of forage crops.
36. Identification of grain crops.
37. Grain grading.
38. Study of horticulture crops.
39. Fruit preservation.
40. Study of vegetable crops.
41. Farm co-operatives.
42. Farm laws.
43. Insurance.
44. Farm taxes.
45. Financing and credit.
46. Marketing.
47. Farm mechanics-implements,
construction and repair.
48. Study of insect pests and
diseases of crops and control.
49. Study of animal diseases.
50. Farm safety.

51. Farm beautification.
 52. Rural living.
 53. Irrigation.
18. Standard at which students are doing plot work on school farm, i.e., carrying out all operations by the students themselves for raising crops on the allotted land of school farm.
 19. Area allotted to each student for plot work. _____ acres.
 20. Crops grown by the students in plot allotted to them.
 21. Name of subjects in which more stress on practical is put.
 22. If possible please enclose copy of outline of courses in agriculture taught in each standard.

N.B. In supervised farming program, the student does raising of crop in more than one acre or he may rear dairy cows or few birds in poultry. The student has financial as well as management responsibility. While in plot work students have no financial or management responsibility. Plot work is done on small piece of land of school farm while supervised farming program is carried out on student's own farm or land of school farm or on land of other farmer on partnership basis or rental basis.

APPENDIX C

June 12, 1964

Dear Fellow Teachers:

Let me take this opportunity to introduce you to Mr. D. N. Pandya, an Agricultural Education Graduate student, here at Kansas State University from India. He is making a comparative type study of the 10 best vocational agriculture departments here in Kansas and 10 similar departments in his own country. Names of the 10 Kansas departments were obtained from the State Office.

Because of the time element that Mr. Pandya is working against, your immediate cooperation in this matter would be greatly appreciated. I feel that you will find the checklist quite easy to complete.

Sincerely,

(Signed) David J. Mugler

David J. Mugler

Date: June 13, 1964

From:

D. N. Pandya,
Graduate Student,
c/o David Mugler,
Department of Agriculture Education,
School of Education, Kansas State University,
Manhattan, Kansas.

Dear Mr.

I, the undersigned, D. N. Pandya, studying as a graduate student in the field of Agriculture Education at Kansas State University, have undertaken the work of comparing agriculture courses taught in the high schools of the State of Kansas with those taught in high schools of the State of Gujarat (India) with the approval and advice of Dr. R. J. Agan, Professor of Agriculture Education.

We, as agriculture teachers, are concerned about the improvement of agriculture by training the students in a manner which will help them to become established in farming or other related occupations successfully.

As per program, the information is to be collected by the checklist method. Copy of checklist is sent herewith. I think you will find the checklist simple for understanding and supplying required information. Information of the ten best high schools is to be collected. I am requesting your kind co-operation in supply information. I am happy to learn that the high school where you are teaching is ranking in the top ten of this state.

The burden is being given to you by increasing your work, but the help you give me by completing the checklist will be highly appreciated.

A self-addressed envelope is enclosed herewith for returning the checklist duly filled in. It would be highly appreciated to hear from you before the end of this month.

In item number eleven of checklist-details of subjects taught in different grades, if the same subject is taught in classes of more than one grade, check mark may kindly be put under the column of all grades in which it is taught. Under item fourteen-supervised farming program, information for the year 1963-64 may be given. Copy of outline of courses taught by you may kindly be sent along with the checklist if possible.

Thanking you.

Sincerely yours,

(D. N. Pandya)

CHECK LIST FOR COLLECTING INFORMATION REGARDING AGRICULTURE
COURSES TAUGHT IN THE HIGH SCHOOLS OF THE
STATE OF KANSAS

NAME OF HIGH SCHOOL:

1. Type of Agriculture Department in high school:

Part time (). Full time ().

2. Grade at which agriculture instruction is begun:

& () 8 () 9 () 10 ().

3. Time allotted for class teaching and shop teaching:

a. 2/3 class teaching, 1/3 shop teaching.

b. 3/5 class teaching, 2/5 shop teaching.

4. School farm:

School has no farm ().

School has farm area of

1 to 50 acres (). 201 to 250 acres ().

51 to 100 acres (). 251 to 300 acres ().

101 to 150 acres (). 301 to 350 acres ().

151 to 200 acres (). 351 to 400 acres ().

401 acres and above ().

5. Options for scheduling full time departments of vocational
agriculture:

9. Teachers load:

Number of students of Vocational Agriculture per year per teacher of agriculture:

10. Selection of student:

No selection of student done ().
 Students having agriculture farm
 are selected ().

11. Details of subjects taught in different grades:

Details of subject	Grade in which it is taught					
	7	8	9	10	11	12
1. Farm accounting	()	()	()	()	()	()
2. Farmers' organization (FFA)	()	()	()	()	()	()
3. Parliamentary procedure	()	()	()	()	()	()
4. Swine enterprise-study of breeds, body parts, feed requirements, breeding, selection, etc.	()	()	()	()	()	()
5. Sheep enterprise	()	()	()	()	()	()
6. Cow enterprise-beef	()	()	()	()	()	()
7. Buffalo enterprise	()	()	()	()	()	()
8. Poultry enterprise	()	()	()	()	()	()
9. Dairy enterprise	()	()	()	()	()	()
10. Study of crops-important and grown locally	()	()	()	()	()	()
11. Farm mechanic skills	()	()	()	()	()	()
12. Technical aspect of silage making	()	()	()	()	()	()
13. Feeds and feeding and figuring rations	()	()	()	()	()	()
14. Poultry culling	()	()	()	()	()	()
15. Live market poultry grading	()	()	()	()	()	()
16. Dressed market poultry grading	()	()	()	()	()	()
17. Egg grading	()	()	()	()	()	()
18. Livestock production testing and genetics	()	()	()	()	()	()
19. Milk testing	()	()	()	()	()	()
20. Wool grading and marketing	()	()	()	()	()	()
21. Livestock and dairy selection	()	()	()	()	()	()
22. Meats identification	()	()	()	()	()	()

	7	8	9	10	11	12
23. Meats selection	()	()	()	()	()	()
24. Meats grading	()	()	()	()	()	()
25. Farm mechanics construction	()	()	()	()	()	()
26. Seed germination	()	()	()	()	()	()
27. Operating the farm level	()	()	()	()	()	()
28. Contour farming	()	()	()	()	()	()
29. Terracing	()	()	()	()	()	()
30. Classification of land	()	()	()	()	()	()
31. Factors of land classification	()	()	()	()	()	()
32. Soil testing	()	()	()	()	()	()
33. Fertilizers	()	()	()	()	()	()
34. Green manuring	()	()	()	()	()	()
35. Mixed farming	()	()	()	()	()	()
36. Rotation of crops	()	()	()	()	()	()
37. Identification and classification of weed and control	()	()	()	()	()	()
38. Identification of forage crops	()	()	()	()	()	()
39. Identification of grain crops	()	()	()	()	()	()
40. Grain grading	()	()	()	()	()	()
41. Study of Horticulture crops	()	()	()	()	()	()
42. Fruit preservation	()	()	()	()	()	()
43. Study of vegetable crops	()	()	()	()	()	()
44. Farm co-operatives	()	()	()	()	()	()
45. Farm Laws	()	()	()	()	()	()
46. Insurance	()	()	()	()	()	()
47. Farm Taxes	()	()	()	()	()	()
48. Financing and credit	()	()	()	()	()	()
49. Marketing	()	()	()	()	()	()
50. Farm mechanics construction and repairs	()	()	()	()	()	()
51. Study of insect pests and diseases of crops and control	()	()	()	()	()	()
52. Study of animal diseases and their control	()	()	()	()	()	()
53. Farm safety	()	()	()	()	()	()
54. Farmstead beautification	()	()	()	()	()	()
55. Rural living	()	()	()	()	()	()
56. Irrigation	()	()	()	()	()	()
57. Rural electrification	()	()	()	()	()	()

12. Number of visits paid per year by the agriculture teacher to the farms of agriculture students:

13. Number of field trips organized per year for each grade:

Grade	Number of field trips organized per year.
-------	---

14. Supervised farming program:

Name of Student	Number of animals	Type or breed	Number of crops	Crops	Farm mechanic projects	Improvement projects	Supplemented practices
1	2	3	4	5	6	7	8

15. Factors considered and the agencies consulted in deciding courses to be taught:

Needs of community ----- ()
 Opinion of the members of advisory council ----- ()
 Opinion of passed students ----- ()
 The school administrative staff ----- ()
 Employees of the students ----- ()
 The farm family ----- ()
 Education consultant ----- ()

16. Use of resource persons of the community to aid class teaching

Specialist ----- ()
 Man from business ----- ()
 Man from industry ----- ()
 County agent ----- ()
 Others ----- ()
 (Please mention)

17. Status after graduating from high school:

1. Percentage of vocational agriculture high school graduates established in farming -----()
2. Percentage of vocational agriculture high school graduates employed in non-farm business related to agriculture----- ()
3. Percentage of vocational agriculture high school graduates joined college for higher study in agriculture----- ()

COMPARATIVE STUDY OF AGRICULTURE CURRICULUM FOLLOWED IN HIGH
SCHOOLS OF THE STATE OF KANSAS AND GUJARAT

by

D. N. PANDYA

B. Sc. Agri. (Hons.), Gujarat University, 1952

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

School of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1965

This study was made with a purpose to compare agriculture curriculum followed in the high schools of the State of Kansas and Gujarat. The objectives were (1) to study the courses of agriculture taught in the high schools of the State of Kansas and Gujarat, and (2) to study the extent to which the teaching of agriculture in the high schools helped in (i) developing an effective ability to make a beginning and advance in farming; (ii) providing training in agriculture and related occupations; (iii) providing a medium for improving school and community relationship; (iv) providing the required background of knowledge for continuing further study in college in agriculture; (v) developing the ability to participate in rural leadership; and (vi) developing the ability to be a good citizen.

The study was limited to a comparison of courses taught in the best ten high schools of both the states. The selection of the best ten high schools of Kansas and Gujarat was made by the State Supervisor, Agricultural Education, State Board of Vocational Education, Topeka, and the Director of Agriculture, Gujarat State, Ahmedabad, respectively. The required information from the selected high schools of Kansas and Gujarat was collected by means of a mailed check list and survey form, respectively.

The items of comparisons were (1) level of starting to teach agriculture; (2) time allotted in teaching agriculture; (3) possession of a school farm; (4) time spent by the teacher of agriculture in teaching subjects other than agriculture; (5) staff employed to teach

agriculture; (6) number of students enrolled and load per teacher of agriculture; (7) selection of students for admission to learn agriculture subjects; (8) course taught at the different levels, i.e., in agriculture I, II, III, and IV; (9) spread of the teaching of the different subjects, i.e., teaching of a particular course over a period of one, two, three or four years, (10) supervised farming programs and plot work; (11) field trips and teacher's visits to the students' home farms; (12) factors considered and the agencies consulted in deciding courses to be taught; and (13) use of resource persons to aid in teaching.

Summary and conclusions: Teaching of courses such as parliamentary procedure, farmers' organizations like Future Farmers of America, farm laws, rural living, rural electrification, farm mechanics especially maintenance and repairs of farm machinery and use of resource persons to aid in teaching was found less in Gujarat. Courses prescribed by the Government Department of Education were followed in the high schools of Gujarat and they were less flexible. The teachers in Gujarat were found not to be visiting the students' home farms. The students undertook supervised farming programs and plot work in Kansas and Gujarat, respectively. The selection of students for agriculture courses were done by 70 per cent of the selected high schools of Kansas, while no selection was done in Gujarat. The percentage of agriculture teachers who were found to be teaching subjects other than agriculture was 55 and 77.7 in Kansas and Gujarat, respectively.

Supervised farming practices, procedure of visiting students'

home farms by the teachers, teaching parliamentary procedure, farm mechanics such as maintenance and repairs of farm machinery and training for leadership by making the students active members of organization like the Future Farmers of America should be introduced in Gujarat. In Gujarat courses to be taught should be flexible and should be decided by consulting the farmers, members of the advisory committee, past students, employers of the students, etc. The teachers of high schools of both the states should be relieved from the duty of teaching subjects other than agriculture to enable them to devote more time for on-farm instruction to the individual student. In Gujarat the load in terms of students per teacher should be less, so that the teacher can teach and supervise the students individually, which is required in teaching agriculture.