ORGANIZING AND CONDUCTING AN EVENING CLASS WITH ADULTS, INTERESTED IN SOIL AND MOISTURE CONSERVATION, AND SOIL IMPROVEMENT

ORGANIZING AND CONDUCTING AN EVENING CLASS WITH ADULTS, INTERESTED IN SOIL AND MOISTURE CONSERVATION.

by

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PURPOSE

The purpose of this study was to develop suitable methods of organizing and presenting subject matter to adults interested in Soil and Moisture Conservation and Soil Improvement.

METHODS OF PROCEDURE

The work of developing suitable methods of organizing and conducting Evening Classes in Soil and Moisture Conservation, and Soil Improvement was started while the author was teaching Vocational Agriculture at Luther, Oklahoma.

A tenative outline of procedure was worked out during the summer of 1934 and submitted to Mr. Don M. Orr, Associate Professor, Department of Agricultural Education, Oklahoma A. and M. College, Stillwater, Oklahoma, for his approval. The tentative outline at that time was as follows:

(1) The instructor will, with the aid of his students, prepare a map of the vicinity of the place where in the class is scheduled to convene; and plot on the map the locations of various farmers living within four miles of the place of class meeting.

(2) After plotting the locations of farmers on the map, the instructor will make a detailed survey of each farm operated by a White man, with the purpose in view of interesting the farmers concerned in organized evening class work.

(3) By a detailed and intelligent analysis of the surveys, the instructor will be able to determine the nature and scope of the essential problems to be considered by the class.

(4) From the problems indicated by the process in point three, the instructor will be able to organize teaching units which will be in keeping with the problems requiring special attention.

(5) In advance of the date when teaching is scheduled to begin, the instructor will prepare detailed teaching plans for each separate unit and submit them to Mr. Orr for his suggestions and criticisms.

(6) Before teaching from the lesson plans, they should be revised according to the criticisms received.

(7) Having had his lesson plans approved and revised, the instructor should begin his evening classes early in September.

(8) The instructor should study the manner in which the farmers react to his presentation of subject matter.

This problem worked out approximately as outlined, with a class of twenty adult farmers, at the Garden School house near Luther, Oklahoma. Each class member attended an average of six class meetings.

The following units were taught:

(1) Organic matter (green manures) in their relation to soil and moisture conservation and soil improvement.

(2) Organic matter (barnyard manure and crop residue) in their relation to soil and moisture conservation and soil improvement.

(3) Terracing, strip cropping, contour farming, and crop rotation as methods of controlling erosion in cultivated fields.

(4) Determining what constitutes standard practices in terracing.

(5) Methods and results at the Red Plains Soil Erosion Experiment Station, Guthrie, Oklahoma, field trip.

(6) Conduct an all-day terracing demonstration.

(7) Methods of culture as related to soil and moisture conservation and soil improvement.

(8) A field trip covering methods and results at the Soil Conservation Service Demonstration Project at Stillwater, Oklahoma.

(9) Planning of a cropping system for the individual farm which will conserve the soil and moisture, supply feed for family and livestock, and provide a cash income.

Conclusions and results of the first evening class: Some very desirable work was done and more planned as a result of the course. However, it was evident that more group instruction was needed on: (1) Methods of controlling erosion in clean cultivated fields, and (2) Organic matters (green manure) in their relation to soil and moisture conservation and soil improvement.

FARM PRACTICES ADOPTED AS A RESULT OF INSTRUCTION

Name of New or Improved Practise	Total Number Farmers Using Practise As Result of Course	Total Scope On Which Practises Were Used.
Planting legumes	19	220 Acres
Terracing	8	70 Acres
Fall and winter plowing of land	18	593 Acres
Turning under crops as green manure.	9	81 Acres
Crop rotation	3	195 Acres
Make proper use of barnyard manures.	15	515 Tons

Name of New or Improved Practise	Total Number Farmers Using Practise As Result of Course	Total Scope On Which Practises Were Used.
TOTAL.	20	1159 Acres 515 Tons

A record of the completed work was submitted during the summer of 1935.

To make a more complete study of suitable methods of organizing and conducting evening classes in soil and moisture conservation, and soil improvement, additional work was undertaken at Konawa, Oklahoma, in cooperation with Mr. Eldon Gunn, the local vocational agricultural instructor.

The first step in preparing for the evening class at Konawa, Oklahoma was to make an outline map covering an area within a radius of approximately three miles of Cook and Summers Chapel Schools, on which the names and locations of practically all farmers were plotted. A copy of this map is shown in figure 1.

The next step in preparation for the course was to make a detailed soil and moisture conservation, and soil improvement practice survey of eighteen farms in the area. These farms were selected in conference with Mr. Gunn. The reasons for selecting these farms are as follows:

(1) Acquaintance with the operators.

(2) Different sizes of farms were desired.

(3) The Soil Conservation Service had made detailed soil surveys on the farms selected.

(4) The operators on ten of the farms had cooperative agreements

with the Soil Conservation Service.

(5) The operators of the farms selected had attended previous evening classes.

Space was not provided on the survey blanks used at Luther to record some of the information desired. Therefore, changes were made to meet local needs at Konawa. The purpose of the survey was explained to each farmer. All of the farmers contacted appeared anxious to cooperate and supplied the necessary information. Copies of the first and second survey blank forms used are found in fig. 2 and fig. 3.

The survey blank forms containing the information from the eighteen farms were summarized and analyzed to determine the nature and scope of the problem to be considered. The results of the summary and analysis were as follows:

SUMMARY OF SOIL AND WATER CONSERVATION, AND SOIL IMPROVEMENT PRACTICE SURVEYS

NAME	ADDRESS	OWNER	TENANT	Size of Farm	SOIL TYPES
Stephens, H.H.	Route #1, Konawa, Okla.	Yes		80	Yahola fine sandy loam
Hillerman, A.A.	Sacred Heart, Okla.	Yes		40	Bates fine sandy loam
Johnson, S.F.	Route #1, Konawa, Okla.	Yes		200	Hanceville very fine sandy loam
Johnson, W.B.	" "	Yes		80	" " "
Slaughter, W.R.	Konawa, Okla.	Yes		80	" " "
Slaughter, W.R.	" "	Yes		240	Kirkland very fine sandy loam
West, C.A.	Route #1, Asher, Okla.	Yes		320	Hanceville very fine sandy loam
Johnson, J.T.	Route #1, Konawa, Okla.		Yes	118	Bates fine sandy loam
Nichols, J.R.	Route #1, Konawa, Okla.		Yes	100	Bates fine sandy loam
Campbell, Ira	Route #3, Konawa, Okla.	Yes		120	Hanceville very fine sandy loam
Quillin, R.O.	Konawa, Okla.	Yes		55	Vernon sandy clay loam
Sacred Heart Mission	Sacred Heart, Oklahoma	Yes		870	Bates fine sandy loam
Bates, S.W.	Konawa, Okla.	Yes		335	Bates fine sandy loam
Hesson, W.A.	Route #3, Konawa, Okla.	Yes		80	Kirkland very fine sandy loam
Huddleston, W.R.	Konawa, Okla.	Yes		80	" " "
Greer, R.O.	Route #3, Konawa, Okla.	Yes		200	Bates fine sandy loam
Atkinson, W.W.	" "	Yes		160	Kirkland silt loam.
Griffin, H.O.	" "	Yes		80	Vernon very fine sandy loam
TOTAL		16	2	3238	

SUMMARY OF SOIL AND WATER CONSERVATION, AND SOIL IMPROVEMENT PRACTICE SURVEYS

(Crop Summary)

NAME	1R.Peas 2R.Corn	Corn	Cotton	G. Sorg	Alf-Alfa	Oats	Wheat	Peas	Vetch	I.Rye Grass	Cover Crop
H.H.S.	-	10	19	5	-	-	-	8	2	1	10
A.A.H.	-	7	5	3	-	-	-	-	-	-	-
S.F.J	-	-	25	-	33	29	-	-	-	-	-
W.B.J.	-	-	-	21	-	-	-	10	3	3	-
W.R.S.	15	-	15	4	-	-	-	-	4	3	15
W.R.S.	23	-	46	-	34	42	-	-	-	-	26
C.A.W.	37	-	19	-	37	39	11	-	26	-	-
J.T.J.	11	-	15	15	-	-	-	-	4	2	15
J.R.N.	11	-	10	30	-	-	-	-	4	-	-
I.C.	9	-	-	7	-	8	-	8	-	-	8
R.O.Q.	-	-	14	9	-	5	-	5	-	-	10
S.H. MISS.	-	11	-	19	4	68	-	-	-	-	-
S.W.B.	17	-	31	17	-	43	25	-	-	-	68
W.A.H.	23	-	19	4	-	5	-	5	5	3	-
W.E.H.	-	33	27	-	-	10	-	-	-	-	-
R.O.G.	16	-	23	-	4	20	-	20	10	2	38
W.W.A.	18	-	28	17	-	-	-	-	-	-	-
H.G.	-	7	-	-	4	-	-	5	-	-	8
Total Acres	180	68	296	151	116	296	36	61	58	14	200

SUMMARY OF SOIL AND WATER CONSERVATION, AND SOIL IMPROVEMENT PRACTICE SURVEYS

(Animal Summary)

NAME	Kind of Livestock					
	Work Stock	Dairy Cattle	Beef Cattle	Hogs	Sheep	Poultry
H.H.S.	2	3	-	2	-	200
A.A.H.	2	2	-	2	-	20
S.F.J.	5	-	30	20	-	200
W.B.J.	2	2	11	11	-	100
W.R.S.	2	2	-	4	-	100
W.R.S.	8	9	-	10	-	250
C.A.W.	8	4	20	20	-	200
J.T.J.	4	3	-	6	-	35
J.R.H.	2	6	-	4	-	80
I.C.	2	10	-	3	-	270
R.O.Q.	2	3	-	-	-	100
S.H. MISS.	6	-	25	30	50	175
S.W.B.	6	3	22	15	-	100
W.A.H.	2	2	-	2	-	150
W.E.H.	2	2	-	2	-	75
R.O.G.	4	6	19	17	-	500
W.W.A.	4	2	8	5	-	100
H.G.	2	2	6	4	-	150
TOTAL	65	61	141	157	50	2805

SUMMARY OF SOIL AND WATER CONSERVATION, AND SOIL IMPROVEMENT PRACTICE SURVEYS

(Miscellaneous)

Crop Rotations Practiced:

Rotation (1)	Rotation (2)	Rotation (3)
Cotton	Alfalfa	Cotton
1 Row Peas, 2 Rows Corn	Cotton	1 Row Peas, 2 Rows Corn
G. Sorghums	Oats and Lespedeza	Lesp. and S. Clover

Rotation (4)	Rotation (5)	Rotation (6)	Rotation (7)
Cotton	Corn	Corn	1 Row Peas, 2 Rows Corn
G. Sorg.	Oats	Cotton	Oats Wheat
Oats and Cowpeas	G. Sorg.	Oats	Cotton G. Sorg.

Abandoned Farming Land (698 Acres):

Condition of abandoned acres as observed by author.

1. A large per cent is severely gullied.
2. A small per cent is in fairly good condition.
3. Sheet erosion is severe on all acres.

Terraced Farming Land (537 Acres):

Condition observed by author.

1. Many terraces and fills are too small.
2. There are many terrace breaks.
3. A small per cent of terraces are in good condition.
4. Many fields were eroding between terraces.

Farming Land Needing Terracing (268 Acres):

1. There are many alkali spots on these acres.

Contour Farming With Terraces (337 Acres):

Results given by farmers.

1. Less erosion.
2. Increased yields.
3. Moisture better conserved.
4. Less labor required.
5. Longer rows secured.
6. Point rows.

(Continued)

Contour Farming Without Terraces (151 Acres):

Results given by farmers.

1. Spreads water.
2. Withstands drouth better.
3. Conserves soil.
4. Gives larger yields.
5. Requires less labor.
6. Point rows.

Contour Strip Cropping With Terraces (183 Acres):

Results given by farmers.

1. Eliminates point rows.
2. Less erosion is noticed.
3. Conserves moisture.

Contour Strip Cropping Without Terraces (37 Acres):

Results given by farmers.

1. Eliminates point rows.
2. Less erosion is noticed.
3. Conserves moisture.
4. Less labor is needed.

Acres of Pasture Land Mowed (15 Acres):

Results given by farmers.

1. Gives increased grazing.
2. Eliminates weeds.

Pasture Land Contour Furrowed or Ridged (527 Acres):

Results given by farmers.

1. Increases the vegetative growth.
2. Conserves soil and moisture.

Pasture Land needing to be Contour Furrowed or Ridged (395 Acres):

Gullied Condition of Pasture Land as Observed By The Author:

1. A large part of the acres were severely gullied.
2. A small per cent of the acres was free from gullies.
3. Diversion ditches had been constructed to divert the water out of the gullies on ten farms.

Condition of Terrace Outlets As Observed By the Author:

1. Severe erosion at the terrace outlets on five farms noticed.
2. The erosion at terrace outlets on six farms had been controlled by the use of masonry baffles and vegetation.
3. The erosion at terrace outlets on two farms was in the process of being controlled by vegetation.

(Continued)

Number and Condition of Farm Ponds:

1. Four farm ponds were in good condition as shown by proper size of dams, vegetation established on dams, and adequate spill ways provided.

2. Four farm ponds were in poor condition, due to small dams, lack of vegetation on dams, and inadequate spill ways.

SOIL IMPROVEMENT PRACTICE SURVEY

Name_____ Location_____ Route_____ Postoffice_____

Telephone_____ Owner_____ Renter_____ Acres in Farm_____ Soil Type_____

Crop enterprises_____ Animal enterprises_____

Crop rotation practiced_____

Disposal of crop residue_____

Practice contour farming on unterraced land_____ Results_____

Acres of abandoned farming land_____ Condition_____

Acres of farming land needing terracing_____ Alkali spots present_____

Acres of pasture land needing terracing_____

LEGUMES: Kind_____ Acres_____ Use_____

Kind_____ Acres_____ Use_____

Kind_____ Acres_____ Use_____

Kind_____ Acres_____ Use_____

Crops planted after legumes_____

Failures with legumes_____

TERRACING: Contour farming on terraced land_____

Height_____ Width_____ Vertical interval_____ Slope of land_____

Length of terrace_____ Distance between terraces_____ Gradient_____

Breaks_____ Erosion in front_____ Erosion at outlets_____

Erosion between ridges_____ Soil samples secured from_____

Report on soil samples_____ Evening class discussions_____

Special information on_____

(FIGURE 2)

SOIL AND WATER CONSERVATION AND SOIL IMPROVEMENT

PRACTICE SURVEY.

Name _____ Location _____

Address _____

Owner _____ Renter _____ Acres in farm _____ Soil type _____

Crop enterprises _____

Animal enterprises _____

Crop Rotation Practiced _____

Winter cover crops _____

Abandoned farming land _____ Condition _____

Farming land terraced _____ Condition _____

Farming land needing terracing _____ Alkali Spots _____

Contour farming _____ With terraces _____ Results _____

Contour farming _____ Without terraces _____ Results _____

Contour strip cropping _____ Without terraces _____ Results _____

Acres of pasture land mowed _____ Results _____

Pasture land contour furrowed or riged _____ Results _____

Pasture land needing to be contour furrowed or ridged _____

Gullied conditions of pasture land _____

Terrace outlet condition _____

Number and condition of all farm ponds _____

(FIGURE 3)

Some of the essential facts brought out by the survey are as follows:

(1) The farmers were putting forth an effort to conserve soil and moisture and improve the condition of the soil on their farms.

(2) The quality of work done indicated that the farmers lacked sufficient information to use approved practices in the most efficient way.

(3) Only a small per cent of farmers were using contour farming and contour strip cropping as methods of conserving soil and moisture. The farmers using these two methods had failed to use them effectively.

(4) An adequate supply of water had not been provided to accommodate all live stock.

(5) The need of pasture improvement was very noticable.

The survey of the eighteen farms revealed many soil and moisture conservation and soil improvement problems which were not studied during the evening classes, due to lack of time. Some of the problems recognized, which were not studied, are as follows:

(1) Location and construction of suitable farm reservoirs to impound the surplus water from field and pasture lands.

(2) The control and treatment of gullies, furnished another problem which was not studied in evening class work.

(3) The rotation of crops was not properly practiced by the farmers involved in the program.

The need for study by the farmers appeared to be the greatest

on the problems selected. The instructors decided it would be more profitable to spend all the time necessary to study a few problems in detail, rather than study more problems less thoroughly.

The following teaching units were selected from the problems indicated in an analysis of the eighteen soil and moisture conservation and soil improvement surveys, and from the suggestions of farmers at the first group meeting at Cook and Summers Chapel Schools:

(1) Pasture management in its relation to soil and moisture conservation, and soil improvement.

(2) Organic matter (green manure) in its relation to soil and moisture conservation, and soil improvement.

(3) Terracing in its relation to soil and moisture conservation, and soil improvement.

(4) Contour farming and contour strip cropping in their relation to soil and moisture conservation, and soil improvement.

(5) Determining the kind and amount of crops to plant on the individual farm to produce food for family and feed for the livestock.

(6) Methods used and results obtained on farms in the Soil Conservation Service work area, Konawa, Oklahoma. (A field trip.)

A detailed teaching plan for each of the above units was worked out before teaching the lesson in cooperation with Eldon Gunn, local vocational agricultural instructor.

Observations were made on the reactions of farmers to subject matter presented and methods used in teaching each lesson. These observations follow each lesson plan.

PROMOTING THE CLASS

The beginning and succeeding dates of a series of jobs to be studied were advertised. Announcements through local newspapers, the Lions Club, and Soil Conservation Association meetings were used to stimulate class interest. Personal contacts along with cards mailed to members and prospective members were used in securing attendance.

The first meeting at Summers Chapel was held December 10, 1936. The class met approximately each Tuesday evening thereafter until the series was completed, May 20, 1937.

The first meeting at Cook School was held December 30, 1936. This class met each Thursday evening thereafter until the series of meetings was completed, May 20, 1937.

PROBLEM: Organizing and conducting an evening class with adults interested in soil and moisture conservation and soil improvement, in Cook and Summers Chapel communities Konawa, Oklahoma.

JOB I: Pasture management in its relation to soil and moisture conservation, and soil improvement.

OBJECTIVES:

1. To get the farmers to recognize the value of contour ridging, protection from overgrazing, rotation of grazing, revegetation, and mowing of weeds as a means of pasture improvement..
2. To get the farmers to use approved practices in the improvement and management of their pastures.

REFERENCE:

1. National Erosion Survey, 1934.
2. U. S. D. A. Soil Conservation Magazine, August, 1935.
3. Sooner State Conservation News, July, 1936.
4. Agronomy Manual for Oklahoma. S. C. S. January, 1936, Stillwater, Oklahoma.
5. Korean Lespedeza in Rotations of Crops and Pastures. Mo. Agr. Exp. Sta. Bul. No. 360.
6. Soil Fertility and Sweet Clover Production in Oklahoma. Exp. Sta., Bul. No. 206.
7. U. S. D. A. Farmers' Bulletin No. 1663.
8. Forage Plants and Their Culture, Piper.

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9. Range and Pasture Management, A. W. Sampson.

10. U. S. D. A. Farmers' Bulletin No. 1143.

11. Soil Science, 29 (1930), 281-84. R. M. Barnette and J. F. Hester. Effect of Burning Upon The Accumulation of Organic Matter in Forest Soils.

12. Unpublished Data, Red Plains Soil Erosion Exp. Sta., Guthrie, Oklahoma.

SUBJECT MATTER	METHOD
1. The problem of soil and moisture conservation, and soil improvement is one that vitally affects our nation. It is not just an agricultural problem but it is also a social and economic problem of far-reaching significance which affects, either directly or indirectly, every man, woman and child in the United States. In fact, the conservation of our soil and the control of our rainfall where it falls on our fields and pastures is a problem that we must meet as a nation, state and community, in order to avert the tremendous loss which we are annually suffering due to a carelessness, indifference, and wasteful exploitation of natural resources by rugged individualism.	1. A statement of subject matter should be made by the instructor. All technical information will be presented by the instructor as it is needed.

Seventy-five per cent of our cultivated

fields are sloping enough to suffer serious soil losses from uncontrolled run-off of rain water. One hundred thousand acres of land, formerly planted to clean tilled crops, are being abandoned annually. These tremendous losses are costing our farmers annually four hundred millions of dollars. Three billion tons of soil are washed annually from the fields and pastures in this country by uncontrolled run-off water. This equals a loss of the top six inches of soil from three million acres of land each year.

There are approximately sixteen million acres of land in cultivation in Oklahoma. According to a soil survey of this State, made by the Soil Conservation Service during the summer of 1934, eighty-five per cent of our cultivated fields in Oklahoma are suffering from severe soil losses, and that nearly two million acres of formerly good fields have already been abandoned because of the loss of practically all of the top soil and severe gullying. This is indeed one of the biggest problems confronting the nation and the state. The decrease in the productive power of our soils caused by erosion is increasing the cost of producing our crops in Oklahoma by the amount of forty millions of dollars annually. Our nation and our state cannot afford to evade this problem any longer. A large part of this loss is directly charged to careless and inefficient methods of handling cultivated fields and pastures. Ninety to ninety-eight per cent of these tremendous losses can be averted by the application of practical methods for controlling the rainfall on the fields and pastures where it falls.

SUBJECT MATTER	METHOD
2. The things to study and put into practice that will aid in improving and conser-	2. What are the things we may study and put

SUBJECT MATTER	METHOD
ving the soil and moisture are as follows: a. Winter cover crops. b. Pasture management. c. Terracing. d. Terrace and contour ridge construction. e. Controlling and treatment of gullies. f. Contour farming g. Strip cropping. h. Crop rotation i. Farm tour over the Soil Conservation Service Area, Konawa, Oklahoma. j. Location and construction of farm ponds. k. Fire prevention. l. Green manures.	into practice that will aid in improving and conserving the soil and moisture in this community? Secure the experiences of group members and discuss each point briefly. The instructor should supply additional information if needed.
3. The condition of pastures in this community. a. Many badly gullied. b. Sheet erosion severe. c. Infested with noxious plants. d. Overgrazed.	3. Since it is the desire of the group to make a study of pasture management, answer this question: What are the conditions of pastures in this community? The

SUBJECT MATTER	METHOD
	conditions should be listed on the board and discussed as they are suggested by the members.
4. Things we may do to improve our pastures: a. Contour ridge. b. Control gullies. c. Protect from over-grazing. d. Prevent fires. e. Control weeds. f. Rotate grazing. g. Control brush. h. Revegetate.	4. What are some things we may do to improve our pastures? The question should be raised by the instructor and discussed briefly by the members. Ref. No. 2, pp 7-8. Ref. No. 3, p 6. Ref. No. 4, pp 76-78.
5. A contour ridge is a miniature terrace.	5. What is a contour ridge? Conclusions concerning contour ridges should be discussed and decided upon by the class.
6. Benefits derived by contour ridging or furrowing: a. Conserves soil and moisture. i. Each lineal foot of contour	6. What benefits may be derived by contour ridging or furrowing? The benefits to be de-

SUBJECT MATTER	METHODS
ridge six inches high on ten per cent slope has a water holding capacity of 1.75 cubic feet or 13.09 gallons. It is probable that during a heavy rainy spell of 48 to 72 hours duration, contour ridges or furrows should cause to soak into the ground and evaporate from 2 to 4 times their holding capacity.	rived from contour ridging or furrowing should be listed on the board and discussed fully.
Theoretically, the water holding capacity of the contour ridges on a 640 acre pasture with an average ten per cent slope and furrows averaging twenty feet apart is approximately 20,000,000 gallons of water.	Ref. No 1, pp. 7-8. " 4, p. 74.
b. This practice aids in the prevention of floods.	
c. This practice serves as a starting point for revegetation.	
7. Conditions under which we should contour ridge or furrow:	7. Under what condition should contour ridges or furrows be used? List
a. Over grazed pastures.	
b. Pastures subject to drouth or	points on the board as

SUBJECT MATTER	METHOD
severe erosion. c. Land not severely gullied. d. Pastures having a fair cover of tall grass.	suggested by the group and discuss fully. Ref. No. 4, p. 74.
8. Conditions under which we should not contour ridge or furrow: a. Pastures that have a good cover. b. Pastures that are not overgrazed. c. Rough, steep, or badly gullied land. d. Areas of pasture which are to be used for water disposal from terraces.	8. Under what conditions should contour ridges or furrows not be used? Name and discuss topics concerning above questions. Ref. No. 3, p. 74.
9. Contour ridges and furrow lines are surveyed on the level. If low places and gullies are to be crossed, good fills should be made. If not, the lines should be turned up the slope at these low places or gullies and ends. The spacing of contour ridges or furrows is very important. Spacing depends largely upon the type of cover, type of soil, and slope. A general table used by the Soil Conservation Service at Konawa, in spacing contour ridges is as follows:	9. What things should be given particular attention in constructing contour ridges or furrows? Secure the experiences of group members and discuss each point in detail. Ref. No. 4, p. 74.

SUBJECT MATTER

METHOD

Slope, Percent	Vertical Interval Feet	Horizontal Distance Between Contour Ridges or Furrows
1	.6	60 feet
2	.6	30
3	.7	23
4	.8	20
5	.9	19
6	1.0	16
7	1.1	15
8	1.2	15
9	1.3	15
10	1.4	14

Place contour ridges 14' apart on slopes greater than ten per cent. Contour furrows are usually placed closer together than the contour ridges.

10. Instruments used in constructing contour ridges are as follows:
    a. Regular breaking plow.
    b. Long wing plow.
    c. Small grader.
    d. V-drag.

10. What instruments are used to construct contour ridges or furrows? Questions should be raised by the instructor, and the expe-riences of group solicited. Conclusions should be drawn from group experiences.

Ref. No. 4, pp. 74-75.
Ref. No. 2, pp. 7-8.

SUBJECT MATTER	METHOD
11. Contour ridges should be constructed as follows: When a regular breaking or long wing plow is used, back furrow three complete rounds. On most soil types it is better to use three head of work stock, rather than two. It is possible then to secure greater height which is desirable. When using a grader or V-drag to construct contour ridges, one round is usually all that is necessary unless the soil is rather heavy. The type of ridge is dependent upon the amount of cover, the slope, and the plan for revegetation. As far as natural revegetation is concerned, a narrow ridge plowed from one side only may prove more satisfactory. If artificial revegetation is desired, a more elaborate and thoroughly prepared ridge is necessary.	11. How should contour ridges be constructed? Secure experience of members of the group. The instructor will supply additional information. Ref. No. 2, pp. 7-8. Ref. No. 4, pp. 74-75.
12. The time to construct contour ridges or furrows is in the fall, early winter and spring months.	12. When should contour ridges be constructed? Use discussion by the

SUBJECT MATTER	METHOD
	members of the group. Ref. No. 4, p. 75.
13. Preparing contour ridges for revegetation: If the ridges have been properly constructed, it is possible to prepare a satisfactory seed bed. The ridge should be worked with an orchard disk or similar implement until the soil is well pulverized. The disk should be set to throw the soil to the center of the ridge. The amount of work necessary to prepare the ridges will depend upon the conditions of the soil before plowing.	13. How should contour ridges be prepared for revegetation? Discuss in detail the points bearing upon this question. Ref. No. 4, p. 75.
14. The different kinds of vegetation growing in our pastures are: a. Bermuda grass. b. Buffalo grass. c. Johnson grass. d. Weeds. e. Blue stem. i. Little. ii. Big.	14. What are the different kinds of vegetation growing in our pastures? Make a list of the kinds of vegetation grown which are known by members of the class. The instructor will supplement the infor-

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f. Gramas.	mation supplied by the
g. Switch grass.	group. Each kind of
h. Indian grass.	vegetation will be dis-
i. Sweet clover.	cussed briefly.
j. Lespedeza.	
k. Underbrush.	
15. Some plants we may use to improve our pastures are:	15. What are some plants we may use to improve our pastures? The instructor will raise
a. Use more Bermuda.	the question and make a
b. Use more lespedeza.	list on the board. The
c. Use more sweet clover.	adaptability of various
d. Italian rye grass.	plants suitable for our
e. Hairy vetch.	locality will be dis-
f. Yellow hop clover.	cussed.
g. Black medic.	Ref. No. 5, pp. 20-22.
16. Some good pasture mixtures for this community:	16. What are some good pasture mixtures for this community? Secure
a. Kind — Amount Per Acre	the experiences of the
Little Bluestem — 6 Pounds	group members, list
Big Bluestem — 4 "	their experiences on the
Switch grass — 2 "	board, and discuss them
Indian grass — 2 "	in detail. The instruc-

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	Side oat grama	1 pound
	Total	15 pounds

b.	Kind	Amount Per Acre
	Sweet clover	8 Pounds
	Lespedeza	5 "
	Italian rye grass	8 "
	Hairy vetch	8 "
	Total	29 "

c. Bermuda grass sod

Korean lespedeza	3-8 Pounds
Kobe lespedeza	3-8 "
Italian rye grass	3-8 "
Total	9-24 "

d. Bermuda, sod or roots

Dallis grass	4-6 Pounds
Lespedeza	5-10 "
Hop clover	1-2 "
Italian rye grass	3-8 "
Total	13-26 "

There are many other good mixtures for pastures in this area, either in combination with Bermuda or lespedeza or without. Mixture (b.) is especially recommended for supplementary pastures.

17. All areas to be seeded should first

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tor will supply and list on the board additional good pasture mixtures and discuss them in detail.

Ref. No. 4, p. 81.
Ref. No. 5, pp. 20-22.

17. When and how should

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be contour ridged as discussed under that topic. Fall or winter plowing is advisable to insure a firm seed bed. If plowing is delayed until spring, shallow cultivation is best. Light disking should precede planting to insure best results. When pasture mixtures with both fall and spring planted seed are to be used, the seed bed should be prepared in the late summer or early fall. The seed should be planted during the early fall and spring months and harrowed.	the seed bed be prepared? Secure the experiences of group members and discuss them in detail. Ref. No. 4, pp. 87-96. Ref. No. 5, pp. 20-22. Ref. No. 6, p. 31.
18. For all the native grasses, spring seeding (April and May) is recommended. The tests indicate that earlier seedings are not advisable where a seedbed has been prepared. The pasture plants to be seeded in the fall and early winter (Aug. 15 to Nov. 1) are: a. Italian rye grass. b. Hairy vetch. c. Hop clover.	18. When should pasture plants be seeded. Question should be raised by instructor. He should secure the experiences of group members, list them on the board, and discuss briefly. Ref. No. 4, pp. 81-95. Ref. No. 6, p. 31.

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d. Austrian winter peas. e. Black medic. f. Bur clover. In most instances it is best to use seed which still have their seed coat, as this insures a good stand. If those germinating early get destroyed by frost or other means, you still have enough seed left to produce a stand.	
19. Planting: The seed may be planted broadcast or in rows. Either method is satisfactory; however, row planting requires less seed and permits cultivation for weed control. The seed should be covered with a harrow or similar implement. Best results are obtained by covering the seed about one-half inch deep. If the seeds are covered too shallow, they are often damaged by drying out, and if covered too deep the seedlings fail to emerge. Sodding: When transplanting Buffalo grass, the sod should be taken to	19. What methods should be used in planting or sodding? Secure the experiences of group members and discuss their experiences in detail. The instructor will supply needed technical information. Ref. No. 4, pp. 82-89. Ref. No. 6, p. 31. Ref. No. 10, p. 8.

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a depth of at least three or four inches. The sod should be well firmed into the soil, but the plant should not be covered entirely.

One of the best ways to plant Bermuda is to lay off shallow furrows after the land has been prepared as discussed above and plant the sod or roots immediately. Rows should be about three and one-half feet apart. Small pieces of sod or roots planted two or three feet apart in the row gives good results. Sod is preferable to roots where moisture conditions are not favorable. Precaution must be taken to use only fresh sod and set it firmly in the moist soil. If the field is not laid off in rows, shovels may be used in planting.

Spot planting: It is often desirable to spot plant native grasses where preparation of the entire field is not desirable, due to a partial cover of vegetation or where the soil is too poor for general planting. Under these conditions, contour ridges

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are excellent places for making such plantings. Either seed or sod may be used.	
20. The carrying capacity of pastures varies so much that no definite figures can be given. Factors that affect the amount of grazing furnished are as follows: a. The soil. b. Moisture. c. Type of grasses. d. Treatment that has been given the pastures. The carrying capacity of pastures in this community varies from one-half to thirty acres per animal unit. Some pastures may even have a lower carrying capacity during dry years.	20. What is the carrying capacity of the pastures in this community? List these capacities on the board as suggested by the members of the group and discuss them briefly. The instructor should supply the needed technical information. Ref. No. 4, p. 76. Ref. No. 8, pp. 107-108.
21. A pasture should never be grazed to the limit, but it should be grazed so that fifteen to twenty-five per cent of the growth remains on the pasture throughout the year. Exceptions may	21. To what extent should pastures be grazed? Discuss the present and needed practice of grazing.

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be made to this rule when rotation grazing is practiced, as this method allows the grass to recover and build up the reserve food supply. The total beef or milk production from a properly grazed pasture will be higher than that from a pasture that has been overgrazed. A properly grazed pasture with a surplus of vegetative covering will not suffer badly from erosion.	Ref. No. 4, p. 76. Ref. No. 8, p. 107-108.
22. Some of the disadvantages of overgrazing are: a. A decrease in vegetative cover. b. Decline in forage yield. c. Decrease in the most palatable grasses. d. Replacement of perennials with biennials and then annuals. e. More erosion. f. Poor condition of grazing animals. g. Increased need for and total cost of supplementary feeds. h. Decrease in permanent water. i. Increases the cost of production of each animal.	22. What are the disadvantages of overgrazing? Review conditions of pastures which were heavily grazed during previous years, and ascertain the cause of these conditions. Ref. No. 9, pp. Ref. No. 4, pp. 76. Ref. No. 8, pp. 107-108.

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23. Early grazing should not be practiced year after year. The tall grasses should not be grazed until they are three or four inches high. Short grasses should be allowed to get a good start before grazing in the spring.	23. When should grazing be started in the spring? Discuss the conditions as to moisture in the soil, growth, and type of plants in determining the time for the beginning of spring pasturing.
24. The disadvantages of early grazing are: a. Will not allow the plants to store the food needed to carry them through the hot, dry summer. b. Destroys the plant growth needed to properly protect the soil during heavy rainfall periods. c. Retards and restricts the production of seed. d. The pastures are usually water soaked at this time of year, and the movement of livestock over them causes many plants to be trampled into the ground, the roots to be broken, and the soil to puddle, or become very hard.	24. What are the disadvantages of early grazing? Secure the experiences of members of the group, list them on the board, and discuss them in detail. The instructor will supply the needed technical information. Ref. No. 4, p. 76. Ref. No. 9.

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e. The young grass also contains a high per cent of moisture and low per cent of plant nutrients, and therefore livestock will not eat enough of this forage to supply their needs.	
f. The young grass may upset the digestive tract of livestock.	
g. It is usually the wet season of the year when the forage is just beginning to grow, and if the forage is grazed off, the runoff of water is greater and erosion is more serious.	
25. Rotation grazing: The pasture is divided into several parts and each one grazed only a part of each year. This system of grazing can best be accomplished when used in conjunction with supplementary pasture crops that carry the grazing load during the critical periods.	25. What is rotation grazing? The question should be raised by the instructor and group discussion had. Ref. No. 4, p. 77.
26. The advantages of rotation grazing are:	26. What are the advantages of rotation grazing? Secure experiences
a. Increased forage growth.	

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b. Less travel of animals to find grass. c. More even grazing. d. More forage cured for winter pasture. e. Increased carrying capacity. f. Less erosion, due to a better vegetative cover.	of members of the group and discuss them in detail. The instructor will supply needed technical information. Ref. No. 4, p. 77.
27. Effects of burning pastures and woods on soil and water losses annually: a. The following table shows that the annual burning of the woods and pastures multiplies the loss of run-off water by 38 and the loss of soil by 13.	27. What are the damages done by "burning over" pastures? Secure and discuss the experiences of the group members. Ref. No. 4, p. 77. Ref. No. 11. Ref. No. 12.

	Percent Runoff	Tons Per Acre Soil Loss
Virgin woods	.13	.017
Woods burned once each year	4.96	.220

b. Destroys the protective covering.
c. Kills many plants
d. Destroys the seeds of valuable species.
e. Increases weed growth.
f. Reduces the amount of organic

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matter returned to the soil. g. Leaves less protection for plants during adverse weather conditions. h. Less water holding capacity. i. Clean burned land is more easily trampled by livestock. j. Increases the cost of feeding livestock. According to best available estimates, an average of approximately 13,969,000 acres were burned over annually in 1916, 1917, and 1918 representing a yearly loss of about $20,727,000 in Oklahoma.	
28. Damages done by weeds in pastures are: a. Reduces the yield of forage. b. Weeds are less effective in controlling erosion than the grasses. c. Many are poisonous to livestock. d. Less food value than most grasses.	28. What are the damages done by weeds in our pastures? Secure the experiences of the group members, and direct them in discussing damages.
29. Weeds may be controlled by good grazing methods, mowing, chemical treatment, and by grazing with sheep. Mowing: Mowing is perhaps the	29. How may weeds be controlled in our pastures? Secure the experiences of group mem-

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best method of destroying weeds after they have become well established. The number of cuttings necessary for eliminating the weeds depends upon the kinds of weeds and the time of flowering. They should be cut when the reserve food supply is the lowest which is generally about the blooming stage. As a rule, the weeds should be mowed two or three times each year, especially where rag weeds are present. The first cutting should be made high so that the second or third cutting may be made below the first. Mowing also disposes of any old tough grass that may have become unpalatable.	members and lead them in discussing control measures. The instructor will supply any other information needed. Ref. No. 4, p. 77.
Sheep: Sheep may be used for controlling weeds on pastures too rough to mow. Farms that are equipped to handle them should use sheep to balance the grazing system. Care must be taken to see that the pasture is not overstocked since sheep graze much closer than other classes of livestock.	
Chemical Control: Chemical	

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control is not generally recommended since the cost is usually prohibitive. Small areas of noxious weeds may be killed with chemicals. The chemicals are dangerous if not handled properly.	
30. The cutting of blackjack, oak and other trees is not effective unless mowing or grazing with goats is practiced. Thinning blackjack, when the sprouts are controlled, will increase the production of forage greatly on many pastures. This is a costly process, but where the timber is used for wood, it may be justified. Trees should not be removed from thin soil on steep slopes.	30. How may we control sprouts and underbrush in our pastures? Discuss methods used locally in eradicating sprouts, and the results obtained. Other methods should be suggested. Ref. No. 4, p. 78.
Goats may be effectively used for controlling brush if they are confined to small areas. The number of goats necessary to control sprouts varies from one to four per acre.	Decide on the job to study next.

OBSERVATIONS ON THE REACTION OF FARMERS TO SUBJECT MATTER PRESENTED AND METHODS USED IN TEACHING JOB I.

1. Five periods of 90 minutes each were spent in the study of

this job, both at Cook and Summers Chapel Schools.

2. The seriousness of the soil and moisture problem in the United States, Oklahoma, and the local community was rather startling to those present.

3. The farmers were fairly prompt in deciding upon the factors to consider in a soil and moisture conservation and soil improvement program.

4. The conference procedure method was used in teaching this job.

5. The interest evidenced was good throughout the lesson.

6. Class members realized the poor condition of their pastures. They had observed the pasture management work being done in the community by the Soil Conservation Service. They were anxious to improve their pastures.

7. The class members decided to do the following things for pasture improvement:

Approved Practice	Cook School		Summers Chapel School	
	No. farmers	Acres	No. farmers	Acres
Contour ridge	15	353	7	174
Mow weeds	17	341	10	142
Revegetate	16	337	8	93
Supplementary Pasture	14	60	8	55
TOTAL	62	1091	33	464

PROBLEM: Organizing and conducting an evening class with adults, interested in soil and moisture conservation and soil improvement, in Cook and Summers Chapel communities, Konawa, Oklahoma.

JOB II: Organic matter (green manure) in its relation to soil and moisture conservation and soil improvement.

OBJECTIVES:

1. To get the farmers to appreciate the value of green manures as a source of organic matter.
2. To get the farmers to make proper use of green manure crops.

REFERENCE:

1. Soils and Fertilizers, Lyon.
2. The Soil and Its Management, Miller.
3. Soil--Their Properties and Management, Lyon and Buckman.
4. Productive Soils--Weir.
5. Farm Soils--Worthen.
6. Fertility and Crop Production--Hinkle.
7. Soil Physics and Management--Mosier and Gustafson.
8. Agriculture for Secondary Schools--Oklahoma A. and M. Faculty.
9. Fertilizers and Crops--Van Slyke.
10. Production of Field Crops--Hutchenson and Wolfe.
11. Farmers' Bulletin No. 1250.
12. Crop Adjustment--Oklahoma's Opportunity for Soil Improvement , Oklahoma Agr. Ext. Cir. NO. 307.

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We have just completed a study of pasture management. Are there any questions concerning this problem you wish to discuss further?	Statement of subject matter. The instructor will supply statistical and experimental data along as needed in Job II.
The problem for study this evening is Organic Matter (green manure) in its relation to soil and moisture conservation and soil improvement.	
1. Organic matter is animal or vegetable matter in the soil. As organic matter decomposes, it forms a dark brown to black substance known as humus.	1. What is organic matter? Arrive at a clear understanding of terms. Ref. No. 1, p. 51. Ref. No. 4, p. 5. Ref. No. 6, p. 159. Ref. No. 2, p. 20.
2. Effect of organic matter on the soil: a. Increases the tendency toward the formation of granular structure. b. Improves drainage. c. Improves the aeration of the soil. d. Checks blowing of soil. e. A source of plant food material. f. Facilitates heat absorption. g. Increases the extent of root growth. h. Encourages the growth of bacteria. i. May cause light soils to dry out quicker.	2. What are the effects of organic matter on the soil? Points should be listed on the board as they are suggested by the group. Each point should be discussed. Ref. No. 5, pp. 20, 293. No. 7, pp. 231,363. No. 4, pp. 266-267, 98-102, 173. No. 6, pp. 159-161. No. 2, pp. 283-284. No. 11, pp. 4-5.

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3. How organic matter is lost from the soil? a. Plowing and cultivation. b. Erosion. c. Removal of crops and crop residue. d. Leaching.	3. How is organic matter removed from the soil? List the means of removing organic matter from the soil. Ref. No. 6, pp. 70. No. 2, pp.278-279. No. 8, pp. 110. No. 7, pp.151-153.
4. Organic matter may be returned to the soil by the proper use of the following: a. Animal manure. b. Crop residue. c. Green manure. d. Proper system of crop rotation.	4. How may organic matter be returned to the soil? Suggest methods used locally and other methods which may be used for adding organic matter to the soil. Ref.No. 7, p. 158-174. No. 2, p. 284-287. No. 5, p. 283-284, 292-294.
5. A green manure crop is any green crop plowed under for soil improvement.	5. What are green manures? Arrive at a clear understanding of terms. Ref. No. 4, p. 190. No. 9, p. 348.
6. Factors to consider before deciding to grow green manure crops: a. Requirements of the soil for organ-	6. What factors must be considered before deciding to grow a green man-

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ic matter. b. Fertility requirements of the soil. c. Market or feed value of the other crops that might be grown. d. Length of growing season. e. Moisture supply. f. Possibility of damaging the succeeding crop.	ure crop? List factors on the board, as they are suggested by the group. Discuss each point presented. Ref. No. 5,p. 294-95. No. 4, p.194-95. No. 10,p.174-75. No. 11, p. 18-28.
7. Effects of green manure crops on the soil. a. Increases the organic matter. b. Conserves soil nitrates when grown as a cover crop. c. Helps to liberate plant food in the soil. d. Turning under a heavy crop of green plants may depress yields for the first succeeding crop. e. May injure the germination of the seeds of the first succeeding crop. This injurious effect disappears within two or three weeks.	7. How does green manure affect the soil? Discuss the experiences of those present. Supply technical information. Ref. No.4, p. 190-91. No.10, p.174-5, 179. No. 6, p.157-158. No. 11,p. 18-21. No. 8, p.118-120.
8. Advantages of non-legumes as green manure crops. a. They make more rapid growth. b. The seed is cheaper.	8. Why are non-legumes adapted for use as green manures? Relate the practices of the members

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c. They are less subject to winter killing.	and discuss results with non-legumes.
d. Conserves soil nitrogen and organic matter.	Ref.No. 5, p.296, 309. No. 11, p. 43-45.
9. Any crop turned under will help soils deficient in organic matter.	9. What crops are suited for use as green manures: Have group discussion on advantages and disadvantages of crops adapted to local conditions.
Rye is perhaps more commonly used than any other grass or grain as a winter cover or green manure crop. It is adapted to fall sowing and is hardy and will make a heavy growth early enough in the spring to be turned under for most of our spring crops. It will furnish large quantities of organic matter, absorb a portion of the soil nitrates, and tend to prevent the loss of nitrogen by leaching during the winter. Other plants adapted for green manure crops in this community are:	Ref.No.4, p. 194-294. No.9, p.353-6, 120. No.11, p. 43-44. No.11, p. 32-36.
a. Hairy vetch.	
b. Austrian Winter Peas.	
c. Wheat.	
d. Barley	
e. Oats	
f. Cowpeas.	

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Whenever a green manure crop is used, preference should be given to a legume, if it is available, because such a crop will add materially to the nitrogen content of the soil, provided sufficient moisture and nodule forming bacteria are present.	
10. The cost of different seeds, secured locally, are as follows: Hairy vetch: 12¢ per pound. Austrian winter peas: 7¢ per pound. Wheat: $1.85 per 100 pounds. Oats: $0.70 per bushel (recleaned). Barley: $1.40 per bushel. Rye: $1.80 per bushel.	10. What is the comparative cost of different seed? The instructor should list on the board the price of the different seed secured locally and compare values.
11. As a general rule green manure crops should be turned under after considerable growth has been made but before maturity has been reached. They should be plowed under two to three weeks before planting the succeeding crop.	11. When should green manure crops be plowed under? Have the group members discuss their experiences. Ref.No. 5, p. 298. No. 10, p. 175-176. No. 11, p. 30-31.
12. Generally speaking, cultivated crops are the best to follow green manures. The tillage of such crops hastens the	12. What crops should follow green manures? Relate practices followed

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decay of vegetable matter and by aerating the soil, favors additional nitrogen fixation by the soil bacteria. Corn and small grains derive greatest benefit when following green manures. Some crops may not show an increase in yield if the soil is fertile.	by farmers, and point out advantages of certain crops over others.
13. The small grains should be planted between the latter part of August and the middle of October. Plant 1 to 2 bushels per acre. Hairy vetch should be planted between August 15 and October 15, using 15 to 30 pounds per acre. Austrian winter peas should be planted between August 13 and November 1, using 18 to 40 pounds per acre.	13. Of the different crops used as green manures, how much seed per acre should be used and when should it be planted? Guide the class members in making a chart showing the time and amount of seed for the crops listed in exercise 9.

OBSERVATION ON THE REACTION OF FARMERS TO SUBJECT MATTER PRESENTED AND METHODS USED IN TEACHING JOB II.

1. Two periods of 90 minutes each were spent in the study of this job, at Cook and Summers Chapel Schools.
2. Most of the class members, at each place had turned under a green manure crop and therefore were acquainted with some of the benefits.
3. Conference procedure method was used in teaching the lesson.
4. Interest was good throught the lesson.
5. The class members discussed organic matter freely.
6. A large per cent of the group took notes.
7. Class members decided to do the following things to increase the amount of organic matter in their soil:

Approved Practice	Cook School		Summers Chapel School	
	No. farmers	Acres	No. Farmers	Acres
Turn under crop for green manure.	9	63	5	53

PROBLEM: Organizing and conducting an evening class with adults interested in soil and moisture conservation, and soil improvement, in Cook and Summers Chapel communities, Konawa, Oklahoma.

JOB III: Terracing in its relation to soil and moisture conservation and soil improvement.

OBJECTIVES:

1. To get the farmers to understand the principles involved in terracing their farms.
2. To get the farmers to understand the relation of terracing to Soil and moisture conservation and Soil Improvement.
3. To bring before the group experimental data and recommendations in regard to terraces.
4. To teach the farmers to do their own terracing.

REFERENCES:

1. Agriculture for Secondary Schools. Okla. A. And M. Faculty.
2. Oklahoma A. and M. Ext. Cir. No. 218.
3. Terracing Farm Lands. U.S.D.A. F. B. No. 1386.
4. Sooner State Erosion News. Oct., 1934, Stillwater, Oklahoma.
5. Data from Red Plains Soil Erosion Exp. Sta., Guthrie, Okla
6. Address by Dr. N. E. Winters, Nov. 13, 1934. Stillwater.
7. Papers, by S. C. S. and E. C. W. Engineers, Oct. 1, 1935

8. Farm Terracing - F. B. No. 1669.

9. Unpublished data, Soil Conservation Service, Stillwater, Oklahoma.

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1. From the 18 farms surveyed, representing 3238 acres in both Cook and Summers Chapel Communities there were 698 acres of formerly clean cultivated land which had been abandoned due to serious erosion; much of this land was severely gullied. The same survey revealed that 537 acres of cultivated land had been terraced. Most of the terrace outlets were uncontrolled. It appears inevitable that, unless eroding lands can be restored to pasture or forests, or other effective measures of control are promptly instituted, extensive land abandonment will occur in the areas of severe erosion, involving an increase in tax delinquency, slow impoverishment of the communities, with serious social consequences in the localities affected.	1. Statement of subject matter. The instructor will supply statistical and experimental data along as needed in job III. Ref No 6 " 7, pp, 108-109
2. Some of the first factors to consider before deciding to terrace are: a. Does my land need terracing?	2. What are some of the first factors to consider before decid-

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b. Cost of terracing. c. Equipment needed. 1. Availability. d. How to use the equipment. e. Labor available.	ing to terrace? List these factors on the board as suggested by the group members. Discuss each factor. Ref. No 2, p. 11-13.
3. Some of the benefits which may be derived from terracing are: a. Conserves soil. The records obtained at the Guthrie Station show an annual loss for a three year period of 64.12 tons of soil per acre from an unterraced area as compared with an average of 2.21 tons per acre from a terraced area. The loss from the terraced land was only 3.4 per cent of that from the unterraced land. The soil and slope were practically the same on both areas. They were cropped essentially the same, and the average rainfall for the three year period was about normal.	3. What are some of the benefits which may be derived from terracing? Secure the experiences of the group members. Ref. No. 2, pp. 7-8
b. Conserves moisture. A comparison of the same two areas mentioned above at the Guthrie station shows the rain-	

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fall conserved by the terraced area to be approximately five per cent greater than the rainfall conserved by the unterraced area.	
c. Increases Crop Yields. Results obtained at the Agr. Exp. Station, Goodwell, Oklahoma, definitely prove the value of terracing by increased wheat yields. Eight years' results show that terraced land yields 32.6 per cent more wheat than adjoining unterraced land. The normal rainfall during the experimental period has been 17.8 inches.	
d. Assists in preventing floods.	
4. The following things should be considered in sizing up the area to be terraced:	4. What do we consider in sizing up the area to be terraced? Secure experiences of the group and list them on the board. Discuss briefly. Ref. No. 7, p. 95.
a. Type of soil.	
b. Type of sub-soil.	
c. Area of the water shed.	
d. The natural slope of the land.	
e. The number and size of gullies present.	
f. Probable length of terraces.	
g. Terrace outlets.	
h. Probable location of terraces.	

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5. Setting up the farm level. Subject matter is given on pages 9 to 11, Ext. Cir. No. 218, Revised 1935, A. and M. College Stillwater, Oklahoma.	5. How is the farm level set up for use? Demonstrate before class members by actually setting up the level. Ref.No. 2, pp.9-11
6. Finding the high point: Level the instrument on the slope at a point from which the highest point in the field to be terraced can be overlooked. Have the rodman carry the rod to what appears to be the high point; bring the target to a level with the horizontal hair of the telescope. The rodman then moves about until the highest point is located.	6. How is the high point of the area to be terraced located? Secure the experiences of the group members, list the points on the board and discuss them in detail. Ref. No. 2, p. 13.
7. Determining the vertical slope: After the high point is located, the rod reading is noted. The rodman then moves down the slope 100 feet and brings the target on a level with the horizontal hair in the telescope. The difference between the two readings will be the fall or natural slope of the ground in 100 feet.	7. How is the vertical slope of the field to be terraced determined? Arrange for two experienced members of the group to demonstrate the principles involved in determining the vertical slope of the field to be terraced. The instruc-

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	tor will draw a diagram on the board to further explain the procedure. Ref. No. 2, p. 14.
8. Determining the vertical distance between terraces:	8. How is the vertical distance between terraces determined? Write the table on the blackboard and explain and discuss with the group. Ref. No. 2, p. 14. No. 8, pp. 7-8.

We should know something about the spacing between terraces before locating the first terrace line. The Department of Agricultural Engineering, of A. and M. College, Stillwater, Oklahoma, prepared a table that may be used as a guide in determining the above. A guide to the proper spacing of broad base terraces is:

When the slope of the land in 100's of feet is	Give a vertical fall between terraces of
1'	2' 0"
2'	2' 6"
3'	3' 0"
4'	3' 3"
5'	3' 6"
6'	3' 9"
7'	4' 0"
8'	4' 3"
9'	4' 6"
10'	4' 9"

From a study of the table it will be seen that the 3 foot slope has a vertical

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fall of 3 feet, and that for each foot increase in slope thereafter, the vertical fall increases by 3 inches. For each foot decrease in slope from 3 feet the vertical fall decreases by 6 inches. The individual's experience in terracing, good judgment, and knowledge of his soil, should be used with the above table. If the vertical fall indicated by the table results in too great a catchment area being given to the terrace, then less vertical fall should be used.	
9. Locating the first terrace line: With the high point of the area to be terraced located and the natural slope in 100's of feet known, the target is then raised on the rod the required amount, from the reading at the high point, to obtain the vertical distance between terraces. Let us assume that the natural slope is three - feet in 100 feet; the reading on the high point, 2 feet on the rod; according to the table above we may raise the target three feet on the rod, which would make the reading five feet. The rodman now moves down the slope approximately	9. How may the first terrace line be located? The instructor should draw a diagram on the board; the level, target, and rod will be used to illustrate the point. Ref. No. 2, pp. 15-16 No. 8, pp. 12-14

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100 feet and holds the rod for the instrument man to sight. The rodman moves up or down the slope as necessary until the horizontal line on the target is on a line with the horizontal hair in the telescope. This will be the high point of the first terrace line.	
10. Surveying the terrace line: With the high point of the terrace located, the rodman now moves seventeen steps toward the outlet. If level terraces are being surveyed, the position of the target is not changed on the rod. He moves up or down the slope as indicated by the instrument man until the horizontal line on the target is on a line with the horizontal hair in the telescope. Let us assume that the terrace is to have a one inch fall in 100 feet .	10. What procedure may be used in surveying the terrace line? With the aid of one man use the terracing instruments to demonstrate the correct procedure. Allow the members of the group to practice. Ref. No. 2, pp. 15-18. No. 8, pp. 12-14.
The rodman then must raise the target on the rod 0.5 of an inch each 17 steps or 50 feet. The rodman must continually exercise care to set the rod on approximately level ground.	
The rodman should never set the rod	Show how to cross a ditch.

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in a ditch. If the ditch is wide and has sloping sides, it may be advisable to set the target on the slope of the ditch. This would cause the terrace to go further up the side of the hill, thus reducing the amount of fill work necessary in constructing the dam. In many instances it is better, on account of contour farming to make the larger fills. By doing the latter, it is advisable to stop short of the ditch or go beyond it locating the next point on the terrace.

After the rodman has moved approximately 200 feet beyond the instrument, it is advisable to move the instrument to prevent error in sighting at the target. The rodman remains at the last point located after deciding to move the instrument. He exercises care not to move the target or push it in the ground.

Illustrate the steps in moving the instrument.

The instrument man picks up the instrument and carries it forward to a point where the terrace is likely to run. After the instrument is leveled up, the rodman raises or lowers the target on the rod until the horizontal line on the target

is on a line with the horizontal hair in the telescope. The rodman is then ready to proceed as he did before the instrument moved.

11. Locating the second terrace line: After the first terrace has been surveyed, it becomes the high point for the next terrace, or it occupies the same relation to the second terrace as the high point in field, does to the first terrace.

Set the instrument up a little below the upper terrace, preferably at a point from which average conditions of slope and also the probable high point of the terrace are in range of the telescope. Read the rod held on the first terrace line by sighting the target in line with the horizontal hair of the telescope as already described; measure the slope or fall in 100 feet and consult the guide table. When the vertical distance has been decided upon proceed to locate the second terrace line as explained above, on terrace number one.

A man should follow the rodman and drive stakes or throw up a mound of dirt

11. How are the second and succeeding terrace lines located? Demonstrate with the terracing instruments before the group.

Make a diagram on the board to further clear up the questions, and discuss the diagram.

Ref. No. 2, p. 16.
Ref. No. 8, pp. 12-14.

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at each station in a terrace line.	
12. Marking terrace line: Soon after terrace lines are surveyed they should be marked out with a plow before any of the station marks are lost. In marking out the terrace a man should walk ahead of the team and act as guide for the plowman. On gently sloping land the plow may miss some of the stations by several feet. Sometimes a hair-pin bend in the terrace line may be avoided by careful thought by the guide. Only slight variations from the surveyed line are permissible when walking the terrace line, especially at the outlet.	12. What procedure is correct to use in marking terrace lines? Draw a diagram on the board to illustrate the principle. Ref. No. 2, pp. 19-20.
13. The different kinds of terraces used in Oklahoma are: a. Level b. Grade 1. Uniform. 2. Variable.	13. What are the different kinds of terraces used in Oklahoma. Collect the experiences of class members and enlarge upon them if needed. Ref. No. 2, pp. 17-19.

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	Ref. No. 1, pp. 111-112.
14. Disadvantages of level terraces: a. They require exact instrument work. b. Most subject to seepage damage. c. Greater delay in drying sufficiently for tillage. d. Drowns out crops above the terrace ridges under certain conditions. Advantages of level terraces: a. Simplest to lay out. b. Retain maximum amount of soil. c. Retain maximum amount of moisture. d. Maintains a constant vertical interval between terrace dams or ridges. Disadvantages of graded terraces: a. Do not retain the maximum amount of moisture. b. Do not retain the maximum amount of soil. They allow the silt to wash away. Advantages of the terraces with a grade: a. They drain out quickly thus allowing cultivation sooner after a rain. b. They do not drown out the crops above	14. What are the advantages and disadvantages of the different kinds of terraces? List on the board the different kinds as suggested by the group and discuss fully. The group should decide which is the best kind for the community. The instructor will supply the needed experimental data. Ref. No. 1, pp. 112-13. No. 2, pp. 17-19. No. 8, pp. 7-10.

the terrace ridge.

A uniform graded terrace at Bethany, Missouri, having a grade of 4 inches per 100 feet, gave a soil loss of about 37 per cent greater than a variable graded terrace having a grade of one to four inches per 100 feet during a two year period.

Both terraces were 1200 feet long, had a vertical interval of five feet and were on the same slope. Also, for the three largest storms that occured during the year 1933, the average of the maximum rates of run-off during the storms for the uniform graded terrace were slightly over twice as great as for the variable graded terrace. Similar results were obtained on the station at Tyler, Texas, where the soil loss was about 15 per cent greater and the water loss 27 per cent greater on a uniform than on a variable graded terrace.

Since the terrace is intended to conserve both soil and moisture, the following points should be considered in determining the gradient to give the terrace ridge:

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a. The carrying power of water for soil varies directly with the square of the speed, the quantity of water remaining the same. That is, if the speed is doubled, the water will carry four times as much soil.	
b. The cutting or erosive power of water for soil varied directly as the cube of the speed. Thus, if the speed is made three times as great, the water will cut 27 times as fast.	
c. The cutting and carrying power of water for soil varies directly with the quantity of water. That is a large volume of flowing water will cut much faster and carry away more soil.	
15. Terracing Implements:	15. What implements should be used to construct the terrace? List on board the
a. Corsicana.	
b. Texas Terracer.	
c. Martin Ditcher.	
d. Simplex Terracer.	

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e. V-Drag. f. Road Grader. g. Regular Breaking plow. h. Long wing plow. i. Fresno. j. Slips.	implements suggested by the group. Discuss the advantages of each, with group members. Ref. No. 2, pp. 21-22. No. 6, pp. 15-19.
16. The width of a terrace may vary according to the land slope. On gentle to average slopes the width should be from 25 to 40 feet, whereas on steeper slopes, where most of the dirt is moved down hill, the width need not be more than 18 or 20 feet. Although wide terraces are more expensive to build than narrow terraces, in the long run they are cheaper and more satisfactory. They are easier to cultivate, easier to maintain, and are less apt to break during heavy rains.	16. What width terrace should be constructed? Illustrate with a diagram on board. Secure the experiences of the group members, list on the board, and discuss fully. The instructor should supply needed technical data. Ref. No.2, p. 20-21. No.2, p. 18-20.
17. Height of terraces: The terraces should be 12 to 15 inches high on fairly steep land and	17. How high should the terraces be constructed?

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somewhat higher, 15 to 24 inches, on more gradually sloping land. This is because the terraces will be further apart on the more gradual sloping land and the catchment area will be greater.	Illustrate with a diagram on the board.
It costs about the same to build eight miles of terrace 12 inches high as one mile of terrace two feet high. A ridge two feet high requires four times as much earth as a ridge one foot high.	Secure experiences of the group members, and discuss them in detail.
The tendency now is not to construct terraces so high, but lower and closer together.	The instructor will supply needed experimental data.
	Ref. No. 1, p. 112-113. No. 2.
18. In constructing level terraces it is advisable to construct the terrace ridge down the slope far enough to allow the water to be along the line points located by the rodman. If the terrace has a grade the line of points located by the rodman may be the center of the terrace ridge.	18. Where should the terrace construction be started in relation to the terrace line?
In terracing a field, the uppermost terrace should always be construc-	Secure the experience of the group members. The instructor should draw a diagram on the board to aid in explaining to all members

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ted first.	of the group. Ref.No. 1, p 115-116 No. 2, p 23 No. 8, p. 17-18
19. Good terraces may be obtained by back furrowing several times at different time intervals, with a regular breaking or a long wing plow. One thing should be remembered about building a terrace, and that is to get the required height as quickly as possible. If too great width is made first, height is difficult to obtain because of having to work in loose dirt. A good plan is to start at the center of the terrace and make the first round throw the dirt to the plow furrow or surveyed line. The principle of construction is that each roll of dirt is cut and moved to the center of the terrace before cutting a new roll. In this way the blade can be kept in rather firm soil and thus aid in scouring and keeping the dirt rolling. This procedure is continued until the desired width and height are	19. What methods should be used in constructing terraces? Discuss methods which have been used locally and explain other methods if needed. Ref.No.1, pp. 115-116. No. 2, p. 21-28. No. 8,pp. 14-20. No. 9,

SUBJECT MATTER	METHOD
obtained. On the steeper slopes it seems more desirable to move the dirt from the upper side because it is so much easier to push the dirt down hill than up hill.	
The fills in narrow gullies or ditches should be constructed straight across. If the depression or low place is very wide, say, thirty or more feet, a slight curve up the slope is better. This will cause the fill work to be less and should aid in the practice of contour farming. The fills must be made higher than the terrace ridge, which allows for their settling. Strength is needed in fills because of the concentration of water on the upper side.	Study methods of crossing gullies or low places.
20. Approximate cost of constructing terraces 15 inches high, 20 feet wide, and not less than 1000 feet long in light soils on moderate land slopes. DESCRIPTION OF LAND COST PER ACRE Clean cultivated land, no gullies $1.50-$2.50 Grass or virgin	20. What is the approximate cost of constructing terraces? Secure experiences of the group, and compare with experimental data. Ref. No. 8, p. 21 No. 9.

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land, no gullies	$2.00-$3.00
Clean cultivated land, small shallow gullies.	$3.00-$6.00 (depends on the no. of gullies)
Clean cultivated land, gullies three to six feet deep	$7.00-$15.00 "
Newly cleared land. No gullies, most stumps grubbed out.	$7.00-$12.00, (depending upon kind and number of roots and stumps)

The costs given above are based upon the use of a steel ditcher or terracer of the V shape or grader type. In using a wooden V-drag, the number of trips required to build a terrace to a given width and height is greater than that necessary with a steel ditcher or terracer, the time required amounting to one fourth to one half more. Where the labor and power are paid for in cash the terraces thus constructed cost from 25 to 40 percent more than when constructed with the steel terracer, depending, of course, upon the soil conditions. Cost records also show that terraces built with a road grader in the hands of an experienced operator cost about 25 to 50 percent less than

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when constructed with small horse drawn terracers.	
21. Since more water passes the terrace outlet than any other point of the terrace, it is necessary that we have the outlet wide enough to allow the water to pass freely out. A broad shallow outlet instead of a narrow one will, in most instances, prevent a ditch from eating back into the field. It has been common practice to empty the excess water, from over fields out into the roadside ditches. This practice is undesirable because of the damage done to the roads and fields. Uncontrolled overfalls are developed which cause severe erosion at the terrace outlets. A more desirable method is to make the terrace outlets so that they will drain into a natural vegetated draw or into a controlled ditch within the area terraced. The terrace outlet may be underground tile, a masonry spillway, or a	21. What precautions must be observed in constructing terrace outlets? Secure experiences of the group members, and discuss them in detail. Draw diagrams on the board of terrace outlet systems and discuss with group members. The instructor will present technical information as needed. Ref. No. 1, p.114-115. No. 2, p.27-28 No. 8, p. 11-12. No. 5. No. 9.

good growth of sod or other low growing vegetation that lies down flat enough for the water to pass over it, thus protecting the soil from the scouring effect of the water.

If the surplus water from terraces cannot be discharged onto good sod, such as Bermuda, buffalo, or others, and it becomes necessary to construct an outlet channel or ditch which collects the water from the terraces and finally discharges it onto good vegetative sod, or into a natural water course. The outlet ditch should be broad, flat bottomed, and shallow. The dimensions of the channel depending upon the acres in the watershed, type of soil, slope, rainfall, and the means employed in stabilizing the ditch. If the channel is to be sodded with vegetation, such as Bermuda, buffalo, and others, the width should be greater than where concrete and masonry are used. Bermuda grass is perhaps the best grass to use in terrace outlet channels, but unless handled with care, it is apt to spread and become a pest.

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22. Materials and ways in building baffles. a. Masonry. b. Concrete. c. Loose stone. d. Poles. e. Boards. f. Sod. g. Brush. h. Woven-wire. Baffles should be broad and shallow. The main purpose of a baffle is to take the cutting power out of water. Where the water spills over the baffle should ordinarily be at the same height that the water leaves the spill basin of the baffle above. If loose stones are used, good results may be obtained by placing the stones at an angle or sloping back and down. It is perhaps advisable to place sod, such as Bermuda grass, between each stone.	22. What are the different materials and ways to use in building baffles? Secure the experiences of the group. List them on the board, and discuss them in detail. Make diagrams on the board of a baffle and discuss in detail. Ref. No.7, pp 25-32.
23. If terraces are built large in the beginning, and kept sown down to close growing crops for two years, their	23. How are terraces maintained? Secure suggestions

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maintenance is an easy matter. Back furrowing to the ridges once a year is about all that is necessary. It is very important that attention be given to terraces, while they are new, during and after heavy rains. Should breaks occur, the fills are easiest and cheapest constructed immediately, after the rain.	from the group and discuss them in detail. Ref.No. 1, p. 116-117. No. 2, p. 29-30 No. 8, p. 22. No. 9.
24. Cultivation of terraced field: All tillage operations should be done on the contour (level) instead of up and down the slope. This conserves both soil and moisture, by causing more water to soak into the ground. Thus less water gets into the terrace channel. Strip cropping may be practiced on most terraced fields, the sown strips of closely growing plants, absorbing all point rows. Terraces that are crossed by rows of clean cultivated crops are much harder to maintain.	24. How should terraced fields be farmed? Study the present practices of those present and additional practices which may be used. Make a diagram on the board of illustrations of planting along with the terrace. Ref. No. 1, p. 116-118. No. 2, p. 30-31. No. 8, p. 22. No. 5. Decide on the job to study next.

OBSERVATION ON THE REACTION OF FARMERS TO SUBJECT MATTER PRESENTED AND METHODS USED IN TEACHING JOB III.

1. Three periods of 90 minutes each were spent in the study of this job at Cook and Summers Chapel schools.
2. The farmers had noticed that their fields were washing, but some of them had never stopped to consider the causes of abandoned land in the community.
3. Much terracing has been done in each community. Twelve members of the class had terraced 125 acres.
4. Conference procedure method was used in teaching the lesson.
5. Many of the terraces and fills which had been constructed were not large enough. Too much vertical interval had been used between terraces on some farms. Very little had been done to protect terrace outlets.
6. The groups decided that practically level terraces, medium size, and large fills were best under local conditions.
7. Twelve farmers at Cook School plan to terrace 229 acres during 1937. Six farmers at Summers Chapel School plan to terrace 177 acres during 1937.

PROBLEM: Inaugurating a program of soil and moisture conservation and soil improvement, with adults, in Cook and Summers Chapel Communities, in Konawa, Oklahoma.

JOB IV: Contour farming and contour strip cropping in their relation to soil and moisture conservation and soil improvement.

OBJECTIVES:

1. To get the farmers to understand the principles of contour farming and contour strip cropping as a means of conserving soil and moisture.
2. To get the farmers to practice contour farming and contour strip cropping.

REFERENCES:

1. Conservation, Farming Practices and Flood Control. U. S. D. A. Miscellaneous Publication, No. 253.
2. Soil Conservation Magazine, Aug. 1935, U. S. D. A.
3. Unpublished data, Red Plains Soil Erosion. Exp. Sta. Guthrie, Oklahoma.
4. Agronomy Manual for Oklahoma, Soil Conservation Service, Stillwater, Oklahoma.
5. Soil and Moisture Conservation in the Western Plains Area. International Harvester Co., Chicago, Ill.
6. Terracing in Oklahoma. Okla. Exp. Sta. Cir. 218.
7. Strip Cropping to Prevent Erosion. U. S. D. A. Leaflet No. 85.
8. Address, By Dr. N. E. Winters, Nov. 13, 1934, Stillwater, Oklahoma.

SUBJECT MATTER	METHODS
We have just completed a study of terracing in its relation to soil and moisture conservation and soil improvement. Are there any questions concerning this job you wish to discuss further?	Statement of subject matter. Instructor supply technical and experimental data as needed in Job IV.
The job for study this evening is contour farming and contour strip cropping in their relation to soil and moisture conservation and soil improvement.	
1. Contour farming consists of plowing, planting, and cultivating around the slope on the level, instead of up-and-down the slope.	1. What is contour farming? Draw a diagram on board and discuss with group. Ref. No. 1, p. 12. " 2, p. 9.
2. The advantages of contour farming are as follows:	
a. Conserves both soil and moisture as shown by the following data from the Ex. Sta. Guthrie, Oklahoma. The percentage runoff and soil losses May 3, 1934 during a rain of 2½ inches	2. What are the advantages of contour farming? Secure experiences of group members, list on board, and discuss in detail. Instructor supply needed experimental data and further discuss.

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Method of planting	Percent of rainfall which ran off	Soil loss in tons per acre
Flat planted cotton, rows up and down hill	20.34	3,25.
Cotton listed on contour	1.37	.028

METHODS

Ref. No. 1, p. 13.
" 2, p. 9.
" 3,

Over 100 times as much soil and 15 times more moisture were lost, with the cotton rows running up-and-down the hill.

b. Conserves plant food.

c. Easier to maintain terraces.

3. Some of the disadvantages of straight rows are as follows:

a. Causes more soil loss due to more rapid runoff of water.

b. Causes more plant food loss due to more water runoff.

c. Greater loss of soil moisture.

d. Lower yields.

e. Difficult to maintain terraces.

Where rolling land is tilled up and down the slopes, the rows and plow furrows serve as gutters that aid, rather than prevent, soil and water losses. They become man-made channels for the concentration and rapid run-off of water and often develop into gullies

3. What are the disadvantages of straight rows? Secure experiences of group members, list on board, and discuss in detail. Instructor supply technical information and discuss.

Ref. No. 1, p. 13.

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which gather and discharge rain water into streams with maximum speed.

4. On unterraced land the rows should parallel the surveyed contour line. They may be placed on one or both sides of the contour line. By the latter method more rows will be on the true contour.

On terraced land the rows should parallel the terrace ridges. There are several methods used, some are as follows:

a. The first row is layed off on top of terrace ridge, then others parallel to this row on both sides of the terrace. This method will cause the short rows or strips to be in the center of the interval between the terraces.

b. The first row is layed off on top of terrace, then other rows are run parallel to this one on the upper side only. Never crossing the terrace. This method will cause the short rows or strip to be just below the terrace ridge.

There are other modifications of laying-off rows parallel to terraces or contour lines. These may be sketched on the board.

METHODS

4. What relative position should the rows have to the terrace or true contour line?
Draw a diagram on board.
Secure experience of group and discuss.

Ref. No. 6, pp. 30-31.
" 4, pp. 17-19.

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5. When contour farming is practiced, either with or without terraces, short rows will be the results, unless this space is sown to such crops as, oats, sweet clover, lespedeza, alfalfa, sudan and others.

6. The following table demonstrates the value of erosion resistant strips in soil and moisture conservation during a rain at Guthrie, Oklahoma, of 1.56 inches on June 16, 1934.

Treatment	Per cent of rainfall which ran off.	Soil loss, tons per acre during rain.
Cotton planted on the contour in which cultivation had eliminated the lister furrows	8.87	.291
Cotton planted on the contour with erosion resistant strips of alfalfa on the contour	2.54	.026

METHODS

5. How may short rows be eliminated?
Draw diagrams on the board and discuss in detail.
Secure experience of the group.

6. Is strip cropping on the contour efficient in conserving soil and moisture?
Secure experiences of members, list on board, and discuss in detail.

Ref. No. 1, p. 12.
" 2, p. 9.
" 3.

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When the soil in the clean tilled strips fail to absorb the rainfall as fast as it comes down, the surplus, generally loaded with small soil particles, runs into the intervening strips of close growing crops. There, as the movement of the water is slowed down by the close growing vegetation and the mat of roots in the soil, the water drops much of its soil load and tends to soak into the ground. In other words, the protected, close-growing strips between the unprotected clean-tilled strips act as blotters and strainers to slow down the flow of run-off water and checks the removal of soil.

7. The width of the erosion resistant strips in relation to the clean tilled crops, is determined by the steepness of the slope, type of soil, character of rainfall, length of slope, and present condition of the field. The percentage of control strips will vary from 10 to 80 per cent of the land area. As the slopes become steeper, the number of strips and total percentage of the control crop should be increased. On fields with a slope of two per cent, the width of the strip may be one hundred feet or possibly more. On fields with a slope of two to four per cent, the width of the strips should be approximately seventy-five feet, and on fields

7. What determine the width of the strip? Discuss the relation between the width of strip and slope, type of soil, character of rainfall, and type of crops to be grown.

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with a slope of from four to six per cent, the width of the strips should be fifty to sixty feet. It is practical to make the width of the strips about the distance that we usually have between terraces if the field is terraced. The erosion resistant strips should be variable in width in order to eliminate point rows from the intertilled row crops.	Ref. No. 4, p. 17. " 1, p. 12-13. " 2, p. 9. " 7, p. 1-6.
8. The erosion resistant crop may be a small grain, such as oats or wheat, a legume cover crop, such as hairy vetch, Austrian Winter Peas, sweet clover, alfalfa, or a feed and forage crop of sweet sorghums or sudan grass.	8. What plants should be used in sowing the strips? Study the types used locally and those which may be added. Ref. No. 8, p.6-10. " 4, p.17. " 7, p.1-6.

OBSERVATIONS ON THE REACTION OF FARMERS TO SUBJECT MATTER PRESENTED AND METHODS USED IN TEACHING JOB IV.

1. One 90 minute period was spent in the study of this job at each place.
2. Contour farming and contour strip cropping had been used to a limited extent by class members.
3. Farmers had noticed that terracing failed to adequately conserve soil and moisture on farms of community.
4. They realized other means must be used, if an efficient job was to be done.
5. Both conference and informational procedure were used, due to the limited experience of group members.
6. The good results obtained by farmers in the community, who practiced contour farming and contour strip cropping during the crop year of 1936 had been observed by all present.
7. Sixteen farmers, at Cook School, plan to contour farm 379 acres during 1937. Nine farmers, at Summers Chapel School, plan to contour farm 283 acres, during 1937.

PROBLEM: Organizing and conducting an evening class with adults interested in soil and moisture conservation and soil improvement, in Cook and Summers Chapel communities, Konawa, Oklahoma.

Job V: Determining the kind and amount of crops to plant on the individual farm to produce, food for the family and feed for the livestock.

OBJECTIVES:
1. To get the individual farmer to realize the feed requirements of the different classes of livestock.
2. To get the individual farmer to understand the relation between the average number of livestock kept and the number of acres of each kind of crop to plant.
3. To get the farmers to produce feed needed on their individual home farm.

REFERENCES:
1. Oklahoma Agr. Ext. Cir. 233.
2. Oklahoma Agr. Ext. Cir. 291.

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1. Most farmers in this community do not plan their crop acreage so as to produce a sufficient amount of feed for their livestock. A considerable amount of feed is bought each year by the	1. Statement of the job to be studied. The instructor will supply technical information and

SUBJECT MATTER	METHODS
farmers of this community. Most of these feeds or substitutes may be produced on the farms of this community, thus eliminating an unnecessary cash expense. Before deciding upon the kind and acreage of crops to grow, we should consider the number, class, and feed requirements of the livestock on the farm. With this information, it is possible for each person to intelligently decide upon the kind and amount of crops to grow.	experimental data as it is needed in Job V.
2. Type case: 160 acre farm, 5 persons in family. 4 Head of workstock. 2 " " dairy cattle. 4 " " beef cattle. 10 " " hogs. 200 " " poultry.	2. The instructor will list a type case on board and discuss it briefly. Each member of the group will be provided with paper and pencil, for the purpose of making a list of the number of livestock on his home farm.
3. The following table gives the minimum feed requirements for maintaining different classes of livestock, that	

SUBJECT MATTER

have been found applicable to the average Oklahoma farm:

Class of Livestock	Grain Requirement	Hay Requirement	Pasture Requirement
Dairy Cattle, per head	25 bu. corn or equivalent	2 Tons	2 Acres
Beef Cattle, per head	8 bu. corn or equivalent	1 "	3 "
Workstock per head	50 bu. corn or equivalent	2 "	1 "
Hogs, per head	10 bu. corn or equivalent	----	1/4 "
Poultry, per head	3/4 bu. corn or equivalent	----	----

Based on the above table, the feed requirement for the livestock in the type case given in question number 2 would be as follows:

No. Animals	Class	Corn or Equivalent	Hay	Pasture
4	Workstock	200 bu.	8 Tons	4 Acres
2	Dairy Cattle	50 "	4 "	4 "
4	Beef Cattle	32 "	4 "	12 "
10	Hogs	100 "	----	2.5 "
200	Poultry	150 "	----	------
T O T A L		532 bu.	16 Tons	22.5 Acres.

METHOD

3. Secure experiences of group members as to the amount of feed used on the home farm by each class of livestock. List the amount on board and discuss in detail. Instructor will supply experimental data on minimum feed requirements for the different classes of livestock. Compare experimental data with that of members. Allow each farmer to work out minimum feed requirements for livestock on home farm according to experimental data. Ref. No. 1, pp. 5-12.

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4. Land Division

532 bu. corn, 18 bu. per acre	30 acres.
16 T. hay, 2 T. per acre	8 "
Pasture	22.5 "
Potatoes	1 "
Garden	1 "
Orchard and lots	3 "
Woodland	50 "
Roads and other lands	4.5 "
Other crops	20 "
Cotton	20 "
TOTAL	160 acres.

METHODS

4. How many acres of each kind of crop should be planted to provide food and feed needed on the individual farm? Secure experiences of group members as to acres of the different crops planted and yields on home farms, list on board, and discuss in detail.

Instructor work out on the board, the land division on 160 acre farm, with the same number and class of livestock used above. Group discussion on land division for his home farm. Group discussion on land division worked out by the individual.

SUBJECT MATTER	METHODS
	group members.
	Ref. No. 1, p. 12-15 " 2, p. 1-6

OBSERVATIONS OF THE REACTION OF FARMERS TO SUBJECT MATTER PRESENTED AND METHODS USED IN T ACHING JOB V.

1. Two periods of 90 minutes each were spent in the study of this job, at each school.
2. Very little attention had been given to the acres of each kind of crop to be planted to provide food and feed needed on the individual farm.
3. Some men concluded that they should sell some livestock, because of insufficient land to produce feed needed.
4. Some of the farmers thought the feed requirements given in the experimental data were not sufficient.
5. Much interest was shown throughout the study of this job, by members of each group.

PROBLEM: Organizing and conducting an evening class with adults interested in soil and moisture conservation and soil improvement, in Cook and Summers Chapel communities, Konawa, Oklahoma.

JOB VI: Methods used and results obtained on farms in the Soil Conservation Service Work Area, Konawa, Oklahoma, field trip.

OBJECTIVES: To get the farmers to better understand and use approved methods in soil and moisture conservation and soil improvement.

INSTRUCTIONS FOR THE GROUP

Those going on the tour of the Soil Conservation Service Work Area, Konawa, Oklahoma, should meet at the local Camp at 10:00 A. M., May 20, 1937. Cars will be provided for transportation by members of the group. Take your lunch.

Special attention should be given to the study of the following:

a. Terraced fields: size of terraces and fills, outlet control systems, vegetation in outlet ditches, and baffles.

b. Contour farming and contour strip cropping: width of strip, rows in relation to terraces, or contour lines, and crops sown in the strips.

c. Contour ridges or furrows in pastures: spacing, size, and water holding capacity, and amount of vegetation.

d. Farm ponds: size of dam, type of rip-rap, location, and spillways.

MORNING TOUR

Meet at Camp		10:15 A.M.	
Project 12	R. O. Quillin	10:30 A.M.	Stop 25 minutes; observe terracing, contour farming, strip cropping, terrace outlet ditch, and pasture improvement.
Project 25	R. O. Greer	11:00 A. M.	Stop 45 minutes; observe terracing, Bermuda grass outlets, contour tillage, sweet clover, winter legumes, contour ridges in pasture, and strip cropping.
Lunch		12:00 Noon	
Project 32	V. M. Fulton	12:50 P.M.	Observe from road contour farming and contour ridges.
Project 5	C. T. Boles	1:00 P.M.	Stop 40 minutes; observe terracing, Bermuda and buffalo grassed outlet ditches, contour tillage, contour strip-cropping, two farm ponds, and pasture improvement.
Project 13	F. P. Swan	2:00 P.M.	Stop 30 minutes; observe pasture improvement, including contour ridges,

			diversion ditches, revegetation, and mowing of weeds, pond construction, terraces, contour farming, and orchard on the contour.
Project 27	Q. T. Collins	2:40 P.M.	Stop 20 minutes; observe terraces, contour farming, crop rotation, pasture improvement, terrace outlet ditch, and vetch and rye grass seed plots.
Project 19	C. O. Walker	3:20 P.M.	Stop 30 minutes; observe pasture improvement, winter legumes, rye grass and sweet clover.

END OF TOUR

OBSERVATIONS ON THE REACTIONS OF FARMERS TO SUBJECT MATTER PRESENTED AND METHODS USED.

A tour over the Soil Conservation Service work area, Konawa, Oklahoma, was made May 20, 1937. Twenty-nine farmers made the trip. This included farmers from the two communities.

1. The entire day was spent in studying the methods used and results obtained on farms in the area.
2. Much interest and enthusiasm were shown during the entire tour.
3. The group members were especially interested in terracing, terrace outlet control, contour farming, winter legumes, and pasture improvement.
4. Strip cropping and pond construction demanded considerable attention from members of the group.
5. The group decided this to be the most profitable lesson in the course.

CONCLUSIONS AS TO ORGANIZATION.

In organizing the evening classes in Soil and Moisture Conservation and Soil Improvement at Cook and Summers Chapel Schools, eighteen representative farms were selected, and detail soil improvement practice surveys were made, summarized and analyzed as a basis of the course.

The beginning and succeeding dates of a series of jobs to be studied were advertised by means of personal contracts, announcements at the local Lions Club and Soil Conservation Association meetings. Cards were mailed to members and prospective class members. Articles concerning the course were published in the local news paper. These methods seemed to be very effective in stimulating interest and getting the information before the farmers, which resulted in an opportunity for the instructor to become better acquainted with the soil conditions in the area. The surveys furnished much valuable information which was used as material in the course. The instructor and potential class members became better acquainted by personal contacts. They had a mutual understanding of each other and the work done by each. This seemed to be a major factor in causing the farmers to attend the meetings.

The job, pasture management, in its relation to soil and moisture conservation and soil improvement, occupied more time than at first planned. This was due to the poor condition of the pastures of the class members and the interest shown for more information on the subject.

CONCLUSION AS TO PRESENTATION OF SUBJECT MATTER

The materials of this course were presented through informational and conference procedure methods. Charts, blackboard, and demonstrations were used to help develop points.

The experience of the group on parts of some of the jobs studied was very limited. This made it necessary for the instructor to use the informational procedure. Where the experience of the group had been rather extensive and varied, it was desirable to use the conference procedure method in teaching. This stimulated interest and encouraged participation in the discussion.

CONCLUSIONS AS TO METHODS USED IN ENROLLING CLASS MEMBERS IN SUPERVISED PRACTICE WORK.

The facts which were developed in the evening class discussion were kept before the group in enrolling in supervised practice. Each member was led to see the opportunity to study his own problems and secure usable information for its solution. It was pointed out that the instructors services would be available when needed for information and visitation. Each class member would be expected to put into practice just as many approved methods studied as he could conveniently do during the year of 1937.

After the conclusion of each lesson, members were requested to make a list of the kind and scope of the supervised practice work each would do. Other practices were added to these at the end of the course. A summary of the plans of the class are shown on the attached yellow sheets.

GENERAL CONCLUSIONS AS TO THE EFFECTIVENESS OF THE COURSE IN ESTABLISHING A PROGRAM OF SOIL AND MOISTURE CONSERVATION AND SOIL IMPROVEMENT IN COOK AND SUMMERS CHAPEL COMMUNITIES.

Some very desirable work was done and more planned to be done as a result of the course in Soil and Moisture Conservation and Soil Improvement. However, it would have been more complete to have included the study of the following jobs in the course:

a. Controlling and treatment of gullies.

b. Crop rotation.

c. The location and construction of suitable farm reservoirs to impound the surplus water from field and pasture lands.

By the instructor supervising the work closely, each class member should keep in touch with what the others are doing, hence be an incentive for him to do his work more efficiently.

STATE BOARD OF EDUCATION

Division of Vocational Education — John Vaughan, Director

REPORT FOR AGRICULTURAL EVENING SCHOOL

School Konawa, Oklahoma Teacher G. W. Stokes School year 19 36 - 19 37

Enterprise or Short Unit Made Basis of Work Soil and Moisture Conservation and Soil Improvement

Center Where Held Cook School Distance 3 Miles

Name of Class Member	Dates of meetings and attendance at each 1936: 1937														Total Meetings Attended
	12 30	1 6	1 20	2 10	2 18	2 25	3 4	3 17	4 1	4 8	4 15	4 22	2 29	5 20	
Bickerstaff, J.L.		x			x	x	x	x			x	x	x	x	8
Deister, Louie	x	x	x	x	x	x	x	x	x			x		x	11
Elliott, John	x	x	x		x		x	x	x	x	x	x	x	x	12
Foran, Floyd	x		x	x	x				x	x		x	x	x	9
Greenlee, E	x	x		x	x	x	x				x	x	x	x	10
Hillerman, Leo		x	x		x		x		x			x	x	x	8
Higdan, Frank	x			x		x	x		x	x	x	x	x	x	10
Jackson, Cecil			x	x		x	x		x	x	x	x	x	x	9
Jackson, Arthur			x				x	x	x		x	x		x	7
Johnson, W. B.			x			x	x	x		x	x			x	6
Keefover, W. L.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14
Lehman, Phillip		x	x	x	x			x		x			x	x	8
Lewis, Father		x	x	x	x	x	x	x	x	x			x	x	11
Miller, Earl	x	x		x		x				x	x		x	x	8
Platt, G. R.	x	x	x	x	x		x	x	x	x	x	x	x	x	13
Stephens, A. F.			x		x		x	x	x	x	x	x	x	x	10
Stephens, H. H.	x	x				x	x	x	x	x	x	x	x	x	11
Townsend, Gene	x	x		x	x	x			x				x	x	8
Total Attendance at Each Meeting	10	12	12	12	11	10	12	12	12	12	12	13	15	18	

REPORT ON PRACTICES OF MEMBEI

OPERATOR PUBLISHING COMPANY, GUTHRIE, OKLA. 66122

NAME OF CLASS MEMBER	TOTAL NUMBER MEETINGS ATTENDED	FARM PRACTICE Terrace Acres		FARM PRACTICE Contour Farm Acres		FARM PRACTICE Contour Ridge Pasture Land Acres	
		SCOPE	VALUE	SCOPE	VALUE	SCOPE	VALUE
Bickerstaff, J.L.	8	10		15		15	
Deister, LOuie	11			10		8	
Elliott, John	12	20		6		10	
Foran, Floyd	9			8		9	
Greenlee, E.	10	5		40		15	
Hillerman, Leo	8	14		12		8	
Higdon, Frank	10	12		35		20	
Jackson, Cecil	9			15		6	
Jackson, Arthur	7	6				18	
Johnson, W. B.	6	20		20		28	
Keefover, W.L.	14	30		60		10	
Lehman, Phillip	8			18			
Lewis, Father	11	54		62		159	
Miller, Earl	8	5		25		15	
Platt, G. R.	13	11		15			
Stephens, A. F.	10					10	
Stephens, H. H.	11	42		30		25	
Townsend, Gene	8			8			
Total	173	229		379		353	

I, PRACTICE		FARM PRACTICE Mow Pasture Acres.		FARM PRACTICE Revegetate Pasture Land acres.		FARM PRACTICE Turn under crop for green manure acres		FARM PRACTICE Supplementary Pasture acre	
	VALUE	SCOPE	VALUE	SCOPE	VALUE	SCOPE	VALUE	SCOPE	VALUE
		15		15				2	
		8							
				8		16		3	
		15		7		4		4	
		20		15				10	
		10		8					
		20		20		8		5	
		12		6		4		2	
		18		10		2			
		26		20				7	
		3		10		9		5	
		15				2		3	
		200		160		12		8	
		20		10					
		14		6		6		3	
		5		15				2	
		25		25				4	
		5		2				2	
		431		337		63		60	

SUMMARY STATEMENT

Enterprise or Short Unit Made Basis of Work: Soil and moisture conservation and soil improvem

Date Course Started: 12-30-36 Ended: 5-20-37 Number of Meetings Held: 14

Enrollment, Male: 18 Female: - Total: 18 Total Number Individuals Reached: 30

Farm Practices Adopted As A Result of Instruction

Name of New or Improved Practice	Total Number Farmers Using Practices as Result of Course	Total Scope on Which Practices Were Used	Estimated Financial Value of New or Improved Practices
Terrace	12	229 Acres	
Contour farm	16	397 "	
Contour ridge pasture land	15	353 "	
Mow Pasture	17	431 "	
Revegatate pasture land	16	337 "	
Turn under crop for green manure	9	63 "	
Supplementary pastures	14	60 "	
Total	18	1852 "	

COURSE CALENDAR

Date	Job or Practice Taught	Length of Meeting in Minutes
12-30-36	Pasture management in its relation to soil and moisture improvement and soil improvement.	90
1-6-37	" " " "	90
1-20-37	" " " "	90
2-10-37	" " " "	90
2-18-37	" " " "	90
2-25-37	Organic matter (green manures) in their relation to soil and moisture conservation and soil improvement	90
3-4-37	" " " "	90
3-17-37	Terracing in its relation to soil and moisture conservation, and soil improvement	90
4-1-37	" " " "	90
4-8-37	" " " "	90
4-15-37	Contour farming and sontour strip farming in their relation to soil and moisture conservation and soil improvement.	90
4-22-37	Determining the kind and amount of crops to plant on the individual farm to produce food for family and feed for livestock.	90
4-29-37	" " " "	90
5-20-37	Methods used and results obtained on farms in the Soil Conservation Service work area, Konawa, Oklahoma, (A field trip)	180

STATE BOARD OF EDUCATION

Division of Vocational Education — John Vaughan, Director

REPORT FOR AGRICULTURAL EVENING SCHOOL

School Konawa, Okla. Teacher G. W. Stokes School year 19 36 - 19 37

Enterprise or Short Unit Made Basis of Work Soil and Moisture Conservation and Soil Improvement

Center Where Held Summers Chapel Distance 3 Miles

Name of Class Member	Dates of meetings and attendance at each — 1936: 12 10	12 17	12 27	1937: 1 5	1 12	1 19	1 26	2 2	2 16	2 23	3 2	3 16	4 6	5 20	Total Meetings Attended
Berry, Luther		x		x		x	x		x		x	x		x	8
Campbell, Paul		x		x			x					x	x	x	6
Fulton, V. M.	x			x		x	x	x		x	x	x	x	x	10
Frank, Cecil		x	x		x		x			x	x			x	7
Gassaway, Vernon	x				x	x	x	x			x	x		x	8
Greer, R. O.	x	x	x	x	x		x	x	x	x		x	x	x	12
Harris, John	x	x	x			x	x			x				x	7
Hesson, W. A.	x	x	x	x	x		x	x	x	x		x	x	x	12
O'Neal, E. F.	x		x	x	x	x	x			x	x	x	x	x	11
Quillin, R. O.	x	x	x	x		x	x	x	x		x	x	x	x	12
Summers, G. E.		x			x				x	x				x	5
Vance, Calvin		x			x			x			x				4
Total Attendance at Each Meeting	7	9	6	7	7	6	10	6	5	7	7	8	6	11	

REPORT ON PRACTICES OF MEMBE

NAME OF CLASS MEMBER	TOTAL NUMBER MEETINGS ATTENDED	FARM PRACTICE Terrace Acres		FARM PRACTICE Contour Farm Acres		FARM PRACTICE Contour Ridge Pasture Land Acres	
		SCOPE	VALUE	SCOPE	VALUE	SCOPE	VALUE
Berry, Luther	8	65		40			
Campbell, Paul	6						
Fulton, V. M.	10			15		11	
Frank, Cecil	7	5		8			
Gassaway, Vernon	8					7	
Greer, R. O.	12	20		39		88	
Harris, John	7						
Hesson, W. A.	12	50		56		23	
O'Neal, E. F.	11	30		60		25	
Quillin, R. O.	12	7		20		5	
Summers, G. E.	5			10		15	
Vance, Calvin	4			35			
Total		177		283		174	

1 PRACTICE		FARM PRACTICE		FARM PRACTICE		FARM PRACTICE		FARM PRACTICE	
		Mow Pasture Acres		Revegetate Pasture Land Acres		Turn Under Crop for green manure Acres		Supplementary Pasture Acres	
	VALUE	SCOPE	VALUE	SCOPE	VALUE	SCOPE	VALUE	SCOPE	VALUE
		5		15		10		11	
				8					
		9				5		4	
		3		4					
				6				3	
		60		10		28		12	
		7							
		15							
		15		12					
		10		23		6		8	
		8				4		2	
		2						5	
		20		15				10	
		142		93		53		55	

SUMMARY STATEMENT

Enterprise or Short Unit Made Basis of Work Soil and moisture conservation and soil improveme

Date Course Started 12-10-36 Ended May 20, 1937 Number of Meetings Held 14

Enrollment, Male 12 Female - Total 12 Total Number Individuals Reached 25

Farm Practices Adopted As A Result of Instruction

Name of New or Improved Practice	Total Number Farmers Using Practices as Result of Course	Total Scope on Which Practices Were Used	Estimated Financial Value of New or Improved Practices
Terracing	6	177	
Contour farm	9	283	
Contour ridge pasture land	7	174	
Revegetate pasture land	10	142	
Turn under crop for green manure	5	53	
Mow pasture	8	95	
Supplementary Pasture	8	55	
Total	12	977	

COURSE CALENDAR

Date	Job or Practice Taught	Length of Meeting in Minutes
	Pasture management in its relation to soil and moisture	
12-10-37	conservation and soil improvement	90
12-17-36	" " "	90
12-27-36	" " "	90
1-5-37	" " "	90
1-12-37	" " "	90
	Organic matter (green manure) in their relation to soil	
1-19-37	and moisture conservation, and soil improvement	90
1-26-37	" " "	90
2-2-37	Terracing in its relation to soil and moisture conservation and soil improvement.	
2-16-37	" " "	90
2-23-37	" " "	90
3-2-37	Contour farming and contour strip cropping in their relation to soil and moisture conservation and soil improvement.	90
3-16-37	Determining the kind and amount of crops to plant on the individual farm to produce food for family and feed for livestock	90
4-6-37	" " "	90
5-20-37	Methods used and results obtained on farms in the Soil Conservation Service work area, Konawa, Oklahoma. (A field trip)	180

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