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Soil and Water Conservation Project – Project 2

Michigan State University Cooperative Extension Service

4-H Club Bulletin

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SOIL and WATER CONSERVATION

Project 2



MICHIGAN STATE UNIVERSITY
COOPERATIVE EXTENSION SERVICE
EAST LANSING



4-H Club Soil and Water Conservation *

PURPOSE OF THIS PROJECT

In Project II of the Soil and Water Conservation project you have an opportunity to study firsthand a few of the reasons why some farms are not as productive today as they once were. Have you noticed in your community that some farms look very productive and prosperous, some may look very much run down, and others seem in-between?

Did you ever stop to think why some farms are successful and others are not? What are some of the reasons? Could it be a shortage of working capital? Could it be sickness and poor health in the family? Could it be because good crop practices were not followed? Could it be because the soil has been "mined" and "robbed" of its fertility? Failure on a given farm may be due to one or more of the above factors.

It is only during recent years that we have been giving soil and water conservation the attention it should receive. Why do soils wear out? In some parts of the world, land has produced food for hundreds and hundreds of years. What have we done wrong here in Michigan where some soils have become infertile and unproductive in even less than 100 years? Can we manage our soils so we can continue to produce food year after year and century after century?

Soil is the basis of agriculture. On those farms with a productive soil, the farm income and, generally, the family income is high. For this reason, agriculturists and scientists are striving for a higher production per acre—to make two blades grow where one grew before.

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Cover Photo:

Two Ionia County 4-H Club boys are refilling a small washout. They are replacing the soil that has been washed out by rushing water. On steep slopes such as this a sod-waterway may be used to prevent gullying. For such sod-ways, fibrous rooted grasses should be used.

NOTICE—To conform to the system used to identify other Michigan 4-H publications, all club bulletins in the Soil and Water Conservation series are assigned new numbers. The correct numbers designating the bulletins for each of the "Soil and Water" projects are now: Project I, 56A; Project II, 56B.

A community is made up of a large number of citizens—some farmers, some businessmen, some laborers, some professional people, some retired people. A rural community's prosperity is largely the same as the agricultural prosperity of that community. The people in the village depend on the farm people for their business income. The farmers depend on the village storekeeper for their clothes, groceries, fuel, feeds, fertilizers, etc. Are we not dependent on each other?

In this project you will observe some problems in soil and water conservation on our farms. What problems do you have on your farm? Can you correct any of these? Are all of your problems ones that you can solve alone or do some need community action?

In the Soil and Water Conservation project you will no doubt run into many strange words. Gully, sheet, and wind are types of erosion. You will want to study their causes, damage and controls. What is a contour terrace? What does strip cropping mean? What is a diversion ditch, a sod waterway? You will want to learn more about these. Find out when and where they are used and what they accomplish.

We hope this study will make you more conscious of your land and its problems. Look about each day and see what new situation you can observe. What can be done about it?

Soon you may be responsible for the safekeeping of the soil on your own farm. Will you be prepared to do what is best for it?

WHAT YOU ARE TO DO

Both boys and girls are eligible for this 4-H project. It is suggested that the work be done during the winter months, but conducting it during the summer is acceptable. The tour and the movie are required activities in the second-year program.

After you enroll in this project you should complete each of the activities individually except the tour and movie. These two are club activities. Follow the suggestions given in the activity on how to do the problem.

Keep a notebook of what you do in every activity. This may be a two- or three-ring notebook with 8½- by 11-inch pages. Or you may place tablet paper of this same size in a cover of construction paper and either staple it at the left edge or lace it with cord or leather lacing. Place one or more pages of paper in the book for each activity, plus pages for a scrapbook section if you want one.

On the first page of the notebook write this information:

Year

Name Age

Road or Street and Number

Rural Route Number

Post Office

County Year in Project

Name of Club

Name of Local Leader

Legal Description of Your Farm:

Township, North South

Range, East West

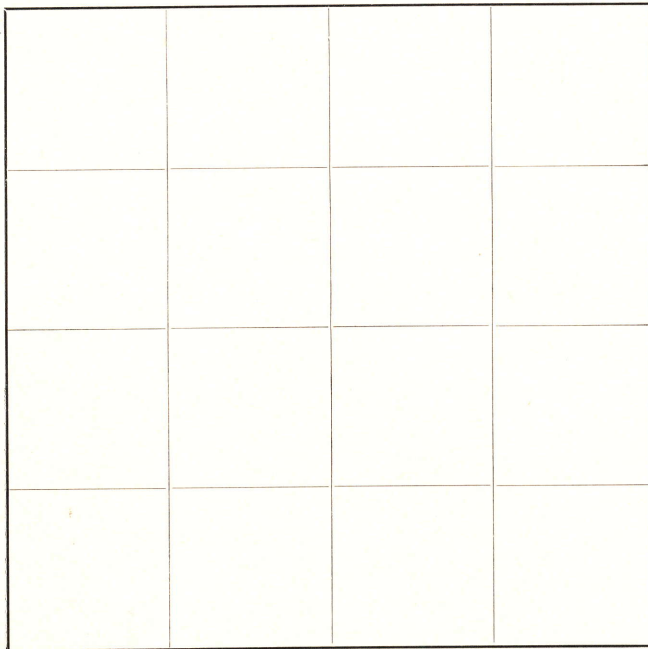
Section,,

Legal Description of Your Home Farm

.....

.....

Map



SECTION....(shade location of your farm)

At the top right hand corner of each page, above the top line, list:
Activity number
Name of activity

Write on the top line at the left hand edge: **What I Did**—Tell in your own words what you did in this activity.

Next write: **What I Observed** or **What Happened**—Tell what happened as a result of what you did.

Next write: **What I Can Do at Home**—Write what you may do on your home farm to improve the soil, using what you have learned in this activity. You may want to cut out some pictures that show something related to some of your lessons in this project. Glue them on the pages at the back of the book, behind the pages on activities. Group them by classes, such as: erosion, contour farming, liming, fertilizing, and drainage. Label each page as to group in the upper right hand corner. More than three or four pictures in a group are unnecessary. If you have cut out more, choose those that best show the lesson you have learned.

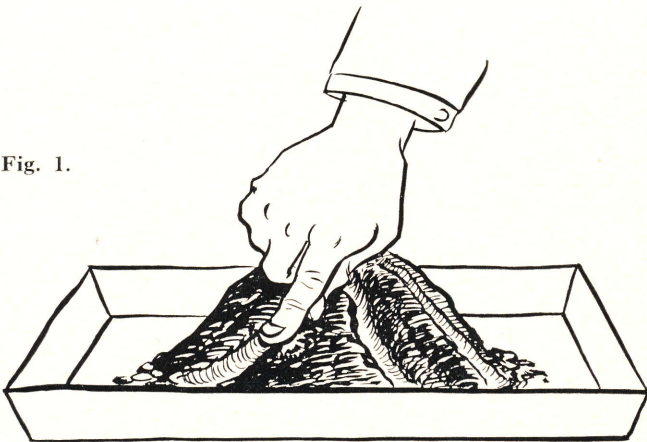
ACTIVITY 1

STOP THE WATER — SAVE THE SOIL

Part 1

1. Put a mound of soil in a large pan.
2. With a pencil or your finger make furrows up and down the slope (Fig. 1).

Fig. 1.



3. With a nail, punch holes in the bottom of a tin can to make a sprinkler.
4. Pour water into the can so it falls on the mound of soil. Measure the water so you know how much was added.
5. Where does the water go?
6. Could this happen on a well-cultivated field?
7. Pour the water from the pan into a jar or glass and allow to settle.
8. What do you find? Is there good soil in it?

Part 2

9. Empty the soil from the pan. Place another mound of soil in the pan similar in size to the first one.
10. With a pencil or your finger make circles around the mound.
11. Apply the "rainfall" as before (Fig. 2).
12. What difference do you note in the action of the water?
13. Did more water soak into the soil?

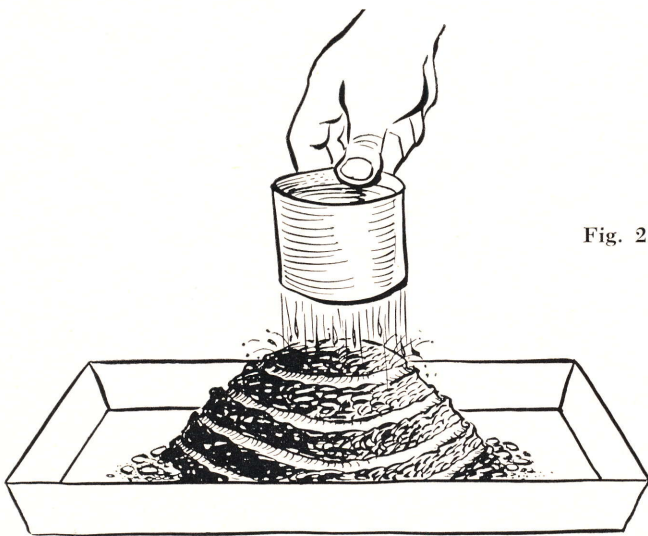


Fig. 2.

14. From this would you recommend working or cultivating fields *across the slope*—or *up and down the slope*?
15. Do you know of fields nearby which could be worked and cultivated across the slope to save soil and moisture?

ACTIVITY 2

EFFECT OF SOD COVER ON SAVING
SOIL AND WATER

1. Make a box, using a board 10 inches wide and 2½ feet long for the bottom. Use 6-inch boards for the sides and for one end. Use a 4-inch board for the other end. (See Fig. 3.)

2. Fill the box with soil from a cultivated field. Pack the soil so it will be 1 inch below the top of the box. Add more soil if necessary.

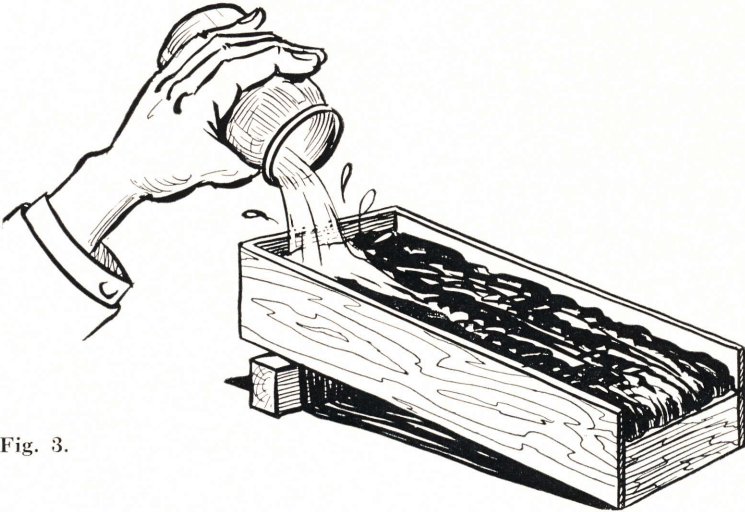


Fig. 3.

3. Place a 4-inch block (such as a 2" x 4") under that end of the box made with the 6-inch board, to represent a sloping field.

4. Pour water slowly over the soil (one pint every half-minute). Pour most of the water on the upper part of the soil (Fig. 3).

5. Keep a record of the number of pints added before the water flows out of the lower end of the box. Add more water and see what happens to it. Is the water muddy? Does much soil wash off? If so, that is an example of "sheet erosion." If possible, collect some of the water and put it in a glass jar—to be compared later with water collected from soil with a sod cover in the next step.

6. Empty the soil from the box; refill it with a piece of good thick grass sod, cut so that it will fit tightly. (A square-pointed spade is good for cutting out this sod piece.) Fill and pack solidly any cracks in the sod and along the edges of the box.

7. Pour water slowly over the sod (one pint every half-minute). Follow the same procedure used with the soil from the cultivated field (Item 5 above).
8. Compare the results.
 - a. Which one absorbed the most water?
 - b. Which one protected the soil best?
 - c. Was there any difference in the muddiness of the water?
9. Observe conditions in your neighborhood.
 - a. Do most soils have a protective sod or cover crop in the fall, winter, and spring?
 - b. Do some fields show evidence of having sheet erosion on them? Is it serious?

ACTIVITY 3

PLANTS NEED FOOD

1. Find a fertilizer bag, and get the three numbers off the front which give the *analysis* of the fertilizer—the kinds and amounts of plant foods.
2. What do each of these plant foods do for the plant?
3. Look up some of the common fertilizers and note what they contain. (Fig. 4.) List them and indicate on what crops they are most often used.
4. Why do farmers use different mixtures of plant foods for different crops and kinds of soils?
5. For what crops does your father use fertilizer?

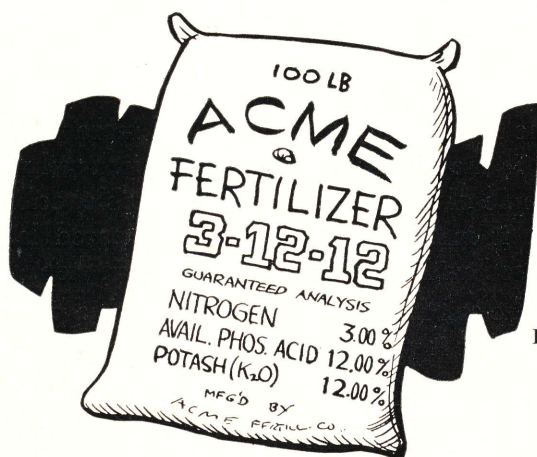


Fig. 4.

HOW TO SAVE THE SOIL

What happens to soils that “wear out”?

If an auto wears out you can buy a new one. But can you get new soils?

What can farmers do to their land so that large yields will continue to be produced? Find pictures in farm magazines showing how farmers keep their land in good condition.

These pictures might be put into a scrapbook (Fig. 5). The book can be divided into the following sections:



Fig. 5.

1. Contour farming.
2. Strip cropping.
3. Gully control.
4. Sod waterways.
5. Windbreaks.
6. Liming.
7. Crop fertilization. Applying commercial fertilizers or stable manure.
8. Legumes.
9. Grasses.
10. Pasture management.

Pictures selected should be placed in one of the above groups.

FARM PLANNING

Are all crops suited to all soils? Are some crops better suited to hilly land or level land than others?

Are some crops better suited to sand than clay?

The wise farmer knows what his land is best suited for. He knows what he is best trained to do. He tries to make the best of what he has to work with.

USING A CONTOUR MODEL

Would you like to plan a farm?

Select a small farm or field in the neighborhood and study it carefully. Is it level or hilly? Has it sandy or clay soil? Is it fertile or is it low in plant foods?

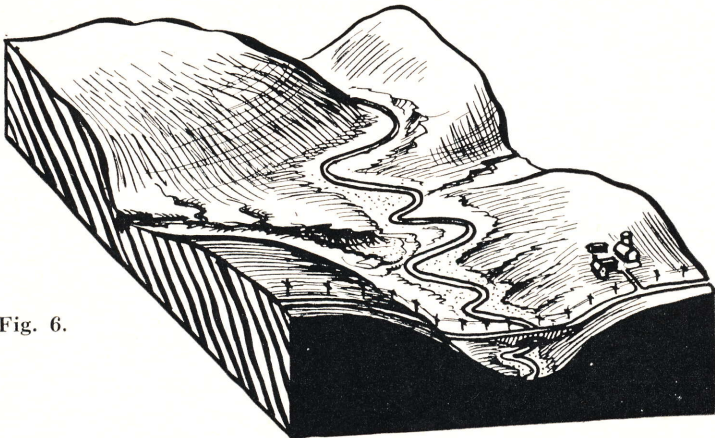


Fig. 6.

Make a "contour model" (Fig. 6) of the farm or field on a sand table or in a low-edged box of sand. Mold the sand into hills, valleys, and flat areas. Now plan the use of the field or farm so as to save the soil.

What crop did you decide was best for hilly land? Should wind-breaks be placed in fencerows or around buildings? What land is well-adapted to Christmas tree production?

Which land is best-suited to row crop use?

Which land should be used mostly for hay and pasture?

Are there waterways which should be left in sod?

Have gullies formed?

Can you see evidences of sheet erosion?

ORGANIC MATTER

Soil organic matter is extremely important in all soil improvement programs. Soil organic matter is formed from plant and animal materials which accumulate on and in the soil. It is an important part of topsoil. This organic matter acts like a sponge, soaking up water and holding it for plants to use. Organic matter makes heavy soils work easier, contains plant food, and reduces soil erosion.

1. Collect three samples of soil.
 - a. Collect a 2-quart sample of muck or soil from a wet, swampy area.
 - b. Collect a 2-quart sample of soil from a sand or gravel pit.
 - c. Collect a 2-quart sample of surface soil from a field.
2. Examine these samples as follows:
 - a. Compare the color of the three samples. Which one is darkest? Why?
 - b. Organic matter weighs less than mineral soil, so soils having more organic matter will probably weigh less. Dry one quart of each sample and weigh it. Make a record of the weights. Which one weighs the most? Which one the least? This may show which carries the most organic matter.
3. Examine a pint of each sample:
 - a. Can you identify portions of leaves?
 - b. Which one has the most mineral particles?

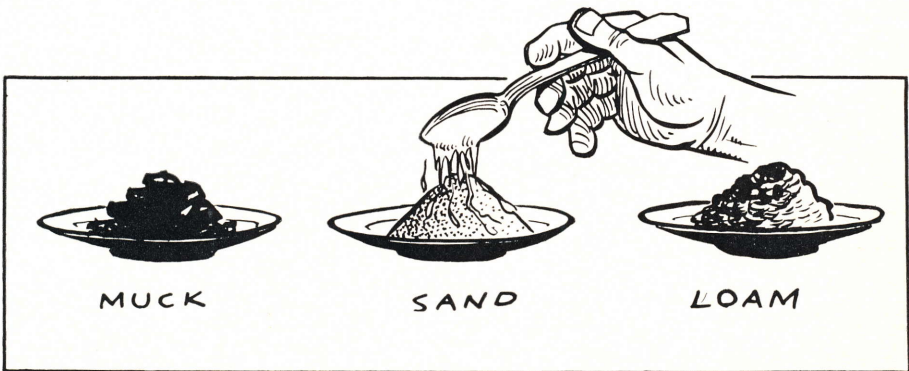


Fig. 7.

- c. Find which soil will hold the most water. Add enough water to the dry soil to make it thoroughly wet but not enough so that water runs out of it. To do this, you may place a teacupful of the dry soil in a dish and add water, a teaspoonful at a time (Fig. 7). Allow plenty of time for the soil to absorb the water. Dry muck may require more than an hour. Count the number of teaspoons of water added to wet each soil. Which one holds the most water? In which one do you think plants would grow longest without rain?

ACTIVITY 7

STUDY A STREAM

A stream flowing through an area offers an interesting study for those interested in land, water, wildlife, and recreation. The stream furnishes drinking water for animals and favorable living conditions for many kinds of wildlife. Besides being the natural drainageway for the land, it may offer opportunities for fishing, trapping, swimming, skating, and other recreation. During periods of high water it may even be dangerous and cause losses from flooding.

If there is a stream nearby, study it and learn about it (Fig. 8).



Fig. 8.

1. Make a list of plants and animals which you have seen along the stream.
2. How large is the stream? How long? How wide at low-water level and at high-water level? How deep is the stream? It would be interesting to make a measuring station on a bridge or some other suitable place where you can see how much the water rises and falls during a season.
3. Can you see any evidence of erosion on the farms along the stream? Is the water clear all through the year? If not, when is it muddy? Can you see large or small gullies where water has flowed into the stream? Are some of the banks undermined and do they eventually fall into the stream? Is the stream straight or is it crooked? Why? What shape is the valley?
4. How is the land used in the valley?
 - a. What kind of vegetation is growing along the stream?
 - b. What kinds of crops do farmers grow in the watershed, the area from which water drains into the stream? Which of these crops encourage erosion?
 - c. What percent of the land is in woods or forests? What percent is left in pasture?
 - d. Are there any homes in the lowest part? If not, why?
 - e. Are there any factories along the stream? What do they make? Do they use water or waterpower?
5. What kind of recreation does the stream provide?
 - a. Is the stream big enough for fishing? What kind of fish do people catch?
 - b. Does anyone do trapping along the stream? What do they catch?
 - c. What other recreational opportunities does the stream offer? Boating? Swimming?
6. How can the stream be improved?
 - a. Are individuals or factories dumping material into the stream?
 - b. Do people throw tin cans, broken glass, and other trash into the stream?
 - c. Is stream-bank erosion a problem?
 - d. Others —

LOOK AT YOUR COMMUNITY

The places where people live vary greatly. Some live near large cities, some live near small towns, and some live in the country several miles from any town. Others live where farms are scattered, with large areas of non-farm land in between.

1. General.
 - a. How far is your community from town?
 - b. How many miles do you have to go to school?
 - c. How many miles do you have to go to church?
 - d. How many miles do you have to go to buy groceries?
 - e. How far are you from the nearest city?
2. How is the land used?
 - a. Select an area, such as a school district, or one of at least a square mile in area.
 - b. How many people live in this area?
 - c. What is the legal description? (Have a supervisor, surveyor or farmer tell how land is described "legally.")
 - d. How many people live on farms where practically all of the income comes from farming?
 - e. How much land is owned by the state, county or federal government?
 - f. Who are the township officials?

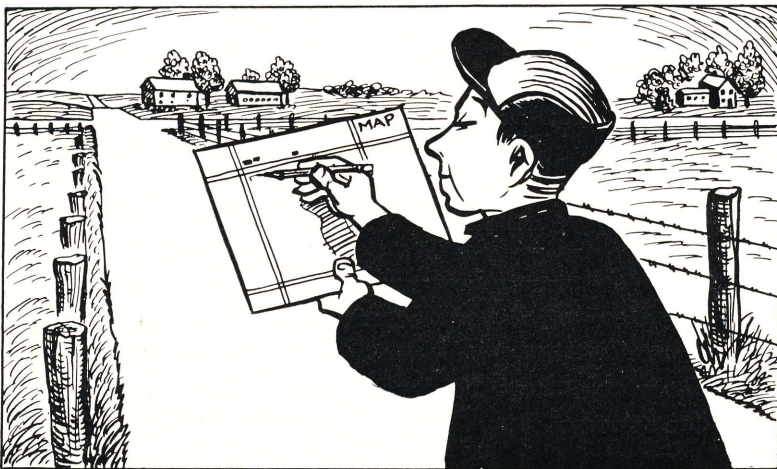


Fig. 9.

3. Make a map of the area (Fig. 9).
 - a. Show where the homes, school and churches are located.
 - b. Where is the area's location in the county and township?
4. List the most important problems. Talk with your parents and others to determine what these problems are.
 - a. Make a list of community problems. Problems sometimes found in communities include:
 - Floods along streams
 - Runoff across farm land
 - Dust storms, especially in springtime
 - Poor drainage
 - Poor roads
 - Wash-outs, soft in wet weather
 - Snow blockades
 - Distance to school
 - Stream pollution
 - Damage to crops and livestock by wild animals
 - b. What can be done about these problems?

ACTIVITY 9

A FIELD TRIP

A field trip offers conservation club members an excellent opportunity to observe in a practical way many of the lessons studied in this project.

If your club is active during the winter months, it may not be easy to arrange a field trip. You may have to wait until after your spring achievement day. If your club is active during the summer months, a club tour is easy to arrange.

In planning your club tour you should consult your county 4-H Club agent. You may also want to discuss this subject with your soil conservation farm planner.

If you have a demonstration farm or a soil conservation district cooperator in your vicinity or close by, you have a good start. On the farms in your neighborhood you also have many examples of good and poor soil practices. Be alert and look for these things. You may pass by them day after day and give them no attention or thought.

Some things to look for on a trip or on your own are:

1. On rolling or hilly land, which way do the furrows run?
2. Are there any evidences of erosion? What type—wind or water?
3. Is the erosion slight, moderate, or severe in extent?
4. Are any farmers using strip cropping?
5. Are any farmers using sod waterways?
6. Do the field fencerows provide good habitats for wildlife?
7. Are woodlots pastured?
8. Do farmers in your neighborhood burn their pasture and marsh areas as well as fencerows and roadsides each spring?
9. There are many others. Make a list of these signs of good or poor land use. Report these in your notebook in the following manner:

NAME OF FARM	GOOD PRACTICES	POOR PRACTICES
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ACTIVITY 10

SHOW A SOIL CONSERVATION MOVIE

Many good soil conservation movies are available for educational meetings.

Your county agricultural agent or your county 4-H Club agent can suggest which ones to get for your community. Your whole club can invite parents and friends to a meeting and show one or more soil conservation movies, to be followed by a discussion of soil conservation.

1. What movie or movies were shown?
2. a. How many members attended?
b. How many others attended?
3. Did you have any other entertainment or serve refreshments?
4. Give a brief description of the movie.
5. Did some of the practices shown in the movie fit the needs of the land in your community?
6. What points were brought out in the discussion?

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