Soil and Water Conservation Project
Michigan State University Cooperative Extension Service
4-H Club Bulletin

B.E. Henry, Harold Sparks, Extension; Kenneth Ousterhout, Assistant State Boys and Girls Club Leader; Leonard Braamse, Conservation Institute; James Porter, Soil Science

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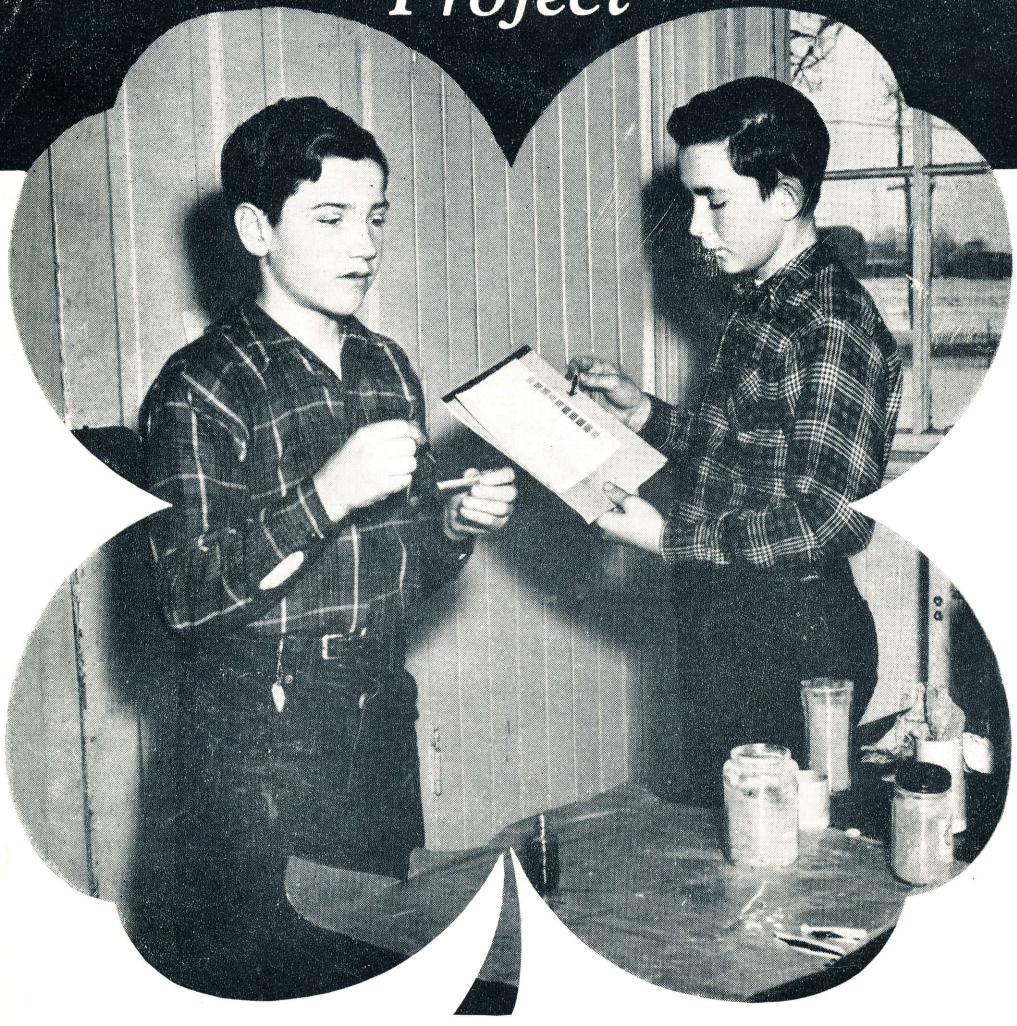
CLUB BULLETIN 56

SOIL and WATER CONSERVATION Project



Testing soil for lime need.

MICHIGAN STATE COLLEGE
COOPERATIVE EXTENSION SERVICE
EAST LANSING

4-H Club Soil and Water Conservation*

PURPOSE OF THIS PROJECT

Young people on farms know that it takes good soil to grow good crops and produce good livestock. They know the milk doesn't just "come from a bottle" as a city boy once said. They know that milk is produced by cows which eat hay and grain. The soil must be in good condition to produce large quantities of good quality hay and grain to feed the cows and to grow the other crops that we all need.

It is easy for us to use the soil without realizing its importance. We may even waste or "wear out" good soil without knowing it. That is the same as throwing away good food. Wasting soil means that the people in the cities would be unable to get enough milk to drink or enough food to eat.

Actually our soils are being slowly used up by growing crops year after year and removing them from the farm. Many soils are being wasted by bad land use and erosion. For that reason it is important that we know more about our soils so that we can take good care of them. Your parents and all people living on farms have a big job to keep their soils producing the milk, other food and material for clothing that people need to eat and wear. You can help them by studying and learning more about the soils on your farm and doing things to keep them productive.

It is the purpose of the 4-H soil conservation project to help you know more about soils and what needs to be done to keep them producing well. When you know that, you will be able to help your parents with this problem on their farm. It will pay to do so. Better crops bring in more money to buy the things which your family would like to have and the things that boys and girls especially enjoy.

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.

*This publication was prepared by:
B. E. Henry, Calhoun County Agricultural Agent.
Kenneth Ousterhout, Assistant State Boys and Girls Club Leader,
Leonard J. Braamse, Conservation Institute,
Harold L. Sparks, County Club Agent of Cass County,
James A. Porter, Soil Science Department, and
Members of the Soil Conservation Service.

Text illustrations were prepared by:
Oscar Warbach, Michigan Department of Conservation.

It is also suggested that all members in a community "club up" in completing this one project. For best results, two or three members may get together and form a work group. The same work group should complete all activities (lessons) together.

They may or may not as they wish prepare a scrapbook of the observations and results of each activity.

The work group shall exhibit at the club or county achievement program.

1. The scrapbook, if one is prepared.
2. Individual reports of each member in the work group.
3. Material prepared together with explanatory signs, posters of one of the completed activities.

ACTIVITY 1

WHERE OUR FOODS COME FROM

Did you ever stop to think where your "daily bread" comes from? Does it come from the soil directly "as is"? How many of these foods do other people help get ready for eating before you use them in your home?

Each member should, with his mother's help, make a list of all of the foods found in their kitchen, pantry, cellar and fruit room. The work group should then divide them into these three groups:

Foods Directly From The Soil	Foods Indirectly From The Soil	Foods Not From Soil
(Like potatoes, apples, carrots, etc.)	(Like baker's bread, meat from market, etc.)	

As you look over this list, would you think we should take good care of our soils? What might happen if we became careless with them?

ACTIVITY 2

WHAT KINDS OF SOIL DO YOU HAVE IN YOUR COMMUNITY?

The most common way of naming soils is by the size of the soil particles that make up the soil. From coarse to fine, the soil particles are: gravel, sand, silt and clay. By comparing soils and learning to observe the "feel" of them, a person can learn to name them correctly as gravelly loam, sand, sandy loam, loam, silt loam or clay loam.

1. Obtain soil samples which have been named and labeled from your county club agent to serve as a guide. These samples will include sand, sandy loam, loam, silt loam, clay loam and muck.

2. Compare soil from your own farm with the guide samples. Do this by feeling the soil between the thumb and finger, not merely by comparing the color of the soil. If the soil samples are dry, dampen them before feeling. The soil should be damp but not wet.

Sand—The large grains of sand feel gritty and there are very few small particles.

Sandy Loam—There are grains of sand which feel gritty but there are also smaller particles which make this soil less gritty than sand.

Loam—In this there are some grains of sand but so many smaller particles that you do not feel much grit.

Silt Loam—Very little sand and the soil feels quite "smooth". When you press the damp soil into a ball it holds that shape.

Clay Loam—You notice here no sand grittiness and the damp soil feels almost greasy. The soil clings firmly when pressed into a ball.

Muck—These soils were made from decaying refuse of plants and trees. They are usually dark in color and contain almost no grit. They hold much water and, when dry, are light and will burn.

3. Take a field trip to a farm near the school:
   a. How many different soils do you find?
   b. Can you see any differences in the trees and crops growing on the different soils?
   c. Why do our soils vary so much?

ACTIVITY 3

ARE SOILS ALIKE?

To most of us soil is just "dirt". Have you ever looked carefully at a handful of soil? What is it made of?

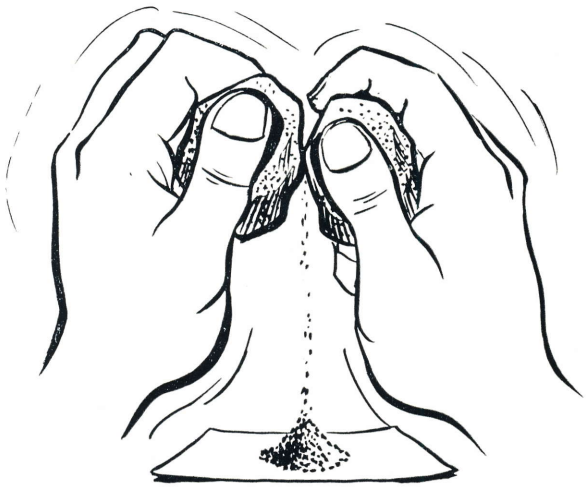
The work group should make a trip to farm fields and collect three or four samples of soil. A quart of each should be collected. The samples should be quite different in appearance. Try to find one that is sandy and another that is quite clayey.

1. Place each quart sample where it will dry.
2. Sieve each through a piece of window screen to take out the roots, stones and vegetable matter.
3. Put some of the sifted soil in a clear glass bottle—fill ⅓ full.

4. Add water until the bottle is ⅕ full and shake vigorously for 2 minutes. If while shaking, the soil takes up water, add more until the bottle is ⅕ full after the soil is wet.

5 Allow to settle over night.

6. Examine the bottles carefully. Do they appear as they did at the start? Where are the coarse soil particles? — the finer ones? Which layers are sand? — which clay?



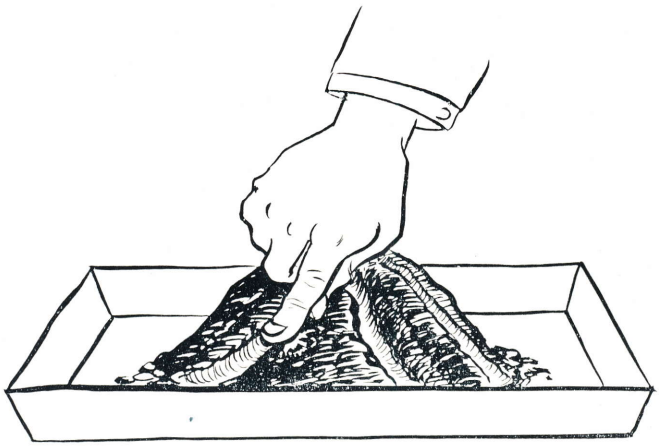
ACTIVITY 4

HOW WERE SOIL PARTICLES (GRAINS) FORMED?

Some people think stones and rocks grow in the ground. Do you believe this? How is soil formed?

1. Take two pieces of standstone or limestone and rub them together over a white piece of paper for a few minutes. What do you get? Can this be soil? What effect did glaciers have in forming soil?

2. Take another piece of sandstone or limestone and heat it very hot on the stove. If the stone is still in one piece, drop it into a can of cold water. What happened? What happens when a bottle of water freezes? Could soil be formed by freezing and heating?



ACTIVITY 5

STOP THE WATER—SAVE THE SOIL

Part 1

1. Put a mound of soil in a large pan.

2. With a nail, punch holes in the bottom of a tin can to make a sprinkler.

3. With a pencil or your finger make furrows up and down the slope.

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 off the water in the pan and allow to settle.

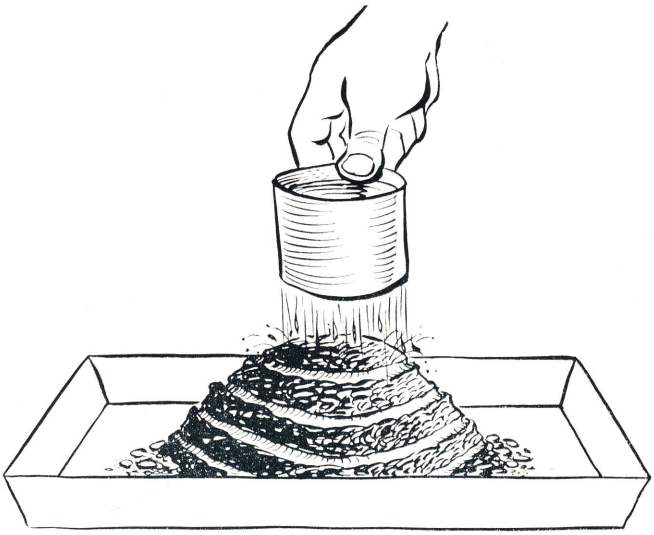
8. What do you find? Is there good soil in it?

Part 2

9. 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.



12. What difference do you note in the action of the water?

13. Did more water soak into the soil?

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 near your school which could be worked and cultivated across the slope to save soil and moisture?

ACTIVITY 6

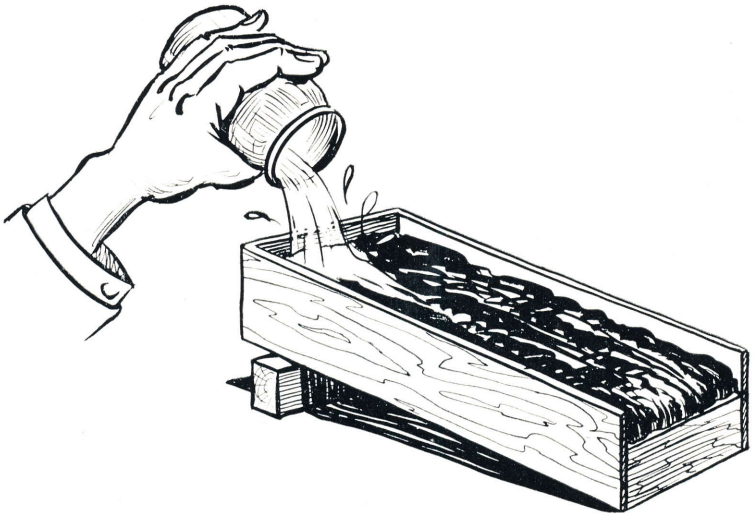
EFFECT OF SOD COVER ON SAVING SOIL AND WATER

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 one end. Use a 4-inch board for the other end.

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

3. Place a 4-inch block (such as a 2″ x 4″) under the 6-inch board end of the box 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.



5. Keep 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 with water collected from the soil with sod cover.

6. Empty the soil from the box and refill with a piece of good thick grass sod, cut so that it will fit tightly into the box. A square-pointed spade is good for cutting out this sod piece. Fill and pack solid into 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 in connection 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 7

WHAT IS MUDDY WATER?

What color is muddy water? What gives it this color? How does water get muddy?

After a heavy spring rain, visit a small stream or ditch and fill two quart-jars with this water.

Compare it with a jar of water from the well or faucet.

Let the muddy water settle for several days.

Notice how long it takes for the water to become clear.

Notice the amount of silt in the bottom of the jar. Save one jar for exhibit purposes if you wish.

Take the second jar and carefully pour off the water. With a spoon dip out the mud. Feel it—squeeze it between the thumb and fingers. Place some on a tin where it will dry.

When it is dry, powder it up and feel it. Is this material sand, silt or clay? Is this good soil? Why?

ACTIVITY 8

WHAT THE WINDS DO

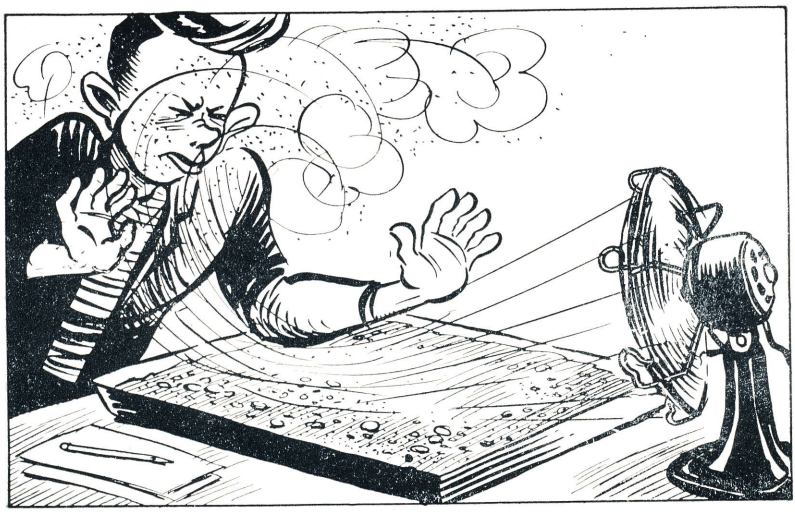
Were you ever out in a dust or sand storm? From where did the storm come? Where did it go?

In this activity we will study some ways of preventing soil from blowing.

Take a shallow pan or box and fill it with dry soil.

Place it on a table against the wall.

Place an electric fan in front of the pan with the air passing over the soil.



What happens?

Could this take place in a field of dry soil?

What size of soil particles drifted against the wall?

Next, wet this box of soil and plant some seeds of wheat, rye or oats. Keep the soil moist. When the seeds have germinated and are well above the ground (1 to 2 inches high) repeat the fan treatment.

What happens now?

Can this be done on a farm?

Note – If the room is not heated throughout the day so seeds can germinate, then stick evergreen twigs in the moist soil to represent growing plants.

ACTIVITY 9

DOES CLOVER AND ALFALFA GROW WELL ON YOUR FARM?

Good crops of clover and alfalfa are valuable livestock feeds and benefit the soil. One reason why some soils do not grow good clover and alfalfa crops is because the lime content is too low. The only sure way of knowing whether there is lime enough is to test the soil.

1. Get a sample of soil from a field on your farm that is growing clover or alfalfa and one from a field where new seedings are going to be made this spring.

2. Take soil samples early in the fall and have them ready to test later in the season.

3. Take samples from the upper 6 inches of the soil.

4. Put the samples in clean tin cans.

5. After the use of the Soiltex kit has been explained to you, test the soil to see whether it is sweet or sour.

6. Do your fields need lime? How much?

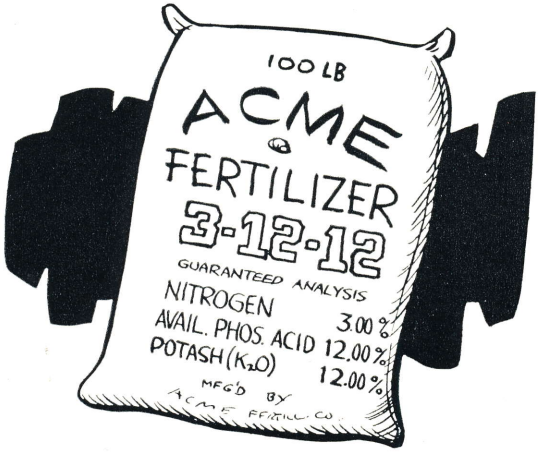
ACTIVITY 10

PLANTS NEED FOOD

1. Find a fertilizer bag and get the three numbers off the front that 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.



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?

ACTIVITY 11

HOW TO SAVE OUR SOIL

What happens to soils that "wear out"?

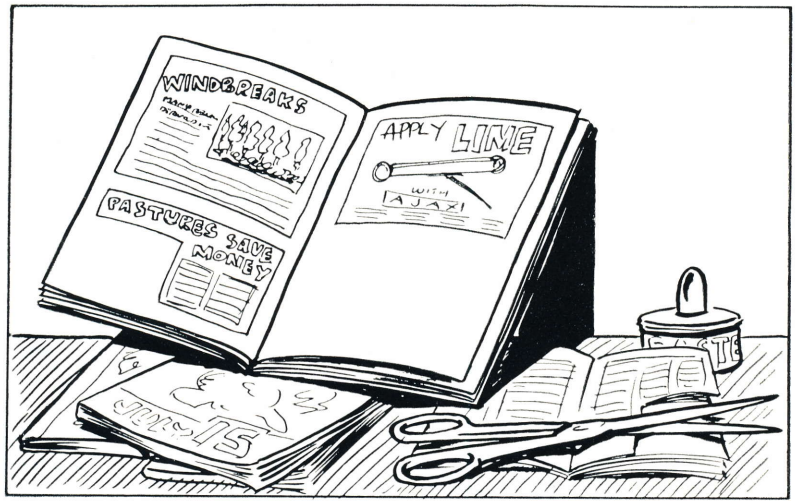
If an auto wears out you can buy a new one.

Can you get new soils?

What do farmers do to their land so 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. The book can be divided into the following sections:



1. Contour farming.
2. Strip cropping.
3. Gully control.
4. Sod waterways.
5. Windbreak.
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.

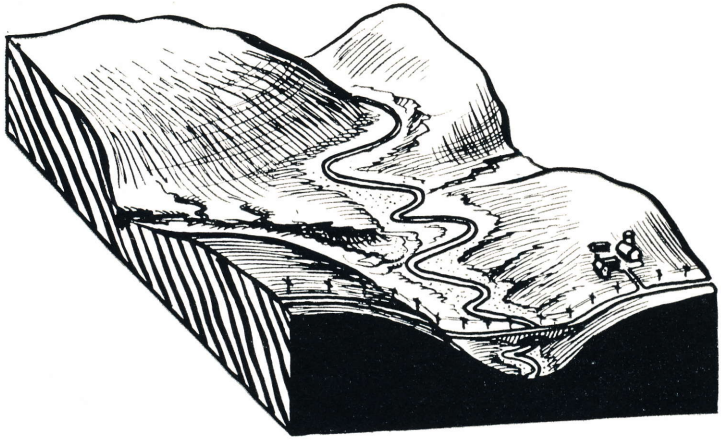
ACTIVITY 12

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 sands than clays?

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.



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?

Make a model of the farm or field on the sand table or in a low edged box of sand. Mold the soil 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 windbreaks be placed in fence rows 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?

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