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Pack 107, Item 9

Type: Script

October 2017

# \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Soil erosion and cropping on sloping land: Part A: Steep hillside land**

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### Notes to broadcaster

Soil is a farmer's most precious resource. Good soil is necessary for growing good crops. But if you farm on a hillside, rainwater can wash away your soil – and with it your livelihood. In this script, we talk with an expert who advises farmers that grow crops on steep hillsides how they can save their soil and maintain their livelihoods.

You might choose to present this script as part of your regular farming program, using voice actors to represent the speakers. If so, please make sure to tell your audience at the beginning of the program that the following short drama is based on a conversation with a real scientist, but that the voices are those of actors, not the original people in the script.

You could also use this script as inspiration to research and develop a radio program on soil erosion and methods to prevent it in your own country.

Talk to farmers and soil experts in your area. You could ask them:

Are there any local areas which are at particular risk of soil erosion? If so, what steps can farmers take to minimize erosion?

What are the best and most cost-effective ways to minimize soil erosion in this area?

Apart from speaking directly to farmers and other key players in the local agriculture sector, you could use these questions as the basis for a phone-in or text-in program.

This is a two-part script. The first part talks about methods for saving your soil if you grow on steep hillsides. The second part talks about methods for saving your soil if you grow on moderate or gentle slopes. You could air these scripts back-to-back, or perhaps one week apart.

Estimated running time: 10-12 minutes for both parts with intro and extro music.

**INTERVIEWER:** Soil is a farmer's most precious resource. Good soil is necessary for growing good crops. But if you farm on a hillside, rainwater can wash away your soil—and with it your livelihood. This is called soil erosion. In this script, we talk with an expert who advises farmers who grow crops on steep hillsides how they can save their soil and maintain their livelihoods.

Moving water, called run-off, is the main cause of soil erosion. Moving water removes the precious top layer of your soil, called topsoil. Clearing vegetation from the soil increases soil erosion, because roots absorb water and trap moving soil. Other major causes of soil erosion are overgrazing, burning crop residues, deforestation, global warming, and leaving the surface of your field bare for long periods of time.

There's a big difference between growing your crops on a hillside and on flat land. Today, let's talk about growing on sloping land.

Some hillsides are steeper than others and you know that the steeper the slope, the harder it is for you to work on it.

There's another thing you may have noticed: If you cultivate land on a sloping field, when there's a heavy rain, the rainwater can wash good soil off your hillside right down to the bottom of the hill. This washes your topsoil. And your topsoil contains most of your soil’s nutrients and organic matter.

When this happens, some people actually gather that good soil that washed down the hillside. They carry it back up the hill in baskets and spread it where it came from. That's a very big job and takes a long time and is a lot of hard work. So most people don't do it.

As more and more of their good soil is washed down the slope, farmers’ hillside land gets poorer and poorer for growing crops. Finally, in some fields, so much soil is washed down the slope that nothing will grow any more.

But some farmers don't have this problem because they take special care to ensure that when it rains, their soil is protected. \_\_\_ is a soil and water specialist. Here he is to tell you how you can take special care to protect your soil.

**AG SCIENTIST:** The best protection for the soil on any slope would be to plant a good crop of grass on the hillside with plenty of strong roots growing down into the soil. If your hillside could be like that, you know that the rain, no matter how much there is, just couldn't get at the soil to wash it away.

But if you live in a hilly area, the hillside may be the only place you can grow your food. When it rains, you don't want any soil erosion to take place on your land—that is, you don't want any of your good soil to be washed down the slope.

Depending on how steep the slope is, farmers have solved this problem in many different ways. They've built terraces with stone, soil and sod; they've constructed bunds and grassed waterways; they’ve made bench terraces; they've cultivated across the slope instead of up and down–there are many ways.

In a hilly part of Nigeria, farmers grow vegetables on steep slopes. Not only do they save good soil from washing down the steep hillside, but they produce more food in a given area than many farmers do.

**INTERVIEWER:** That sounds promising. How do they do it?

**AG SCIENTIST:** The trick is to cultivate only a very small area at any one time on a steep slope. You plant that area and get the vegetation going before you plant the area alongside. So you cultivate your hillside in patches rather than planting the whole hillside. This will minimize the distance that water has to run over bare ground. As the length of bare ground increases, the volume of soil that erodes increases drastically.

Another technique from Nigeria is to grow beans, maize and yams together in the same patch of ground. The maize stalks supply a support for the beans to climb up. They also provide a support for some of the yam vines.

In small areas where the maize does not grow very well, the yam vines move around to get the sun, and shade out the weeds. So they eliminate the need for hoeing.

The yams, the maize and the beans do not all ripen at the same time, so you can harvest food over a fairly long period of time.

As soon as you harvest the maize and beans and yams from a small area—let’s say a few square metres, you can dig up that area and plant it again while beans and maize are still growing on other parts of the same hillside.

This technique means that you are producing from the hillside on a continuing basis and you only have a small area cultivated and bare to the rain at any one time. The yield from a hectare of land cultivated in this way is often three or four times as great as if you merely grew maize or yams by themselves.

**INTERVIEWER:** Perhaps you'll grow different crops that way on steep hillsides where you live, and get high food production from it. The main thing, though, is not to let the rain wash your good soil down the slope. Here's \_\_\_’s final word for you today.

**AG SCIENTIST:** The trick is to force the water to *walk* down the hill rather than *run*.

**INTERVIEWER:** That's a very good way of saying it, isn't it? Because everywhere that crops are grown on sloping land, heavy rains can wash away good soil.

Let's talk about farming on sloping land again. Today, we’ve talked about growing crops on steep hillside. Next time, we'll discuss growing crops on moderate and gentle slopes.

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**Part B: Moderate and gently sloping land**

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**INTERVIEWER:** Have you ever thought about the water that comes to you in the form of rain? Depending on when it comes and how it comes, it can be very good for you—or very bad for you. Your crops need water to grow, but if your land has a steep slope, the water may run away from your crops and down the hill before it can help them much. If there's a heavy downpour of rain and your soil is bare, the large amount of water that comes in a short time can wash your good soil all the way down to the bottom of the hill. The steeper the slope of your hillside land, the faster your good soil can be washed away. But, if you cultivate it and leave the soil bare for the heavy rains to get at, you can lose a lot of soil even on a moderate slope.

In parts of Costa Rica where the slopes are moderate, Dr. \_\_\_ showed me how farmers raise their crops successfully while at the same time protecting their precious soil. They grow maize on hillsides, but they do it without cultivating their land. Here’s Dr. \_\_\_\_\_.

**AG SCIENTIST:** Here's what the farmers in Costa Rica do. Two or three weeks before the end of the dry season, they simply cut the grass and weeds just below the soil surface and leave them as mulch right where they grew. They do this with their machete but could also do it with a hoe.

Then, when the rainy season begins, they plant their maize with a planting stick. This is a sharp-pointed cane, twice as thick as your thumb. They simply jab the stick right through the mulch and make a hole in the ground to put the seed in. When the maize sprouts, it grows right up through the mulch without any trouble.

**INTERVIEWER:** What happens when it rains?

**AG SCIENTIST:** The raindrops don't fall directly on the soil. That is the most important benefit of the mulch. The raindrops fall on the mulch and as they do, they are broken up. That means that they don't disturb the soil at all.

The result is that good soil doesn't get washed down the hillside like it would if the rain was falling directly on it, and with time the mulch breaks down and provides nutrients to subsequent crops. Also, the water soaks into the soil much better. By having mulch on top of the soil like this, these Costa Rican farmers are saving their precious soil.

Another thing – because of the mulch, weeds don't grow. If the maize was growing on bare land with no mulch on top, the farmers would have to weed their crop twice during the growing season.

 So there are three advantages here—reduced soil loss, nutrients for subsequent crops, and less labour for weeding.

**INTERVIEWER:** Now, what about land with a gentle slope? Many farmers do cultivate sloping fields, some even with a moderate slope. What should they do, Dr. \_\_\_.

**AG SCIENTIST:** This should be your rule: Never cultivate up and down the slope. When you cultivate, do it across the slope.

**INTERVIEWER:** I understand that you have worked with farmers who have actually done it both ways on two plots of land side by side.

What do you see when they do this and there is a heavy rain?

**AG SCIENTIST:** Where the cultivation is done up and down the slope, you'll see the erosion. It'll be very clear where the water has washed the topsoil down the furrows between the rows of crops. Sometimes the damage will be quite serious.

When farmers cultivate across the slope, as long as there's a furrow, the furrow forms a small channel that holds the water and stops it from running downhill and eroding the soil.

So each row of the crop holds up a little bit of water and much more water is absorbed into the soil around the roots of the crop.

**INTERVIEWER:** So, by cultivating across the slope, you get two good things. First, you save your soil from being washed down to the bottom of the hill. And, second, you're trapping water all over the field that would otherwise run away – and that water will help your crop grow better.

I asked \_\_\_ if he had any suggestions for farmers who work on small plots of sloping land. Here's what he said.

**AG SCIENTIST:** Try this experiment. Plow one plot across the slope and one plot up and down. Then you’ll be able to really tell if there's any advantage to seeding your rows across the slope.

**INTERVIEWER:** An excellent suggestion from \_\_\_.

*Note: This script is adapted from Package 4, scripts 7 and 8, distributed in 1981. The original participants were George Atkins, founder of Farm Radio International; Professor Robert S. Broughton, hydrologist, Macdonald Campus, McGill University, Ste. Anne de Bellevue, Quebec, Canada; Dr. Warren Forsyth, Director, Inter-American Institute of Agricultural Sciences, St. Michael, Barbados; and Dr. David Kidd, Canadian Training Advisor, ICAR Dryland Project, Hyderabad, India. It was reviewed by Nsharwasi Leon Nabahungu,*

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 The original script was undertaken with financial support of the Government of Canada through Global Affairs Canada.