Rwanda Agronomy: Soil Erosion Control, Lesson Plan

TOTAL TIME: 1 Hour, 35 minutes.

AUDIENCE: Farmer group Leaders and vice leaders, Field officer and cooperative staff

FACILITATOR: Master trainer
LOCATION: Field

OBJECTIVES:

- **OBJECTIVE 1: Describe why soil erosion control is important.**
- **OBJECTIVE 2: Identify soil erosion control methods.**
- **OBJECTIVE 3: Describe how stabilizing grasses control soil erosion and where to plant them.**
- **OBJECTIVE 4: Describe why Vetiver is a useful stabilizing grass and demonstrate how to plant Vetiver.**
- **OBJECTIVE 5: Describe how mulching controls soil erosion and demonstrate mulching.**
- **OBJECTIVE 6: Describe how shade trees control soil erosion**

MATERIALS:

- Enough mulch for all trees in the demonstration plot.
- Clump of Vetiver grass, fresh
- Panga and Jembe for splitting and planting Vetiver from Focal Farmer

TIME	CONTENT OUTLINE
15 Min	**OPENING** **INTRODUCTIONS:** ▪ Instructor ▪ Participants ▪ Guests **LOGISTICS** Review the FFS Ground rules for training.

	ASK: Were there any challenges with doing any of the best practices? **DISCUSS** **REVIEW OBJECTIVES:** ▪ This month we will learn about importance of soil erosion control in sustaining a productive and healthy soil; specifically, we will learn various methods that farmers can use to control soil erosion. **ACTIVITY: Icebreaker** Select an icebreaker that is appropriate for your community
5 Min	**OBJECTIVE 1: Describe why soil erosion control is important.** *Note to Trainer: Brainstorm responses with participants then review answers.* **ASK:** What is soil erosion? **ANSWER:** Loss of top soil by the action of wind or water. **ASK:** Why is it important to control soil erosion? **ANSWERS:** ▪ Losing the top soil means you lose nutrients and organic matter that should feed your coffee plants and maintain a healthy soil. ▪ Roots are exposed and are not able to take up water or nutrients ▪ Fertilizers can be washed away and lost, or end up in your neighbours' farm! ▪ These factors combined mean your trees will produce less coffee **EXPAIN**: ▪ A high percentage of coffee farms in Rwanda are found on slopes and hence soil control is extremely important. ▪ Even if the land is fairly flat erosion control methods are still applicable as soil erosion can still take place on flat land through wind.
5 Min	**OBJECTIVE 2: Identify soil erosion control methods.** **ASK:** What methods do you use, or have seen in the fields, to control soil

	erosion? **ANSWERS:** ▪ Stabilizing grasses, ▪ Mulching, including leaf litter ▪ Shade trees ▪ Physical barriers, e.g., water traps, stone walls ▪ Terraces ▪ Contour planting of coffee **EXPLAIN**: ▪ A combination of these techniques works best as opposed to one single method.
10 Min	**OBJECTIVE 3: Describe how stabilizing grasses control soil erosion and where to plant them.** *Note to Trainer: Brainstorm responses with participants then review answers.* **ASK:** How do stabilizing grasses prevent soil erosion? **ANSWER:** ▪ The roots grow deep and hold the soil in place. ▪ The grass reduces the flow of water and soil particles down the slope. ▪ The grasses can also be cut for mulching and further erosion control. **ASK:** What are some examples of stabilizing grasses? **ANSWERS**: Vetiver grass, Blue grass, Bahia (Crown) grass, Kikuyu grass etc **ASK:** Where should you plant stabilizing grasses to control Soil erosion? **ANSWERS:** ▪ Between the coffee rows in steep fields, to stop the flow of water; planted across the slope, following the contours. ▪ On banks of terraces. ▪ Next to water traps ▪ Near rivers to prevent soil from entering the river/stream. ▪ Anywhere that is prone to soil erosion **SHOW:** a picture of stabilizing grass planted on terrace, between coffee trees

	 *Stabilizing grass on a terrace*
15 Min	**OBJECTIVE 4: Describe why Vetiver is a useful stabilizing grass and demonstrate how to plant Vetiver.** **SHOW:** Farmers the Vetiver grass **ASK**: Why is Vetiver a useful stabilizing grass? **ANSWERS**: ▪ The roots grow 2-3 meters deep and **will not** compete with coffee for nutrients ▪ The root system is very strong; holds the soil to stabilize even very steep banks. ▪ Vetiver is fast growing and forms very thick clumps which stop the movement of soil and water. ▪ Vetiver can be easily propagated by splitting clumps of grass, one clump will make a lot of planting material  *Vetiver grass on a bank of a terrace*  *Planting a row of Vetiver grass* **ASK**: Are any farmers currently using Vetiver grass on their farms to control erosion? What are some of their experiences with the grass?

	ACTIVITY: Planting Vetiver a. DEMONSTRATE how to split and plant Vetiver using the steps described below. Plant only a few splits along the contour or bank of the terrace for demonstration only. 1. Select healthy, vigorous, mature Vetiver grass 2. Uproot the grass with a ball of soil 3. Cut the leaves back to 20cm length 4. Break up clump into slips of **2 to 3 tillers** (see photo above) 5. Plant slips into a furrow at 10-15 cm spacing (plant within 1 day of uprooting). 6. Cover roots with soil and firmly compact the soil for proper root contact. 7. Water the Vetiver and continue watering regularly when there are no rains. b. DISCUSS the activity, and then explain how to maintain Vetiver grass. **How to Maintain Vetiver grass:** ▪ Weed regularly until the grass is established ▪ Cut the grass to a height of 5-10cm once or twice per year, during the rains. ▪ Use the cut grass for mulching.
20 Min	**OBJECTIVE 5: Describe how mulching controls soil erosion and demonstrate mulching** *Note to Trainer: Brainstorm definition with participants.* **ASK**: What is mulching? **ANSWER:** Covering the soil surface with a material, preferably an organic material which protects the soil. *Note to Trainer: Brainstorm with participants and review answers.* **ASK**: How does mulching control soil erosion? **ANSWERS:**

- Mulch reduces the force that the rain drops hit the soil, dislodging the soil particles causing splash erosion. This way, the rain drops first hit the mulch and seeps slowly into the soil.
- Mulch reduces the speed of run off, improving water infiltration into the soil.
- Mulch also helps hold the soil together, preventing the soil from being carried away by running water when it rains.

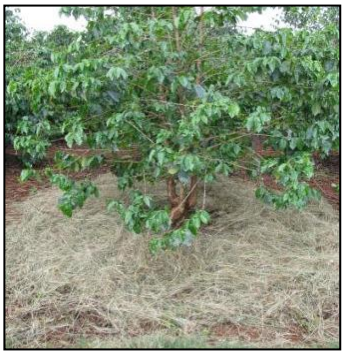
ASK: When is the best time to mulch to prevent soil erosion?
ANSWER:

- Just before the rains. In Rwanda this is Feb or March and Aug or Sept.
- Also mulch at any time when the materials are available, especially when the remains of the harvested crops are plentiful.

ASK: Which types of mulching do we have?
ANSWER:

- Full mulching – if the materials are adequate
- Under-canopy mulching – when the materials are limited.

SHOW: Pictures of full and under-canopy mulching.



Mulching under the tree canopy

Full mulching

Whenever there is a shortage of mulching materials Cover crops can be used and prevent soil erosion.

	ACTIVITY: Mulching*:* *Note to Trainer: Try and get enough material to do full mulching.* a) DEMONSTRATE full mulching on the demonstration plot, following the steps listed below. 1. SELECT two trees to mulch where everyone can see you clearly 2. WEED, using hand weeding if required 3. PREPARE mulching materials (cut them up if they are too bulky) 4. MULCH under and between the trees, minimum 4 cm thick, so you can't see the soil 5. LEAVE a 10 cm gap between the mulch and the trunk. EXPLAIN this is to keep the termites away. b) ASK 2 farmers to volunteer to mulch a second tree. c) GIVE feedback and discuss ***d)*** EXPLAIN to the farmers that they will mulch the rest of the Model farm e) ASK each participant to mulch the assigned section of trees, using full mulching. f) VISIT each participant and give feedback throughout the activity. g) BRING the groups back together. DISCUSS your observations - what went well, what was challenging.
10 Min	**OBJECTIVE 6: Describe how shade trees control soil erosion.** **ASK:** How do Shade trees control soil erosion? **ANSWER:** ▪ The roots of the trees hold soil particles together so that the soil is not easily washed away by run off. ▪ Some shade trees also shed a lot of leaves that act as mulch and stop the raindrops hitting the soil directly and dislodging particles.

	▪ Act as wind breaks, reducing the speed of wind, hence soil erosion by wind. ▪ Shade tree leaves and branches also reduce the speed of the rain drop and protect the soil particles to be removed by the rain **Other benefits of Shade systems in coffee production include:** ▪ Suppression of weeds by reduced sunlight and leaf litter ▪ Moisture retention/conservation in the soil ▪ Maintenance of soil fertility through addition of organic matter from leaf litter. ▪ Fixes Nitrogen into the soil (Leguminous species) ▪ Biodiversity and conservation (important for certification) and pest control ▪ Recycle nutrients deep in the soil. **ASK:** if there are any questions.
15 Min	**CLOSING** **REVIEW KEY LEARNINGS.** **ACTIVITY: Knowledge Check** *Note to Trainer: use review questions to check for understanding providing corrective guidance as needed.* Ask participants the following questions: ○ Why do we need to control soil erosion? ○ Name some of the techniques we can use to control soil erosion. ○ Why is Vetiver grass useful as a stabilizing grass? ○ How does mulching control soil erosion? **NEXT STEPS** ▪ THANK the farmers for coming to training.