



Pathways and challenges toward a socio-ecological transformation

*of landscapes, livestock and livelihoods in
the East African drylands*

FIELD REPORT: PRACTICAL TRAINING ON GULLY REHABILITATION USING VERTIVER GRASS AT CHEPUKAT LIVESTOCK CAFÉ SITE IN CHEPARERIA WARD, WEST POKOT COUNTY



Reported by

Nyaga MN^{1,2}, Mureithi SM^{1,2}, Wegesa J³ and Makokha W²

¹University of Nairobi, ²Triple L, ³Jjaja Regeneration

1. BACKGROUND INFORMATION

Soil erosion is one of the most devastating environmental disasters for most developing countries as it results in the loss of huge amounts of valuable soil which is key to agricultural production. Management methods could be expensive and sometimes less effective. The use of vegetative methods like grasses is an important sediment and soil erosion control method since they are economical in the rehabilitation of degraded landscapes. The use of vetiver grass (formerly known as *Vetiveria zizanioides* L. Nash, now reclassified as *Chrysopogon zizanioides*, L. Roberty) has been regarded as a low-cost and eco-friendly tool to combat soil erosion and for water conservation; when compared with other soil conservation technologies (Fig. 1).

Vetiver is a tall, tufted, perennial, scented grass with a straight stem, long narrow leaves and a root system that is abundant, complex and extensive (Fig. 1; Balasankar et al., 2013). It plays a vital role in watershed protection by slowing down and spreading runoff harmlessly on the farmland, recharging groundwater, reducing siltation of drainage systems and water bodies, reducing agrochemicals loading into water bodies and rehabilitation of degraded soils (Osunsanya and Aliku, 2017). Vetiver grass can be easily established in both tropics and temperate regions of the world. It can survive in conditions where other plants cannot and this is due to its unique and superior physiological and morphological features. Some of these characteristics include a massive, fine-structured root system with high resistance to pests, diseases and fire, high efficiency in absorbing dissolved N, P, Hg, Cd and Pb in polluted water and a good and fast recovery rate after being affected by adverse conditions.

As an inexpensive and eco-friendly tool used worldwide to rehabilitate landscapes. Vetiver grass technology was applied at the Livestock Café site in Chepareria ward which is highly degraded with huge gullies occupying more than 50% of the site. The aim of objective two in the Drylands Transform project is to co-develop sustainable rangeland restoration and management options with the local communities and other stakeholders. Vetiver grass technology was initiated as a tool to rehabilitate the severely gullied part of the Livestock Café site in Chepukat village, Chepareria ward in West Pokot County, with a goal of showcasing it as a possible solution to the severely degraded hotspots in West Pokot County.

¹ Cover photo

¹Gully erosion at the Livestock Café Main site in Chepareria. Photo by S. Mureithi



Fig. 1. *Chrysopogon zizanioides* (L. Roberty) commonly known as Vetiver grass.

2. NAMES OF THE PROJECT PERSONNEL AND CONSULTANTS INVOLVED

Name(s)	Dr. Stephen Mureithi			Researcher, University of Nairobi		
	William Makokha			Triple L		
	Margeret Nyaga			PhD Student, University of Nairobi		
	Jane Wegesa Fraser			Vetiver Trainer/Consultant, Jjaja Regeneration		
	Andrew Wekesa			Vertiver demo's, Jjaja Regeneration		
	Mercy Leting			Agricultural and Livestock Officers, Ministry of Agriculture, Livestock and Fisheries, Chepareria Office		
	Stanlous Juma					
	Henry Losiwa					
Dates of Assignment	Start Date	24/05/22	End Date	04/06/22	Duration (Days)	10
Destination Counties	West Pokot County					
Wards /Sub County	Chepareria Ward, Chepkopegh Location, Chepukat Village					

3. OBJECTIVES OF THE PRACTICAL TRAINING ACTIVITY

- To survey on all the gullies at the site and design the number of contours required
- To layout and mark the contour lines along the gullies
- To initiate rehabilitation of the gullies using Vetiver grass planted on sacks filled with a mixture of soil, river sand and manure.

4. DESCRIPTION OF ACTIVITIES

Day 1: 24/05/2022 Surveying of the site and taking measurements

The Vertiver trainer, Jane Wegesa together with her assistant Andrew Wekesa and Dr. Stephen Mureithi surveyed the site taking the measurements of the gullies from the gully head (Fig. 1). The length of the gullies was 2,456m and the width was 405m. She designed that the main gullies would take 7 contour lines and more contours were concentrated at the gully head to reduce the pressure of surface run off down slope. The design also included reinforcement of the shoulders of the gully with bags and vetiver planted to deter further erosion.

The kitchen garden area was designed to have two countour lines to reduce the speed of surface runoff especially from the roadside. The length and the width of the Kitchen garden area were 1,012m and 286m, respectively.



Fig. 2. The Dryland Transform Project Country Coordinator, Dr. Stephen Mureithi showing the site to the Vertiver Trainers from Jjaja Soil Solutions during the assignment and design (Photos by M Nyaga).

The gullies rehabilitation design was also extend to the Livestock Café Annex site, where there are experimental plots for the objective two PhD student, Margertet Nyaga (Fig. 3). The measurements for the gullies there were; length 1,841m and width 1,109m. The Livestock Café

Annex was thus designed to take 3 contour lines, and gully shoulders reinforced and some bags layed inside the gully planted with vetiver splits to slow down runoff and deter further erosion.



Fig. 3: Obj 2 PhD Student, Margeret Nyaga, measuring of the gullied area using the Digital Distance Measuring Wheel at the Chepareria Livestock Café sites (Photos by S Mureithi).

Day 2:25/05/2022:Marking contour lines

The day's activity involved marking of the contour lines using a Line level. A Spirit level was mounted at the centre of a 10m string supported with two 2m wooden poles of the same size. A line level is operated by three people, two holding the two poles and the third person at the centre to read the centre of the Spirit level (Fig. 4).

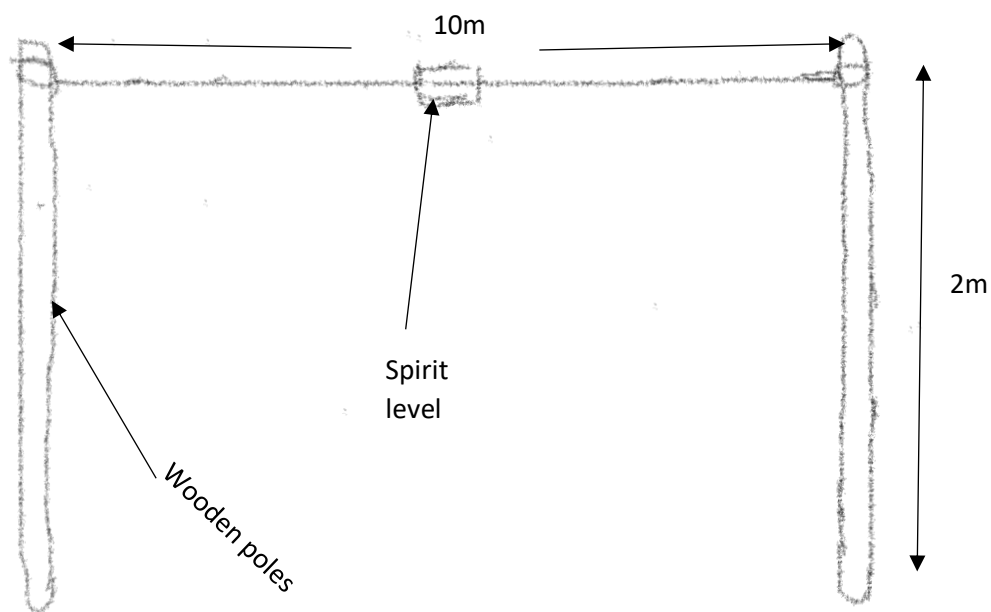


Fig. 4: A sketch of a Line level

Then white ash is sprinkled to mark the contour along the line. The Line-level is the best for use gently sloping areas.



Fig 5: Determining and marking contours using a Line level and White ash (Photos by M Nyaga).

Day 3-7: 26-30/05/2022: - Mixing of soil, sand and manure and laying out the Vertiver splits seed-bed in sacks

Members of the community were involved in all the activities and explained to the importance of every activity. They asked many questions and were eager to learn how the huge gullies at the site can be rehabilitated. The ratio of sand, soil and manure used was were 2:3:1. The mixtures were put in the sacks weighing 50kgs and placed horizontally along the previously marked contour lines after leveling the ground (Fig 6). The sacks help in reducing the evaporation of water allowing the vertiver splits to establish. This is important especially in the arid and semi-arid areas where the evaporation rates on bare soils is high.



Fig. 6: Filling up of soil bags with the mixtures of sand, soil and manure. Aligning the soil bags along the previously marked contour lines (Photos by M Nyaga).

Day 8-10: 1-4/06/2022: Planting of Vetiver grass splits

After the soil bags were properly laid onto the marked contour lines and firmly pinned with some wooden pegs, small openings were made using a knife to open up spaces for planting the Vetiver grass (*Chrysopogon zizanioides*) splits. The community members were divided into two groups to plant the grass after active demonstrations (Fig. 7). One of the groups was working at the Livestock Café Main site under the guidance of Jane Wegesa while the other team was at the Livestock Café Annex site under the guidance of Andrew Wekesa.

One week after the planning, rains were received on 8/6/2022 which gave the planted splits a very good start.



Fig. 7: A group of women planting the Vetiver grass splits in the soil bags (Photos by M Nyaga).



Fig. 8. Vertiver splits planted directly without the bags at the base of the gullies (Photos by M Nyaga).



Fig. 9. Vertiver splits planted in the horizontally laid bags along the contour lines and at gully mouth at the Chepareria Livestock Café Annex site (Photos by M Nyaga).



Fig. 10. Dr. Stephen Mureithi and Madam Jane Wegesa inspect the already planted soil bags at the Chepareria Livestock Café Main site (Photos by M Nyaga).



Fig 11. Vertiver splits establishing well after the rains

5. WAYFORARD

Follow up on the establishment of the vertiver grass splits after the rains. Initiating more restoration practices along the contour lines and other parts of the site such as planting of trees and other grass species to bolster success. Explore on eco-friendly methods of controlling termites that feed on the vetiver splits before they establish (with the rains this will not be a problem).

6. ACKNOWLEDGEMENTS

This field activity was made possible through the financial support of the Swedish Research Council (FORMAS) to the [Drylands Transform Project](#) [2020-00478] 2020-2024. We heartily acknowledge the warm reception, cooperation and team work we received from the communities at Chepukat Village of Chepkopegh location in Chepareria.

Cite Report as:

Nyaga MN, Mureithi SM, Wegesa JF, Makokha WL. 2022. Practical Training on Gully Rehabilitation using Vertiver Grass at Chepukat Livestock Café Site in Chepareria Ward, West Pokot County. Dryland Transform Project