



# 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 VETIVER GRASS AT CHEPUKAT LIVESTOCK CAFÉ SITE IN CHEPARERIA WARD, WEST POKOT COUNTY**



**Reported by**

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## 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. The site 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, to showcase it as a possible solution to the severely degraded hotspots in West Pokot County.

<sup>1</sup> *Cover photo*

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<sup>1</sup>*Gully 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

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

### 3. OBJECTIVES OF THE PRACTICAL TRAINING ACTIVITY

The following were the specific objectives of the training on gully rehabilitation using Vetiver grass in Chepareria:

1. Create awareness and sensitize the agro-pastoralists on the importance of fodder as a sustainable business for resilience building in West Pokot County.
2. To survey all the gullies at the site and design the number of contours required
3. To layout and mark the contour lines along the gullies in a participatory manner.
4. To initiate using participatory approach rehabilitation of the gullies using Vetiver grass planted on sacks filled with a mixture of soil, river sand and manure.
5. To provide an interactive action learning platform during the practical demonstrations of the gully rehabilitation using Vetiver grass.

### 4. DESCRIPTION OF ACTIVITIES

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

The Vetiver 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. 2). 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 downslope. 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 contour 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 Vetiver Trainers from Jjaja Soil Solutions during the assignment and design (Photos by M Nyaga).

The gullies rehabilitation design was also extended to the Livestock Café Annex site, where there are experimental plots for the objective two PhD student, Margeret Nyaga (Fig. 3). The measurements for the gullies there were; a length of 1,841m and a width of 1,109m. The Livestock Café Annex was thus designed to take 3 contour lines, the gully shoulders were reinforced and some bags laid inside the gully planted with vetiver splits to slow down runoff and deter further erosion.



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

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

The day's activity involved marking 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 and 5).

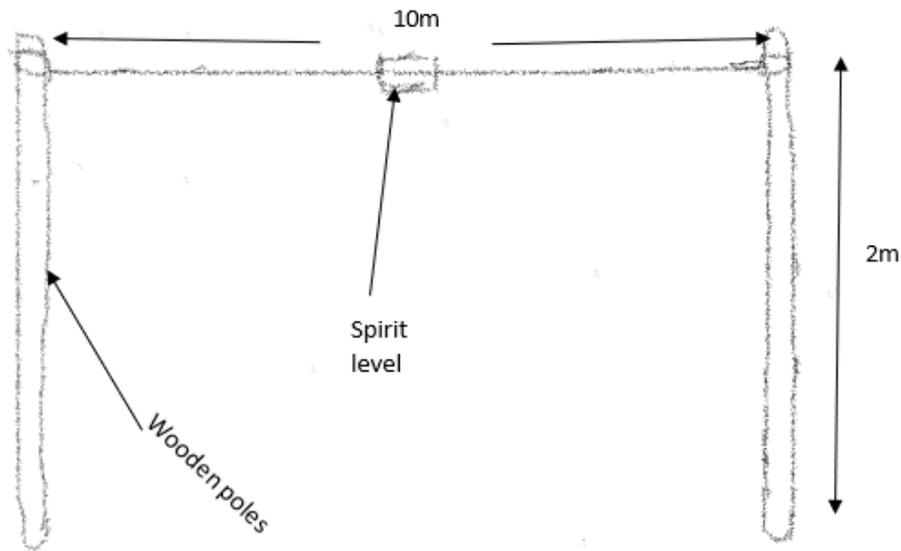


Fig. 4: A sketch of a Line level

Then white ash was sprinkled to mark the contours along the line (Fig. 5). The Line-level is the best for use on 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, river sand and manure and laying out the Vetiver splits seed-bed in sacks**

Members of the community were involved in all the activities and the importance of every activity was explained to them. They asked many questions and were eager to learn how the huge gullies at the site can be rehabilitated. The ratios of sand, soil and manure used were 2:3:1. The mixtures were put in sacks weighing 50kgs and placed horizontally along the previously marked contour lines after levelling the ground (Fig 6). The sacks help in reducing the evaporation of water allowing the vetiver splits to establish. This is important, especially in the arid and semi-arid areas where the evaporation rates on bare soils are 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 planting, the 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. Vetiver splits planted directly without the bags at the base of the gullies (Photo by M Nyaga).



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



Fig 11. Vetiver splits establishing well after the rains

(Photo by M Nyaga).

## 5. WAY FORWARD

In the short-term, follow up on the establishment of the vetiver grass splits after the rains. In the mid-term initiate 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 eco-friendly methods of controlling termites that feed on the vetiver splits before they establish (with the rains this will not be a problem). Continuously provide an opportunity for fodder/pasture technologies dissemination in pasture production, processing, conservation and utilization.

## 6. ACKNOWLEDGEMENTS

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