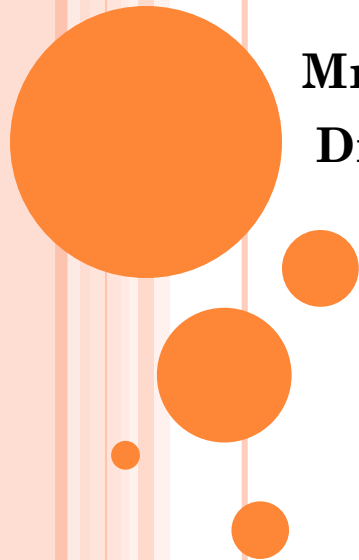


**REHABILITATION OF DEGRADED
LANDS USING VETIVER GRASS SYSTEM:
A CASE STUDY OF VOI RIVER BANK STABILIZATION IN COSTAL
KENYA.**

By


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INTRODUCTION

- **Voi is located in South-Eastern Kenya, Coast Province, Taita Taveta District, 327 km South-East of Nrb and 159 km North-West of msa, altitude about 580 m a.s.l**

Soils:-

- ✓ **characterized by reddish, very deep, acid sandy–clayey soils (Ferralsols) mostly found in Tsavo National Park and the ranches.**
 - ✓ **vulnerable to soil erosion, have low water holding capacity and low soil fertility.**
 - ✓ **Valley bottoms have alluvial soils (fluvisols) and occur in all larger river basins of Bura, Lumi, Mbololo, Mwatate and Voi Rivers.**
 - ✓ **These are young soils with moderate to high fertility, receive fresh sediments and nutrients during regular floods.**
- 

PROBLEM

- **The area has poor plant cover, lack of drainage systems leads to erosion by both wind and water and due to (trees cut down for settlements). River bank collapse.**

Causes:

- i. Unplanned settlements (such as Mwakingali, sofia area etc) have no good drainage and roof catchment ; leads to high volumes runoff creating gullies.**
- ii. Water flows freely from the hills down to the Voi river and the few roads are transformed into streams while gullies have been widened and deepened, and roads become impassable.**
- iii. Brick making -deforestation**
- iv. Uncontrolled grazing/Overgrazing**



DEGRADED SOILS IN VOI



REHABILITATION USING VETIVER GRASS



VETIVER GRASS

- **Vetiver grass - *Chrysopogon zizanioides* - is a tropical clump grass with origin in south India.**
- **Has ability to create a near perfect barrier that filters out sediment, spreads rainwater, improves the shear strength of soil, and recycles soil nutrients.**
- **Limited by winter temperatures due to frost and summers**
- **Grows in: the tropics and semi tropics, Mediterranean climates, and in arid regions (when there is available supplementary water).**
- **Primary uses: soil and water conservation, soil fertility enhancement, bio-engineering, phytoremediation of contaminated land and water, disaster mitigation.**
- **By product: supply for forage, fuel, handicrafts, and perfumery, sequesters significant quantities of atmospheric carbon.**

PROPAGATION

Three commonly used methods for large scale propagation of vetiver (Truon et al; 2008):

- 1) Vegetative Propagation: Using various parts of a mother Vetiver plant . The splitting of tillers and cutting from a vetiver mature clump produce some kinds of planting materials (such as bare root slips, culm slips)
- 2) Bud multiplication: In vitro micro propagation
- 3) Tissue culture: Using a small part of the plant (shoot tips, young flower inflorescences or nodal buds)



VETIVER NURSERY



VETIVER FOR STABILIZATION OF SOILS

KILIFI MANDARIN ESTATE

Bare



Planting of slips



CONTD.

After 3 months



Full cover-6 months



VS IN WATER MANAGEMENT

Check dam- Ndome



Fish dam-Wongonyi



GULLY RECLAMATION STRATEGIES

Mbololo Sunset-Ghazi



Vetiver contours- Ndome



VS FOR NUTRIENT RECYCLING -ON FARM- WONGONYI



VETIVER IN HOMESTEAD



METHODOLOGY

- An on-farm study was conducted at Voi River bank, along the bridge.
- Cultivars of *chrysopogon zizaniodes* were raised in a nursery for three months.
- Slips were transplanted along Voi river banks with a spacing of 1 m X 5 cm.
- NPK 17:17:17 was used during planting (5g/ slip)
- A total of 40,000 slips of Vetiver were planted during January-February 2016



RESULTS AND DISCUSSION



PREPARATION: DEGRADED VOI RIVER BANK





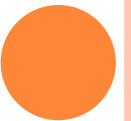
1 MONTH







2 MONTHS



3 MONTHS OLD



4 MONTHS



RESULTS AND DISCUSSION-CONT.

- **Between 1-4 months: plant cover approx 75% and a massive root structure was well developed that stabilized the soils.**
- **VS was found effective in the protection of Voi river banks from erosion.**
- **NPK (17:17:17) fertilizer necessary to supply nutrients during planting.**
- **VS found to reduce rainfall runoff: this would improve ground water recharge.**
- **The cost of planting: approx. USD 2800/acre. However once planted, there is vibrant multiplication of the grass and slips can be obtained for planting from mother bush.**



CONCLUSION

- **Supply of NPK (17:17:17) fertilizer, organic manure and foliar fertilizers (planting) necessary.**
- **VS produced 75% ground cover in 4 months- fast to control erosion & flooding issues.**
- **VS was effective in stabilization of Voi river banks- hence can be used elsewhere.**
- **By-products- can create employment opportunities.**



RECOMMENDATIONS

- ✓ Policy to be developed such that a specific tree cover population per household is maintained.
- ✓ There should be allocated an industrial area for brick making. Top soils from mining areas can be transported to the sites as it's a problem, use vetiver biomass to bake.
- ✓ Recreation area for eco-tourism to be created along the rehabilitated areas along the river basin (fishing etc)
- ✓ All households to have roof catchment and storage-can be used to irrigate the trees and other water uses.
- ✓ Design underground tanks near the households uphill to hold water from causing erosion
- ✓ Degraded lands to be planted with Vetiver plus indigenous trees.

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Thank you



- Truong, P., Tran Tan Van and Elise Pinnars (2008). Vetiver System Applications: A Technical Reference Manual. The Vetiver Network International, February 2008.

