Mine & Associated Rehabilitation Projects in Africa & the Indian Ocean Islands

by
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Introduction

Mining and associated rehabilitation projects in Africa and the Indian Ocean Islands have been successfully implemented jointly under the guidance and auspices of “The Vetiver Network International (TVNI) and the International Erosion Control Association (IECA) as a result of the interaction that has developed between the two organisations in Africa and on the Indian Ocean Islands.
It is recorded that practically 95% of the 53 countries on the entire African continent (including Islands) has successfully implemented the Vetiver System for soil & water conservation during the past 200 years.

A short overview of projects in the following countries will be given, illustrating current activities using the Vetiver system:
1. Democratic Republic of Congo
2. Ethiopia
3. Congo - Brazzaville
4. Congo - Pointe Noire/Brazzaville
5. Guinea
6. Gabon
7. Madagascar A & B
8. South Africa.

The presentation will reflect the major strides that have been achieved in erosion & sediment control, bio-engineering & vegetation restoration and the participation of local communities in general.
Project No. 1 - Selembao Project, Democratic Republic of Congo
A world Bank financed project for the rehabilitation of the erosion gully in the district of Selembao, Kinshasa, DRC.
Construction was carried out by a Congolese company Matla Forrest. Extensive Delays resulted in the Vetiver planting taking place during the dry season with limited available water. Financial constraints limited the planting of Vetiver hedge rows at spacings closer than 4 metre intervals along contours.
A total of 11.5 hectares was planted to Vetiver and thereafter hydroseeded using locally harvested and commercial seed.
Excessive erosion of the drain in the primary catchment area as a result of under-designed collector drains silting up and displacing storm water directly onto the unprotected side slopes.

Vetiver planted Green TerraMesh Walls

Silted Drains – Cause of excessive surface water runoff down side slopes
Sand Bags inter-planted with Vetiver was used to repair the extensive erosion caused by surface water runoff
Installation of Sand Bags

Correct method

Incorrect method
Sand Bag Reinforced & Stabilised Gully
80,000 Sand Bags were used for the stabilisation of the erosion gullies. Vetiver grass was planted into the Sand Bags.

The project where TVNI & Hydromulch formed a established working relationship
- Dr. Paul Truong
- Dr. Dale Rachmeler
- Eng Alain Ndona
- Roley Noffke
Sporadic Veld Fires during the dry season

Recovered Green TerraMesh walls
Project No. 2 - Vetiver System Applications, Ethiopia

SLUF
Debela Dinka Guda
251 91 186 6766
August 2013
Since the establishment of the Ethiopian Vetiver Network (ETVN) in 2009, the VS technology is considered as one of the best biological conservation inputs by government (MoA & ERA) & non-government organizations, farmers & private investors for sustainable land management (SLM) programme.
Vetiver Applications in Community Farming Projects in Ethiopia
Vetiver System in Maize Fields
Training of Ethiopian Road Authority Engineers organized by SLUF & TVNI

Elise Pinners - TVNI Kenya
Ethiopian Ministry of Agriculture has taken the VS as part of its sustainable land management programs.

Ethiopian Roads Authority (ERA) has included the VS for the rehabilitation of all road contracts.
Policy Dialogue
The Ethiopian President, EEPCO, ERA & MoA
Ethiopia’s way forward:

1. Extensive promotion of the VS for wider uses throughout the country.
2. Exploring the use of VG for various uses e.g. handicrafts, perfume, etc.
3. Promoting the VS in schools and higher education institutions.

Vetiver is a Proven GREEN Solution!

USE IT!!
Project No.3 - Boukeni Erosion Gully Project, Brazzaville, Congo
Collapsed infrastructures on Roads & Drainage channels resulting in formation of extensive gullies
Construction is by a Brazilian Company-ANDRADE Gutierez SA. The consultant Engineers for the project -EGIS-INTERNATIONAL. Environmental & Bio-Engineering design, supervision and implementation - Engineer Alain NDONA (TVNI).
Construction activities and finishing off of side slopes in progress on newly constructed drainage system
• Length of gullies: ± 600 m¹
• Length of drains or canals: ± 800 m¹, 50-60 meters wide and 20-40 meter deep
• Surface area planted to Vetiver – ± 36,000 m² per channel
• Planting density - 1 m between rows and 10 plants/m¹
• Vetiver sourced from local community
Implementation of the Vetiver System on side slopes of Canal Construction
Vegetated Side Slopes of Concrete Drainage Channel

Engineer Alain NDONA (TVNI)
**Project No. 4 - The Pointe Noire to Brazzaville Highway, Congo**

Total length of road: ± 600 km

Planned to plant 120 million Vetiver, slips sourced mainly from CHINA.

On site nursery constructed: 5ha.
Side Slope Rehabilitation in progress

45° slope angle with benching at 10 m intervals on average.
Highly dispersive and erodible side slope material
Construction by a Chinese company - China State Construction Engineering Corporation LTD (CSCEC). The consultant Engineers for the project- EGIS-INTERNATIONAL.
Environmental & Bio-Engineering design and supervision - Engineer Alain NDONA.

Setting out & Planting of vetiver hedge rows

1 m¹ between rows and 10 plants/m¹
Stable Side Slope Established with Vetiver System
Stable Side Slope Established with Vetiver System

Vetiver Planted to date: 50,000 m².

45° slope angle with benching at 10 m intervals on average.
Rehabilitation of the highest point of Pic du Fon, Simandou, Guinea
Installation of Bio-Engineering Techniques & Hydroseeding on Exploration Site for protection of chimpanzee habitat
Placing of Bio-Jute on steep side slopes around Drill Pads
Bio-Jute Installation and Vetiver planting on Cut Slope Embankments
Established Vetiver & Hydroseeded Slope
On-Going Stabilisation work on Access Roads along the Montane area
Anglo Ashanti Gold mine in Guinea where the VS is starting up
Illegal Mining Activities on and around the Mine
Delivery of Vetiver Grass from Mine Nursery
Vetiver Grass Slips planted in well constructed furrows or rows at Anglo Ashanti Gold
**GSEZ Nkôk, Gabon**

540 ha of tropical jungle situated on the Equator removed in one operation for industrial development resulting in a civil and environmental disaster with only 20 ha side slopes rehabilitated in Phase 1

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**Work Undertaken**

- 30,000 m³ vetiver grass hedge rows
- Bio-Jute – 10,000 m²
- Silt fences - 3,600 m¹
- Sand Bags – 2,500 m¹
- Hydroseeding -200,000 m²

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**Climatic Conditions**

Annual rainfall + 3700mm

2 Rainy seasons – September to December & May to July
The Impact of 750 mm rain in 24 hours
Excessive Erosion caused by surface water runoff
Before & After pictures of the VS for slope stabilisation – Reasonable cover attained on lower slope
Progressive stages of slope stabilisation using Vetiver (VS), Sand bags, Silt fences & Hydroseeding
Effective use of Silt fences to protect Vetiver (VS) in early stages of growth
Established Side Slopes using Vetiver (VS) & Hydroseeding
Madagascar - Projects

Projects 7 A – Rio Tinto/QMM Ilmenite Mine

Projects 7 B – Sherritt Mining Ambatovy Pipeline
Typical Malagasy Mode of Transport
Project No. 7 A - Ilmenite Project, Madagascar

- Mining site
- Ehoala Dune Cut
- New Harbour
- Quarry
Vetiver Sources

- Vetiver plant material was sourced from surrounding areas within a 50 km radius.

- No planting material was imported or introduced from outside areas.
Local Villagers
Vetiver Purchases from Villagers
Andre & Auguste Mahalogny family from the Mangaiky Village.
Environmental work Started in 2006 with 15 communities, expanded to 32 communities by 2008.
40 hectares were stabilised and re-vegetated.
4,000,000 Vetiver plants were propagated & supplied by local villagers.
Assisted in setting up Vetiver nurseries and provided the necessary training of the local communities.
Planting of Vetiver Grass Hedge Rows on the Ehoala Dune
Locally trained supervisors implementing “Coastal Dune Sand Migration” Control
Impact of Prevailing Winds - Primary Dune

Prevailing wind direction (In excess of 35 days with intense gusting up to 45 knots at times)

Wind Damaged planted areas

Note - Vetiver root system
Surface Water Runoff control with Vetiver Hedge Rows
Established & Stable Ehoala Dune – 9 ha in extent
Project No. 7 B – Ambatovy Project, Moramanga to Tamatave, Madagascar
Installed Erosion Control Structures & Hydroseeding
Progressive Rehabilitation of Pipeline ROW (Right of Way)

- Length of ROW: 220 Kilometres
- Area rehabilitated – 550 hectares
- Rehabilitation period: 3 years
- Vetiver plants & fascines sourced from local communities
Functional Erosion Control Structures & Established HydroSeeding
Rehabilitation of extremely difficult rock sections through mountain terrain - ROW (Right of Way)

- Accessible only via access roads
- Often inaccessible for up to 2 months due to weather conditions
- Unstable cut slopes rehabilitated by Vetiver plants & fascines sourced from local communities
Rehabilitated fill side slopes & stabilised shoulder break point
Project No. 8 - Donga Rehabilitation, South Africa
In Association with the Department of Agriculture, Limpopo Province, South Africa
In-Field Training on soil conservation techniques on degraded area in Tubatse, Limpopo Province, RSA
Community training in setting out of contours and Vetiver planting techniques – Feb 2012

Pre-grown Vetiver plants were supplied for the training program
Established Vetiver plants grazed & damaged by domestic animals – July 2012
Established Vetiver plants grazed by domestic animals – May 2013
Malomanye Village On-Site Training in soil Conservation Techniques – August 2012
Moutse Village Community Training at Hydromulch Training Centre—April 2013
In Conclusion

TVNI and the IECA are strategically positioned to provide the international platform through which degraded areas can be restored such that Sustainable Land Management can be achieved over time.
We always seem to have a PLAN B but we forget that there is “No” PLANET B.

The correct application of soil conservation and bio-diversity principles & techniques remains fundamental to our survival. It is our responsibility to preserve and protect the environment we live in.

Thank you