

Mine & Associated Rehabilitation Projects in Africa & the Indian Ocean Islands at Large Industrial Scale Application

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) have successfully implemented the Vetiver System for soil & water conservation over the past 20 years.

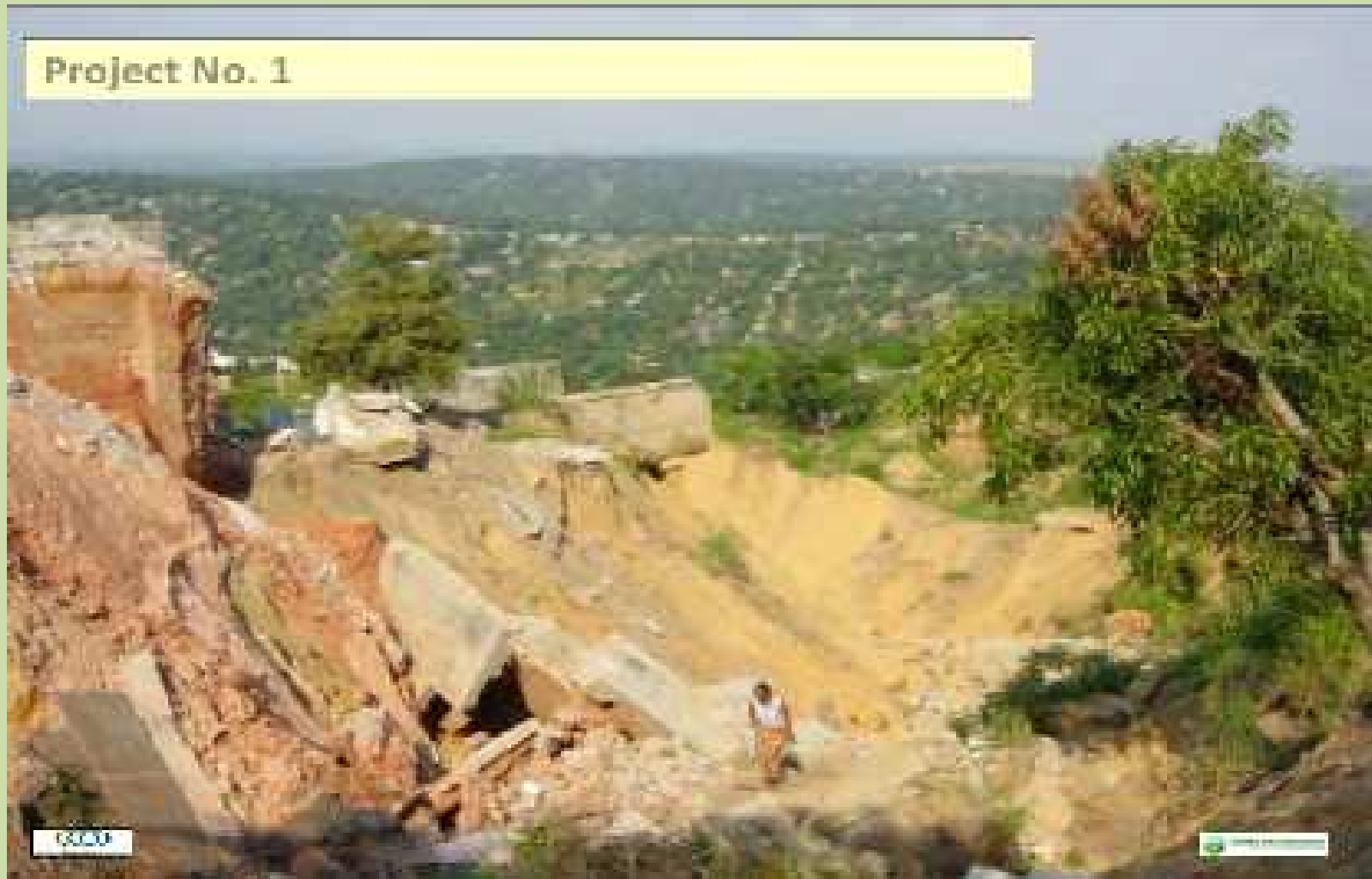
A short overview of projects in the following countries illustrate current activities using the Vetiver System:

- 1. Democratic Republic of Congo**
- 2. Congo-Brazzaville**
- 3. Congo-Pointe Noire/Brazzaville**
- 4. Guinea**
- 5. Madagascar A&B**
- 6. South Africa.**

These case studies 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





Collapsed bridges and urban roads preventing access to properties



Abandoned homes & properties



A world Bank financed project for the rehabilitation of the erosion gully in the district of Selembao, Kinshasa, DRC



Construction commenced in 2004



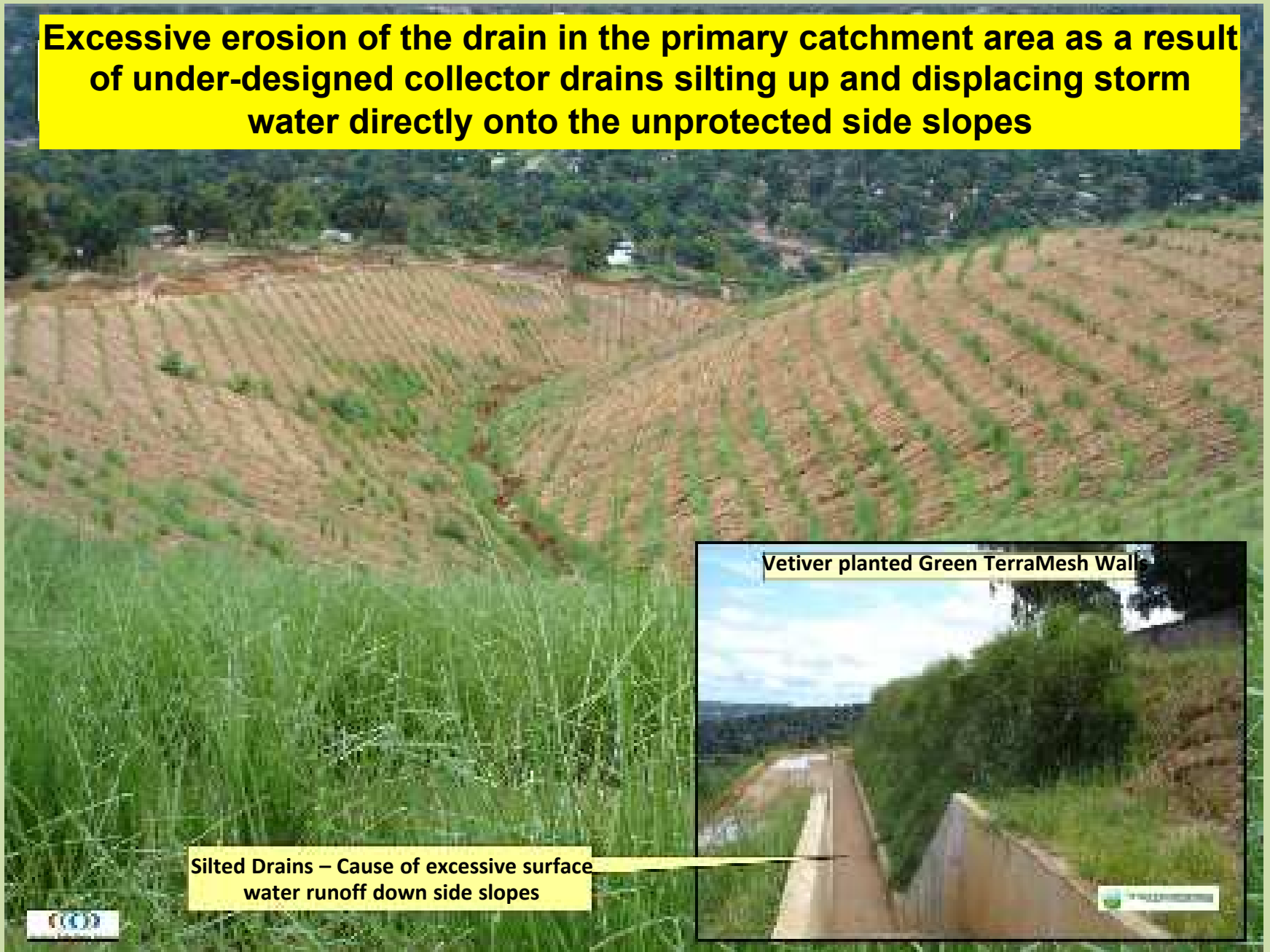
The Selembao Construction Site – 2006



A total of 11.5 hectares was planted to Vetiver and then 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

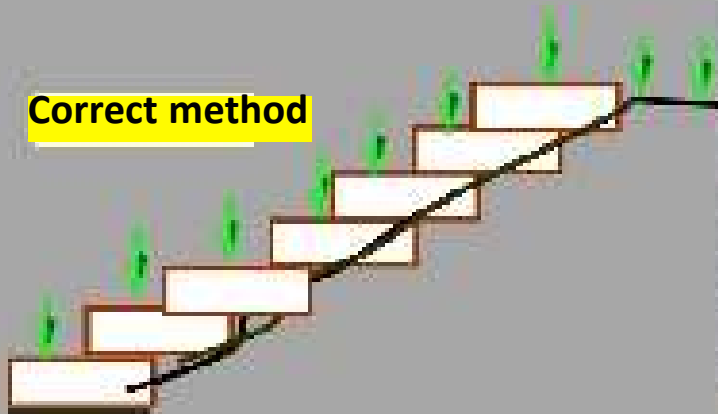


Sand Bags inter-planted with Vetiver were used to repair the extensive erosion caused by surface water runoff

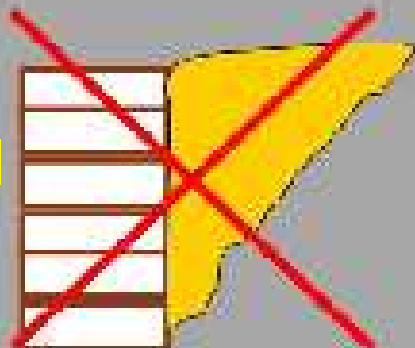


Installation of Sand Bags

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 Ndonga
Roley Noffke**



Sporadic Fires during the dry season



Recovered Green TerraMesh walls



Project No.2 - Boukeni Erosion Gully Project, Brazzaville, Congo





**Construction is by a Brazilian Company-ANDRADE Gutierrez SA.
The consultant Engineers for the project -EGIS-INTERNATIONAL.
Environmental & Bio-Engineering design, supervision and
implementation - Engineer Alain NDONA (TVNI).**





Length of gullies : $\pm 600 \text{ m}^1$

Length of drains or canals : $\pm 800 \text{ m}^1$, 50-60 meters wide and 20-40 meter deep

Surface area planted to Vetiver – $\pm 36,000 \text{ m}^2$ per channel

Planting density - 1 m between rows and 10 plants/ m^1

Vetiver sourced from local community



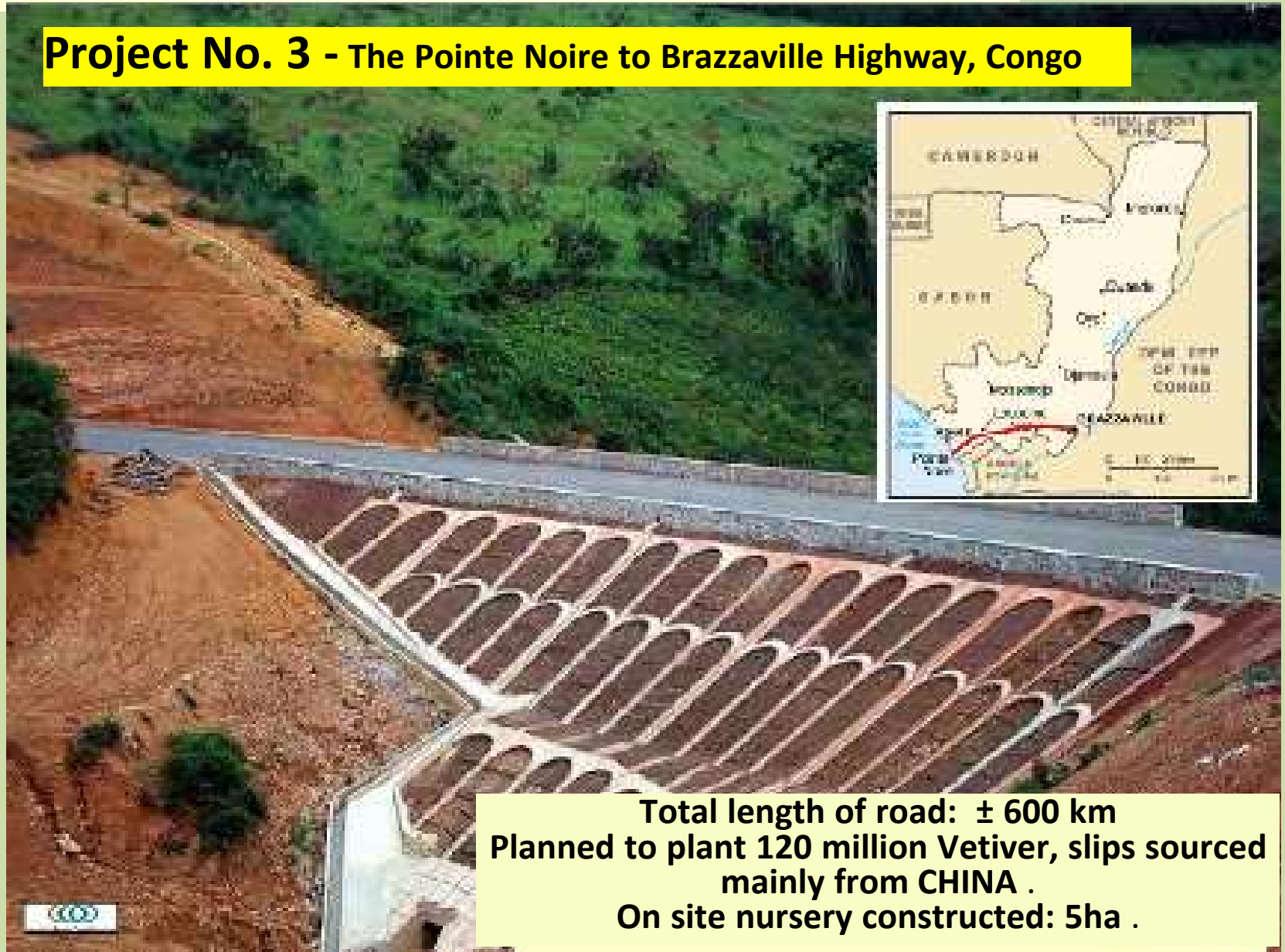
Implementation of the Vetiver System on side slopes of Canal Construction



Vegetated Side Slopes of Concrete Drainage Channel



Project No. 3 - The Pointe Noire to Brazzaville Highway, Congo



Total length of road: \pm 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 .



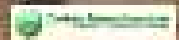
Highly dispersive and erodible side slope material



**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 m¹.
45° slope angle with benching at 10 m intervals on
average .**



Project No. 4 - The Rio Tinto Project- Simandou, Guinea



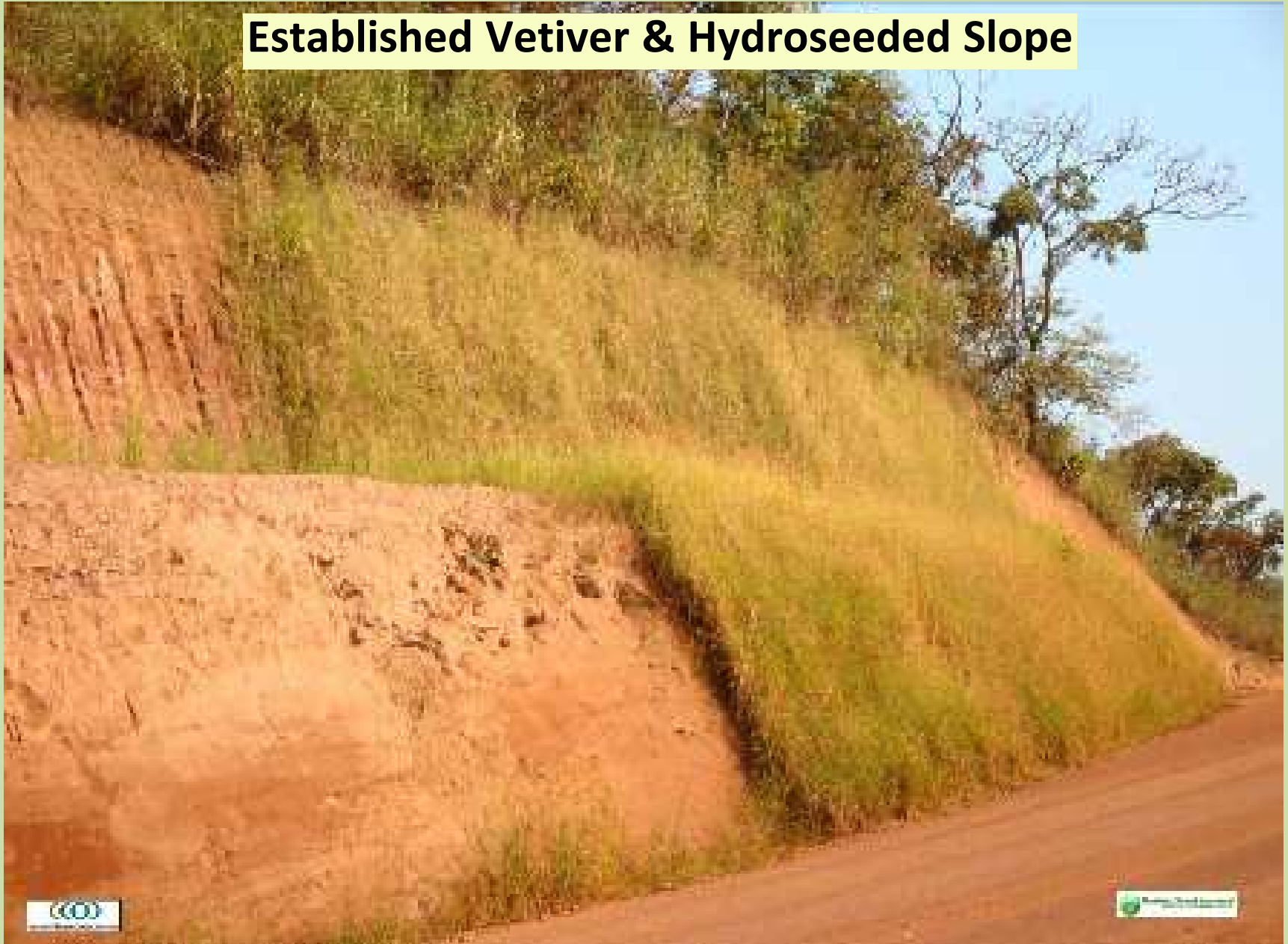
Rehabilitation of the highest point of Pic du Fon, Simandou, Guinea



Installation of Bio-Engineering Techniques & Hydroseeding on Exploration Site for protection of chimpanzee habitat



Established Vetiver & Hydroseeded Slope



On-Going Stabilisation work on Access Roads along the Montane area



Madagascar - Projects

Projects 7 A – Rio Tinto/QMM Ilmenite Mine

Projects 7 B – Sherritt Mining Ambatovy Pipeline



Local Malagasy Community – The Employees



Project No. 7 A - Ilmenite Project, Madagascar



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



Community Vetiver Propagation



- **Environmental work Started in 2006 with 15 communities, expanded to 32**
- **communities by 2008. 40 hectares were stabilized 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



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



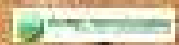
Surface Water Runoff control with Vetiver Hedge Rows



Established & Stable Ehoala Dune – 9 ha in extent



Project No. 7 B – Ambatovy Project, Moramanga to Tamatave, Madagascar



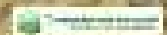
Installed Erosion Control Structures & Hydroseeding



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

