

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

by

Roley Nöffke

TVNI (The Vetiver Network International)

&

IECA (Region2-Southern Africa Chapter)

&

Hydromulch (Pty) Ltd

Johannesburg,

Republic of South Africa

E-mail: info@hydromulch.co.za

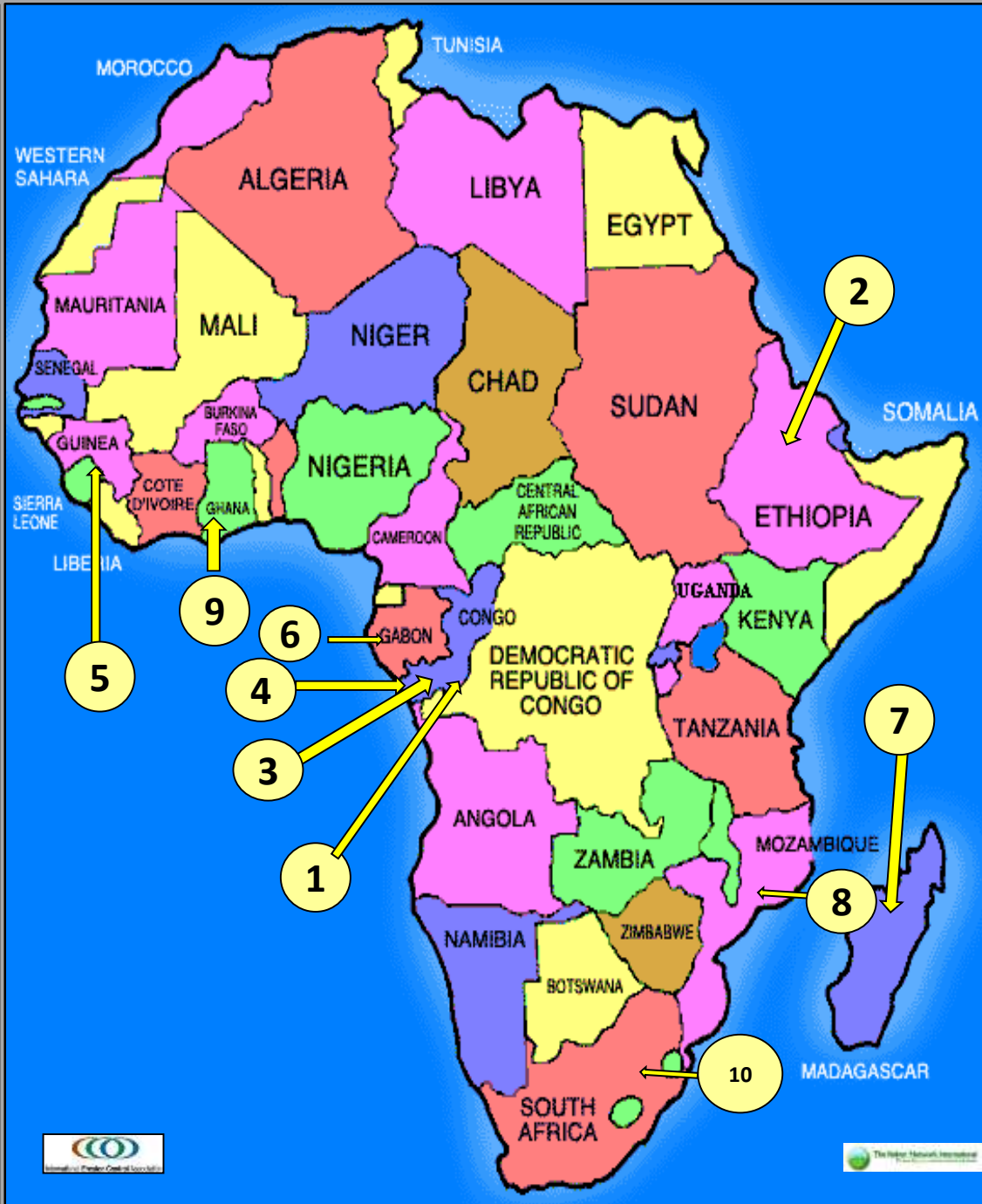


It is recorded that practically 95% of the 53 countries on the entire African continent (including Islands) has successfully implemented the Vetiver System for soil & water conservation during the past 200 years.

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 Town
4. Congo - Pointe Noire/Brazzaville
5. Guinea - (a) Simandou & (b) Ashanti Gold
6. Gabon
7. Madagascar A & B
8. Mozambique rail line
9. Ghana

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



The Selembao Construction Site

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.

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



Vetiver planted Green TerraMesh Walls

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 in 2004
TVNI & Hydromulch
formed an established working
relationship**

- **Dr. Paul Truong**
- **Dr. Dale Rachmeler**
- **Eng. Alain Ndonga**
- **Roley Noffke**

Project No. 2 - Vetiver System Applications, Ethiopia



SLUF
Debela Dinka Guda
251 91 186 6766
August 2013



The Green Frontier: Agricultural Extension for Smallholder Farmers

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) programs.

NATIONAL WORKSHOP ORGANIZED BY SLUF & TVNI, ADDIS ABABA, ETHIOPIA, 2009



**NATIONAL WORKSHOP
WORKING COMMITTEE
ADDIS ABABA
ETHIOPIA, 2009**



**NATIONAL WORKSHOP
DELEGATES
ADDIS ABABA
ETHIOPIA, 2009**



Vetiver Applications in Community Farming Projects in Ethiopia



Handicrafts



Urban Areas



Roadside Embankments



Vetiver Applications

Canals



Training of Ethiopian Road Authority Engineers organized by SLUF & TVNI in May 2010



Elise Pinnars-TVNI Kenya



National & International Co-Operation

Ethiopian Ministry of Agriculture has integrated the VS into its sustainable land management programs

Thailand



Madagascar

Ethiopian Roads Authority (ERA) has included the VS for the rehabilitation of all road contracts

A group of about 10 men are standing under a large red tent. They are holding a white banner with text in French and Amharic. The banner reads: "Le Système Vétiver, Regards croisés Madagascar-Ethiopie" followed by "Conférence-Débat" and "Vendredi 23 Décembre 2011- 14 h - CNEAGR NANISANA". There are several logos at the bottom of the banner. The background shows a building and trees.

Le Système Vétiver,
Regards croisés Madagascar-Ethiopie
Conférence-Débat
Vendredi 23 Décembre 2011- 14 h - CNEAGR NANISANA

Policy Dialogue

The Ethiopian President, EEPSCO, ERA & MoA



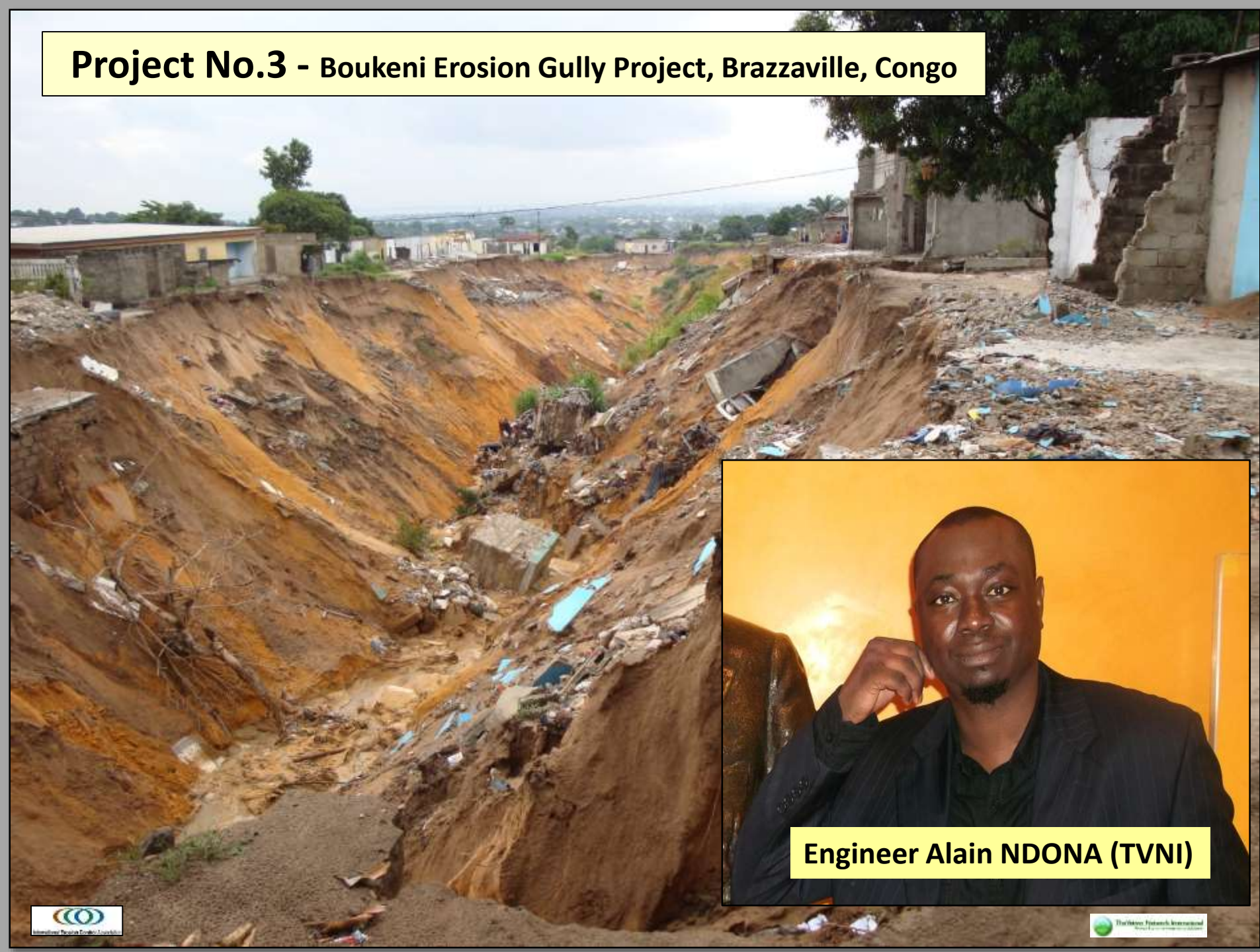


Ethiopian Philosophy & Consensus

Vetiver is a Proven GREEN Solution!

USE IT!!

Project No.3 - Boukeni Erosion Gully Project, Brazzaville, Congo



Engineer Alain NDONA (TVNI)



**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).**

Vegetated Side Slopes of Concrete Drainage Channel





May 2014

May 2012



Boukeni Rehabilitation site, Brazzaville, Congo

May 2014



Project No. 4 - The Pointe Noire to Brazzaville Highway, Congo



Total length of road: \pm 600 km

Planned to plant 50 million Vetiver, slips sourced mainly from CHINA.



Side Slope Rehabilitation in progress

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



Established Side Slope on Highway



Project No. 5 (a) - The Rio Tinto-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



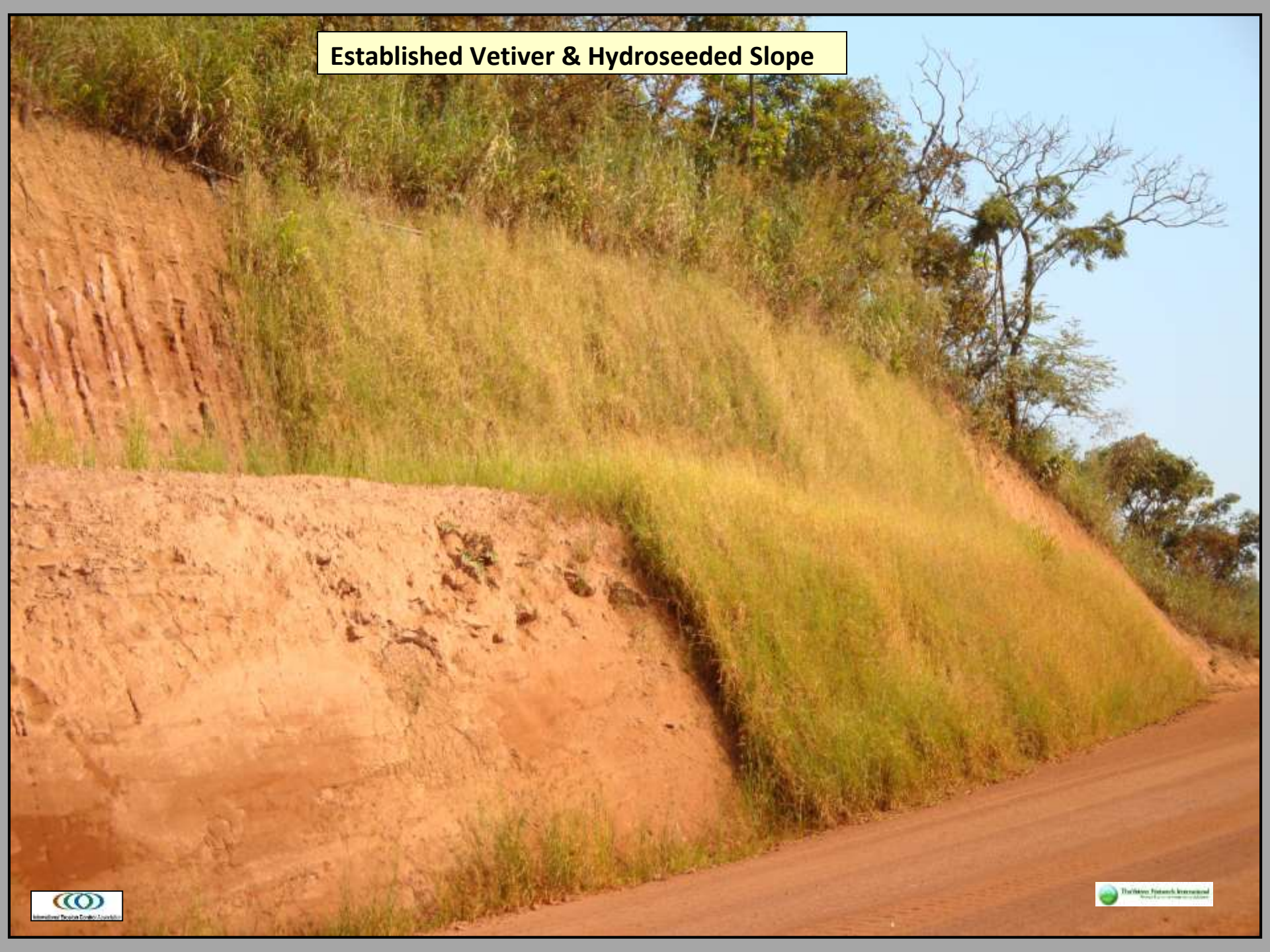
Bio-Jute Preparation



Bio-Jute Installation and Vetiver planting on Cut Slope Embankments



Established Vetiver & Hydroseeded Slope



Project No. 5 (b) - Anglo Ashanti Gold mine in Guinea



Delivery of Vetiver Grass from Mine Nursery



Vetiver Grass Slips planted in well constructed furrows or rows at Anglo Ashanti Gold



Project No. 6
OLAM GSEZ
Nkok (Libreville), Gabon



Libreville features a tropical monsoon climate with a lengthy wet season and a short dry season.

Annual precipitation averages around 3000 mm. Libreville's wet season is about nine months long (September through May), with violet downpours occurring in March-April. June to August are the dry months with almost zero precipitation. Humidity sometimes reaches 98% and is seldom below 70%.



GSEZ Nkok, 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



Work Undertaken

- 60,000 m¹ vetiver grass hedge rows
- Bio-Jute – 10,000 m²
- Silt fences - 3,600 m¹
- Sand Bags – 2,500 m¹
- Hydroseeding -200,000 m²

Climatic Conditions

Annual rainfall + 3700mm
2 Rainy seasons –
September to December &
May to July



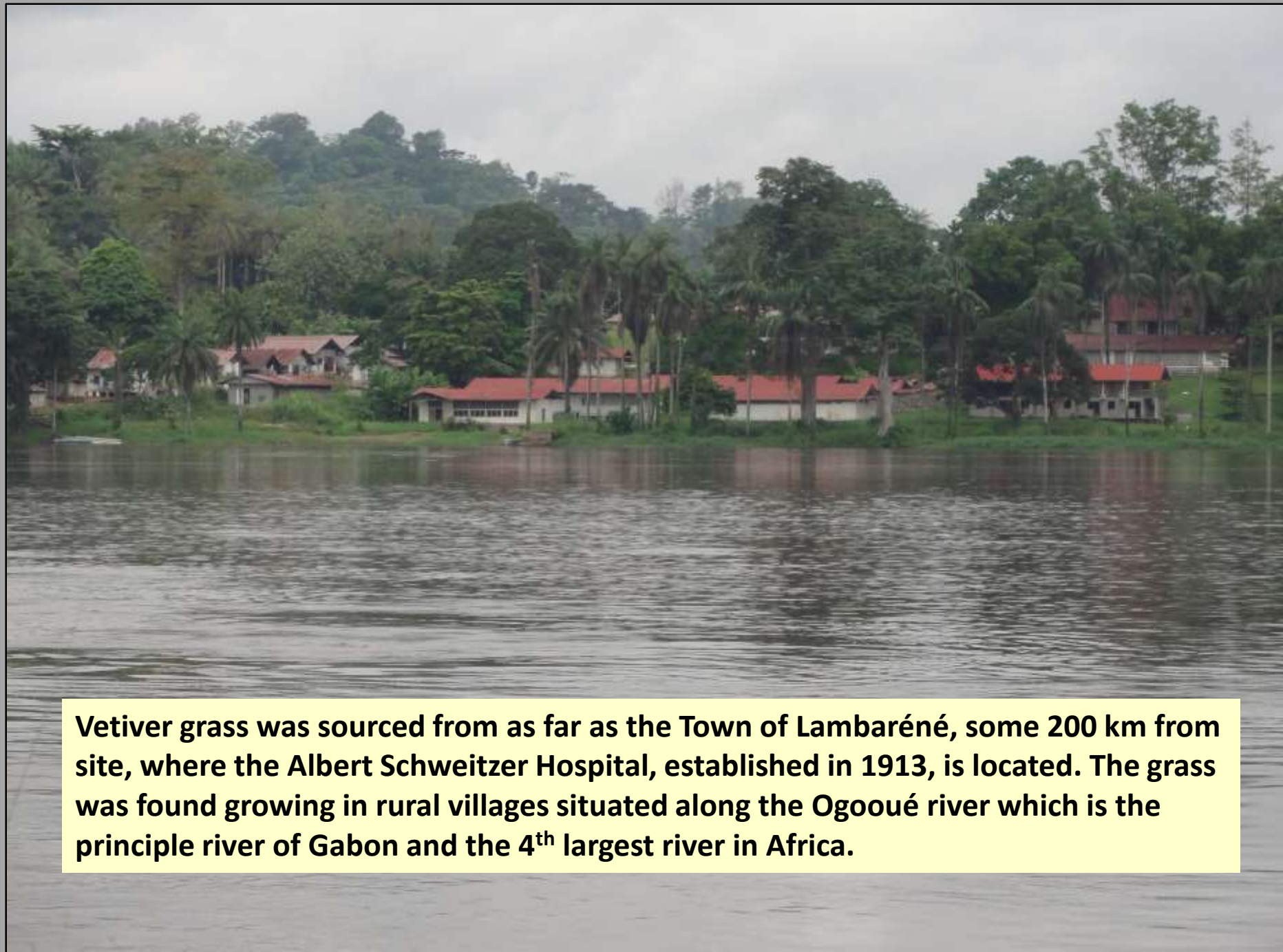
The Impact of 750 mm rain in 24 hour period





Excessive Erosion caused by surface water runoff





Vetiver grass was sourced from as far as the Town of Lambaréné, some 200 km from site, where the Albert Schweitzer Hospital, established in 1913, is located. The grass was found growing in rural villages situated along the Ogooué river which is the principle river of Gabon and the 4th largest river in Africa.

**Albert Schweitzer's
House in
Lambaréné, Gabon**



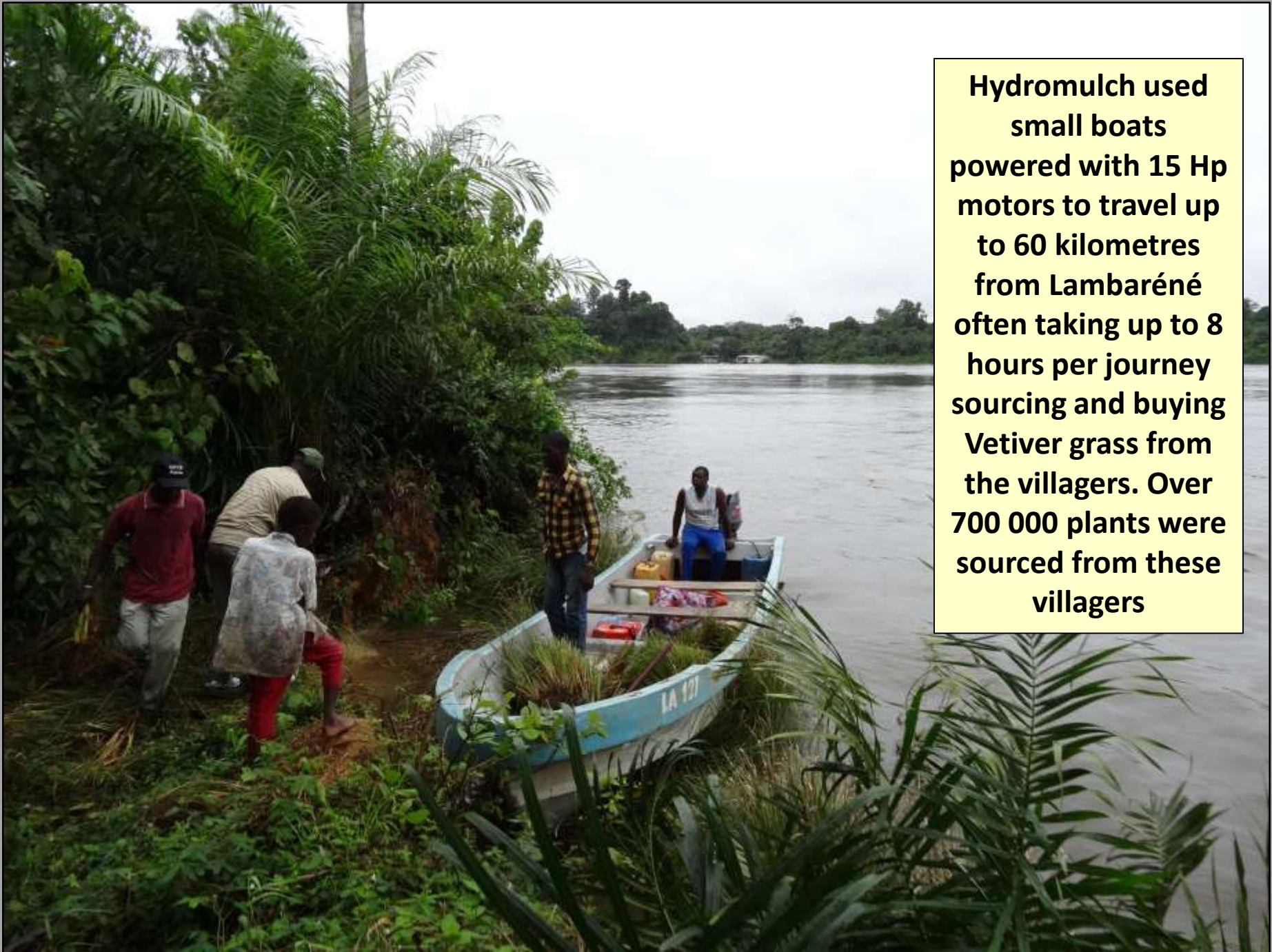
**Albert Schweitzer's
Hospital in
Lambaréné, Gabon**



In Memory of Albert Schweitzer Lambaréné, Gabon



Hydromulch used small boats powered with 15 Hp motors to travel up to 60 kilometres from Lambaréné often taking up to 8 hours per journey sourcing and buying Vetiver grass from the villagers. Over 700 000 plants were sourced from these villagers





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

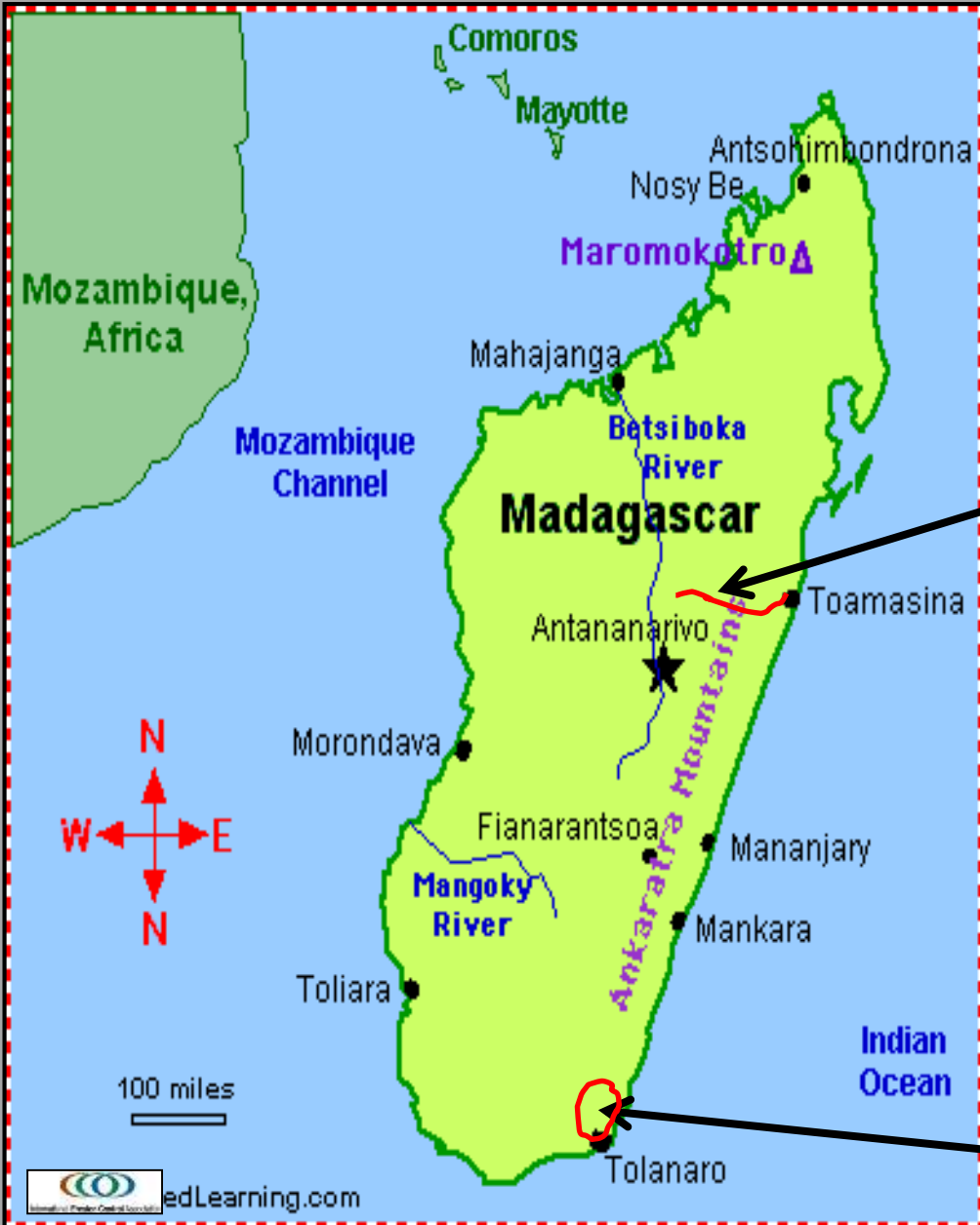
The Mendere Joint Venture

A Water Flow Partnership

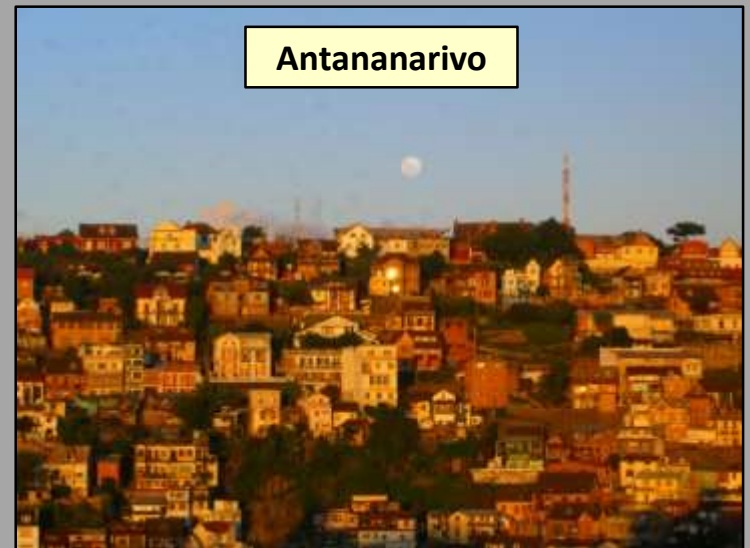
*Madagascar
Fort Dauphin*



Location of Rio Tinto & Sherritt Mining Project in Madagascar



Antananarivo



Sherritt Mining Ambatovy Project



Rio Tinto Ilmenite Project

Local Malagasy Community



Typical Malagasy Mode of Transport



Project No. 7 A - Ilmenite Project, Madagascar



Quarry

Ehoala Dune Cut

Mining site

New Harbour

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.



Vetiver Purchases from Villagers



Andre & Auguste Mahalogny family from the Mangaiky Village.



Environmental work Started in 2006 with 15 communities, expanded to 32 communities (168 families) 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

Local Fishing Village



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

- Length of ROW: 220 Kilometres
- Area rehabilitated – 550 hectares
- Rehabilitation period: 3 years
- Vetiver plants & fascines sourced from local communities

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



Vetiver Nursery in South Africa

6 hectare open ground field with 3 tunnels for plant propagation
Greenhouse trial centre & Soils laboratory



International Vetiver Collection consisting of 18 varieties



Greenhouse Trial Centre



Phytoremediation Pond



Project No.9 Newmont Mine, Ghana



Akyem is an open-pit gold mine, wholly-owned and operated by Newmont Mining Corporation located in Birim North District in the Eastern region of Ghana. The Akyem mine site covers a total area of 1,903ha of which, 74ha lies in the Ajenjua Bepo Forest Reserve. Mining activities at the site started in August 2012. The mine employs 1,300 workers and contractors belonging mostly to the communities within the mining area. The estimated mine life of the Akyem open-pit is 16 years.

Maxwell Oduro

A local Ghanaian contractor, with some of his environmental team engaged in side slope stabilisation using Vetiver grass. Maxwell trained and supported by Dr. Dale Rachmeler of TVNI.





**Work Progress on Site
around mining
infrastructure**

**Erosion & Sediment Control
work currently being carried
out by **Maxwell Oduro**,
the local Ghanaian
contractor & Vetiver network
member.**





**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