

Mine & Associated Rehabilitation Projects in Africa & Indian Ocean Islands

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ABSTRACT

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 the Indian Ocean Islands.

The presentation will reflect the major strides that have been achieved on erosion & sediment control, bio-engineering & vegetation restoration and the participation of local communities in general.

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

However, a short overview of projects in the following countries will be given, illustrating current activities using the Vetiver system, reflecting the major works that have been achieved on erosion & sediment control, bio-engineering & vegetation restoration with community participation in general.

- ❖ Democratic Republic of Congo- Selembao
- ❖ Ethiopia-SLUF
- ❖ Brazzaville Congo - Boukeni Erosion Control Project
- ❖ Pointe Noire/Brazzaville Congo - National Highway
- ❖ Guinea- Simandou
- ❖ Gabon – Gabon Special Economic Zone (OLAM)
- ❖ Madagascar- Ilmenite & Ambatovy projects
- ❖ Mozambique – Maltize to Nacala Railline
- ❖ Ghana – Newmont Mine
- ❖ South Africa – Department of Agriculture, Limpopo Province

1. Democratic Republic of Congo-Selembao

The rehabilitation of the Selembao gully erosion control work (World Bank financed) in Kinshasa is an ecological disaster which caused huge damage to the human and physical environment. The design and supervision of the rehabilitation was carried out by BCEOM, the French Engineering Consultancy. Many of the problems stemmed from lack of maintenance, deforestation and cultivation on the slopes (cut & burn), chaotic urbanisation without proper water canalisation systems etc. The gully progressively worsened causing collapsing of houses and urban roads.

The gully stretched over a distance of 1 300 metres, with a width of between 60 and 70 metres and a vertical distance of 120 metres. A total of 11.5 hectares was rehabilitated using Green TerraMesh Walls, Vetiver grass hedge rows and hydroseeding. 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 distances of 4 metres along the contours.



2. Ethiopia - SLUF

The timeous work by Debela Dinka Guda and fellow SLUF members in promoting Vetiver grass in Ethiopia has resulted in the Ministry of Agriculture and the Roads Authority of Ethiopia including the use of vetiver in all future rehabilitation projects.

- ❖ Vetiver grass (*Chrysopogon zizanioides*) was introduced to Ethiopia by Jimma Coffee/Agricultural Researchers from Tanzania in 1970.
- ❖ It was later taken by Ethiopian Coffee Development Plantation Enterprise and used on coffee farms.
- ❖ An international NGO named Menschen fur Menschen Foundation introduced Vetiver grass clumps taken from Coffee Plantation Enterprise to West Ethiopian farmers in the early 1990s for use in soil & water conservation.



A national workshop organized by SLUF & TVNI in 2009 was held in Addis Ababa, the capital of Ethiopia and was well supported by various national & International organisations. Since the establishment of the Ethiopian Vetiver Network (ETVN) in 2009 the Vetiver System technology is considered as one of the best biological conservation inputs by government & non-government organizations, farmers & private investors. The national workshop was followed by a second national workshop “Training of Trainers” for the Ethiopian Roads Authority in May 2010.

SLUF has, over the years engaged in many National & International co-operatives and networking with the likes of Thailand and Madagascar. The Ethiopian Ministry of Agriculture has taken the VS as part of its sustainable land management programs and the Ethiopian Roads Authority (ERA) has included the VS for the rehabilitation of all road contracts- all as a result of SLUF's motto ***"Vetiver is a Proven GREEN Solution USE IT??"***

3. Congo - Brazzaville

The Boukeni Erosion Control Project in Brazzaville, Congo, under the guidance of Environmental Engineer Alain Ndona of EGIS-International, is a true reflection of the high standard and quality of work that has successfully been carried out. Similar in many ways to the Selembao project, where the main contractor had to contend with many human, physical and environmental difficulties, before, during and after construction. Construction by Brazilian-Portuguese company ANDRADE Gutierrez.



Boukeni Erosion Project

- Length of gullies: - 600 m¹
- Length of Canals: - 800 m¹
- 50-60 meter wide
- 20-40 meter deep.
- Planting rows 1 meter apart with 10 slips per m¹.
- 36,000 m² on average per channel rehabilitated with Vetiver grass.
- Vetiver grass sourced from local communities.

4. Congo - Pointe Noire/Brazzaville Highway

The rehabilitation of the national road between Pointe Noire and Brazzaville (RN1) is currently under construction by a Chinese company - China State Construction Engineering Corporation LTD (CSCEC).

The consultant Engineers for the project- EGIS-INTERNATIONAL and the Environmental & Bio-Engineering design and supervision is being carried out by Engineer Alain NDONA.

The construction of the highway will be conducted in four phases.



Brazzaville to Pointe Noire Highway

- Length of road: - 600 km
- Planned to plant 10 billion Vetiver plants on contract.
- 50,000 m¹planted to date.
- 45°slope angle with benching at 10 m intervals on average
- Planting rows 1 meter apart with 10 slips per m¹.
- Source of Vetiver: China
- Local community Vetiver nursery of 5 ha established.

5. Guinea - Simandou

Rehabilitation work was required on the service roads leading up and around the drill pads on the Simandou Range in Guinea where Rio Tinto was carrying out exploration work along sections of the Pic de Fon/Oueleba ridge which is about 110km in length. This ridge is situated above some of the forest patches that serve as habitat for the West African Chimpanzee – a conservation priority species. Kew Gardens, United Kingdom approved the use of the Vetiver system on the project and only locally harvested grass seed was permitted to be hydroseeded between the vetiver rows. Commercial seed was however permitted in the agricultural belts away from the sensitive forest areas. Vetiver grass was located in the town of N’Zekore some 150 kilometres from the mine site. Rehabilitation is on-going with the planting of Vetiver and hydroseeding.



6. Gabon - Nkok Gabon Special Economic Zone, (GSEZ)

The OLAM Gabon Special Economic Zone development project in the town of Nkok, Gabon situated on the equator and having one of the highest rainfall statistics universally (3000mm per annum), was vegetated using Bio-Engineering structures, Vetiver grass and Hydroseeding. 20 hectares of dispersive lateritic soils was stabilised and vegetated. Many structural failures resulted with the collapsing of some of the side slopes due to inadequate drainage installation by the main contractors.

However, the contractors were able to stabilise the side slopes by benching, re-profiling, channelising of surface water runoff and continued maintenance work. Vetiver grass was located some 250 km away in the town of Lambaréné, the resting place of Doctor Albert Schweitzer.



7. Madagascar- Fort Dauphin & Ambatovy Pipeline

The inclusion of Vetiver grass for the rehabilitation of the Ilmenite project for Rio Tinto and the Ambatovy pipeline for Sherritt Mining in Madagascar not only contributed to the successful rehabilitation of the projects but also created many work opportunities for local communities. These villagers were trained in basic skills, soil conservation, micro-financial management and propagation techniques by the on-site HYDROMULCH staff. Yoann Coppin of La Plantation Bemasoandro in Madagascar has also completed many interesting and difficult environmental projects using the Vetiver system.

The Ilmenite project required extensive dune rehabilitation work where approximately 4 million Vetiver plants were propagated by local communities to vegetate an area of 40 hectares. The Ambatovy project was more intense with 550 hectares rehabilitated.



Ilmenite project



Ambatovy Pipeline project

The Ambatovy pipeline contract stretching over 220 km between Moramanga & Tamatave likewise incorporated the Vetiver system in their rehabilitation program.

8. Mozambique – Nacala port & Rail Project

The modernization and upgrading of 1200km rail line by Vale from Brazil, linking the Moatize coal mine to Nacala-à-Velha, where Vale have built a deep-water sea port, revamping some 682 kilometres of existing railroads and laying a new 230- kilometre section.



The corridor will cross the south of Malawi bordering Mozambique. Extensive rehabilitation work using Vetiver grass was used to stabilise the steep side slopes on the rail loop in the Port.

9. Ghana

An open-pit gold mine located in Birim North District in the Eastern region of Ghana, is wholly-owned and operated by Newmont Mining Corporation. 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. Maxwell Oduro, a local Ghanaian contractor has been proactive in rehabilitation work at the mine where vetiver grass has proved to be extremely successful in the stabilisation of side slopes in and around the mine infrastructure areas (operations management camp, the plant & administrative areas) as well as rehabilitation of side slopes at the Akyem pit mine and tailings storage facility.

10. South Africa – Limpopo Province.

Numerous projects in South Africa have been successfully rehabilitated using the Vetiver system/ Hydroseeding technique and has now been extended to local communities in rural areas for donga rehabilitation. Training has also been given in general erosion & sediment control techniques & methods to engage them in sustainable land management practices.

Local communities have been trained in the harvesting and propagation of vetiver grass for donga rehabilitation applications as well for domestic use in and around households and farming ventures.



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