

VETIVER SYSTEM

PROVEN AND GREEN ENVIRONMENTAL SOLUTIONS

An Overview



THE VETIVER SYSTEM

A “green” technology that is low cost, easy to use, and it works

Used for:

- Soil and Water Conservation
- Infrastructure Stabilization
- Flood Control
- Water Quality Improvement
- Pollution Control
- Land Rehabilitation
- Disaster Mitigation
- Handicrafts
- Many other uses



THE PLANT - *Chrysopogon zizanioides*



Australia - Queensland



Malaysia - close up
Clump grass



Costa Rica



THE ROOT



China - excavated root



Malaysia - longitudinal section through hedge
note the root mass in the top meter of the soil
profile



THE VETIVER GRASS SPECIAL CHARACTERISTICS

- Grows under extreme and wide range of conditions:
- Long Living Perennial Grass
- Temperatures: -12 ° C to >55° C
- Soil pH from <3 to >10
- Annual Rainfall <300 mm to > 5,000 mm
- Tolerant to all heavy metals
- Saline tolerant
- Fire tolerant
- Few Pests and diseases
- Powerful (75 Mpa root strength) and deep root system
- Non competitive and non invasive



THE VETIVER GRASS TECHNOLOGY

The basic technology comprises a hedgerow of vetiver grass planted on the contour



Malaysia - 30 month hedgerow planted on the contour



Malaysia - close up hedge cross section



PROPAGATION

Vetiver grass from South India is a sterile and a non invasive polyploid variety of *Chrysopogon zizanioides*. Cultivars of this variety are used and promoted under the Vetiver System.

Vetiver is propagated by root division. If large quantities of plant material are required nurseries need to be established.



China - 20 ha nursery - bare rooted plants



Malaysia - containerized vetiver nursery



PLANTING



Mexico - Planting by hand



India - Preparing planting material



Australia - machine
planting



VETIVER SYSTEMS FOR ON FARM SOIL AND WATER CONSERVATION



Columbia - CIAT vetiver
- cassava trial on 12% slope



El Salvador - hillside
conservation



Costa Rica - vetiver protecting
tobacco crop



Malawi - Erosion control
on maize field



VETIVER SYSTEMS FOR SOIL AND WATER CONSERVATION



Panama - Vetiver hedge on a steep slope in Chiriqui



Mexico - Oaxaca. Stabilizing a cliff with vetiver



VETIVER SYSTEMS FOR SOIL AND WATER CONSERVATION



China - VS for wind erosion control and protection of young trees from wind damage



Costa Rica - VS for erosion on a steep slope coffee farm

Congo (DRC) - A reshaped urban gully being stabilized with vetiver grass



VETIVER SYSTEMS FOR INFRASTRUCTURE STABILIZATION



El Salvador - VS for bridge/
culvert protection. Newly
planted vetiver hedgerow



Extreme slope stabilization Ho
Chi Minh Highway - Vietnam



El Salvador - mature vetiver
hedge protecting road
embankment



VETIVER SYSTEMS FOR RIVER BANK AND IRRIGATION CHANNEL PROTECTION



Thailand - River bank protected with Vetiver



Madagascar - Vetiver stabilizing irrigation canal



VETIVER SYSTEMS FOR FLOOD CONTROL



Australia - Even on flat land there can be serious erosion. Here, on black cotton soil, a long vetiver hedgerow protects a field from flood damage.



VETIVER SYSTEMS FOR SOIL AND WATER CONSERVATION



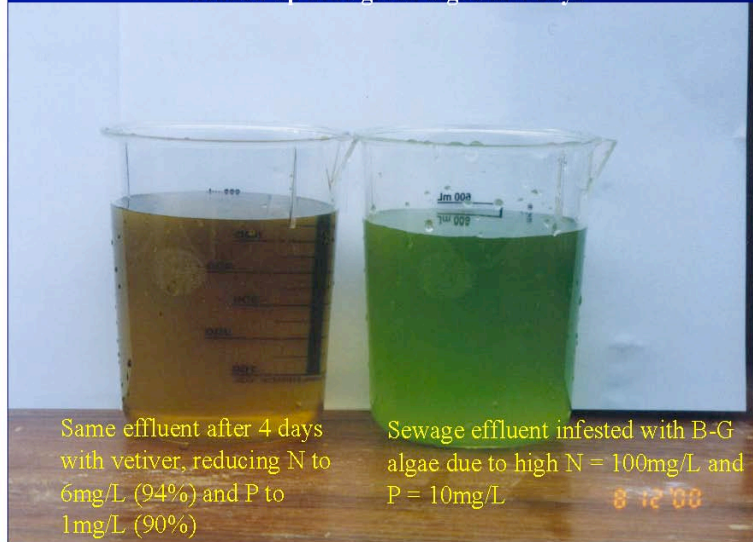
Australia - Stone quarry rehabilitation using Vetiver System

Venezuela - Rehabilitation of bauxite mine using Vetiver Systems



VETIVER SYSTEM FOR POLLUTION CONTROL

With high capacity of removing N and P in polluted water, vetiver cleaned up blue green algae in 4 days



Same effluent after 4 days with vetiver, reducing N to 6mg/L (94%) and P to 1mg/L (90%)

Sewage effluent infested with B-G algae due to high N = 100mg/L and P = 10mg/L

8 12 00

Vetiver was grown in the left hand beaker. After 4 days it reduced nitrates by 94% and Phosphates by 90%.

On a piggery effluent pond in Vietnam



In Vietnam and China floating rafts of vetiver have been used to clean piggery effluent ponds.



VETIVER SYSTEM FOR DISASTER MITIGATION

- Disasters caused by flooding create havoc for communities, and most often results in loss of life and income. The Vetiver System can prevent such disasters and also help stabilize landscapes and infrastructure after disasters.
- Vetiver System is particularly good in reducing incidence of landslides, highway collapse, building collapse, river levee breaching, and other damage due to heavy rains and flood.



VETIVER SYTSTEM FOR LANDSCAPING



Portugal - Lagos. VS used to prevent head light glare from traffic on a divided road.



El Salvador - Landscaping and slope stabilization at an urban gas station.



VETIVER SYSTEM FOR OTHER USES



Handicrafts
Building materials
Medicinal
Fuel
Ethanol
Aromatic oil
Water purification
Paper
Mulch
Insect Control
Forage

