

THE VETIVER SYSTEM

A PROVEN SOLUTION

The Vetiver Network <http://www.vetiver.org>

VETIVER GRASS

A HEDGE AGAINST EROSION

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VS FOR IO-ENGINEERING

- For the stabilization and protection of infrastructure (roads, railroads, and other construction sites) VS is proven effective, efficient, and low cost when compared to other alternatives such as construction and maintenance using cement, rock, and steel. Vetiver grass roots have an Mpa of 75 (1/6 the strength of mild steel) and will improve soil shear strength at a depth of 0.5 meters by as much as 39%. VS costs from 55% to 85% less than traditional engineering systems.



The KEY to successful VS bioengineering applications for infrastructure is the availability of large quantities of good quality vetiver planting material. Above are Chinese nurseries that cover tens of hectares of land



China - a highway cut just planted to vetiver. The soils are very acid and prone to slippage. High levels of fertilizer assure good growth



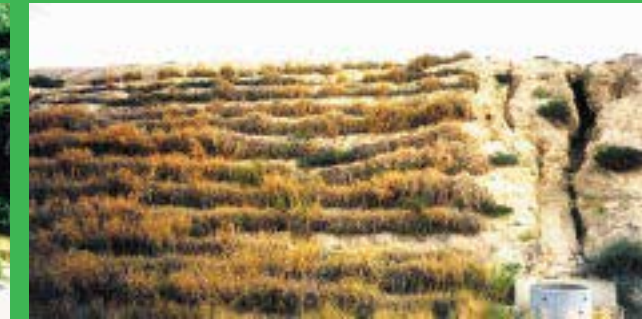
China - the same cut 12 months later. This cut was prone to massive slip. Stabilization with VS has given complete protection



China - unstable highway fill prior to VS treatment. Road stability was so bad in untreated state that major lateral cracks in the pavement occurred



China - same fill less than a year later. After another two years this fill became fully forested. Untreated cut shown as white in background



Spain - unstable highway fill treated with VS. Untreated eroded fill on right. Example of VS under low rainfall Mediterranean climate



El Salvador - Highway fill section treated with VS. Applications such as this provided full protection during Hurricane Mitch



China - engineering solutions are expensive and often break down when tied to fragile soils, particularly under high rainfall conditions



Malaysia - VS applied to major expressway through drainage system



Philippines - VS applied to highway cut that had been seriously damaged by earthquakes



South Africa - VS applied to stabilizing a construction site. Indigenous species were seeded between vetiver hedgerows

VS FOR WATER RELATED APPLICATIONS

- VS protects ponds, reservoirs, and rivers banks from erosion caused by wave action, it strengthens earthen dams against collapse, and it reduces maintenance costs and ensures the integrity of dam walls, canal and river banks, and drains.
- VS improves groundwater recharge through improved infiltration and reduced rainfall runoff, and the quality of water by removing sediments and chemicals.



Bangladesh - irrigation canal protected with VS. Vetiver has been here for many years, and has shown no sign of escape



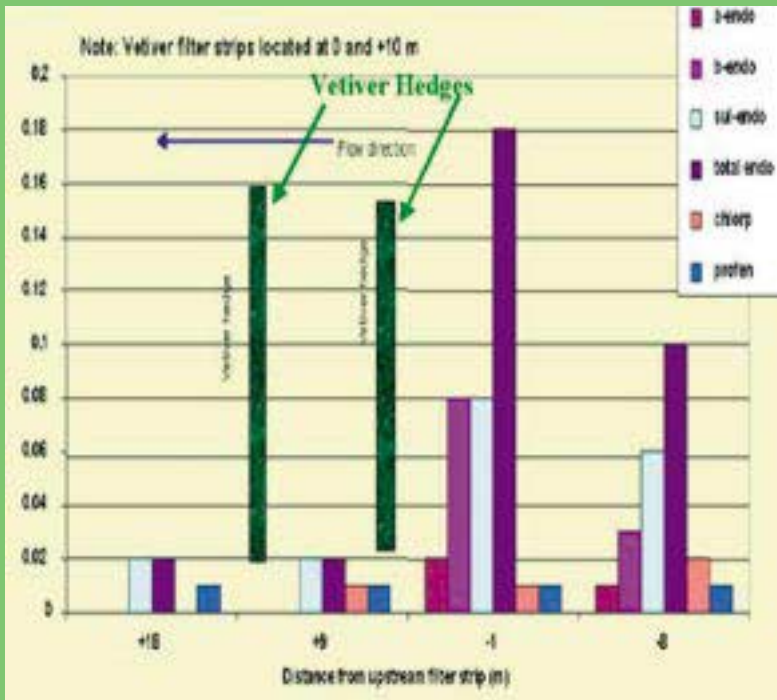
China - VS used to stabilize a small river bank located behind hedge



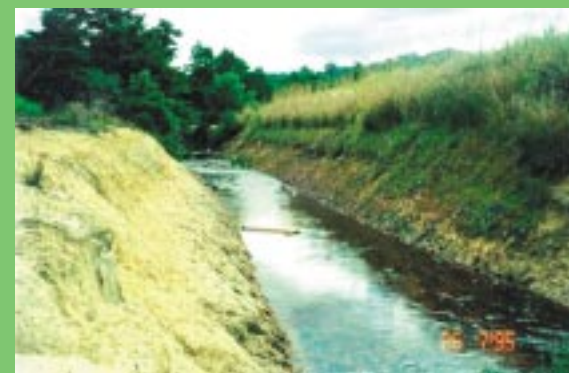
Thailand - in many countries VS is used to stabilize the banks of fresh water farm ponds. As a byproduct it makes a useful thatch and mulch



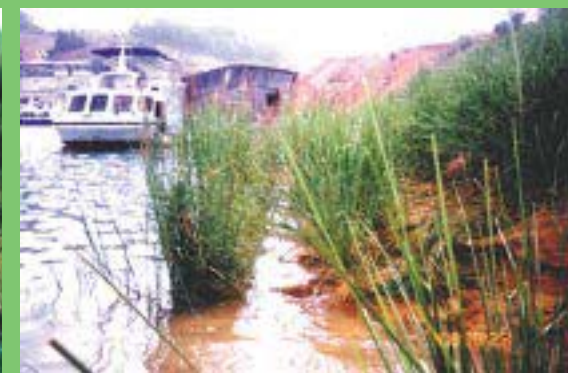
Zimbabwe - a fast flowing stream protected from stream bank erosion using VS application



Australia - schematic to show dramatic drop of pesticide levels as pesticide laden water moves through vetiver hedges from right to left. (Green columns = hedges - all other columns pesticide levels)



Australia - VS protects the right hand bank of a drain cut through acid sulphate soils of Queensland. Note left hand bank is devoid of any vegetation



China - partially submerged vetiver grass being used to stabilize the inside slopes of reservoirs in Guangdong Province



Zimbabwe - vetiver grass hedgerows were planted across a 100 meter wide reservoir spillway. The spillway was subjected to 3 months continuous flow



China - river flood embankments become heavily eroded and often breach causing much economic damage



China - the embankment on the image to the left was reshaped and planted with vetiver grass hedgerows. Hedgerows were planted perpendicular to each other



Australia - this causeway was regularly damaged by flooding. Gabions were often washed out



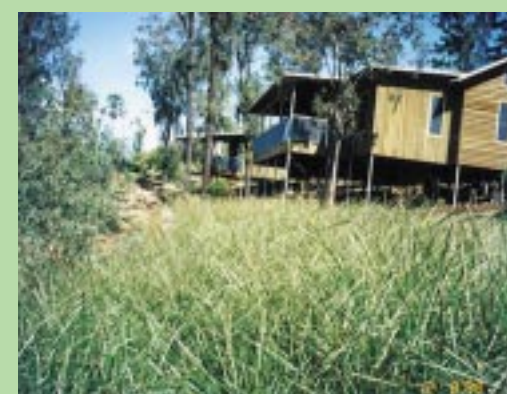
Australia - the same causeway now stabilized with vetiver grass hedgerows. Damage by flooding minimized

VS FOR IO-REMEDATION

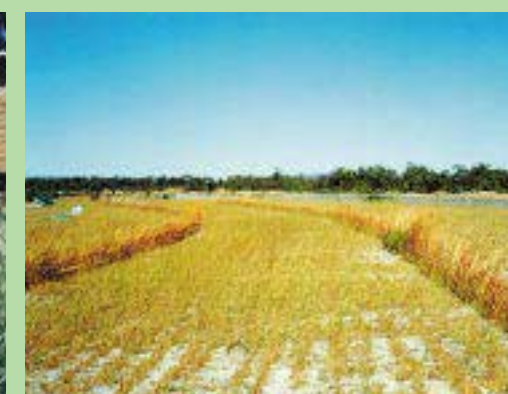
- Onsite and offsite pollution control from wastes and contaminants is a breakthrough application of VS for environmental protection. Vetiver is being used to rehabilitate a large copper mine in China, coal mines in Indonesia, diamond mine spoils in South Africa, to control erosion and leachate from municipal landfills in China.... and more.
- Research has clearly established the VS tolerance to extremely high levels of Al, Mn, As, Cd, Cr, Ni, Cu, Pb, Hg, Se, and Zn.
- Vetiver has been used to reclaim soils and increase site productivity in places that were previously believed to be totally unproductive.



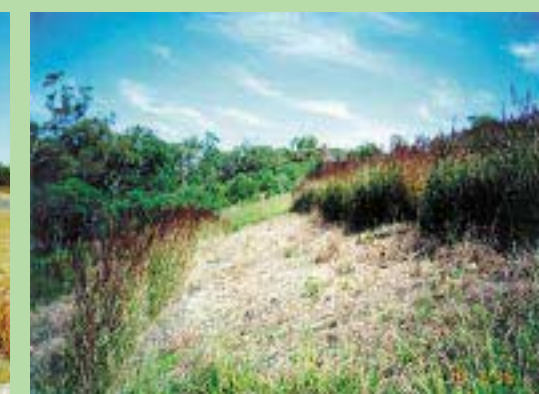
Australia - Grasses like vetiver can be used to create an artificial wetland



Australia - VS used as a buffer to absorb seeping sewage from this holiday camp site



Australia - VS used to stabilize a gold slimes waste area. The hedges reduce the incidence of wind blown cyanide polluted dust



Australia - VS used to stabilize a municipal landfill and resultant reduction in leachate export from site

VS FOR OTHER USES

- In disaster mitigation and vulnerability reduction, VS has a role to play.... "The storms were terrible. [Afterward there were] landslides, roads destroyed, agricultural lands washed away; but, where there were vetiver barriers, everything seemed normal". (pers. comm. Mr. E. Mas, USDA/NRCS after Hurricane George, Puerto Rico)
- For handicrafts, perfumes and medicinal purposes.
- For paper making, mulch, reinforcing bricks, fuel, pesticide, and many other uses.



Thailand - ladies making handicrafts, including handbags, vases, lampshades, book covers, hats and other crafts out of vetiver grass leaves and stems



Zimbabwe - a nicely thatched meeting house using vetiver grass thatch. The thatch will last three times as many years due to its resistance to insects and fungus attack

ACT NOW! and contact TVN for additional technical information.

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The Vetiver Network (TVN) is a nonprofit foundation under United States code 501 (c) (3). It is a volunteer organization that promotes the use of the Vetiver System through dissemination of information and networking worldwide. TVN has helped established over 25 regional and country-based affiliated networks.

Contact your local vetiver network at: