

Global Applications of the Vetiver System Technology



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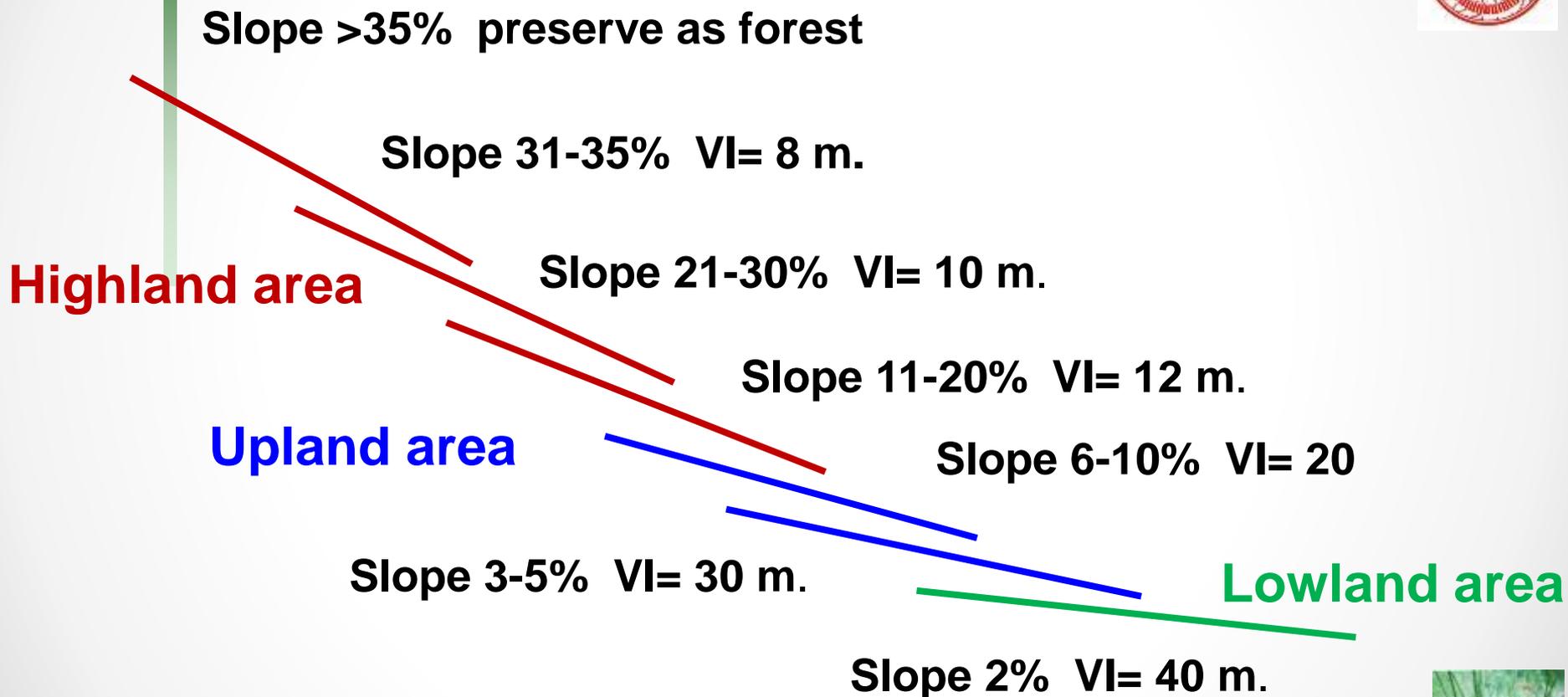
BRIEF HISTORY ON THE DEVELOPMENT AND APPLICATIONS OF THE VETIVER SYSTEM TECHNOLOGY

1. **Soil and Water Conservation in Agricultural Land**
2. **Stabilisation of Infrastructures**
3. **Environmental Protection**
 - Phytoremediation of wastewater*
 - Phytoremediation contaminated lands*
4. **Socio-economic impact on rural community**
 - Poverty alleviation*
 - Rural employment*
5. **Other major uses of vetiver plant**
6. **Mitigation of Climate Change impact**



Soil and Water Conservation in Agricultural Land

*The followings are works conducted by the Land Development Department,
Ministry of Agriculture and Cooperatives, Bangkok, Thailand,
Presented by Dr Pitayakon Limtong*



Applications of Vetiver system for soil and water conservation in Thailand



Soil and Water Conservation in Agricultural Land (Thailand)



Contour lined of Vetiver grass with terrace



Contour lined of Vetiver grass with hillside ditch



Vetiver grass lined in fruit tree plantation



Vetiver grass lined in fruit tree plantation

Soil and Water Conservation in Agricultural Land (Thailand)



Half-circle plantation for water preservation



Contour lined of Vetiver grass in upland area



Vetiver grass lined with hillside ditch in fruit tree plantation



Plantation on the bank of water drain ditch

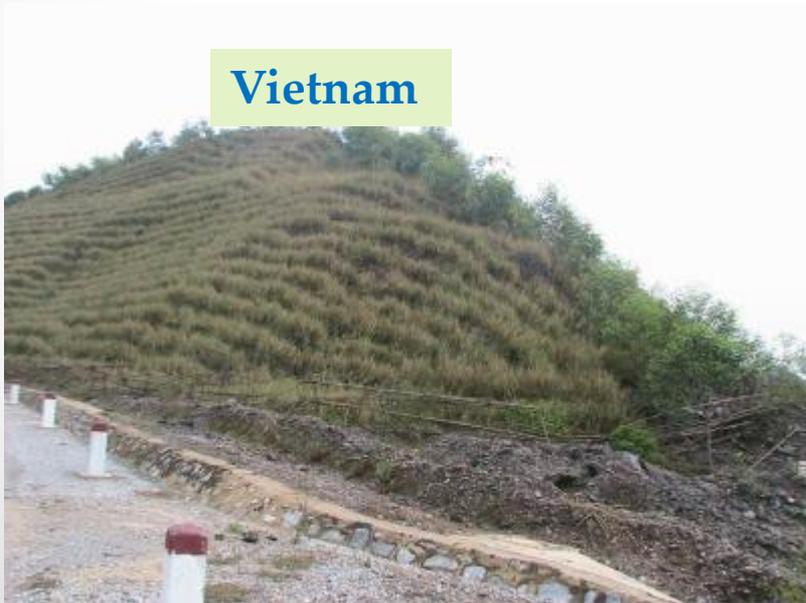
Stabilisation of Infrastructures

Thailand

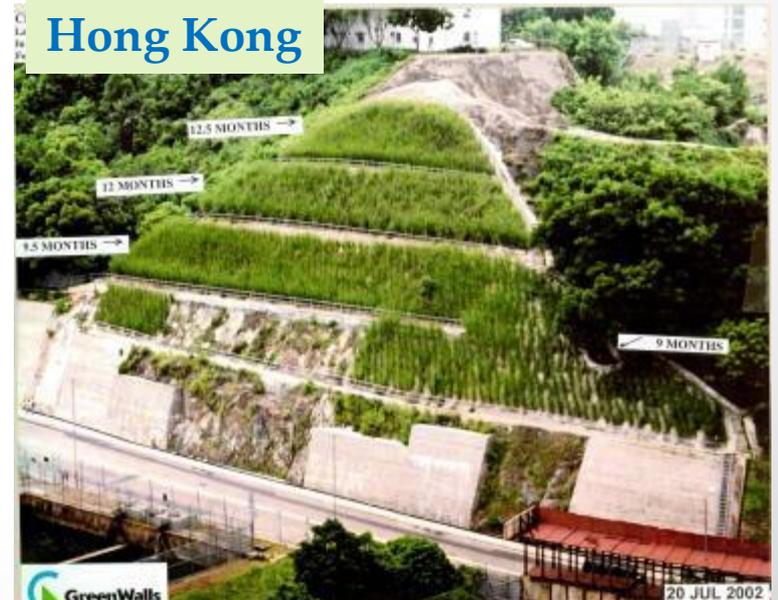


Before and after with appropriate design and implementation

Vietnam



Hong Kong



Stabilisation of Infrastructures in Latin America and Africa

Brazil



Madagascar



Colombia



Venezuela



Comparative of effectiveness and cost between VST and conventional engineering structures (J. Barcant)

	The Vetiver System (VS)	Hydroseeding	Hydroseeding with Coco Mats	Concrete Retaining Wall with Nails and Grouting	Gabions
COMPARED FEATURE					
Overall Slope Stabilization	Excellent	Very Poor	Poor	Excellent	Excellent
Interrill Erosion Protection (raindrop splash induced)	Poor (unless leaves used as mulch, than medium - excellent))	Medium	Excellent	Poor	Poor
Rill erosion (surface runoff induced)	Excellent	Medium	Excellent	Medium (needs re-vegetation)	Excellent
Sediment Retention/Control	Excellent	Medium	Excellent	Medium (needs re-vegetation)	Excellent (until silts up, then poor)
Gully Erosion Protection	Excellent	Very Poor	Excellent	Excellent	Excellent
Runoff control (concentrated flows)	Excellent	Poor	Medium	Medium (needs re-vegetation)	Excellent
COST	Excellent	Excellent	Medium	Very Poor	Very Poor
Time for Planting or Construction	Medium	Excellent	Medium to Excellent	Very Poor	Poor
Time to Effectiveness	Medium	Medium	Medium to Excellent	Excellent	Excellent
Durability	Excellent	Medium	Medium	Excellent	Excellent
Natural/Green Factor	Excellent	Medium	Medium	Medium	Poor
Encourages Re-growth of Local Plants and Trees	Excellent	Medium	Poor	Medium	Poor



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

Sewage effluent infested with Blue-Green algae due to high Nitrate (100mg/L) and high Phosphate (10mg/L)

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



Disposal of domestic sewage effluent

Vetiver planting to absorb effluent discharge from a toilet block in a park in Brisbane.



Six months after planting this stand of 100 plants absorbs all the discharge from the toilet block



SEWAGE EFFLUENT DISPOSAL

RESULTS

Better growth

IN FLOW

Average daily flow: **1 670L**

Average total N: **68mg/L**

Average total P: **10.6mg/L**

Average Faecal Coliform: **>8 000**

Poorer growth

OUT FLOW

Average daily flow: **Almost Nil***

Average total N: **0.13mg/L**

Average total P: **0.152mg/L**

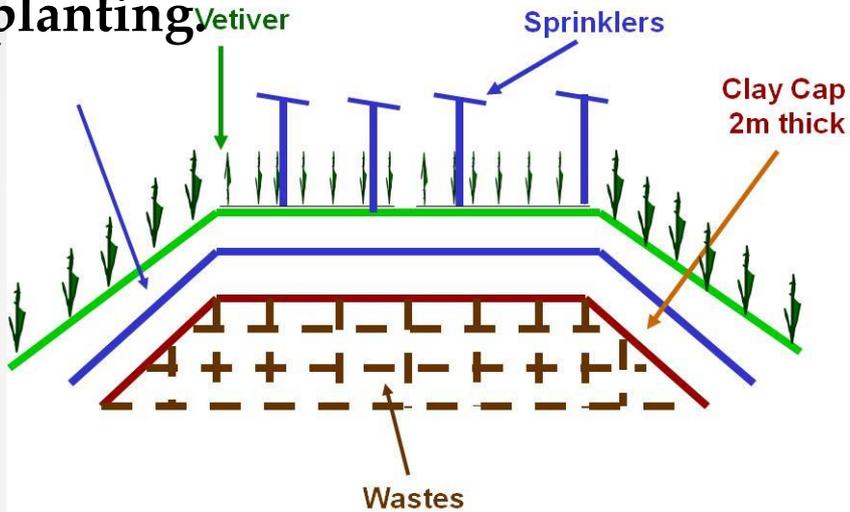
Average Faecal Coliform: **<10**

*** Only flow after heavy rain**

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Disposal of municipal landfill leachate in Australia

Spray irrigation on landfill mound: the diagrammatic cross section of the mound (top left), vetiver irrigated every day with leachate after planting (top right), two (bottom left) and twelve (bottom right) months after planting



Twelve months after planting, the 3.5ha site disposing 4 ML/month



Full details on
wastewater
treatment will be
presented in
WORKSHOP 2

Fresh leachate pool



Environmental Protection *Phytoremediation of Contaminated Lands* (more details in Workshop 3)

Ammonia and nitrate contaminated site at Bajool, Australia

This site was contaminated with extremely high levels of Ammonia and Nitrate as a result of explosive manufacturing.

Land surface area: 7 300m²

Soil depth: 2.5m to 3.0m

Contaminate soil volume: 20 000m³

Soil Ammonia level, ranging from 20 -1 220mg/kg, averaging 620mg/kg

Soil total N level, ranging from 31-5 380mg/kg, averaging 2 700mg/kg

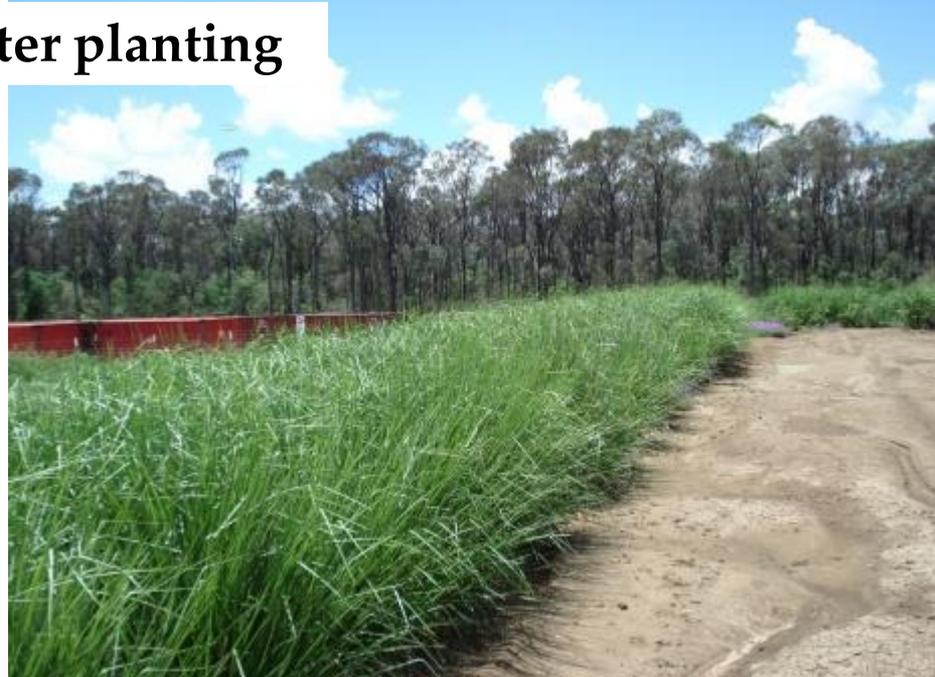
Water Ammonia level, ranging from 235-1 150mg/L, with one sample at 12 500mg/L

Water total N level, ranging from 118 – 7 590mg/L, with one sample at 18 300mg/L





8 months after planting



Environmental Protection *Rehabilitation of Mining Wastes* in Australia Before and after (more details in Workshop 3)



Coal mine overburden



Bauxite Redmud



Bentonite tailings



Environmental Protection *Rehabilitation of gold tailings* in Australia Before and after



Old tailings



Fresh tailings



**Full details on mine
rehabilitation will be
presented in WORKSHOP 3**

Environmental Protection *Rehabilitation of mine tailings* Before and after



Old Pb-Zn tailings in China



New iron ore tailings in India



Socio-economic impact on rural community *Poverty alleviation*



Protection food crops from soil erosion.



Stabilising rural road for easy access to market education and heal care in Bali



Providing extra income from “home nurseries” in Madagascar



Socio-economic impact on rural community *Rural employment*



Employment of women and children in community nurseries in Vietnam



Employment of women and men for vetiver planting in China



Employment of women and children in handicraft production in Venezuela

Other major uses of vetiver plant: *Handicraft*



China



India



Philippines



Senegal



Thailand



Venezuela



Other major uses of the vetiver plant



Grazing in India



Feedlot in New Zealand



Grazing in Australia



Ornamental in China and Vietnam



Thatching in Africa



Mitigation of Climate Change Impact



Landslide in Australia



Gully erosion in Congo



Landslide in Madagascar



Before and after:
Landslide in Brazil



The

Thank You