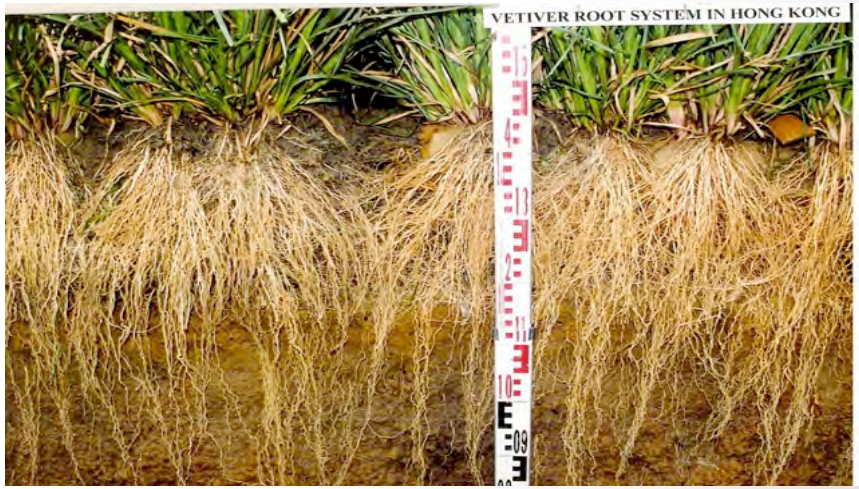
Past Achievements and Future Direction of The Vetiver Network International

by
Richard G Grimshaw O.B.E

Vetiver Grass - *Chrysopogon zizanioides*

Vetiver Grass Technology = Plant + Hedge (on contour)



Vetiver People of Latin America

Top row: **Oswaldo Luque** (Venezuela), **Paulo Rogerio** (Brazil), **Aloisio Periera** (Brazil)**, Oscar Rodriguez** (Venezuela), **Luiz Leucena** (Brazil).
Middle row: **Yorleny Cruz** (Costa Rica), **Joachim Boehnert** (Peru), **Alberto Rodriguez** (Puerto Rico), **Daniel Londono** (Colombia) **Carolina Rivas** (Chile)p.
Bottom row: **Lucio Lambert** (Brazil), **Fernando Costa Pinto** (Brazil), **Rafael Luque** (Venezuela), **Paula Leão** (Brazil), **Octavio Torres** (Colombia).

Vetiver People of the World



















Top row: **Jim Smyle (**USA), **John Greenfield** (New Zealand), **HR Princess Maha Chakri Sirindhorn of Thailand**, **Narong Chomchalow (**Thailand), **Elise Pinners (**Kenya), **Dale Rachmeler** (USA).
Second row: **Alain Ndona (**Congo), **Yoann Coppin (**Madagascar), **Marco Forti (**Italy), **Debela Dinka (**Ethiopia), **Roley Noffke (**South Africa), **Paul Truong** (Australia).
Third row: **Mark Dafforn (**USA), **Don Miller (**New Zealand), **Liyu Xu** (China) **Criss Juliard (**USA), **Suwanna Pasiri (**Thailand), **Dick Grimshaw (**USA).
Fourth row: **Shantanoo Bhattacharrya (**India), **Tran Tan Van (**Vietnam)

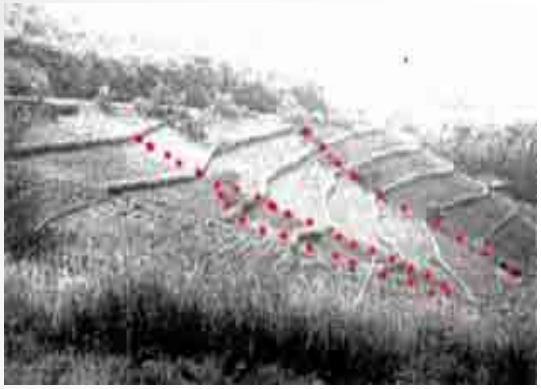
Vetiver Grass Hedgerow Technology Timeline Summary

- **1986 – Greenfield/World Bank Vetiver Grass Technology (VGT) for Agriculture initiative in India.**
- **1986 > focus on VGT for on-farm soil and water conservation.**
- 1989 – World Bank Vetiver Information Network established.
- 1993 – US National Academy of Sciences endorses VGT
- **1993 – start of serious development of VGT as a bio-engineering tool for slope stabilization (Yoon and Hengchaovanich).**
- 1995 – The Vetiver Network formally established as a non-profit organization, later renamed The Vetiver Network International.
- 1996 – first (Thailand)of five international conferences on Vetiver at 3-4 year intervals
- 1997 – start of formation of regional and country VGT networks
- **2000 – DNA analysis of genetic diversity of Vetiver – Robert Adams**
- 2002 – VGT info dissemination by Internet
- **2003 - VGT established as a phytoremedial tool for treating contaminated water and land Truong and Xia Hanping**
- **2003 – Vetiver System (VS) – name encompasses all VGT applications**
- **2003 – 2013 the three major VS applications continue to expand, increasing involvement of private sector, NGOs and government agencies.**
- **2007 – USDA/NRCS Plant Guide – Sunshine Vetiver – Robert Joy Non-invasiveness of Sunshine vetiver confirmed.**
- 2009 – Social media becomes an important tool for VS interaction and dissemination. TVNI supports a website, Facebook and blog. Other Vetiver networks and users do the same.

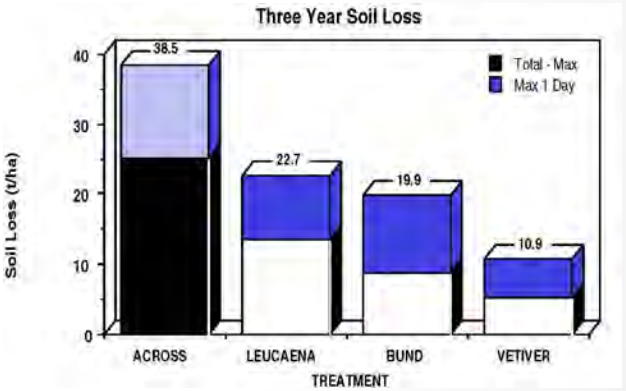
Vetiver Grass Hedgerow Technology Agriculture - Timeline 1930 to 1993

- **Pre 1930 - Vetiver grass hedgerow technology (VGT) used in south India for erosion control and field boundary demarcation. Also used in Nigeria for field boundary demarcation.**
- **1930 -1950 – VGT introduced to Caribbean countries (including St Lucia and Grenada) for on farm erosion control.**
- **1950s – VGT applied by Fiji Sugar Corporation (FSC) for erosion control on steep cane fields owned by small farmers.**
- **1986 – John Greenfield (ex FSC) introduces VGT to World Bank funded watershed development projects in India.**
- **1987 – Greenfield authors "Vetiver Grass – A Hedge Against Erosion".**
- **1986 – 1993 Indian Agricultural Universities conduct Soil and Water conservation research using VGT. Results indicate 90% reduction in soil loss and up to 70% reduction in rainfall runoff.**
- **1988 – Grimshaw introduces VGT to China's "Red Soils Project"**
- 1990 – World Bank initiates Vetiver Information Network.
- **1990 – King of Thailand initiates and promotes VGT.**
- 1990 – Jim Smyle hosts VGT workshop in Ethiopia.
- **1991 - 1993 – Dr. P.K. Yoon researches VGT in Malaysia, and produces a report "Look See at Vetiver Grass in Malaysia"**
- 1992 – First International Vetiver Workshop, hosted by Rubber Research Institute of Malaysia.
- **1993 – Paul Truong and Australian universities initiate VGT research**
- **1993 – US National Academy of Sciences reviews history of Vetiver and endorses technology, publishes "Vetiver Grass – A Thin Green Line Against Erosion".**
- 1993 – Vetiver Awards program and The King of Thailand Awards initiated.

Vetiver Grass Hedgerow Tecnology; Early On-Farm Applications - 1

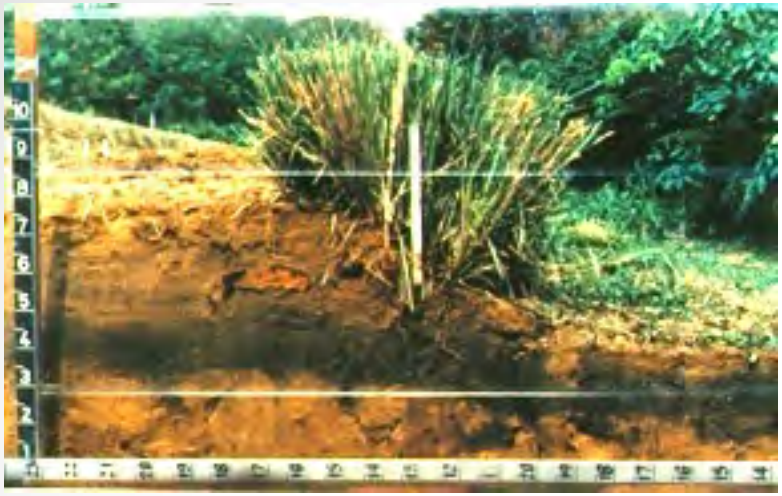




Top row: St Lucia (1940s), Fiji (1950s), India (traditional)
Bottom row: Fiji (1950s), India (1980s), Indian Research (1980s)

The Vetiver System – Agriculture - 2



Cross section of VG hedge

Longitudinal section of VG hedge

30 year old hedgerow, 20% slope, Fiji

Vetiver protected farm land in Cuba

The Vetiver System – Agriculture (Ethiopia -3

Vetiver hedgerows in western Ethiopia

- **erosion control soil loss reduced by > 90%**
- **reduction in rainfall runoff by 70%**
- **crop yield increases by 30%**
- **drought proofing 100%**
- **groundwater recharge**
- **protection against extreme flooding**
- **forage, thatch, mulch, and biofuel**
- **thousands of users, farmer to farmer promotion and dissemination**

Vetiver Grass Hedgerow Technology
Slope Stabilization – Timeline 1994 - 1999

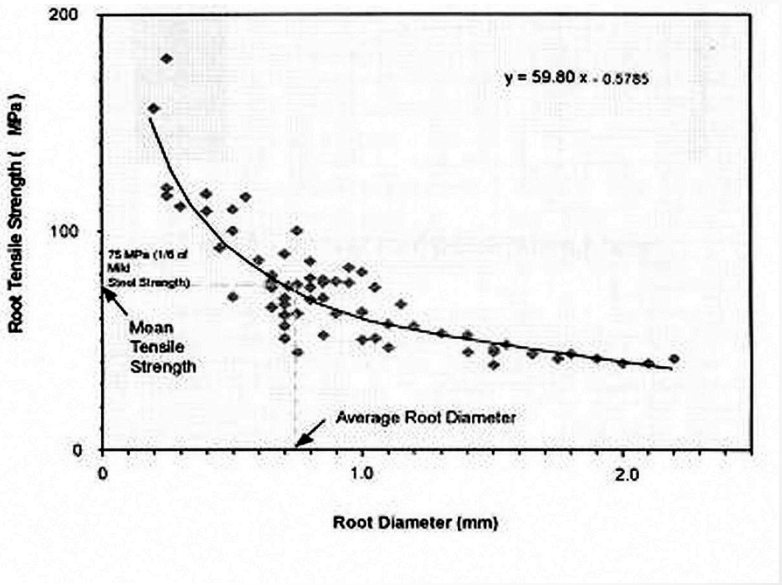
- 1995 – The Vetiver Network International (TVNI) is established as a non profit Corporation in Virginia USA.
- 1996 – TVNI wins US$100,000 John Franz Award for Sustainability ands receives a US$ 300,000 grant from The Royal Danish Government.
- 1996 – First International Vetiver Conference (ICV1) – Vetiver the Miracle Grass held in Chiang Mai, Thailand.
- **1996 - VGT firmly established as a bioengineering tool for slope stabilization – P.K.Yoon & Diti Hengchoavanich Average tensile strength of Vetiver roots Mpa 65 (9400 psi)**
- 1997 – China, Southern Africa, Latin America, Pacific Rim, The Philippines, Venezuela, and West Africa Vetiver Networks established.
- **1997> many NGOs promote the use of VGT; TVNI provide $200,000 to support NGO operated VGT pilot projects**
- **1997 – Vetiver activities extend to El Salvador, Malawi, Tanzania, Costa Rica, Zimbabwe,**
- **1997 – Madagascar VGT program initiated by Criss Juliard and Dale Rachmeler**
- 1997 TVNI website established at www.vetiver.org
- 1999 – Europe and Middle East Vetiver Network established

Vetiver Grass Hedgerow Technology
Slope Stabilization -1

P.K.Yoon's first stabilization trial – vetiver on right, local species on left.

Yoon's first major highway application - Malaysia

2 year old vetiver root - China

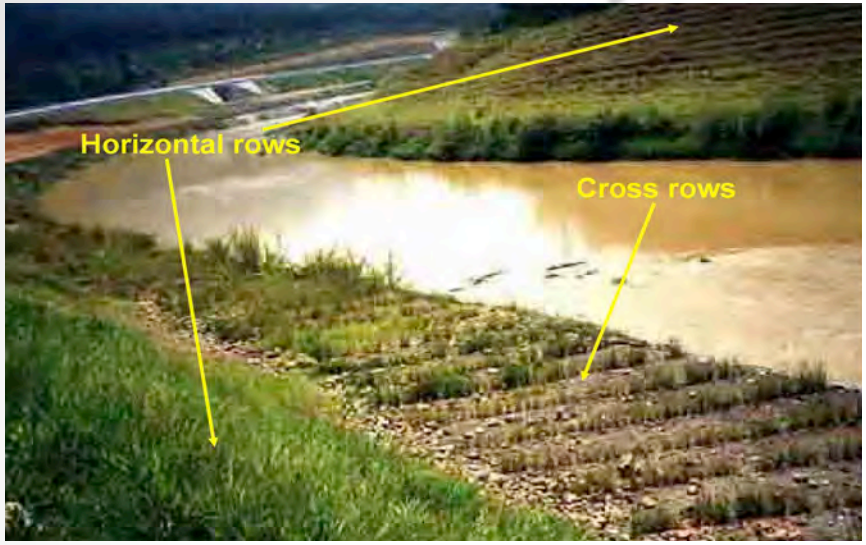


Tensile strength of vetiver root – 65 MPa

The Vetiver System – Slope Stabilization -2

Highway stabilization. Top row: Hong Kong, China, Vietnam. Bottom row: India, Brazil, Madagascar.

The Vetiver System – Slope Stabilization - 3

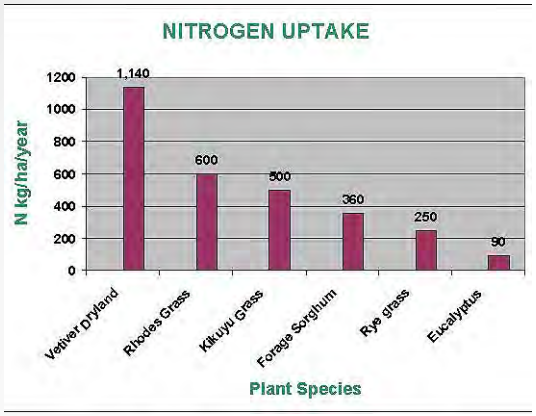


Top row: Road fill and river bank stabilization (Malaysia), Mekong River Cambodia. Bottom row: Canal and storm dyke protection (Vietnam)

Vetiver System Timeline 2000 - 2003

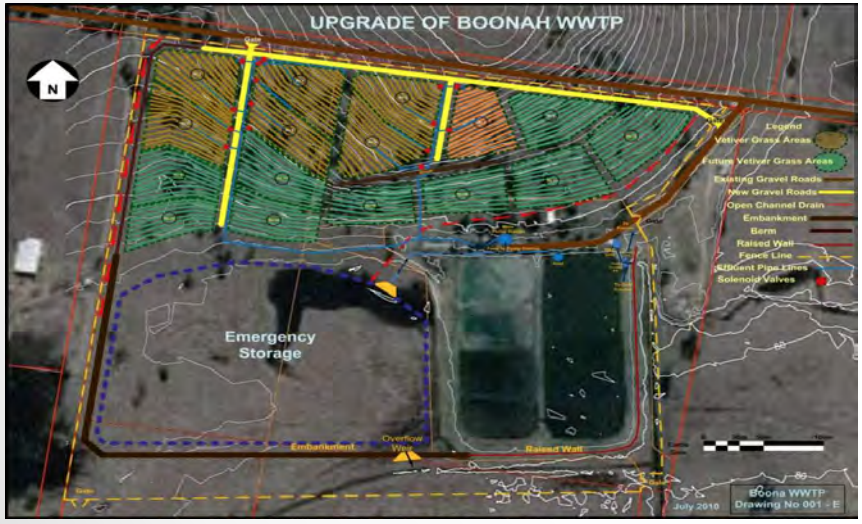
- 2000 – Second International Vetiver Conference (ICV2) – Vetiver and the Environment, held in Phetchaburi, Thailand.
- 2000 - The Vetiver Network (TVN) Her Royal Highness Princess Maha Chakri Sirindhorn of Thailand becomes patron of TVNI.
- 2000 – TVNI receives US$108,000 grant from Royal Danish Government and US $100,000 from William H Donnor Foundation.
- **2000 – DNA analysis of genetic diversity of Vetiver – Robert Adams**
- 2002 – "Vetiver Grass – An Essential Grass for Planet Earth" by John Greenfield.
- 2003 – Third International Vetiver Conference (ICV3) - Vetiver and Water, held in Guanzhou, China.
- 2003 – TVNI initiates Certification for Technical Excellence.
- **2003 – Vetiver 's tolerance to heavy metals and ability to take up high levels of Nitrogen and phosphates established – Truong, Hanping and amongst other.s**
- **2003 – VGT used on large scale for landfill protection and reduction of leachates in China and treatment of sewage in Australia.**
- **2003 – VGT demonstrated as a rehabilitation/phytoremediation technology for the mining industry in China and Australia.**
- 2003 – TVNI Board establishes the name ":Vetiver System" to encompass all aspects of VGT
- **2003 – East Bali Poverty Project demonstrates community involvement in VGT though teaching children.**

Vetiver System and Phytoremediation -1



Work by Truong (Australia) first demonstrated that Vetiver had significant potential for treating waste water and contaminated land

Vetiver System and Phytoremediation – 2 Waste Water



Vetiver System and Phytoremediation – 2 Contaminated Land

Top left: Gold mine (Australia)
Top right: Bauxite mine (Venezuela)
Bottom: Landfill in China

The Vetiver System Timeline 2004 - 2009

- **2005 – VS applied to domestic sewage treatment in the rehab of Aceh, Indonesia.**
- 2006 – Fourth International Vetiver Conference (Vetiver and People), Caracas, Venezuela.
- **2006 > Expansion of bi-product use of Vetiver, especially for handicrafts following Thai and Venezuelan demonstrations.**
- 2006 – Morocco Vetiver Workshop
- 2006 – Kuwait Vetiver Workshop. VS research initiated for arid region application.
- **2007 – USDA/NRCS Plant Guide – Sunshine Vetiver – Robert Joy Non-invasiveness of Sunshine vetiver confirmed.**
- 2008 – National Vetiver Workshop India – Cochi Significant increase in VS thereafter develops in India.
- **2008 – Publication of The Vetiver System Applications – Technical Reference Manual by Truong, Tran and Pinners**
- 2009 – Ethiopia and Kenya Vetiver Workshops.
- **2009 – wide scale use of VS for soil and water conservation and wetland rehab demonstrated in Ethiopia over 20 years.**

The Vetiver System Timeline 2010 - 2013

- **2010 – NGO "Haiti Reconstruction" starts testing VS as a biofuel for cook stoves**
- 2010 – First Regional Latin America Vetiver Conference – Santiago, Chile.
- **2010 – Following 2010 hurricane in Haiti VS seen and applied as a major land rehab and protection application.**
- **2010 – Vetiver for Disaster Mitigation and Land rehabilitation, – Brazil landslide rehab, Madagascar**
- 2011 – Fifth International Vetiver Conference(Vetiver and Climate Change – Lucknow, India.
- **2011 – large scale landfill leachate recovery using VS demonstrated in Mississippi, USA – extended to Mexico**
- 2012 – Regional Vetiver Conference, East Asia, Danang, Vietnam.
- **2012 – Iran and Kuwait demonstrate use of VS under arid conditions.**
- **2012 – large scale use of VS by commercial companies for slope stabilization in Brazil, China, Congo, Colombia, India, Madagascar, Venezuela – mitigating global warming extremes.**
- **2012 – TVNI Top Rated Non Profit Organization and in 2013**
- 2013 – Second Regional Latin America Vetiver Conference – Medellin, Colombia.

The Vetiver System – Disaster Mitigation Before and After

Landslide rehab - (Brazil)

Urban erosion rehab (Congo Brazzaville)

The Vetiver System
Community Involvement

Top row: Ethiopian farming communities rehab their farm land and create income.
Bottom row: Madagascar community earned US$200,000 in producing plant material for stabilizing these huge sand dunes.

The Vetiver System
Land Rehabilitation

Above: 200 km of VS hedges rehabilitated this degraded commercial farm in Ethiopia and led to increased yields and perennial spring flow.

Madagascar has very serious erosion leading to massive movements of sediment at great economic cost. Vetiver can stabilize and rehabilitate these huge degraded areas - right and below.

The Vetiver System
Lessons Learned - 1

- VGT characteristics and applications are scientifically well supported and verified. It is a low cost technology applicable over a wide range of conditions (benign and extreme).
- Quality plant material and quality application are important.
- VS applications relate to soil and water conservation (including groundwater recharge), contaminated land and water rehabilitation (including pollution control), and slope stabilization associated with infrastructure and natural systems such as riverbanks and gullies.
- There are many interesting bi-products of Vetiver that are being used, tested and developed.

The Vetiver System
Lessons Learned - 2

- Small farmers are slow to use VS for erosion control for many reasons; their reluctance could be reduced through better training at community level and appreciation of the many applications and uses of Vetiver. Those who train farmers, whether they are government workers or NGOs need to understand the wider aspects of Vetiver, particularly the use of its bi-products.
- The adequate availability of Vetiver plant material is a prerequisite to any VS program however big or small.
- Small farmers can be easily taught to produce high quality Vetiver plant material for sale to contractors/landscapers and others responsible for stabilization of slopes, as well as to other nearby farmers or community projects.
- VS should not be a technology confined only to agricultural and soil conservation staff and engineers, but is a tool for anyone in any sector looking for a biological solution to solve problems relating to land and water.
- When VS is applied for infrastructure – slope stabilization or waste and water treatment - it is important that technically verifiable specifications are clearly established. Follow up maintenance for at least two years is important to assure long term effectiveness.

The Vetiver System
Lessons Learned - 3

- The private sector has a major role to play in extending the technology and pressing government policy makers and agencies to use it. Large companies have an important role to involve small farmers in the production of quality plant material.
- The demand for plant material will increase substantially and it needs to be propagated near the application site.
- TVNI no longer funds research, there seems sufficient interest in the technology assuring alternative funding for research.
- Workshops and conferences are important for furthering the technology, and should be continued. Attendance by experienced VS resource persons is important.
- Greater efforts need to be made to create VS awareness at policy maker levels across various sectors.
- The Internet has been and will be critical to the success of VS in providing information fully in the public domain on the technology and for providing the means for social networking and interaction.
- The 100% volunteer culture of TVNI and its associates has helped assure a common trust amongst users that has resulted in an unprecedented sharing of information and experience that to my knowledge has not been duplicated.

The Vetiver System
What Next?

The Vetiver System building on 25 years of experience should play an important role in mitigating the effects of climate change by:

1. **Enhancing food security (including ground water recharge).**
2. **Reducing poverty through increasing farm incomes and providing VS related employment.**
3. **Mitigation of extreme events, landslides, flooding, and intense and damaging rainfall.**
4. **Providing for a low cost and effective bio-engineering solution for infrastructure stabilization.**
5. **Rehabilitation and protection of degraded land and water sources.**
6. **Decontaminating land and water, and thus improving public health and wildlife.**
7. **Bio-product use especially as an energy source.**
8. **Sequestering atmospheric carbon.**

The Vetiver Network International
What Next?

TVNI should continue much as it is doing now:

1. **Continue as a knowledge based organization.**
2. **Support and generate user interaction.**
3. **Support workshop conferences and training.**
4. **Provide where possible expert technical support.**

In the immediate future:

1. **Commission an in-depth review of TVNI and VS covering the past 25 years.**
2. **On the basis of the review create a strategy where policy makers, designers and project/program executors take notice and use VS to tackle the land and water issues that are being impacted by climate change.**
3. **Restructure TVNI on the basis of available funding (the latter could include some sort of professional fee structure for VS members).**