July 2002
Number 24

The Vetiver Network

VETIVER NEWSLETTER

A NEWS MAGAZINE PROMOTING THE VETIVER SYSTEM
HER ROYAL HIGHNESS PRINCESS MAHA CHAKRI SIRINDHORN OF THAILAND - PATRON

The Vetiver Network (TVN)
3601 N. 14th Street
Arlington, Virginia 22201
USA
Tel: (001) 703-525-7092
Fax: (001) 703-243-6203
Email: vetiver@vetiver.org
Homepage: www.vetiver.org

WHAT'S HAPPENING AT TVN ?

By Jim Smyle, President - TVN

It has been approximately one year since our last Vetiver Newsletter and I am sure many of you have been wondering what has happened. In the past, TVN Newsletters had been published about two times per year; something to which we had all become accustomed. The reason for the long time since publication of the last Newsletter has nothing to do with a lack of new information and news. On the contrary, during 2001/2002 we have seen a lot of activity worldwide with the Vetiver System [VS]. Rather it has been due, among others, to the increase in activities by the Regional and National Networks, many of which are putting out two to three Newsletters per year and keeping their membership well-informed on relevant goings-on. Also, this last year has seen TVN's activities become much more web-based. All of the good information coming in is available immediately as it is published on the web. This now also allows the Regional and National Networks to rapidly get the information out to their 'unconnected' (via the Internet) readers. The key features of TVN on the web are:

TVN Homepage <www.vetiver.org>. The TVN website is a repository for all current and historic information on the Vetiver System. **Dick Grimshaw** is the webmaster and he keeps the site updated so that all the latest information is immediately available.

TVN Discussion Board. Inaugurated on November 30, 2001 this lively online discussion now has some 240 postings. See page 4 for a full listing of topics.

Photo 1. A women's group in China study their Vetiver System brochures provided to them by the China Vetiver Network.

Photo Credit: Liyu Xu

The Discussion Board is a handy place to get your technical questions answered or to share your expertise and knowledge with others. Register and join in on the Discussion Board at <www.vetiver.com/discus>. The archives of past discussions as well as the current, ongoing exchanges can be found there.

Email Queries. These days over 90% of the correspondence we receive comes through email (<vetiver@vetiver.org>). This allows **Joan Miller**, our TVN coordinator, to put people directly in touch with other users in their own country, with their national or regional networks (where these exist), or with our VS experts who can provide detailed technical advice.

Of course, we are not giving up producing newsletters, answering mail and sending out published information (like the ever popular

INSIDE :

"Green Book"). There are still many of you who rely on TVN's 'conventional' means of getting information to you. However, at this time, because TVN is an all-volunteer effort, our slow down in conventional activities has also been due to a busy year in our "other" jobs. Unfortunately, this slow down has also come at a time when the global activities of TVN have expanded considerably and thus more opportunities. So, both for you who rely on hard copies of newsletters, information packages, etc. and for those who have yet to hear about the VS, we are hoping to improve our capabilities and overcome our limitations as a voluntary service. To this end, we have been looking at a number of alternatives:

- Forming a partnership with a Washington, DC-based private, non-profit, international development organization (ACDI/VOCA) which would operate the "Vetiver Information Network" (VIN) with a full-time coordinator, backed by an experienced and well-funded, non-profit development agency.
- Decentralize completely such that the national and regional Networks become the primary providers of information, with the web-site as a clearing house for global information.
- Other? Suggestions welcome.

So, while we may have been a bit slow this last year, the TVN and its members around the world have been working hard and getting results. Use and knowledge of The Vetiver System is now expanding at a faster pace than ever before. Here are just a couple of highlights:

The dates for the **Third International Vetiver Conference (ICV-3)** have been moved up by one year to October of 2003. The Conference will be held in Guangzhou and **Dr. Luo Fuhe** (President, Guangdong Academy of Agricultural Science and Director, Guangdong Provincial Grass Industry and Environment Association) has agreed to become the President of ICV-3 and take responsibility for providing the necessary arrangements for the event. These arrangements are the results of the hard work by **Prof. Liyu Xu**, the Coordinator of the China Vetiver Network, **Dr. Sumet Tantivejkul**, Secretary-General of the Chaipattana Foundation and Chairman of the Continuing Committee (CC) of the ICV, and **Dr. Narong Chomchalow**, Coordinator of the Pacific Rim Vetiver Network and Secretary of the Coordinating Committee for ICV-3.

John Greenfield's new and comprehensive book on the VS is just about ready for publishing. The book, entitled, *Vetiver Grass — An Essential Plant for the Conservation of Planet Earth,* has been several years in the making with John diligently scribbling away and patiently suffering the editorial comments of TVN members. John's new book pulls together the thousand plus year of history of vetiver grass and "*aims to provide planners in the government and private sectors with as much information as possible on this natural system of conservation for future application…"*, which it admirably does. The book will be available in August from Infinity Publishing.com. See page 6 of this newsletter for details.

In looking back over what we know has been accomplished in the last year what is striking is how one sees that it is people, not organizations or institutions that are making all the difference. **Criss Juliard** in Senegal has been particularly busy spreading the word, including setting up demonstrations, looking at applications for *Vetiveria nigritana* and traditional uses of vetiver as a decorative plant.

Additionally, you can find on the website reports on all the new developments over the last twelve months…any of which we would be happy to download, print out and send to those of you without any means of accessing the website. Among the these developments you will find: In **Vietnam**, vetiver is now being used to protect ditches and river bank properties. There is a 'Growing Vetiver Movement', in **India**, for soil and moisture conservation in tea plantations. In **Portugal** for highway landscaping. In **China** there are new projects in south China's Dabie Mountains; vetiver grass was demonstrated at a garden show for landscaping and handicrafts; and a Vetiver Conference was held by the Highway Bureau of Fujian Province. Reports were received from China on the "*Stabilization of a Railroad Embankment with Vetiver in South China"*, on work in the Datianshan Landfill in Quangdong Province, on the *"Stabilization Of a Building Site at Huizhou University in South China"*, *"Using Vetiver Grass Stabilization of a Sports Stadium Site"* and *"Environmental Mitigation - Landfill Stabilization and Cleanup Using Vetiver"*. In **Bali**, The East Bali Poverty Project is harnessing 'The Power Of Vetiver Grass'. In **Thailand** we have the reports from Thailand on *"The Use of Vetiver Grass System for Erosion Control and Slope Stabilization along the Yadana Gas Pipeline Right of Way"*, and *"Utilization of Vetiver as a Medicinal and Aromatic Plants"*. In **Madagascar**, the protection of infrastructure (railroads, ponds, highway) using VS continues to grow. In **Australia**, *"Brisbane Schists [have been] Stabilized with Vetiver Grass"*. Many of the new uses for the VS have been documented in Australia: for Waste Water Treatment, for Agrochemical Pollution Control, for Water Quality Improvement in Acid Sulphate Soils, for Landfill Leachate Control, for Algae Bloom, and for Treating Sewage Effluent.

Finally, as you may have heard, vetiver's taxonomic name has been changed from *Vetiveria zizanioides* (L.) Nash to *Chrysopogon zizanioides* (L.) Roberty. Do not expect to see a change in the name of the network… the VS remains the same, vetiver grass is what holds it all together, and TVN will carry on promoting it as a solution for your problems. v

ANNOUNCEMENTS

THIRD INTERNATIONAL CONFERENCE ON VETIVER & EXHIBITION (ICV-3)

The Vetiver Network is pleased to announce the Third International Vetiver Conference in Guanzhou, Guangdong Province, in southern China from **October 6 to 9, 2003**. The theme of the conference is 'Vetiver and Water' and the focus will be on the Vetiver System's (VS) application to improve water quality and distribution in the environment. Topics will include application of VS for: runoff control, groundwater recharge, erosion control and slope stabilization, pollution control and water quality protection, purification of landfill and mining leachates, earthwork stabilization, plant production, extension strategies, and other grasses for water and soil conservation. The conference is being organized to focus on the needs of users of VS by concentrating on providing information and site visits to see applications and generate discussion to will help guide the practioner.

It is anticipated that participants from over 30 countries will attend. The conference will be conducted in English with simultaneous translation to and from Chinese. A conference announcement and registration form is posted on the Vetiver Network Homepage and at <www.ICV-3.com>. Information can also be obtained at: ICV-3 Office, Guangdong Academy of Agricultural Sciences, Wushan, Guangzhou 510640, tel: 86-20-85514259; fax: 86-20-87503358; Email: <office@ICV-3.com>. v

KING OF THAILAND VETIVER AWARDS ANNOUNCED

TVN has been informed that **Princess Maha Chakri Sirindhorn**, Chairperson of His Majesty the King of Thailand's Chaipattana Foundation, has agreed to grant US$10,000 from the Chaipattana Foundation for "The King of Thailand Vetiver Award" for the most outstanding works on vetiver. This is the third time that such an award has been made This award will be split into two prizes, valued at US$5,000 each; one prize will be awarded to the most outstanding research on vetiver and the other to the best program for dissemination of vetiver technology.

Nominations for the award may come from any person of any nationality. Please send nominations to:

Office of the Royal Development Projects Board
78 Rajdamnern Nok Ave.
Dusit, Bangkok 10300, Thailand
Fax: (66-2) 280-6206, 629-8915
Email: <vetiver@mail.rdpb.go.th>

Please include a self-addressed card that can be returned to the nominees to acknowledge receipt of nominations. The nominations must be postmarked on or before **30 June 2003**.

The announcement of the winners will be made in August 2003. The winners will receive the awards from Her Royal Highness Princess Maha Chakri Sirindhorn, the Patron of the Vetiver Network, on His Majestry's behalf. The presentation of the Award will be made during the Opening Ceremony of ICV-3 in Guangzhou, Guangdong, China on 6 October 2003. **The award does not cover the cost of participation at ICV-3.** v

VETIVER NETWORK AWARDS PROGRAM UPDATE… NOMINATIONS WANTED

The Vetiver Network reminds you that the third series of Vetiver Awards (announced in Vetiver Newsletter #23), totaling US$45,000 in prize money will be awarded thanks to a generous grant from the **William H. Donner Foundation**. In anticipation of the Third International Conference on Vetiver, to be held in China in October 2003, whose theme will be "Vetiver and Water", one category of the awards will be VS applications in relation to water. As in the past, the TVN hopes to receive many nominations for each category. The **deadline for nominations will be July 2003** (note that in Newsletter 23 the deadline was listed as October 2003 – this has been moved forward for the conference). Award winners will be announced at the ICV-3 Conference in October 2003.

As a reminder, the Awards categories are as follows:

- Water Applications (Watershed Protection/ Improvement, Engineering – Natural and Constructed, Quality – Pollution Control and Treatment)
- Engineering/Infrastructure Protection
- Land Reclamation
- Dissemination
- Country Vetiver Award
- Farmer/User Awards – Regional (Asia, Africa, Latin America)
- Other
- Vetiver "Champion"

Refer to Newsletter 23, Page 4 for details or check the Vetiver Network Homepage <www.vetiver.org>. v

Note address change for nominations:
The Vetiver Network
709 Briar Road
Bellingham, WA 98225
USA

Project	Recipient	Total Grant
Use of Vetiver (Vetiveria zizanioides) with Leguminous Species for the Conservation and Recovery of Soils.	Ing. Luis A. Arevalo, International Center for Research in Agroforesty (ICRAF), Peru	$ 9,000.00
Utilization of Vetiver for Treating Acid Mine Drainage Treatment	Dr. W.S. Shu, Associate Professor, School of Life Science, Zhongshan University, Guangzhou, China	$ 6,536.00
Relation Between Fats and Vetiver Grass and Counter-measures	Mr. Chen Shangwen, Researcher, Forestry College, Nanning University, Nanning, China	$ 1,720.00
Vetiver System For Erosion Control in the Central Highlands, Vietnam	Dr. Pham Hong Duc Phuoc, Department of Plant Physiology, University of Agriculture and Forestry, Thu Duc, Ho Chi Minh City, Vietnam	$ 5,300.00
A Study on Purification of Vetiver Man-made Wetland for Industrial Wastewater	Dr. Xia Hanping, Associate Professor, Centre for Ecological Research, South China Institute of Botany, The Chinese Academy of Sciences, Guangzhou, China	$ 8,000.00
Vetiver Grass Technology for Wave and Current Erosion Control in the Mekong Delta, Vietnam	Dr. Le Viet Dung, Department of Crop Science, University of Can Tho, Vietnam	$ 6,800.00
Assistance to Vietnam Donner Research Grant Projects	Dr. Paul Truong, Principal Soil Conservationist, Natural Resource Sciences, Brisbane, Australia	$ 3,000.00
Study on the Effectiveness of Vetiver Hedges in Reducing Sediment and Pesticide Movement from Agricultural Lands	Mr. Edison Purba, Lecture, Faculty of Agriculture, Universitas Sumatra Utara, Indonesia	$ 2,725.00
Growing Vetiver in the Polluted Water: Generating Income for the Poor in Peri-Urban Areas	Mr. Yudi Widodo, MSc., Senior Agronomist, Research Institute for Legume and Tuber Crops, Malang, Indonesia	$ 2,150.00
		$45,231.00

Table 1. Summary of research projects funded by the William F. Donner Foundation through TVN's research program.

Donner Foundation Research Grants – Update

Through the generosity of the William H. Donner Foundation, TVN awarded grants totaling $45,000 for research on water-related aspects of vetiver. TVN funded up to 50% of the proposed research, with the remaining 50% provided by the recipients. Above (Table 1) is a table with a brief summary of the proposals that were funded. v

New TVN CD-ROM Available

TVN has a new CD-ROM available for US$15 (including mailing). This CD contains amongst other files, the complete TVN website and all its associated files as of 1 April 2002. This CD contains practically everything we know about vetiver and is fully illustrated with color images. The CD also includes **Dr. P.K. Yoon's** *"Look See at Vetiver"* which Dick Grimshaw still considers the best compilation available of vetiver basics and research. Also included are the excellent posters on the VS prepared by **Paul Truong** for the Bonn Water Conference in Germany and a Vetiver Workshop in Australia. The printer-ready version of the VS brochure that was published in 2001 is also on the CD. If you would like a copy, please send a US$ check or money order to: The Vetiver Network, 709 Briar Rd, Bellingham, WA 98225 USA. v

The Vetiver Network Discussion Board

In January 2002, a TVN Discussion Board was initiated so that users could share their experiences, ask questions and receive answers from experienced users, and discuss a wide range of topics relevant to the application of VS. There are twelve topic areas, with discussions, archived on the site:

- Vetiver Grass Agronomy & Taxonomy;
- VS for Environmental Protection, including prevention of floods, landslides, & mining reclamation, carbon dioxide sequestering;
- VS for Engineering Site Applications;
- Vetiver Grass Nursery Planting Techniques, Propagation & General Management Issues;
- Vetiver Grass Sales Outlets;
- VS for Soil & Water Conservation & Erosion Control;
- VS Technology Transfer Issues & Networking;
- VS for Beach, Canal, Drainage & River Bank Stabilization;
- VS for Ground Water Improvement
- VS for Waste Water Improvement & Other Water Quality Issues;
- Other Uses of Vetiver Grass; and
- Other Technologies;

The discussion board can be accessed via TVN's Homepage or directly at <www.vetiver.org/discus > v

Tentative Program of International Training Course on Vetiver Handicraft-making

The **Pacific Rim Vetiver Network** (PRVN) is developing a two week training course on production of handicraft items.

The course will include several days devoted to the preparation of raw materials and tools needed, more than a week for learning how to produced vetiver handicraft products (such as boxes, trays, hats and baskets), and finally information on finishing and decorating products.

The course has not yet been scheduled, but if you are interested please contact PRVN at: Office of the Royal Development Projects Board, 78 Rajdamnern Nok Ave., Dusit, Bangkok

10300, Thailand, Fax: (66-2) 280-6206, 629-8915, Email: <vetiver@mail.rdpb.go.th> v

THE VETIVER WEBSITE: HOW USEFUL IS IT? ACCESSING WHAT WE KNOW ABOUT VETIVER

Our webmaster, **Dick Grimshaw**, has been operating and keeping TVN's website up-to-date for several years now. The website has become our most important repository of information. There, you will literally find every bit of information we have received that can be published in electronic format and it is all indexed and searchable. But, do people use it? The answer to that is "yes". We know it because of the volume of queries we get where people tell us that they found us through the website. We know it because the TVN website is referenced or linked on hundreds of web pages put up by universities, research centers, NGOs, government agencies, individuals, etc. We can also tell from the domain report which identifies the origins of visitors to this site by the suffix of their domain name and by our website report that gives a summary of the general statistics for the entire web site during the report time frame. For those of you who are interested:

Between October 31, 2001 and April 28, 2002 , the following number (see Tables 2 and 3) of requests and volume of information was transferred from <www.vetiver.org> to people from 21,190 different "hosts" or internet servers. v

Successful server requests	292,666
Total data transferred	7.18 GBytes
Total data transferred in last 7 days	263.34 MBytes

Table 2 (above). Number of requests received on Homepage for VS information (between 31 October 2001 and 28 April 2002).

Table 3 (below). Summary of origin and number of requests for VS information by region and most inquisitive countries.

Location Of Requesting Server	# of Requests	Most Active Countries
Unknown, Total	219,374	
Europe	20,940	France (4,166) & Italy (3,918)
East Asia	11,893	Thailand (3,177) & Taiwan (2,232)
Latin America & Caribbean	11,547	Mexico (2,716) & Brazil (2,455)
North America	10,654	USA (7,434)
Oceania	8,453	Australia (6,033)
South Asia	4,173	India (3,880)
Africa	2,551	South Africa (1,182)
Mediterranean	2,271	Portugal (1,915)
Middle East	810	Israel (422)
Total	**292,666**	

NEW VETIVER PRODUCTS:

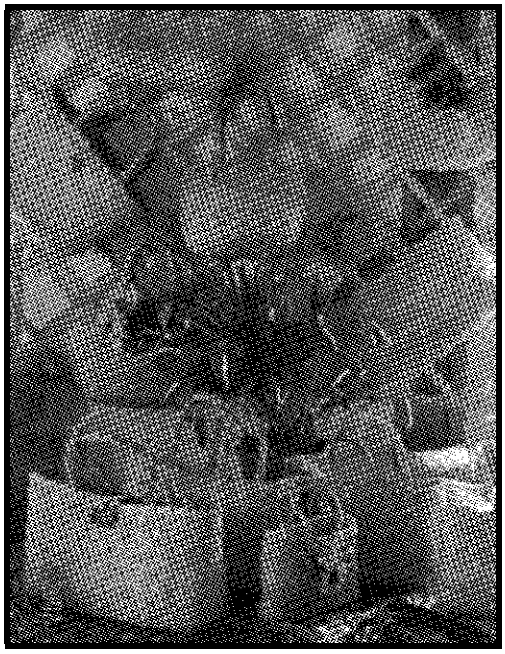

Photo 2. Some vetiver products produced as part of **Fundacion Polar's** vetiver Projects in Venezuela.
Photo credit: Fundacion Polar

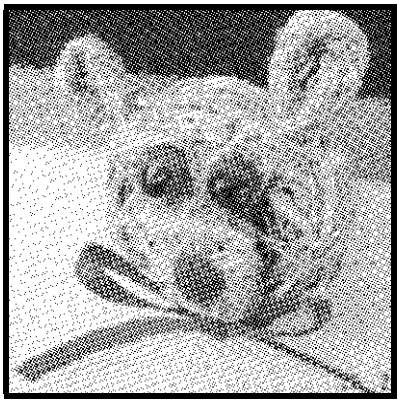

Photo 3. Madam Zhang Jin has started a handicraft business using vetiver products in Fujian, China.
Photo credit: Liyu Xu

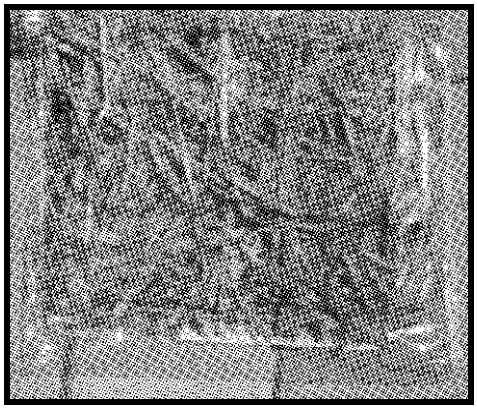

Photo 4. Erosion control mat made from vetiver leaves commercially produced in Sri Lanka.
Photo credit: Paul Truong

PUBLICATIONS

"VETIVER GRASS - AN ESSENTIAL GRASS FOR THE CONSERVATION OF PLANET EARTH"

The above titled book is ready for publication authored by vetiver expert **John C. Greenfield** summarizing vetiver's history; the problems of erosion and degradation; its use (among others) as a plant for agricultural uses, erosion control and bioengineering, and environmental protection; worldwide experiences; potential for commercialization; propagation strategies; planning a country-wide vetiver program; a photographic summary; pests and diseases of vetiver; and a comprehensive index.

The book will be available in August 2002 (US$19.95 plus shipping) from:

Infinity Publishing.Com
519 West Lancaster Avenue
Haverford, PA 19041-1413 USA
<infinitypublishing.com> or
<www.buybooksontheweb.com>
fax: 610-519-0261

It should be available from Amazon.com and BarnsandNoble.com in late November or December. v

PUBLICATIONS FROM THE OFFICE OF THE ROYAL DEVELOPMENT PROJECTS BOARD IN THAILAND

ICV-2 Proceedings

The Office of the Royal Development Projects Board (RDPB) (in Thailand) has announced the publication of the "Proceedings of the Second International Conference on Vetiver" held at Cha-am, Phetchaburi, Thailand, 18-22 January 2000.

The 482-page ICV-2 Proceedings include an Executive Summary, the Keynote Address papers given by the winners of of the King of Thailand Vetiver Award, all the presentations made including "Experience in Putting Together Country-wide Vetiver Programs: Policy Issues, Expectations and Results"; "Vetiver and Natural Disaster"; "Soil and Water Attributes"; Pollution Control and Treatment/ Restoration and Rehabilitation of Disturbed and Contaminated Areas; Disaster Prevention; Training and Technology Dissemination; Basic Research and General Studies; and Alternative Uses and Socio-economic Values of Vetiver. The Proceedings are indexed by author and subject.

The Utilization of Vetiver as a Medicinal and Aromatic Plant with Special Reference to Thailand

By **Narong Chomchalow**, Assumption University Bangkok, Thailand - Publication of the Pacific Rim Vetiver Network (PRVN) Technical Bulletin No. 2001/1, September 2001.

This publication highlights the utilization of vetiver in traditional medicine, in pest control, and as a fragrant plant. Research on production of vetiver oil and reserach and development on the industrial potential of vetiver in Thailand are also described. The publication includes discussions on vetiver planting, environmental implications, socio-economic aspects, and industrial potentials.

Development of the Vetiver System in Guangdong, China

By **Xia Hanping** - Restoration Ecologist, South China Institute of Botany, Guangzhou, Guangdong, China - Publication of the PRVN Technical Bulletin No. 2001/3, December 2001.

(Excerpt from abstract) During the past 11 years, research on vetiver and the VS has made a great progress in Guangdong [China], and initiated a new concept, named 'Vetiver Eco-engineering'. Its demonstrations and application have also been extended into numerous fields such as reservoirs and rivers, highway slopes, landfills, quarries, mined land, and even city parks from its original use in soil and water conservation in agricultural. In recent years, there have been more institutions, agencies, and the private sector in Guangdong engaged in VS research and application resulting in a rapid development of the VS in this province. On the whole, development in VS has been most rapid in Guandong as compared with other provinces of China.

Copies of the three above publications may be requested from:

The International Affairs Section
The Office of the Royal Development Projects Board
78 Rajdamnern Nok Ave.
Dusit, Bangkok 10300, Thailand
Email: <vetiver@mail.rdpb.go.th>

"VETIVERIA: THE GENUS VETIVERIA"

A book has been recently published on the genus Vetiveria. **Massimo Maffei**, a plant physiologist and Head of the Department of Plant Biology at the University of Turin, Italy, has edited a publcation of nine chapters, authored by twelve experts. The book describes the anatomy, physiology, biochemistry, essential oil biogenesis and chemical composition, distillation as well as production of plants for essential oil production and the use of vetiver as an ecological tool against erosion, soil pollution and many other applications.

The book can be ordered online at Amazon.com <www.amazon.com> or contact the publisher directly at:

Antonio Upali
Marketing Assistant
Taylor & Francis
11 New Fetter Lane
London EC4P 4EE
United Kingdom
Fax: +44 (0) 20 78422300
Phone for credit card orders:
+44 (0) 1264 343071

LETTERS

VETIVER & ROADS

From **Mr. Chai Yangsong**, Highway Director of Fujian Province, China (forwarded to TVN by The China Vetiver Network)

Thank you very much for your concern on the highway greening of our province. As a worldwide-recognized grass, vetiver is an ideal plant for soil erosion control and fertility recovery. We have done our best to popularize the technology in the highway institutions in our province. The cities like Fuzhou and Nanping have planted the grass for major highways on a large scale since 1998, and Quanzhou and Ningde Cities have been planting since 1999. There are over one million tillers planted, most of them around national highway No. 316. On highway embankments planted with vetiver grass, slopes were stabilized and erosion was controlled.

Vetiver technology achieved good results in stabilizing slopes according to the application in our province. In the next stage our Bureau will popularize vetiver technology continuously. I hope to get your valuable comments and you are welcome to visit Fujian and provide more instruction to the highway greening of our province.

(Note: Fujian Province was the first province in China to use Vetiver System [VS] for highway embankment stabilization. The Highway Administrative Bureau released an official document in 1998 requesting engineers and technicians of all cities/prefectures and counties of the province to study VS, read the paper "Application of Vetiver Technology for Engineering Purposes", *and collect and share experiences in order to extend VS more rapidly and smoothly. The document was prepared by the China Vetiver Network based on* ***Diti Hengchaovanich's*** *technical publication by the Royal Projects Development Board in Thailand)*

VETIVER & TEA

From **P. Haridas**, Deputy General Manager R&D, Tata Tea Limited, Kerala State, India

I wish to inform you that I have been receiving the Vetiver Newsletter through your kind cooperation. I found the information contained therein of immense value for our tea plantations (Tata Tea Limited). I have introduced vetiver for soil and moisture conservation in our estates situated in the Western Ghats of India. Recently I have been transferred to our head office at Calcutta and I have started using vetiver in our Assam tea plantations. After going through your articles and the work in different parts of the world, I have no doubt that vetiver can be a powerful solution for soil erosion in our tea gardens. Is it not a coincidence that this grass was reported as the best soil conservation plant in tea by T. Eden way back in the 1940s?! I was convinced about its utility when I saw it in Sri Lanka in early 2000.

VETIVER & HANDICRAFTS

From **Sudhakar Hegde**, Agriculturalist - India

I am a vetiver farmer from India. I grow vetiver in unused lands for oil production. I am also making footwear, caps, bags and handicraft items from vetiver. I came to know that a root length up to 2m can be harvested in 13 months.

VETIVER IN SAGALA, KENYA

From **Eric Jolliffe**, Peace Corps Volunteer, Sagala via Voi

Thanks for the long awaited information about [vetiver] nutrition. Now the livestock officers will have a little more respect for this grass. There are rumors around here that cows will not eat it. This should stop all that.

The vetiver grass we received in Sagala from Kisii is achieving a 52% survival rate in the main nursery here (674 of 1220 splits are living and thriving). The rest died for any number of reasons. Thankfully, **Mr. Essau Mwanganda** (nobody has done more for this grass in this district than he) had more vetiver grass plants ready for sale now than I originally knew about. We are also close to taking the final measurements in an experiment on corn and vetiver intercropping.

On the lighter side, we are also "signing up" balding guys around Sagala to test a vetiver grass "Rogaine" concoction. So far, I think we have 6 men who are enthusiastic about trying it. I certainly hope there are no side effects! Essau claims to be using the instructions from one of your past newsletters for this concoction. If it works, we're onto something BIG. Essau always gets a lot of laughs when he makes the claim about hair restoration.

If people ask you where in Kenya they can find commercially available vetiver grass, refer them to Sagala near Voi in the Taita Taveta District. Essau, **Mary Gonah**, and **Rebecca Maindi** currently have grass avilable for sale. The Mrura/Latah Nursery vetiver grass will be commercially available in January [2002]. For a 51% survival rate, we sure have a lot of it! Nobody there has e-mail yet, but **Arthur Maindi, Anthony Nyatta, Florence Juma, Evans Mwakya,** and **Joeseph Mwanganda** are the best people to contact.

Most of the people in Sagala who recieved a portion of the November vetiver shipment from Kisii, and who already had vetiver grass use it as boundaries around their small gardens. They like its soil moisture retention properties. It has become a revered and wanted grass, rivaling napier in its popularity.

DISCOVERING VETIVER IN ST. KITTS, LESSER ANTILLES

Letter sent to **Katrin Scholz-Barth** [USA] from **Martin Lowell**, Lesser Antilles

…I am making progress on the vetiver project. The grass is well known here and is called *Kush Kush* or Arrow grass. Today I met with the

Sugar Corporation man in charge of the soil conservation program. We discussed the projects I have in mind for Ottleys and surrounding areas. I toured their vetiver nursery and they offered me as much as I want. I also toured several other areas where there are extensive plantings. They may even help with the labour needed to do the project.

I have surveyed the areas around Ottleys a bit more thoroughly in the last week and am very excited about the project. I am departing for the US [soon] and am working to have vetiver in the ground in key vulnerable areas before I depart. This includes the area we walked below the pond and also in the cut in our rainforest where I want it to trap sediments in the runoff water which periodically flows through the area. I am nursing 35 plants right now in pots so they will have some strength before they get planted in the darker forest areas.

Thank you so much for turning me on to vetiver. We are really going to accomplish something useful wtih this plant. I'll keep you posted.

Multiple Purpose Vetiver in Suriname

From **Dr. H.L. van de Lande**, Department of Biology and Chemistry, Anton de Kom University, Paramaribo, Suriname, South America

I received the package with the vetiver information early this week and went through practically all of it and have become even more enthusiastic about the wealth of application possibilities [of vetiver] for Suriname. I have a small ongoing program in sustainable agriculture at the University and with the PRODAGRIS Foundation. Within this sustainable agriculture program I started up a biopesticides program (begun with neem). I have been looking for an intercrop for the neem which could be planted under extreme conditions. I have started planting neem trees as part of a rehabilitation of mined-out areas (bauxite). Vetiver looks like the perfect answer for that purpose.

I also see excellent application possibilities for erosion control in river banks and roadsides along rivers (which are flooded especially in the rainy season). I have seen it growing in some Maroon villages, where it was most probably introduced for hedge planting and erosion control in sandy areas. Apparently no follow-up was given.

The general objective is to lay the basis for the promotion of the use of vetiver: erosion control, water management, pesticide development, rehabilitation of mined out areas (gold mining!) and leached-out areas, application as roofing material, handicraft development (with Maroons and Amerindians).

Vetiver and Export Crops

From **David Harvey**, Agriflora Small Scale Cooperative Scheme, Lusaka - Zambia

Currently I am working for 'Agriflora Small Scale', providing agronomical advice for small-scale farmers growing vegetables for the export market in Europe, South Africa and the USA. I had tried vetiver with great success in the northern province, and now we are to introduce it to our farmers. We currently have 470 farmers in 9 cooperatives and will set up central nurseries at each coop with lead farmers. Intially [vetiver] will be used for field boundaries and field subdivisions. The commercial rose growing operation has also being eyeing our nursery and will be planting vetiver around the nursery to stop dust and heat coming into the green houses and affecting rose yields.

Vetiver & Pests/Diseases

From **Mark Dafforn**, Research Officer, U.S. National Academy of Sciences, Washington, DC - USA in response to **Mr. Hervé Lapierre**, France

Mike Pease of the European and Mediterranean Vetiver Network forwarded [an inquiry] on aphids, mealy bugs, and virus disease in vetiver, in response to the sentence contained in the paper of Morakul, et al. in the ICV-2 'Preceedings' which reads, *"Perhaps the most serious pests are aphids and mealy bugs"*.

As you probably know, vetiver grass has proven to be notably unaffected by pests and plagues. This does not seem to be a transient observation. The heritage of agronomic knowledge about vetiver is deep, as it has been cultivated for thousands of years.

In response to your particular question, I am unaware of any insect-mediated viral disease causing a notable infestation in vetiver. In the past ten years, no viral diebacks have been reported to TVN. I have searched the recent literature (notably CABI and AGRICOLA, plus www.vetiver.org), and found no relevant references among the 300+ vetiver citations within the past 20 years. Pathologists working in the US, Australia, Taiwan, China, Thailand, South Africa, Mauritius, and other locations have not indicated virus disease in vetiver. Most intriguing, the Animal and Plant Health Inspection Service (APHIS) of the US Department of Agriculture has run a number of vetiver accessions through phytosanitary quarantine. These were all clonal material, and came from every continent but Australia (this material has been screened separately by the Australians). Vegetatively propagated grasses, as you know, tend to serve as viral magnets and long-term repositories of viral infestations. APHIS has not detected any viral pathogens in the 14 accessions screened thus far using standard analytical techniques.

This apparent lack of viruses in vetiver is remarkable and worthy of further investigation. One can only speculate that vetiver contains an effective array of antiviral substances. Nonetheless, this observation tends to support the position that aphids and mealybugs do not serve as notable vectors for viral diseases in vetiver.

For your information, probably the most complete census of insects on vetiver was made by **Chen Shangwen** of Guangxi University in Nanning, China. It can be found at:

<www.vetiver.org/AGR_insects.htm>.

Finally, in 1996 I presented a paper that included a discussion on vetiver as a potential disease vector: *The main pest-and-plague problems reported with vetiver have been few: fungal dieback from* Helminthosporium *and* Bipolaris*, bacterial leaf blight from* Xanthomonas*, sooty molds such as* Meliola*, stem borers and white grubs, maize cyst and root-knot nematodes, termites, and rats. The genus is susceptible to smuts from* Tilletiaceae *and from* Ustilaginaceae*. This is available on-line at <http://user.aol.com/vetivernet/vip/vipthai1.htm>.* v

NETWORK NEWS

MEXICO (MEXVN)

Ana María le Moing, Apdo. Postal 124, Oaxaca, Oax., CP 68000 - México; Tel/fax: (52) 951 43494; Email:<lasosac@yahoo.com>

We present here a short report of the main activities and results obtained during the last 6 months. For climatic and budget reasons this period consists mainly in preparing for the next rainy season when planting can take place, and government funds are available for supporting the projects.

Promotion in Various Sectors

Private Sector. Organization of a one week field tour and negotiation with the staff of a firm (INARMEX) who decided to include vetiver in its panel of solutions for highways and water courses stabilization.

Following up of the negotiations initiated by **Nick Dolphin** with BANAMEX, an agreement was reached to make a first test in highway stabilization project; a 6.000 m^2 stretch will be protected.

Negotiations are on course with a private enterprise "Erosion Control Services" to install a nursery in the State of Zacatecas with the purpose of protecting roads, mining lands and dams.

Negotiations with several land owners (mainly in the State of Veracruz) are underway to produce vetiver on a large scale to respond to the increasing demand for plants.

Institutional & Community Sector. Through the Program for the Conservation and Restoration of Soils (PCERS), two projects are active. The first one, in a nature reserve (Lagunas de Chacahua, Coast region), combines VS and other engineering systems, for protecting agricultural land against river flooding and involves communities, SEMARNAT (Federal Department for Natural Resources) and CNA (National Commission for Water). The second one, in collaboration of the State Department of Agriculture is to restore a degraded area for reforestation around a dam near Oaxaca. In both cases, local nurseries were established to obtain enough material to be planted in the site at the next rainy season.

With the NGO LASOS, a community project is being expanded with the support of SEMARNAT in the Mixe for protection of irrigation installations and farmer's land. In the Coast (Pochutla), communities have been producing and using vetiver for more than three years, and now are working on a "territory management" process which will include reforestation, ecological tourism, etc. The research sector, SEMARNAT and, possibly soon, SAGARPA (agriculture ministry) are involved. A one week training with two weeks of on-site follow-up was carried out.

First contacts have been made for providing technical assistance to the SEMARNAT office (responding to their demand) in the State of San Luis Potosí. They want to install nurseries and make tests on degraded lands to allow for reforestation.

Promotion of VS is to be included by municipalities in their development programs. Participatory development of a practical manual for Natural Resources Management, and direct training and planning events with the local councils in the Cañada and Istmo regions have been agreed.

LASOS, in the Coastal Region, is following up on a project in road protection in Potchutla involving the municipality and SCT (Communication and Transport Federal Secretariat) and another one in Huatulco with the State Department for Tourism.

Civil Organizations. Through existing networks, promotion of VS has been done with several NGO´s who work with farmers and rural groups in the States of Oaxaca, Puebla, Tlaxcala, Veracruz and Querretaro. We have agreed to install a nursery and demonstration barriers in a strategic conservation region in the north of Oaxaca, incorporating vetiver in a vast agroforestry project supported by GEF, SEMARNAT and international foundations such as Ford, MacArthur and Kellogg.

We received and trained, a Dutch volunteer working with a civil organization on erosion control with rural groups in the State of Guanajuato (San Miguel de Allende). She is now doing the first promotion work there and we expect to have some news soon.

Vetiver Network Development in Mexico

The main activity has been the maintenance and improvement of the web page (which still needs some work to be perfect!), and developing the contacts through several channels, as mentioned before.

Other Activities

Networking. We continue with an active participation in PCERS management and activities. As PCERS has no

external funds, we are in a process of discussion to distribute the functions between each member. The Mexican Vetiver Network would mainly assume the communication and technical assistance activities in coordination with the agronomy research institute of Oaxaca, in this new scheme.

Promotion & Dissemination. We are working to fund and develop a video for the promotion of VS, specifically in agriculture land protection and continue to disseminate existing documents, using a combination of TVN and local material (photos, articles, field visits and testimonials), information and training events.

Funding. We have negotiated funds from SEMARNAT for the Mixe group, with LASOS providing the plants. In exchange, the group provided maintenance to LASOS's nursery and received the Dutch volunteer for her training.

We obtained funds from SEMARNAT for the elaboration of the video, (US$1,100) which contributes up to half the cost.

Conclusion

The current activities should lead to concrete products during the next rainy season.

The main difficulty we encounter is the complexity of the network of enterprises and government offices involved in civil engineering projects, amplified by the political and economic context.

A high priority is to develop the capacity to nursery vetiver in order to respond to the growing demand. v

Costa Rica (CRVN)

Linda Moyher, Apdo. 1, Paraíso 1-7100, Costa Rica; Email:<crvn@vetiver.org>

The demand for vetiver in Costa Rica is growing and our nursery has been expanded. Major buyers this year have been the sanitary landfill in San José and one of the Chiquita banana plantation in Siquirres.

We plan to plant a new nursery in Turrialba to serve the Guayabo area that was hard hit by storms in May.

CRVN is looking for a volunteer willing to spend a few weeks working in the new nursery and several "pro bono" planting projects. Room and board provided. Spanish helpful but not necessary. Strong back and tough hands required. v

Latin American Vetiver Network (LAVN)

Prof. Oscar Rodriguez, Apdo. 5115, El Limón-Maracay 2105, Venezuela; Telfax: (58) 043 831734; Email: <red_vetiver@hotmail.com>

I have in mind to develop an online course on vetiver as a free introductory guide to potential users and interested persons. I think this is the easiest way to reach many people and share basic knowledge and terminology on vetiver potential and applications.

I will try to transform the former workshops I conducted into an online course. The course developed in Thailand can also be a source for material. There is the possibility of organizing a small international meeting or course in Venezuela, inviting key persons (4 or 5) to develop particular topics of interest on vetiver. Fundacion Polar, has started some vetiver projects with social, economic and environmental goals. They have made a lot of progress in a year, so they want to give technical and scientific support to organizing the mentioned meeting. v

Ecuador (Ecuativer)

Piet Sabbe, Escuela de Ciencias Agrícolas y Ambientales (ECAA), PUCE - Ibarra, Avenida Jorge Guzman y Pólit, Ibarra - Ecuador; Email:<info@ecuativer.com >

We had to overcome a lot of obstacles before we got the vetiver Project in Esmeraldas set up. Now, vetiver is planted in the nursery of the University (2 hectares). This nursery should provide us about 1,800,000 new slips for future projects, in about 10 months. In collaboration with IngeConsult, and the Municipality, a site near the town has been selected for direct planting. We had planted already a small amount on another site (Barrio 20 de Noviembre) in December 2001, but that failed because of the severe drought and destruction by local people.

Mr. Aguayo of IngeConsult has been doing a very fine job with his report "Plan de Control de Riesgos." [Risk Control Plan].

He recommends to work in watersheds, where vetiver should be used to:

- control run-off (planted in hedges);
- stabilize the soil (hedges) (in some occasions it can be used to support concrete swales and channels); and
- recover the soil with vegetation (as a pioneer plant), in combination with trees and shrubs.

In recent weeks Fundaciòn Natura (FN) has been [requested] by Petroecuador to set up a reforestation program. [This] could be a way to show the efficiency of the VS to future sponsors. Nothing has been put on paper yet, but both FN and the Municipality are strongly in favor of using vetiver. v

Peru

Dr. Julio Alegre, Av. La Universidad 795 La Molina, Apartado 1558, Lima - PERU, Tel: (51) 1 3486017 Ext: 2117, Fax: (51) 1 3495638, Email:<j.alegre@cgiar.org>

ICRAF (International Centre for Research in Agroforestry) members, **Julio Alegre, Luis Arevalo, Abel Meza** and **Nelly Luque** are undertaking some research with vetiver and tree crops using Donner Foundation funds. The research site is located in Pucallpa. Vetiveria has been planted in double contour rows with peach palm (*Bactris gasipaes*) and *Inga edulis* (ice cream beans) or guava for fruit, fire-

wood and nutrient recycling. v

TANZANIA (TZVN)

Anthony Makoye, P.O. Box 31050,
Dar es Salaam - Tanzania;
Email:<vetiverTz1999@hotmail.com >

Towards the end of year 2001 various inquiries were received from regional authorities, mainly from North and Western Tanzania, for information on how they could control soil erosion, land degradation in the mining areas and control siltation in lake areas in an effective and low cost manner. In response we undertook to explain to them how vetiver grass could be deployed to curb such situations. Kigoma regional authorities (Kigoma town is on the eastern shores of Lake Tanganyika) approached TAVEN to carry out a detailed study with cost estimates as to how they can arrest the situation. The central drainage channel and other town infrastructure like the railway station, play grounds, etc. are full of silt which is hindering the efficient use; Lake Tanganyika is experiencing serious uncontrolled siltation which will soon obstruct navigation, anchoring and fishing activities; and the Tanzania Electric Supply Co. Ltd (TANESCO) has fuel reservoirs [tanks] near the lake which drip fuel on the ground which then seeps underground into the lake causing pollution and threatening marine life.

These problems, according to the authorities, need to be addressed immediately. Our quick evaluation, we require about US$35,000. A project proposal was submitted to donors, through the National Environmental management Council (NEMC)

Another inquiry was received from Kahama Mining Corporation, which operates a world-class gold mine at Bulynhulu regarding the use of vetiver grass to control land degradation and reclamation. We made available to them, 150,000 tillers of vetiver grass plants which are being used to control erosion, mining spoils, helping to revegetate the mine slimes.

Early this year TANROADS (Tanzania Roads Agency) approached us to find out how they could use vetiver grass to control spoiled roadsides, gullies, road-cuts and land fills. Their approach was based on the green booklets, *"Vetiver the Hedge Against Erosion"* and *"Nyasi Za Vetiva"* (a publication in the local language), they obtained from TAVEN and were distributed to all Regional Engineers Tanzania mainland offices. They are actually planting vetiver grass to control such erosion.

We see serious inclination by local people and institutions to adopting vetiver grass technology in the country. Institutions like TANROADS, mining companies etc. have realized the effectiveness of this technology. TAVEN is of the view that we embark on serious promotion of this wonder grass by organizing seminars in the country. We have recently approached our Tanzania Technology Transfer (TANT2), who in collaboration with the Faculty of Engineering, University of Dar es Salaam and supported by US Federal Highway Administration (FHA), carry out the task of improving the quality of road transport. TANT2 has shown interest in jointly organizing a one-day seminar tentatively scheduled for July/August 2002. We envisage inviting various individuals, NGO's institutions, agencies and are thinking of inviting one resource person from South Africa (SAVN), Mr. Duncan Hay, SAVN Co-coordinator.

Anthony also reports later...The Tanzanian government is now starting to pick-up VS. Government ministries are making many inquiries on its application. It is said 60% of Tanzania is semi-arid. The problems facing the semi-arid areas include gully erosion and overgrazing, hundreds of thousands of cattle pound the earth. This causes erosion, loss of top-soil cover and siltation of dams and other important water retaining structures.

This situation has frustrated government initiatives towards dam construction, since dams silt up before their economic time span. The seasonal rains are of short duration with high flow overtopping natural channels and worsening erosion. A siltation rate of 1% per annum would be acceptable, (i.e. 100 years life span of a dam). However under the situation in Tanzania, dams fill up within 5 to 10 years.

It is intended to use VS as a nationwide remedy to the problem using Watershed Catchment Management Principles (WCMP). Starting with a pilot project in four districts in the republic of Tanzania namely, Monduli, Magu, Shinyanga Rural and Kondoa. These are where small and medium sized earth dams are in place.

Note: Anthony requests from other vetiver networks and coordinators literature and photos which may be of use to them. v

RECENT VETIVER NETWORK NEWLSETTER PUBLICATIONS

Network	Title
Pacific Rim Vetiver Network	*Vetiverim 21* (July 2002)
Venezuela Vetiver Network	*Boletín Vetiver de Venezuela* (No. 1 - May 2002)
Southern Africa Vetiver Network	*Vetiver* (No. 10 - April 2002)
The European & Mediterranean Vetiver Network	*EMVN Newsletter* (No. 7 – June 2002)
Latin America Vetiver Network	*Boletin Vetiver* (No. 10 - May 2002)
Malawi Vetiver Network	*Malawi Vetiver Newsletter* (Volume 2, Issue 1 - June 2001)

Table 4. Some of the newsletters published in the last year by Regional and Country Vetiver Networks. All can be found on the TVN Homepage.

COUNTRY REPORTS

VETIVER HELPS PROTECT BEACH EROSION IN BALI

By **David Booth**, Founder & Exec. Director, East Bali Poverty Project (EBPP), Denpasar, Bali - Indonesia

Since starting our first vetiver project to save our mountain village in March 2000, vetiver has also enabled us to develop organic gardens for the children's food and save many steep dirt tracks from complete collapse.

Now I'd be grateful for your urgent advice on a new vetiver project we have here for a client whose new house fronts the beach, with a river coming in from the east side to the sea. I am presently preparing a design, but am not sure how durable the vetiver will be when planted in "improved" sand when the high tides come next year. From experience, it seems that we have about seven months before the seaward side will be challenged. Below I will describe briefly the two situations.

The beach-front side: 8 days ago, we trial planted 10 vetiver polybags in the sand on the berm, in the following way: 1) excavated the sand to 20cm below polybag, and mixed a handful of organic worm fertilizer with the sand, 2) cut the bottom of the polybag and firmly placed polybag on mixture, and back filled with sand, 3) gave gardener instructions to water every evening after sunset, 4) checked 6 days later, and found roots had already extended by 5-7cm.

*[**Paul Truong** has responded: Why did you only take out the bottom of the polybags? I think you should take them out of the bags completely as on sandy soil we need the shallow as well as the deep roots to hold back the soil. In addition the water supply on sand is vital so you should expose as many roots to the moisture as possible.]*

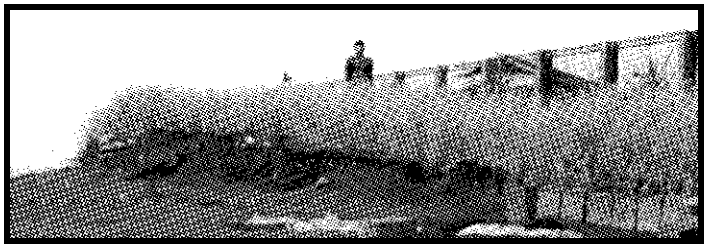

Photo 5 and 6. Photos taken less than 2 months after planting vetiver along a beach in Bali. "The power of vetiver is really showing itself after less than 2 months. We are all marvelling at the speed of growth and strength of the roots." Photo credit: David Booth

River bank side: Here I plan to follow the design from the CD-ROM with the perpendicular rows: along the contours, about 1.5-2 metres apart up the slope, and vertical to slow the flow. It seems the flow will never be very fierce, so what spacing would you suggest?

*[**Paul Truong** has responded: How steep and how long is the slope? On very steep slopes, 1.5 horizontal to 1 vertical, you may need to plant them 1m apart. You have to design to take the flow at flood time or high flows, not normal flow, it is very difficult to advise you from here but off the top of my head, on good soil you can plant them 7-10m apart but on bends or erodible, sandy soil you must to go to 5m apart.]*

We introduced vetiver to Bali last May with our successful vetiver conference, thanks to **Ed Balbarino** [from the Philippines Vetiver Network], who was the key speaker. However, it is only in the last 8 months that we have had stock to sell… [and] every week we get new inquiries. We are now leading the way in Bali (and hopefully we can soon spread our knowledge throughout Indonesia and beyond) in advising and planting vetiver in a whole range of applications. However, we are also just learning, and whilst I think we are the only organization with sufficient experience, knowledge and vetiver stock, I am keen that we can achieve the optimum benefit for our existing and new clients, and hence I am appealing for advice from the experts in USA, Philippines, Australia and Thailand. You have all, at one time or another, been kind enough to advise us at the time of our first vetiver purchase in March 2000.

I would be most grateful for comments and advice from as many of you as possible, to help us spread the message, and hopefully pave the way for a much healthier and better land through vetiver solutions, from which many can benefit in a sustainable way. v

CHINA VETIVER AND AGROFORESTRY TECHNOLOGY PROJECT LAUNCHED ON DABIE MOUNTAIN IN CHINA

By **Prof. Liyu Xu**, Coordinator, China Vetiver Network (CNVN), Nanjing - China

A two-year project started in October 2001 to run through October 2003 was initiated in the Dabie Mountain area of China (the boundary of three provinces: Anhui, Hubei, and Henan). Dabie Mountain is at 90 -1,700m above sea level with a total area near 100,000 km^2. The Dabie Mountain area forms one of the poorest regions of the country. In the recent years, increased interests in commercial

tree production has cleared vegetation, built earth terraces and planted tea, mulberry and chestnut trees, etc. on a large scale. This has lead to erosion and soil fertility problems and resulted in siltation of reservoirs and flooding. The project is:

- Introducing and raising awareness of soil and natural resources protection and the importance of VS in erosion control and sustainable agriculture, earth work stabilization, disaster prevention, sustainable farming, and other multiple uses among policy makers, farmers, extension workers and technicians in the Dabie Mountains;
- Introducing and extending proper agroforestry technology, such as hedgerow intercopping of vetiver-chestnut-wheat system; nitrogen-fixing trees, shrubs, and plants; contour planting technology, crop diversity for erosion control, etc.;
- Generating income by establishing high quality commercial trees and vegetables on terraces protected with vetiver, silkworm production, small animal husbandry, mushroom cultivation, and handicraft production, etc;
- Increasing food production by developing electrical pumping systems, intercropping of commercial tree with crops, reasonable application of fertilization based on soil and crop sample analysis;
- Helping women improve social and economic condition by training and demonstration on silkworm raising, tea production, and handicrafts production with vetiver pruning;

Extending the above technologies and experiences to the whole Dabie Mountain area through multiple activities. v

Project for Mountain Revegetation Launched in Nanjing, China

By **Prof. Liyu Xu**, Coordinator, China Vetiver Network (CNVN), Nanjing - China

To speed up the re-vegetation of Mofu Mountain with vetiver, a new project was launch in Nanjing, China. Situated in the northern part of Nanjing City, the mountain has an area of 7,040 km^2. The existing problems have been caused by quarrying. The mountain is covered by rock fragments, rubbish, and sediment that was excavated from a lake. Following the expansion of the city and economic development it is urgent to green up the disordered mountain. However, bad ecological conditions [make it difficult] for most of the plants to survive. The Vice Mayor asked the Mountain Landscape Management Office to contact the China Vetiver Network and plant vetiver. The project includes [treatment of]:

- fragments left by quarrying;
- sediments coming from [excavation of the] lake;
- rocky areas;
- parent rock.

For the fragments and sediments fill, bare-root vetiver was contour planted with a spacing one meter between rows. For the rocky and stony areas, vetiver in containers will be planted. For parent rock sites that contain neither soil nor rock fragments holes will be excavated and then container-raised vetiver planted into the holes. The basic soil and ecological properties will be studied and recorded. The project will last one year.

The present project attracts wide interest in correspondents and reporters. The project was shown in the newspaper such as Nanjing Daily and Jingling Evening. v

Swaziland Farmer Development Foundation Vetiver Demonstration Site

Review by **Rob Mackenzie,** Swaziland Farmer Development Foundation (SFDF), Manzini - Swaziland

Following is an edited version of the more interesting vetiver demonstration sites featured in an April 2002 review by the Swaziland Farmer Development Foundation.

Dvokodvweni Community Dam – Malindza

Project: Siltation control at a small community dam with a large catchment area and long steep stream. The planted areas are protected from cattle. Two double lines of vetiver were planted across the flow line on 7 Sept 2000.

Establishment was good, even in seasonally waterlogged areas. By mid October, vetiver growth was inhibited by weed growth and by late November weed growth was smothering the vetiver. In the main flow line, vetiver was buried and washed away. Canopy thinning of trees shading the lower vetiver lines was necessary. Weeding was very difficult once vetiver had been smothered, especially in waterlogged areas. The hedges responded well to weeding and canopy thinning in January.

The portions in the flow line, washed away or buried by storm flows, were replanted and a third hedge planted near the waterline in March. The flow lines were planted with vetiver in poly-bags and strips protected by sandbags. The sandbags were not adequately tied into the banks and flow from a late storm went around the protective sand bags washing out some vetiver.

The third hedge near the waterline …is not developing well because of competition, primarily from self-sown bulrush (*Typha latifolia*), which is well established in places.

On May 5, a 1.5m concrete sill was constructed to protect the flow line in the uppermost sill and vetiver strips planted behind.

By mid-August, the dam water levels were 1.5m below full supply level and with little winter rain, the area was very dry. There had been considerable grazing by livestock. The dam fencing had been damaged by storm flows early

last season but had only recently been repaired. All vetiver had survived. Later plantings were not thriving but will survive until the next rains.

Lubhuku Farmers Association (near Mpaka)

Project: Siltation Control and Land Rehabilitation in the catchment of a small community dam with a small catchment area and gentle flow line. The planted areas are protected from cattle.

On 26 October 2000, 3 hedges were planted across the flow line and protected with stones. Hedges were also planted across adjacent degraded areas into exposed subsoils. Further hedges were later planted by the community. Establishment was poor in the raised portions of the subsoil plantings with attack by termites common. Surprisingly even the growing leaves were attacked in places. Establishment was good in lower, wetter areas, initially with little loss from burial or dislodgement even though significant storm flows were experienced. Hedge development was however later restricted by burial under silt. Plantings of vetiver clumps, poly-bags and strips in March were quick to establish.

By mid August the vetiver was suffering severe water stress, with most of the foliage desiccated. Trampling and grazing by goats, which could pass through the barbed wire fence was severe in places. Little of the vetiver planted into the subsoil survived.

Mgampondo (Lavumisa area)

Project: Siltation control in community weir.

Vetiver hedges were planted above a stone check dam and gullies above the weir on 8 November 2000. Establishment was good though there was some damage by grazing goats, trampling by cattle and dislodgement in the main flow line. The damaged hedges were not protected by fencing. Hedges planted into shale were slow to develop. Vetiver planted into a partially shaded flow line, where the flow was often prolonged at times, developed well.

Mkhaya Community Dam (near Gilgal)

Project: Spillway Protection at a newly constructed community dam with a sandy spillway. The dam is fenced. The catchment is large. Approximately 12,000m^3 storage capacity with a catchment area over 5 km^2.

Four vetiver hedges, 50 to 75m long comprised of one double line and three single lines, were planted across the full width of the spillway on Nov 9. The vetiver was planted into germinated Rhodes grass (*Chloris gayana*) and self-sown species with minimum disturbance because of the vulnerability of the site. By early December competition from other grasses was affecting growth. There was no maintenance carried out by the community. Vetiver planted in late September, before the Rhodes grass was sown, did develop well.

During the heavy rains in February and March there was considerable flow down the spillway, which resulted in the formation of large gullies. Large sections of the vetiver hedges were washed away and the 1m deep sand/cement block sills were almost undercut at several points. Erosion on these highly erosive soils was made worse by the poorly leveled spillway and spillway sills. An effective hedge had not developed but there was evidence that flow had been channeled into gaps in the hedges, increasing localized erosion. Some erosion from turbulent flow through the hedges was also evident.

Note that vetiver hedges must not be planted within one vertical meter of the spillway mouth, as this will restrict flow and could contribute to the dam breaching.

Sithobela Dam

Project: Siltation control above a community dam with a medium sized catchment and gentle flow-line. The protective fencing is poorly maintained.

Vetiver hedges were planted above a stone check above the dam on 23 November 2000. A considerable number of gaps caused by trampling by livestock and people and grazing (the newly planted slips were pulled out) were replanted with pre-rooted vetiver on March 12. The established vetiver was developing well. By mid August all the vetiver had been grazed to near ground level (2-5cms) including most culms. Later plantings were surviving but seem particularly vulnerable to trampling.

Vuka Sidwashini F. A. near Buhleni.

Project: Embankment and gully stabilization at a Farmer Association Sugar Cane Scheme in association with SKPE.

On 11 Jan 2001, hedges were planted which was during a very hot dry spell. They were well watered by the members and survival was in excess of 80%. Most of the gaps in the hedges were filled by the community. Some damage was caused to hedges when a pump house was constructed.

Mgulube and Mkhuhlweni Community Dams

Project: Spillway protection at an established community dam to control erosion at the return to stream. The protective fencing is poorly maintained.

Mgulube Dam - Planted on 7 February 2001 into very wet soils, the survival was high but vetiver planted at the bottom of the small rills was washed away. During the winter of 2001, grazing by cattle was severe.

Mkhuhlweni Dam - The protective fencing is poorly maintained. On 15 March 2001 vetiver was planted into shallow flowing water at the end of the spillway. The area

was covered with bulrush (*Typha latifolia, T. capensis*), which had to be cleared to allow planting.

Asibemunye Farmers Association

Project: Vetiver nursery establishment, erosion control in an orchard in association with Vus'umnotfo and Swaziland Settlement. The orchard has steep slopes and is in a high rainfall area.

Planted on 22 March 2001, a row of vetiver was planted 2m above the top line of deciduous trees in an orchard and a small nursery established. The nursery was to provide planting material to plant further rows in the orchard 2m above and 2m below each line of trees which are planted roughly along the contour with 10m between lines.

Mortality was low and the nursery was well cared for, though growth has been retarded by livestock entering the garden and grazing the grass.

Ngwazini Orchard and Community School Nursery

Planted with assistance from DFID in December 2001. A small nursery was established for income generation, a community orchard planted for erosion control and mulching and an eroded area protected.

Highway Embankment Stabilization Mvutjini

Hydromulch (Pty) Ltd, a leading South African company, with the Ministry of Works established an embankment stabilization trial on the Manzini to Mbabane highway, 10km from Mbabane on 30 November 2000.

Vetiver in poly bags was planted and the area hydro-seeded using a mixture which appears to be dominated by *Eragrostis teff*. The vetiver has survived but not thrived. Starting in early winter 2001 the whole area has been mowed to ground level, showing the roads maintenance does not know the vetiver maintenance requirements. Vetiver should only be trimmed to knee height. All the plots, which include Kikuyu turf, Kikuyu turf strips, 2 types of mulching fabric and hydro-seeding alone, appear good especially when compared the bare control area. There was some rill formation in the hydro seeded plots, with or without vetiver. The vetiver was not planted closely enough (20cm between plants) and because of competition from the *E. teff* did not develop enough to have any effect. *E. teff* is an annual and the vetiver may develop in the coming seasons giving a more long-term effect.

Highway Embankment Stabilization Motjane

Puggs Landscaping of Nelspruit was contracted by the Ministry of Works to demonstrate embankment stabilization on the Mbabane Ngwenya highway near Motshane. A long steep embankment was planted to vetiver in March 2001. The distance between plants and rows was good. Bare root tillers were used (which we would not advise on a long steep embankment in a high rainfall area). There was adequate rainfall in the weeks following planting. The planting material was obviously dead when planted and there was 100% mortality.

Editor's Note: Rob's report strongly reminds us that while vetiver is a tough plant, it is still a plant. Like all plants, it needs suitable conditions to establish and maintain itself. As ***Aldo Miranda****, from NOBS in El Salvador told us, one of the keys to successful establishment in road stabilization projects in his country had been in first getting the community to understand why the plant was there and what the benefit was to them… this way, the communities themselves protected the plantings during the establishment phase and NOBS could concentrate on the technical factors.* v

CVN Earns 2002 Environmental Achievement Award

The China Vetiver Network/Institute of Soil Science was presented with the 2002 Environmental Achievement Award of Distinction from the International Erosion Control Association (IECA) at their annual conference in Orlando, FL. **Jim Smyle**, President of TVN, accepted the award on behalf of the CVN and **Liyu Xu**. The annual award is given to an outstanding project which demonstrates excellence in natural resource conservation and environmental protection through the use of effective erosion and sediment control policies, practices and/or public education. v

Guyana Sugar Corporation: Vetiver is Part of Company's Environmental Policy

From Guyana Sugar Corporation Website <www.GuySuCo.com>

The **Guyana Sugar Corp.** (GuySuCo) has a policy to implement an Environmental Management System that prevents pollution in the cultivation of sugar-cane and the manufacture of sugar and its by-products, both within the Corporation's boundaries and in adjacent communities. The system is compliant with national legislation and follows internationally acceptable standards. It is subject to continual review and improvement by management to ensure that environmental goals are achieved. The system is being developed in conformity with ISO 14001 standards.

The GuySuCo and the Guyana sugar industry are trying to improve their environmental management. To do so they are using vetiver grass to help prevent soil erosion by stabilizing soil (e.g. on drain sides and canal edges) and absorb and prevent the movement of contaminants (e.g. from land-fill sites and waste disposal ponds). Vetiver grass is also being evaluated as a natural insect repellent and a potential barrier to rat migrations into sugar cane.v

INVESTIGATIONS OF JIJI GRASS AS AN ALTERNATIVE TO VETIVER GRASS FOR NORTH CHINA

By **Prof. Liyu Xu**, Coordinator, China Vetiver Network (CNVN), Nanjing - China

Under generous funding from **The Wallace Genetic Foundation**, a comprehensive research on Jiji grass (*Achnatherum splendens* (trin.) Nerski), a grass which can tolerate an extremely cold and dry climate, was implemented. The study included extensive field observation, laboratory analysis, greenhouse experiments, etc.

Distribution and major function

Multiple investigations before and during the project showed that although Jiji grass has a wide distribution, in general it can be found in 3 ecological zones: (a) Meadow Eocene - the grass was the main pasture component for livestock; (b) Semi-desert Eocene for anti-desertification and wind erosion control; (c) Serious eroded gully zone for soil erosion protection which was our main research topic.

Effect on soil properties

Based on the data and discussion, it is concluded that since Jiji grass had massive roots, >1 mm roots in particular, the number of soil pores, including capillary pores and non-capillary pores, were significantly increased. This decreased soil bulk density and increased soil water capacity, reduced runoff, and increased water penetration into soil. Jiji grass has great potential for soil physical property improvement, soil and water conservation, and crop production in Loess Plateau area.

With Jiji grass, soil nutrient properties were improved. Organic matter, nitrogen, phosphorus, potassium, pH value, and cation exchange capacity all improved.

Jiji grass has a high root density. The grass retained soil insitu and reduced scouring and erosion and therefore has high potential in soil erosion control and slope stabilization. Also, the grass improved other soil chemical, physical, and biological properties that are beneficial to crop production.

Jiji grass increases soil shear strength, with its strong and dense roots. Water erosion was controlled effectively. From earlier research we found that Jiji grass grew even better on the edges of eroded gullies, with roots length of one or two meters where the soil contained less water.

The strong root system of Jiji grass enabled the improvement of soil structure, porosity, and thus permeability, and therefore enabled more rainfall penetrating into soil and recharge to ground water during wet season, which not only reduced runoff and water erosion but also increased soil moisture for crop production.

Ecological tolerances

Based on field investigations which covered several provinces, in combination with laboratory analysis, it was confirmed that:

- Jiji grass can be tolerate temperatures from <-33C° to > 38°C.
- It is drought-tolerant. (it has been observed growing on earth walls in dry areas).
- It can tolerate saline soil containing salt (50% or more). In such areas, Jiji can tolerate submersion in saline water. Testing has indicated that certain salt contents may promote growth.
- The grass is tolerant of poor soils and has been found growing on stone walls with very low nutrient availability.
- Although Jiji grass requires light, it was observed to have better growth under the shade of trees possibly because of increased soil moisture.
- The most extraordinary property was that it was fond of growing on the edges of deeply eroded gullies or steep slopes where the soil had little moisture and higher capillarity.
- Like vetiver, Jiji grass can withstand fire. Although part of the old grass clumps, the central part in particular, may die-back, the clumps can stand several decades. Even if the clump looks almost dead the soil mound was still well fixed.
- Several tests showed that the grass does not grow well on acid soils (< pH 7.0) such as in south China.
- Although it can stand some grazing, long term overgrazing may cause the grass to degrade.

Main applications

For further applications, the first consideration is to plant the grass at edges of the eroded gullies to prevent further erosion in the Loess Plateau area.

Jiji grass can be used to stabilize new terraces. For sloping lands, Jiji grass should be planted along contours, 1-2 m vertical spacing.

Also, the grass can be planted for new construction protection, such as highways, railways, and dams.

Further study

Although preliminary test showed that the grass can be reproduced by both seeds and tillers, the survival rate was not as high as vetiver grass. Further study is needed mainly on the propagation and should include:

- Propagation: The tillers tested came from old plants, possibly a few decades old, and the survival rate was low. It may be much better to obtain tillers from nursery stock.
- The use of growth regulator for vegetative propagation.
- Propagation with seeds followed by transplanting

- Establishment of Jiji hedges (spacing, number of tillers/clump, etc.) and its effect on erosion and sediment control. v

Vetiver Propagation - Better Than Cow Tea, Faster Than a Speeding Bullet

By **Criss Juliard**, Vetiver Network Board Member, Dakar - Senegal

I stumbled on another, perhaps more rapid and less troublesome method to speed up the rooting process of vetiver shoots for more effective multiplication. I had some vetiver slips sent from a reputable South African supplier (thanks to **Duncan Hay** of the SAVN). Plants were packed bare-root in carton boxes that had been lined with black plastic, and water had been sprinkled on the tightly packed plants to keep them damp. The plants took about 8 days to arrive, between time packed to clearing customs and delivery. When I opened the cartons, nearly all the bare root slips had new white roots growing from the crowns, some measuring up to 3 cm, especially the carton that had been well sealed and had almost no chance for air or moisture to escape. There was lower growth in the box that did not have sufficient humidity. We immediately put the plants in damp soil, reducing to a minimum the amount of time roots were exposed to light, and put them in bunches of 25 to await dispatching. We had ordered 4,000 plants that had to go out to several districts in Senegal. Now some 4 weeks later, I have almost 100% growth, and very speedy retakes, faster than the cow-tea bath we often mentioned in multiplication efforts. When I dispatched the plants to other regions (some a week later, using the sealed, dampened cardboard box trick), we had similar results when unpacked in the field. Since then I have tried to replicate the method, and find that it works, although not as well as the plants that had an 8 hour airplane ride. In addition to roots, the stems began to grow out even though there was no light. When the plants were reintroduced to light (slowly going from shade to open sunlight over a period of 10 days), the plants developed at a faster rate than traditional methods of multiplication (no statistics, but confirmed observation).

I am looking for other experiences. I suspect the plants, under stress, liked the dark, the cold and the damp, and subsequently sprung roots in their effort to survive. Tell me if testing this method interests you, and if you can replicate. I would happy to hear the results of your efforts in your respective zones. Richard Grimshaw indicated he had a similar experience years back in India when he received a shipment of vetiver also sent by plane. We are not sure whether it is the plane ride or the dark, humid atmosphere, but perhaps this experience will lead you and others to experiment.

*[Note from **Paul Truong**: Very interesting, most plants tend to "grow" better in the dark, to be more precise they produce more roots and shoots but actually not growing as there is no photosynthesis. The trick therefore is to get them out to the sun as soon as possible to replenish their food reserve and continue to make the best of the new shoot and roots they produced before. Somehow vetiver seems to do very well under these conditons.]* v

Some Observations on Vetiver in the Mediterranean Region

By **Mike Pease**, EMVN, Algarve - Portugal

Dr. Vito Sardo, working in Catania, Sicily has drawn some valuable conclusions on the performance of vetiver under Mediterranean conditions. He writes:

"After six years with vetiver plants of the 'Monto' seedless variety, the following conclusions can be drawn:

- Vetiver grass in the Mediterranean environment can thrive satisfactorily as long as it is well irrigated.
- However, the growth rate is far lower than reported in the literature referring to tropical environments, the principal limitation depending on soil and atmosphere temperature - to initiate growth, in fact soil temperature must exceed 18º C.
- Vetiver grass can survive long periods (even months) of water submersion.
- Under the experimental conditions (37º latitude, sea level elevation, fully irrigated, loamy soil) the above-ground biomass production averaged about 20 Mg/ha dry matter/year.
- Root development was in all cases much less than reported in the literature, never exceeding 1m depth.
- Hedges formed to protect soils from run-off and erosion are efficient and reasonably fast to form (one season).
- While growing vigorously even under extremely high temperatures (46º C), vetiver grass can survive low temperatures (even lower than 0º C) but growth is arrested.
- No pest or disease was detected during the six years of observation.
- In no case did vetiver grass show the tendency to expand and become a weed; conversely, no weed could grow in the vetiver grass fields.
- Vetiver grass showed an appreciable efficiency in the depuration of urban wastes.
- Vetiver grass showed an unexpected tolerance to salinity."

[According to Mike Pease a number of questions arise from Vito Sardo's finding]:

Annual precipitation in Catania is normally about 600 mm but in recent years has been around 300 mm. Under these conditions leaf height varied between 1m and 1.5m.

In the Algarve, Portugal, various field applications of vetiver during the past 4 years have shown that, under irrigation and plant feeding, leaf growth will reach 2m or even exceed it. Root development has not been measured. It certainly does not reach the depths recorded in the literature for tropical

regions, i.e. 3-5m. However, it may exceed the 1m recorded scientifically by Dr. Sardo. Annual precipitation in those areas where vetiver is growing in the Algarve varies from say 400 - 800 mm per annum.

There is probably little question that, in those southern parts of the EMVN Region where climatic conditions permit the establishment of vetiver, plants will grow at a less rapid rate and reach a lower ultimate level of growth for both leaf height and root development.

This raises the question as to what are the critical leaf heights and root depths for effective hedgerow establishment to control erosion and water run-off.

I suggest that the critical height of dense, above-ground mass may be no more than 60-70 cm except where the purpose of the hedgerow is to act as a wind-break. If this surmise is correct, then it matters not if, under EMVN conditions, plants reach not much more than 1.5m. in leaf height.

Root depth and density is more critical. I am not aware of data that establishes the critical depth/density factors. However, it is probably reasonable to surmise, for the time being, that providing root depth is not less than say 1m and that root density is good, soil 'nailing', control of tunneling and overall surface and subterranean soil cohesion will be adequate. **Criss Juliard** comments that 'root mass' is more critical than 'root depth' in nailing the soil to prevent erosion. Incidentally, he has also found that pig manure is more effective in promoting extensive root growth than other manures.

In **Dick Grimshaw**'s report on his recent visit to China he mentions the desirability of removing 'dead woody stem material' (DWSM) from planting material. I think this merits discussion.

In has always been my practice to prepare really nice looking slips and this, of course, involves removal of the DWSM. It is unsightly, gets in the way and would not be viewed favourably by an agricultural inspector if the plants were for export. But, as far as I am aware, the DWSM harbours no pest or disease and causes no harm to the living plant. So, if it were not for the unsightliness the DWSM could be left on.

I have made a very approximate estimate of my work break-down for plant preparation. But my figures should be viewed in the light that my nursery is sited on heavy clay soil, whereas a good nursery site should be on light sandy soil. Also, a fully operational nursery would certainly have mother plants no older than 2 years, perhaps mostly one year. In my case the mother plants are 4 years old and have been trimmed back 4 times in their lives. So I have a lot more dwsm than one would expect in a commercial nursery.

- Digging out/removal of main clods - 10%
- Soaking/splitting into manageable chunks - 15%
- Trimming leaves to 20cm, roots to 10cm - 10%
- Washing - 5%
- Removal of DWSM and washing again - 50%
- Counting into bundles - 10%

Put a cost on the labour involved and the cost of removing the DWSM then becomes debatable. I would certainly never supply for sale plants that were not carefully selected and prepared with all DWSM removed. However, if I was dealing with thousands of plants rather than the few that I supply I would consider carefully whether it was worthwhile removing the DWSM, especially if the plants were destined for local use. v

SUBMERGENCE TESTING VETIVER GRASS

Photo and Report by **Dr. Xia Hanping**, South China Institute of Botany, Chinese Academy of Sciences, Guangzhou - China

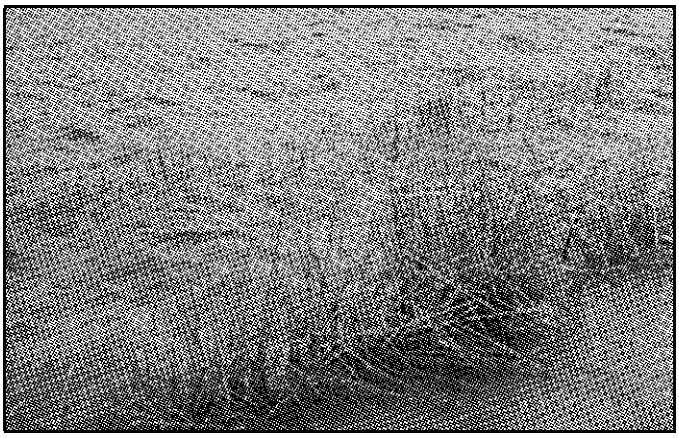

Photo 7. Taken Sept. 10, this vetiver hedge was completely submerged for 50 days (July 4th - August 24) and survived. A sixty day submergence trial is planned.

Photo credit: Xia Hanping

HOW MUCH VETIVER DO WE NEED?

By **John Dickinson**, PROSCARP, Lilongwe - Malawi (excerpt from the Malawi Vetiver Network Newsletter, Volume 2, Issue 1, June 2001)

How often have you been shown a newly established vetiver nursery by a justifiably proud village conservation committee or village headman? Much effort has been expended, money spent and resources utilised to establish the nursery. But how much land will this nursery protect once the grass is transplanted as countour hedgerows? Sadly, in the short-term, not as much as the farmers expect.

Let's look at the figures. But first some basic data and assumptions.

- On upland soils the recommended spacing for vetiver is 90 x 45cm givng a plant population of just under 25,000 clumps/ha.
  On dambo [good] soils the recommended spacing is 45x45 cm giving a plant population of nearly 50,000 clumps/ha.
- Under good management, between 10 and 40 splits can be obtained from one clump, hence 500,000 to 2 million splits from 1 ha. of dambo nursery.
- One split must be retained for replanting so 450,000 to 1.95 million splits can be obtained for hedgerow planting from 1 ha. of nursery.
- The recommendation for planting on the hedgerow is three splits every 10 cm or 30 splits per meter.

  So, under ideal conditions and good management, 1 ha of vetiver nursery will produce enough vetiver grass to plant between 15 and 65 km of hedgerow.

  On moderately sloping land, 15m spacing between hedgerows is recommended. Hence 1 km of hedgerow (1000m) will protect about 1.5 ha of land.

Management Level	Dambo		Upland	
	Low	High	Low	High
Excellent	12	45	6	20
Good	8	30	4	15
Fair	4	15	2	7
Poor	2	7	1	0.5

Table 5. This table estimates the area of land that may be protected by a 0.5 ha nursery under different management conditions.

1 hectare of nursery can therefore potentially protect 22.5 to 97.5 ha only

Of course management is rarely ideal, nurseries are often not established in dambos and villages able to provide and manage 1 ha of land for a nursery are the exception rather than the rule.

So, we have seen that under normal conditions a typical village vetiver nursery will, on an annual basis, provide only a fraction of the village's requirements for soil conservation. Even with a well established nursery, 8 years or more will be needed to protect all the land for an average Malawian village.

These figures should not be seen as discouraging. Rather, it is essential that from the outset of a vetiver program with any community, the long-term commitment required is clearly stated.

Many of the above figures are notional. We would be very happy to receive comments from others on their own experiences whether they appear to confirm or refute the above. v

Road Works Stabilization …Your Problem?

The Problem

The Solution!

Soil stabilization is a critical issue to be addressed in road or railtrack engineering. This applies to cuttings, embankments, culverts and bridge abutments as examples. Often, a solution is sought by engineered means.
These can include gunite application, creation of gabion walls, biomatting or hydro-seeding as examples.
These solutions can be effective but they are generally costly or require costly maintenance. Mostly they are not aesthetically pleasing.

Vetiver Grass Hedgerows*

- Stabilize slopes cheaply, permanently and in an aesthetically pleasing manner.
- Restrain downward water flow by their density and height (up to 2m).
- Anchor and nail down the soil by using their unique, vertical and extremely strong rooting system (>3m deep and root tensile strength of 75 mpa).
- Resolve problems of gullying, rilling and tunneling that do not occur where a good system of Vetiver hedgerows has been established.

Practical Application and Economics

- Effective hedgerow establishment requires some attention initially. Thereafter, maintenance requirements are minimal and hedgerows will survive, even with annual precipitation as low as 300mm.
- Stabilization of engineered slopes using Vetiver hedgerows has been successfully demonstrated in such countries as: China, Malaysia, Thailand, Madagascar and El Salvador.
- The cost of soil stabilization using Vetiver hedgerows can be 60-90% of the cost using engineered methods, as demonstrated in Australia and China, dependent upon the nature of the works and labor costs.**

* **The Vetiver System (VS)** is a cheap, safe, proven and effective means of soil conservation and stabilization and has been extensively employed in many countries. Vetiver grass does not produce seed and stays where man plants it. So, it is not invasive. It is not affected to any significant extent by pests and diseases, nor does it act as a host for pests or diseases that might attack other plants. So, it is safe. The plant, emanating from India, has existed for centuries. But its extensive use for soil conservation, pollution control and bio-engineering only commenced in the 1980's. For more information contact The Vetiver Network www.vetiver.org.

** **Bracken & Truong**, 2000

Photo 8. Fact sheet developed by **Mike Pease** and **Harry Nijpels** of the EMVN. They would like to see the development of additional fact sheets with before and after photos would be used to "stimulate initial interest in VS" to then be followed up with additional information.

VETIVER NETWORK CONTACTS

The Vetiver Network (TVN)
Ms. Joan Miller
3601 N. 14th St.
Arlington, VA 22201
USA
Tel: (703) 525-7092
Fax: (703) 243-6203
Email: vetiver@vetiver.org
Homepage: www.vetiver.org

Pacific Rim (PRVN) & Thailand (THVN)
Office of the Royal
Development Projects Board
78 Rajdamnern Nok Avenue
Dusit, Bangkok 10300
THAILAND
Tel: (66-2) 280-6193
Fax: (66-2) 280-6206
Narong Chomchalow
Email: journal@au.ac.th
Email: vetiver@mail.rdpb.go.th
Homepage:www.prvn.rdpb.go.th
(Represents Australia, Brunei, Cambodia, China, Fiji, Indonesia, Japan, Lao PDR, Malaysia, New Zealand, Papua New Guinea, Philippines, Taiwan, Thailand, Vanuatu, Vietnam)

Europe/Mediterranean (EMVN)
Mr. Micheal Pease
Quinta das Espargosas
Odiaxere, 8600 Lagos
Algarve - PORTUGAL
Tel/fax: 351-82-798466
Email: mikepease@mail.telepac.pt
Homepage:
www.vetiver.org/EMVN_NET.htm

Latin American (LAVN)
Dr. Oscar Rodriguez
Sociedad Conservacionista Aragua
Apartado Postal 5067
El Limón-Maracay 2105
VENEZUELA
Tel/fax: (58) 043 831734
Email: red_vetiver@hotmail.com

Andean Region
Mauricio César Calderón Sánchez
Cuevas Nº 480
Rancagua - CHILE
Tel: (56) 72 231936
Email: rialmoca@conaf.cl
(Represents Chile, Peru, Bolivia, Argentina, Uruguay)

Southern Africa (SAVN)
Mr. Duncan Hay
Institute of Natural Resources
University of Natal
Private Bag X01
Scottsville, 3209
REP. OF SOUTH AFRICA
Tel: 033-3460796
Fax: 033-3460895
Email: Hay@nu.ac.za
Homepage: www.inr.unp.ac.za/vetiver

Cameroon (CMVN)
Mr. Ngwainmbi Simon Chia
Belo Rural Development Project
P.O. Box 10, Belo
Boyo Division
North West Province
CAMEROON
Email: melcom@douala1.com

China (CNVN)
Prof. Liyu Xu
71# Beijing Donglu
Nanjing 210008
CHINA
Tel. 86-25-3367364
Fax 86-25-3353590
Emails: vetiver@jlonline.com; lyxu@issas.ac.cn
Homepage:
www.vetiver.org/CHN_NET.htm

India (INVN)
Rajan R Gandhi
X-011, Regency Park - II
DLF City Phase IV
GURGAON 122 002
Haryana
INDIA
Tel: 98102-92484
Email: invn@vetiver.org

Indonesia (IDVN)
Mr. Indrawan Suparan
Jl. Arco Raya Buntu B16
Cipete Selatan, Jakarta 12410
INDONESIA
Fax: 62 21 7690906
Email: isuparan@telkom.net
Homepage:
www.vetiver.bizland.com

Madagascar
Mr. Eric MacDonald
Boite Postal 4301
Antananarivo, 101
MADAGASCAR
Tel: 261-22-348-08
Fax: 261-22-348-01
Email: berthon@simicro.mg

Philippines (VETINETPHIL)
Dr. Edwin Balbarino
Farm and Resource Management Institute, FARMI-ViSCA
Baybay, Leyte - PHILIPPINES
Tel: (053) 3352433 /
Office (053) 09196678205
Fax: (053) 3352433
Email: vnp-cicred@philwebinc.com

Tanzania (TZVN)
Mr. Anthony Makoye
P.O. Box 31050
Dar es Salaam
TANZANIA
Email: vetiverTz1999@hotmail.com

Vietnam (VNVN)
Dr. Pham Hong Duc Phuoc
Director, International Programs
Ho Chi Minh City
University of Agriculture & Forestry
Thu Duc District
Ho Chi Minh City
VIETNAM
Email: phdphuoc@hcm.vnn.vn

Brazil (RBV)
Eng. Rogério de Souza Lima
Caixa Postal 33130
Rio de Janeiro, RJ
CEP 22442-970
BRAZIL
Tel: (55) 21 96259951
Email: brasilvetiver@hotmail.com
Homepage: brasilvetiver.00page.com

Chile
Ing. Pablo Molina B.
Manuel Antonio Maira 1011
Depto. 18
Providencia
Santiago de CHILE
Tel: (56) (2) 22 59 146
Fax: (56) (2) 69 63 180
Email: vetchile@vetiver.org
Homepage:
www.geocities.com/vetiverchile

Colombia (RCV)
Ing. Octavio Torres Jimenez
A. Aereo 51748
Barranquilla
COLOMBIA
Tel: (57) 3553183; Cel 033-6317583; Fax: (57) 3552836
Email: ambyagro@LatinMail.com

Costa Rica (CRVN)
Linda Moyher/Ernesto Carman
Finca Cristina
Apartado 1
Paraíso 1-7100
COSTA RICA
Email: crvn@vetiver.org

Ecuador (Ecuativer)
Atn. Piet Sabbe
Escuela de Ciencias Agrícolas y Ambientales (ECAA)
PUCE - Ibarra
Avenida Jorge Guzman y Pólit
Ibarra - ECUADOR
Email: info@ecuativer.com
Homepage: www.ecuativer.com

El Salvador & Nicaragua
Ing. Ronald Chávez
NOBS Antierosión
Km 21 carretera a Santa Ana
Colón, La Libertad
EL SALVADOR
Tel: (503) 338-4367
Fax: (503) 223-9823
Email: nobs@navegante.com.sv

México (MEXVN)
Ana María Le Moing / LASOS
Apdo. Postal 124
Oaxaca, Oax. CP 68000
MÉXICO
Tel/Fax: (52) 951 4 34 94
Tel: (52) 951 1 05 65
Email: Lasosac@yahoo.com

Panama
José Luis García B.
Ave. Pablo Arosemena, 4847
Aguadulce - Provincia de Coclé - PANAMA
Tel: (507) 997- 5365
Fax: (507) 998-4638
Email: cuty_99_1950@yahoo.com

Peru
Dr. Julio Alegre
Av. La Universidad 795 La Molina
Apartado 1558
Lima - PERU
Tel: (51) 1 3486017 Ext: 2117
Fax: (51) 1 3495638
Email: j.alegre@cgiar.org

Venezuela
Prof. Gerardo Yepez
Aptdo. 5115
El Limón - Maracay
VENEZUELA
Tel/fax: (043) 36.18.20
Email: socaragua@cantv.net