VETIVERIM

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Editorial

Vetiver Network Acronyms

Looking at the long list of vetiver national and regional networks, it must be admitted that we are on the right tract to transfer technology of the vetiver system. The Editor is of opinion that many more networks will soon be established once the importance of vetiver is realized. Another close look at the acronyms of the present networks indicates that they are quite varied and no system is adopted. Wouldn't it be better, before too late, that we should adopt a system that acronyms be standardized? It is suggested that *we should have a four-letter acronym for the whole networks under the umbrella of the international one.* The regional networks have set up a good example, viz.:

PRVN = Pacific Rim Vetiver Network
EMVN = Europe and Mediterranean Vetiver Network
SAVN = Southern Africa Vetiver Network
WAVN = West African Vetiver Network
LAVN = Latin American Vetiver Network

Some of the national networks have also adopted a four-letter acronym, viz.:

MGVN = Madagascar Vetiver Network
THVN = Thailand Vetiver Network
VNVN = Vetiver Network Viet Nam

There are some networks, however, that use three-letter acronyms, and some even have more letters (like VETINETPHIL). Is it now time that we adopt the four-letter acronym system so that there will be no chaos in the future, particularly when more networks are established? A three-letter acronym does not provide enough choice because the first letter (e.g. in CVN) signifies the country (China). Then the other countries having the same first letter (e.g. Cameroon) cannot use the same acronym. How many countries in the world have the same first letters?

Even if we agree on a four-letter acronym, there may still be some problem of certain countries like India and Indonesia (the UN system uses IND and INS to distinguish them). Who can make decision for them? *Perhaps a central body can designate the appropriate acronym for a given country or region and register it (like the two-letter codes of the airlines).*

In the article immediately following this Editorial, the Editor compiles comments on the proposals received from a few network coordinators and make conclusions as to how we can standardize vetiver network acronyms although there is still no unanimous agreement. Vetiver Network Coordinators are requested to send

Responses from the Coordinators on the Proposal for Vetiver Network Acronyms

Response from Joan Miller, Coordinator, The Vetiver Network:

Dick Grimshaw has asked me, as TVN Coordinator, to get involved in the acronym discussion so that we can come to a conclusion on how to rationalize and standardize acronyms. What I suggest that we do is:

- ‘Grandfather’ all existing network acronyms. A number of the networks have been operating for several years and are known by their current names and acronyms.
- For new networks we will ask them to choose on a short (maximum five?) letter acronym, ending in “VN” for “Vetiver Network”. I suggest five letters as we can be expecting sub-regional or sub-national networks that may require more letters. This naming convention would be observed when reference is made in English to that network, otherwise we would leave the flexibility that in the national or local language that the acronym would be based on the translation of “Vetiver Network”. Example: The Latin American Vetiver Network is “LAVN” in English publications, but in Spanish publications it is “Red Latinoamericana de Vetiver” or “RLV”. This gives some room for flexibility.
- In ‘official’ documents and publications, use the proper way of referring to acronyms by spelling them out the first time.

I think what is important is that we avoid any confusion or repetition of any acronym. Perhaps the best way to do that would be to establish a registry as you did in Thailand with the orchid growers. Would you be willing to take charge of establishing and keeping the registry of names and acronyms? I would be very pleased if you would consider it. If you like, we could work together with the new networks to agree on their acronyms. Shall we put together a list of all networks and their acronyms and move on from there?

Response from Indrawan Suparan, Coordinator, Indonesia Vetiver Network

On the naming of the network, I must admit that it took some time for me to adopt a name and its acronym, so I did some research on non-used acronym before adopting the simplest form: IVN. I would be glad for a regionally managed network that will enable more accessibility on the information with ease of ‘navigation’. The accepted practice of acronym would be much better than re-inventing new ones that potentially can create confusion later. The problem is the ‘accepted’ practice was not clear, e.g. I thought INA is Indonesia and IND is India (Olympic acronym?). Any decision on this is better than no decision, and I will adopt it, the sooner the better.

Response from Anthony Makoye, Coordinator, Tanzania Vetiver Network

Thank you very much for the proposal to standardize the VN acronyms as you discussed with Joan Miller of TVN. As you suggested, we should have a four-letter acronym for the whole networks under the umbrella of the international one. Tanzania has TZ as a country code. Please be informed that we have changed TAVEN to TZVN as suggested and recommended. So, let it be known by all vetiver networks that the acronym for Tanzania Vetiver Network is now TZVN instead of TAVEN.

Response from Ken Crismier, Coordinator, Vetiver Network Viet Nam

(1) Is any regional or sub-regional or national or even local " vetiver network" going to be ostracized if it does not accept some uniform scheme of acronyms? I would certainly hope not, although I'm sure everyone agrees that disambiguation is desirable.

(2) It does not seem to me that there is any need to have a uniform number of characters, even if all were being determined at one time (such that 'grandfathering' was not even an issue).

(3) Given (2), there seems nothing wrong to me; in fact, to me it makes perfect sense that China, given its primacy (size and influence, and order of establishment of a network), should be 'C', and that Cameroon be (say) 'CA', and so on, either on a first-come-first-served basis. (This is nothing against Cameroon, although admittedly Viet Nam does not have this problem for me to care about!) Similarly, there is no reason that India should not be 'I', in my view. (Some might think this approach might not work well in the United Nations).

(4) However, I would personally much prefer (consider it a proposal, albeit probably immediately rejected) the convention that Vetiver Network and its VN part of the acronym (and even name) come first, not last. This is a very common way of doing things, in many fields, and has distinct advantages – not critical, mind you, but nevertheless distinct:

(a) It conveys the sense of unity, that Vetiver Network XYZ is not entirely a separate "vetiver network", but rather it is an extension or member (not in the sense of organizational membership, but as an arm in a "member" of the body) of the global "vetiver network" – it says "we're all in this together".

(b) It both allows and facilitates the very uniformity and consistency that is the issue here. In one trivial but concrete way, if there is a column of acronyms, the whole column is unified by the fact that all the occurrences of VN line up! Contrariwise, with VN last, the variable length of the first part (variable both in number of letters and in width of those letters, with a proportionally spaced font), militates against seeing them all in the same way.

(c) Vetiver Network China and Vetiver Network India and Vetiver Network Thailand and Vetiver Network Philippines just sound better, to me at least. More concretely, yes, country names are sometimes used as adjectives, e.g. China Airlines, as is proposed (and is already mostly done), but they typically do not have a good 'ring' to them – Thailand Vetiver Network to me has a stilted, unnatural sound (as would "Thailand Airways"), whereas Vetiver Network Thailand flows, sounds natural (again, to me). This convention entirely avoids the issue of whether to use the country (or region) name, or its adjective form – even Vetiver Network Latin America, Vetiver Network Andes, and Vetiver Network Europe and Mediterranean all sound better to me – are there any better counter-examples?

In any case, for now, VNVN stands for Vetiver Network Viet Nam, not Viet Nam Vetiver Network. For Viet Nam, at least, this has the advantage that it reads the same (same structure, same sense and feeling) in both English and Vietnamese. Of course each of you may think of it however you wish, and ultimately it is up to Viet Nam to decide, not me!

Conclusion

From the above responses from a few Vetiver Network Coordinators, it is clear that there is still non-unanimous agreement on standardizing the vetiver network acronyms. However, based on the majority of responses (many have not been shown above), it is clear that it is better to have a system that is agreeable to the majority of people in the field. Thus, the Editor would like to propose the following approaches to standardize the acronym for global vetiver networks:

1. There should be a standard system of using the acronyms for all vetiver networks.

2. The system adopts a four-letter code for all levels of the vetiver networks (simply because it has the least number of letters and contains adequate information of the network, and the majority of the present networks is using it):

2.1 The first two letters are for country code, based on the e-mail country code, e.g. India =IN, Indonesia = ID, Cameroon = CM, China = CN. In case the first two letters have already been used by the regional networks (viz. EMVN, LAVN, PRVN, SAVN, WAVN), or the sub-regional networks (at present two are recognized, viz. Andean Vetiver Network and El Salvador/Nicaragua Vetiver Network, both of which do not have acronym as yet), the country has to seek two other letters and register the code with the Vetiver Network Registrar.

2.2 A new regional or sub-regional network will have to do the same. Once the code is registered, that code cannot be used by other networks.

2.3 The last two letters are VN for Vetiver Network. Note that some networks use the first two letters for Vetiver Network, e.g. Vetiver Network Viet Nam (VNVN), although it does not make any difference in this case. This is acceptable.

2.4 Countries or regions using languages other than English should use English translation of the networks as the acronyms for international communication. For example, the Spanish – Red Latinoamericana de Vetiver or RLV is translated into Latin American Vetiver Network; thus its acronym, LAVN, should be used in international circle, but RLV may be used within the region. Similarly, BRVN for Brazil Vetiver Network should be used in international contact instead of RBV, the Portuguese acronym for Rede Brasil Vetiver.

2.5 The old networks having different systems of acronym – some use a three-letter code while the other more than four, some use their national-language acronyms – these are referred to as the "grandfather" networks. We have to allow them to continue using the ones they have been using, although we have requested / shall request them to voluntarily change to the newly adopted system, to make the system consistent. This is the case of the China Vetiver Network which has agreed to change from CVN to CNVN, the Indonesian Vetiver Network from IVN to IDVN, and the Tanzania Vetiver Network from TAVEN to TZVN. If the rest should decide to change to the agreed system, it would make the whole system more consistent.

3. With respect to the country or regional name, there are two approaches. One is to use the country's or region's name, followed by 'Vetiver Network', e.g. China Vetiver Network, or Southern Africa Vetiver Network. (Note that this is not South Africa(n) Vetiver Network because it is meant to be the regional network for the whole of Southern Africa region.) The other is to use adjective form of the country or region, e.g. Indonesian Vetiver Network or Latin American Vetiver Network. Both are acceptable.

4. Vetiver Network Registrar:

4.1 Name of the Registrar: Dr. Narong Chomchalow

4.2 Postal Address: c/o Office of the Royal Development Projects Board
78 Rajdamnern Nok Avenue
Dusit, Bangkok 10300, Thailand
Tel. (66) 2280-6193; Fax: (66) 2280-6206, 2280-8915

4.3 E-mail Address: journal@au.ac.th

5. Following are the list of current vetiver networks, their acronyms, contact persons and e-mail addresses:

Network Name	Acronym[1]	Contact Persons & E-mail Addresses
A. Global Network		
The Vetiver Network	TVN	Jim Smyle/Joan Miller <vetiver@vetiver.org>
B. Regional Networks		
Pacific Rim Vetiver Network	PRVN	Narong Chomchalow <journal@au.ac.th>
Latin American Vetiver Network	LAVN	Oscar S. Rodriguez P. <osrp@telcel.net.ve>
West African Vetiver Network	WAVN	Linus Folly <wavn@ghana.com>
Southern Africa Vetiver Network	SAVN	Duncan Hay <Hay@nu.ac.za>
Europe and Mediterranean Vetiver Network	EMVN	Michael Pease <mikepease@mail.telepac.pt>
C. Sub-regional Networks		
Andean Vetiver Network*	?	M.C. Calderôn Sanchez <rialmoca@conaf.cl>
El Salvador/Nicaragua**	?	Ronald Chavez <nobs@navegante.com.sv>
D. Country Networks		
1. Asia		
China Vetiver Network	CNVN	Liyu Xu <lyxu@mail.issas.ac.cn>
Indian Vetiver Network	INVN	Rajan R. Gandhi <mistral@satyam.net.in>
Indonesian Vetiver Network	IDVN	Indrawan Suparan <isuparan@telkom.net>
Vetiver Network-Philippines***	VETINET-PHIL	Ed Balbarino <vnp-ed@mozcom.com>
Thailand Vetiver Network	THVN	Kamolinee Suksriwong <vetiver@mail.rdpb.go.th>
Vetiver Network Viet Nam***	VNVN	Ken Crismier <kencris@gte.net>
2. Africa		
Ethiopia Vetiver Network	?	Alemu Mekonnen
Cameroon Vetiver Network	CMVN	Ngwainmbi Simon Chia <dreamland@refinedct.net>, <awa.daughters@camnet.cm>
Madagascar Vetiver Network	MGVN	Eric MacDonald <berthon@simicro.mg>
Tanzania Vetiver Network	TZVN	Anthony Makoye <vetiverTZ1999@hotmail.com>
3. Latin America		
Brazil Vetiver Network	RBVN	R. de Souza Lima <brasilvetiver@hotmail.com>
Chile Vetiver Network	?	Pablo Molina B. <vetchile@uol.cl>
Colombia Vetiver Network	RCV	O. Torres Jimenez <ambyagro@LatinMail.com>
Costa Rica Vetiver Network	?	Linda Moyher <organic@racsa.co.cr>
Ecuador Vetiver Network	?	Piet Sabbe <bospas22@hotmail.com>
Mexico Vetiver Network	MEXVN	Nick Dolphin <Lasosac@yahoo.com>
Panama Vetiver Network	?	Jos Luis Garca B. <cuty_99_1950@yahoo.com>
Peru Vetiver Network	?	Julio Alegre <j.alegre@cgiar.org>

Venezuela Vetiver Network	?	German Trujillo germantr@telcel.net.ve
4. Europe & Mediterranean		
Albania	?	Vangjo Kovaci <migenak@hotmail.com>
Italy Vetiver Network	?	Claudio Zarotti <velasrl@tin.it>
Israel Vetiver Network	?	Leo Toledano <retem@internet.il>
Morocco	?	Dale Rachmeler <drachme@mtds.com>
Spain Vetiver Network	?	Maria Jos Martinez <mjose@fcu.um.es>
E. City Network		
Fuzhou Vetiver Network (China)	FZVN	<fzagri@public.fz.fj.cn>

** Consists of Peru, Chile, Argentina, Bolivia and Uruguay.*
*** Consists of El Salvador and Nicaragua.*
**** Starts with Vetiver Network followed by country name.*
[1] Acronyms that do not conform with the proposed system are underlined.

Report on the Viet Nam Visit*

The main purpose of the trip was to select trial sites and to discuss the design for trials funded by the Donner Foundation:

- Riverbank stabilization against wave erosion in the Mekong Delta conducted by staff of Cantho University.
- Soil and water conservation in plantations in the Central Highlands, conducted by staff of the Thu Duc University in Ho Chi Minh City.
- In addition I also spent quite a bit of time with commercial companies that are promoting and using VS. I met up with Elise Pinners and Tran Tan Van, who have obtained a grant from the Dutch Embassy (Poverty Alleviation Program) to use vetiver for flood erosion control in central coastal VN.

The overall impression was overwhelming. From just a few plants this time last year, in less than 12 months, the total nursery area now must be at least 50 ha producing millions throughout the year for several projects (with irrigation in the dry season). To be more exact the whole thing took off only eight months ago after locating an old vetiver nursery near Ho Chi Minh City. With so many projects now underway I only had time to visit a few more important ones. I was told it would take another four weeks to see them all, from the Gulf of Thailand all the way to the Chinese border in the north!

** By Paul Truong, The Vetiver Network East Asia and Pacific Representative, Brisbane, Australia, of his visit to Viet Nam during 18 January – 6 February 2002.*

Donner Foundation Projects

Both universities have done a great job, more than what they were set out to do for the first year, each has at least 4 ha of vetiver nursery, ready for planting out. They developed their own methods of producing slips and polybags and at Thu Duc University they have produced and sold planting materials for various commercial applications.

It was noted for the first time that the plants grown at Thu Duc Uni nursery in Ho Chi Minh City were badly infested with probably a fungal disease. The disease was observed at the beginning of the dry season, starting with older leaves infected with brown spots on the tips and then gradually spreading and the whole leaf dried up. There was suggestion that it might be a viral disease as small native flies often appeared on these dead leaves, suspected of spreading the virus. However it is most likely to be a fungus. The problem is quite serious and need urgent attention; both the University and Thien Sinh Co. are working on it.

In addition to the establishment of nurseries and the development of methods for mass production of slips, both universities have several research projects for student students on acid sulfate soil, herbicides tolerance and wastewater treatment. In the Plain of Reeds, the Al acid sulfate has pH as low as 2.0, which requires lime and mulch for good establishment. On the Fe acid sulfate, with pH at 3.5 and above, results confirmed my findings in Australia that vetiver can be planted without lime but fertilizers are needed.

Mekong Delta

In the Mekong Delta, suitable sites have been selected for the wave erosion control on both rivers and canal bank near Cantho City. In addition to these sites, due to the recent heavy floods in the region and on the request of Dr. Dung, Project Leader and Dr. Ve, Dean of the Faculty of Agriculture, I have agreed to extend the project to cover flood erosion control instead of more sites for wave erosion control.

In the past, the upper reach of the Mekong River in South Vietnam, near the Cambodian border, is known as the floating rice region because of the annual flooding, up to 2-3m deep. A very fast growing but low yielding variety of rice was the main crop due to its ability to grow up with the fast rising flood-water, hence the name ‘floating rice’.

However, in recent years, the local authorities have built a massive system of dykes and canals for flood mitigation and irrigation, totaling thousands of kilometers in each province in this floating rice region. These dykes were built firstly to protect the double or some times triple cropping system, which are now widely practiced, and secondly to protect their homes. The canals are needed for both irrigation and transportation, thus suffering from wave erosion also.

There are two types of dykes, one to keep water out completely during flood time and the other for the very low areas where the dykes only keep the water out during the small floods but completely submerged during high floods. Most of these dykes were built with acid sulfate soils, material obtained from canal dredging. Both of these dykes are dry nine months of the year so I think VS should work even in muddy water. I have selected several sites for the wave and flood erosion control trials.

Central Highlands

The crash of coffee price in recent years has changed the landscape completely. People have stopped clearing indiscriminately the little forest left and even have abandoned their planted crops. They simply walked off their land and let the Bank and the weeds to repossess it. So erosion is not so serious on the steep-land for now but the focus should be on the ‘better managed’ crops including rubber and cocoa. One or two sites have been selected and at least two more will be identified before the wet season.

Commercial Applications

Commercially the application rate has been very fast in the last year through Thien Sinh Company, an organic fertilizer company in Ho Chi Minh City, which has signed an MOU supporting/sponsoring the vetiver research program conducted at Thu Duc University. Thien Sinh funded a study tour to Thailand for its staff and Dr. Phuoc, the Program Leader. The company subsequently initiated and sponsored the vetiver seminar in Hanoi last October and later obtained a letter from the Deputy Minister of Agriculture recommending VS to all provinces for various applications from wastewater treatment to infrastructure protection.

With the agreement from the Transport Ministry, Thien Sinh, at their own expenses have established several demonstration sites on a number of newly built or under construction highways from the north near the Chinese border, through the Central Highlands to the Plain of Reeds in the south.

Some of these are highly effective and successfully convinced the engineers of VS effectiveness and its low cost alternative to conventional rock structures.

However, the most challenging and important site is on the Ho Chi Minh Highway, at a location called ‘Spring Pass’ (Deo Lo Xo) so called ‘SPRING’ because it is so twisting and winding like a metal spring. The demonstration is on a cut batter, 55m high, on a supposed to be 1:1 slope. To my great concern there is not a single drainage bench on that 60m slope

From the information supplied, Thien Sinh has done a superb job technically, under the extremely difficult conditions, the planting crew had to use ‘abseiling’ rope to plant and fertilize and to their great credit they planted on near perfect contour lines. The crew had no previous experience in doing any vetiver planting, let alone planting on such a steep slope.

Thien Sinh was also successful in inviting President Tran Duc Luong of VN to plant the ‘first sod’ at the Spring Pass in January 2002.

Conclusion

Overall I was very impressed with the preparation and progress achieved in the last 12 months, both on the Donner projects and commercial promotion. However, I would advise caution, not to push VS technology too fast and too far into untested ground where failure will bring bad name to VS. Again as I mentioned many times before, failure is due to application methods rather than VS *per se.*

The Third International Conference on Vetiver (ICV-3): Vetiver and Water

Water is the source of all lives. Human beings are facing the most critical problems: the availability, the quality, and the destructiveness of water. Although around 71% of the earth surface is covered by water, fresh-water accounts for only 2.53% of the total amount. Most of it exists in the North Pole and the South Pole as ice. The real available fresh-water resources in the world comprise only 0.2%. As a result, fresh water is becoming more and more valuable following the increase of population. In 80 countries, 40% of population live in very dry areas, and 1,200 million people of the world are short of safe drinking water. China might face a serious drought within one decade.

On the contrary, excess water and flooding often led to tremendous destruction that caused great losses of lives and properties. In 1998, the heavy flooding in China caused 4,150 deaths and direct economic loss of 255 billion Yuan RMB (about US$31 billion). In India there are 40 million ha of land subject to frequent flood damage.

It is estimated that in the following 30 years, over 60% of world population will face problems related to water.

I. Soil Erosion, Water Quantity and Quality

Water-caused erosion and flooding have destroyed farmland, earth works and various infrastructures, caused large amounts of sediment to enter numerous lakes and reservoirs, raised river beds, made wetlands disappear or convert into deserts. It reduced storage capacity, and caused further water shortage and frequent drought and flood disasters. For example, the bed of the main reaches of the Yangtze River raises 1 m every 10 years. The situation has become worse following great increase in new construction projects (highways, railways, dams, mines, etc.) in developing countries: recent investigation in Guangdong Province of China showed that the new construction sites accounted for 70% of the total erosion area, and 80% of the amount of soil loss, respectively.

With rapidly increasing population and related human activities, the destruction of natural forests and grassland led to a huge amount of water loss. It has been estimated that each hectare of forest can restore 300 m^3 of water, i.e. about 3,333 ha of forest can act as a reservoir for 1,000,000 m^3 of water. The clearance of natural vegetation led to a huge loss of water and soil. For example, previous investigations on the Chinese Loess Plateau have shown that the erosion area accounts for as large as 400,000 km^2, or about 90% of the total area, with annual water loss of 20,000 million m^3, and 1,600 million tons of soil were brought into the Yellow River.

As the result of water shortage and irrational development, desertification became serious as it affected food production and deteriorated the environment. For example, the land affected by desertification is increasing 2,460 km^2 every year in China; the total desertified land now accounts for about 40% of the whole area of the country. The sandstorm also occurred frequently. For instance, the large sandstorm increased from once every century by the year 1000 to one sandstorm every two years in 1960s and 1970s. During 1993-1996, the sandstorm occurred every year. In the year 2000 several heavy sandstorms have occurred within the first few months, which influenced most parts of China from Beijing in the north to Shanghai in the south, which buried villages, interrupted transportation and caused a loss of lives.

Following industrial development, several different pollutants have contaminated freshwater. There were 354 million m^3 of polluted water discharged each year in China (in 1990). Over application of chemical fertilizers caused eutrophication in freshwater and led to high contents of N, P, and BOD in the water and nearby soils, resulting in the rapid growth of blue-green and green algae. The decline of soluble oxygen content led to the death of aquatic animals, and the deterioration of water quantity and quality.

To struggle against water shortage, people have to use underground water, while the recharging water has become limited, breaking the water balance and led to the subsidence of land, destruction of buildings, and exhaustion of groundwater resources.

It is obvious that water has become a most critical issue human being has to resolve.

II. Vetiver and Water

As a single and simple technology, although the Vetiver System (VS) cannot solve all problems related to water, the grass does help to solve a lot of them. Plenty of experiences obtained in the past decade in various countries of the world have proved that VS is beneficial to water quantity, quality and the control of damages caused by water.

- Reliable information from several experiments indicates that when vetiver hedges are contour planted on sloping farmlands, runoff was reduced as much as 70%, and soil loss reduced by more than 90%. It therefore helps conserve soil and water, facilitates water percolation into the ground, prevents sediments from being transported into rivers and lakes, and reduces flood disasters.
- Recent research showed that non-agricultural practice could cause serious soil erosion problems. Vetiver has dense and massive root system with mean tensile strength of about 75 MPa at 0.7-0.8mm root diameter, i.e. equivalent to one-sixth of the ultimate tensile strength of mild steel. Therefore, it can stabilize new construction sites, stop point erosion, and prevent sediments from moving into river and benefit water storage and discharge systems. Furthermore, the cost of VS applied in the aspects of erosion control and slope stabilization is usually only about 10-20% of the cost of the “hard” measures.
- With its strong deep-root system, vetiver can stabilize water storage facilities such as dams, banks and ditches, fishponds, reservoirs, and hence enhance water conservancy and storage effectiveness.
- VS can prevent or reduce natural disasters caused by hurricanes, landslides and flooding, as it was investigated in Honduras, El Salvador, the Philippines, and China.
- Vetiver can quickly rehabilitate wastelands (gullies, mine areas, extremely degraded lands). Its large amount of biomass (upto 350 t/ha/growing season) can increase soil organic matter dramatically, improve soil structure and porosity, and increase water storage capacity.
- A recent study indicated that soil may have a great capability for water storage when it is well husbanded, while VS can improve this ability substantially.
- Vetiver grass as a pioneer and under-story plant can improve the growth of tree seedlings (15%) and their survival (95%), help afforestation and accelerate vegetation recovery on barren land and subsequently slows down water flow and, subsequently, soil erosion.
- The root system of vetiver has an ability to penetrate through hard pans and clay pans, thus increasing downward movement of water, enhancing groundwater recharge.
- Vetiver grass hedgerows can reduce flood damage to farmland. Its pruning applied as mulch during dry season can help preserve soil moisture and improve crop performance, and increase crop yield by as much as 40%. It has an important role in watershed management.
- Vetiver grass can tolerate high levels of toxic elements and pollutants, therefore can absorb heavy metals, remove excess phosphates, nitrates and pesticides from farmland, relieve water eutrophication, and improve water quality.

To sum up, the vetiver system could play a crucial role in improving the availability and quality of water in tropical and subtropical countries and reduce water-related catastrophes, since it behaves as a biological sieve in preventing the movement of soil particles and the attached pollutants, by conserving and ‘purifying’ water, and by strengthening soil profiles through its root

system, thus preventing water-induced slippage and collapse, with subsequent damage to property and life. Therefore, during the Business Meeting of the Second International Conference on Vetiver (ICV-2) in Thailand, in January 2000, 'Vetiver and Water' was unanimously selected as the theme for the ICV-3.

III. China's Contribution to Vetiver Development

As early as the 1950s China started its research and application on vetiver technology. Multiple vegetative propagation methods were created in Guangdong Province to speed up seedling production. Vetiver oil was extracted. Since the 1980s vetiver has been used for soil erosion control, including the protection of orchards, newly constructed terraces, fishponds, river and coastal banks, and the revegetation of barren lands. Besides, cut leaves and culms were used as fodder, fuel, mushroom cultivation medium, and for handicraft production.

Since 1990, lots of researches, led mainly by the South China Institute of Botany, the Chinese Academy of Sciences located in Guangzhou, have been conducted in Guangdong, including the physio-ecological features of vetiver, its adaptation to climate of South China, benefits on erosion control and promotion to crops, efficiency for rehabilitation of landfill, quarry, and phyto-remediation of mineland and polluted water, etc. All these researches have gained meaningful results and produced a good influence in the vetiver circle of the globe.

In recent years, following fast economy development, new constructions caused serious erosion. As investigated in Guangdong Province, vetiver was applied for engineering purpose (highway embankment protection in particular) throughout almost all southern provinces of China. Because VS is not only very effective, but also economical (about 1/5-1/10 of the hard measures, such as using concrete protection), it has been disseminated quite quickly. Numerous organizations were involved, including universities, research institutions, governmental offices, and the private sectors, with multiple disciplines involved, such as water conservation, agriculture, forestry, ecology, environment, road construction and maintenance, etc. Now, China becomes one of the largest vetiver users for engineering protection in the world.

In addition to research, VS has been actively extended in China through printed matters, journals, newspapers, and television broadcastings. Pertinent publications were also produced, such as Vetiver Research and Development, Vetiver Newsletter, Fact Sheets, etc. Conferences and training courses were organized by the China Vetiver Network and its collaborating institutions, such as the International Vetiver Workshop in Fuzhou in 1997, Vetiver Bioengineering Technology for Erosion and Sediment Control and Civil Construction Stabilization in Nanchang in 1999, and the International Workshop on Application of Vetiver in Guangzhou in 1999.

In addition to mainland China, numerous researches and applications were also conducted in Taiwan and Hong Kong. The following are some examples:

- Study on the application and research of vetiver grass has been made at the National University in Taiwan in the past several years. The present work is on germplasm collection: 15 accessions were obtained from the US Germplasm Bank.
- Vetiver has been used in Hong Kong to rehabilitate wasteland at a site adjacent to a land-fill area in the hills not far from the old airport in Kowloon. This site was a completely eroded park where trees could not be established.
- Vetiver hedgerows were planted in Hong Kong to reduce rainfall runoff and erosion. *Acacia mangium* trees were then planted and they grew very well.
- The University of Hong Kong and Guizhou Agriculture Academy joined together to study the effect of VS on the erosion control of red soil and the effect of fertilizers on vetiver grass.
- The Hong Kong Baptist University is working on phytoremediation mechanism of vetiver in collaboration with Australian researchers.
- The Hong Kong Baptist University and Zhong Shan University in Guangzhou are working on

♦ Based on these achievements, China Vetiver Network, under the coordination of Prof. Liyu Xu, received "The King of Thailand's Vetiver Award" in 2000, and China was nominated as the host country to organize the Third International Conference on Vetiver (ICV-3) in about four years after ICV-2, so that China's achievement could be shared by worldwide vetiver users.

IV. Conference Program

A. Topics

The ICV-3 will put emphasis on the theme of "Vetiver and Water" and the strategy on VS extension in order to relieve freshwater problems of the world and to speed up VS dissemination, including:

- VS for runoff control
- VS for groundwater recharging
- VS for erosion control and slope stabilization
- VS for pollution control and water quality assurance
- VS for purification of leachate of landfill and mined land
- VS for earth work stabilization and point erosion prevention
- Fast production of planting materials
- Quality guarantee for multiple VS applications
- Extension strategy for fast dissemination of VS
- Factors influencing VS dissemination and methods to solve this problem
- Other grasses for water and soil conservation, especially those for cold areas
- Other topics relating to VS and its dissemination.

B. Program Structure

The program will include:

- Key presentations by well-recognized vetiver experts of the world
- Plenary sessions
- Concurrent sessions
- Group discussions
- Poster paper presentations
- Exhibitions of various papers, photos, and publications, and video/computer media
- Business meetings for network coordinators and nomination of the host of ICV-4
- Mid-conference excursions to visit various demonstration areas.

C. Participants

It is anticipated that more than 300 participants from over 30 countries will participate in the Conference. They will be mainly scientists, experts, engineers, government officials, and extensionists.

D. Sponsorships

It is expected that around 30 participants from developing countries (least developed countries in particular) will be sponsored by the Conference's Organizing Committee. Limited number of distinguished foreign experts will be invited to attend the Conference as resource persons to be supported by Chinese Academy of Sciences, National Natural Science Foundation of China, etc.

E. Organization

The Organizing Committee will be formed consisting of international and Chinese experts, in close cooperation with The Vetiver Network (TVN). A Working Group will be established under the China Vetiver Network (CNVN) to process routine issues in cooperation with multiple national and provincial institutions.

F. Location

The conference will be held in Guangzhou, in southern China where the local authority has high enthusiasm in using vetiver and there have been many successful applications of VS suitable for demonstration purpose.

G. Duration

The conference will be held from 6 to 9 October 2003.

H. Language

The conference will be conducted in English with simultaneous interpretation to and from Chinese for the benefit of the Chinese participants.

I. Expected Output

The expected output will include:

- Conference Preceedings (camera-ready manuscripts) will be printed and distributed during the Conference while the formal Proceedings will be published within one year after the Conference and distributed worldwide through The Vetiver Network and through CNVN.
- ICV-3 Daily News will be prepared on a daily basis during the Conference to provide up-to-date information to the participants.
- Color prints illustrating vetiver applications in China will be distributed to all participants.
- Vetiver Newsletters will be produced to publicize the Conference information. Some promising application models will also be produced and widely sent to government officials, scientists, potential participants and vetiver users both before and after the Conference.
- Vetiver Fact Sheets vividly describing the use of vetiver grass will be produced and sent to the original and new users at county and prefectural levels in China.
- A resolution of the Conference will be drawn to assist governments, organizations, institutions, agencies, researchers and farmers/land users in establishing appropriate directions in handling further research, extension and utilization of the VS.
- A practical link will be established among scientists, engineers and government officials of China and other countries involved in various disciplines to enhance further cooperation in various aspects of VS.

V. Contact

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5.2 Growth differentiation

General speaking, the demonstration section of the road had a direction of east-west. Vetiver grass on the southern slope was not as good as that on the northern slope, possibly because the soil of southern slope contained less moisture. However, even on the same slope vetiver growth was different especially in the first two months. In addition, tillering differentiated from 5 to 45 tillers/ clump. Analysis showed that soil nutrients differed from place to place (Table 4). It is because the soil materials come from farmland derived from the Yangtze River sediments of which different layers contained different contents of nutrients. Besides, the surface soil of farm land should have higher nutrients that promoted vetiver growth. From Table 4 we can find high nitrogen content may promote vetiver growth even at the early stage.

Table 4. Soil nutrient analysis of surface soil from different section of road embankment

No. Descriptions	O.M. (g/kg)	T - N (g/kg)	T - P (g/kg)	T - K (g/kg)	S-N (mg/k)	S-P (mg/kg)	S - K (mg/kg)	pH (water)
1 Vetiver grew very well, south slope	5.9	0.33	1.70	19.8	78.16	3.7	34	8.70
2 Vetiver died after first planting, south slope	4.7	0.29	1.72	20.8	63.95	39.3	90	8.51
3 Vetiver grew well, north slope	5.5	0.32	1.22	21.8	71.05	2.4	32	8.86
4 Slide place, north slope	7.1	0.37	1.87	19.6	93.79	4.1	37	8.79

Note: *O.M. = organic matter, T- = total, S- = soluble*

5.3 Insect control

In the beginning of August, rice borer was found on some of the grasses. The insect was at the end of the first generation and the beginning of the second generation. To control the insect Tamaron was used on 6 August, 28 September, and 15 October 2001.

6. Function on Erosion Control

Generally, the grass that was firstly planted on 20 April reached around 80cm high two months after planting and formed a preliminary hedge and started to exert the protection function. Investigation at the end of July, three months after planting, the whole embankment was fully protected with vetiver grass that reached over 2m high. The roots reached down to 80–110cm. The embankments were well protected and passed a raining season safely, because vetiver has dense and massive root system underground and offers better shear strength per unit fiber concentration. According farmers' experience, the slope must be protected by rocks otherwise the embankments

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** By Liyu Xu, Coordinator, China Vetiver Network, Namjing, China. Continued from Vetiverim 19.*

would collapse and bury near by rice field. Normally, the railway engineers had to use huge plastic sheets to cover the whole embankments against erosion. The present demonstration showed that vetiver hedges acted as concrete wall or rock skeleton to protect the road.

However, according to investigation on 27 June 2001 a small slide with about 4 m^3 of soil material found and then repair and replanting were made. Soil sampling and analysis showed that although the particle size distribution looked no great change, the sample No. 4 had a texture of sand and loamy sand because it had less clay particles, which explained why this section of the slope had a small slide (Table 4). However, the slide happened two months after planting when vetiver hedges

were not fully formed and it was caused by continuous rainfall during plum-raining season. Once the rainy season passed and the vetiver grew up, the embankment no longer clasped.

Table 5. Mechanical analysis of surface soil from different section of road embankment.

No.	Description	Particle size (mm, %)				Texture
		2 - 0.2	0.2– 0.02	0.02–0.002	< 0.002	
1.	Vetiver grew very well, south slope	0.8	74.8	16.0	8.4	Sandy loam
2.	Vetiver died after first planting, south slope	0.5	84.0	9.8	5.7	Sandy loam
3.	Vetiver grew well, north slope	0.5	69.5	20.5	9.5	Sandy loam
4.	Slide place, north slope	0.5	84.8	9.5	5.2	Sand & loamy sand

7. Conclusion

The first application of vetiver for railway embankment protection was quite successful, which indicated that vetiver could be used to protect slope formed by sand particles that was quite different from other numerous applications on highways in the mountainous area in China that usually contained rock fragments, some clay particles and mixed with forest soil containing some organic materials. Although the best planting season in this area was March in the dormancy period, vetiver could grow up in three months when planted at the end of April while vetiver started to grow.

To ensure planting to be successful, followings should be seriously considered:

- Before planting people may consider it to be an absolutely technical issue. However, once seeing the planting procedure, s/he may look down upon the technology and subsequently led to the planting failure. As a result, planting and management regulation should be prepared and be followed during the whole process.
- Planting materials should not come from the nursery with very clayey soil to avoid difficulty in separating the tillers.
- Organic manure is recommended to be used as basic manure. If chemical fertilizer is to be used, calcium-magnesium-phosphate might be a good choice to avoid possible root damage.
- Planting materials should be very carefully prepared (not longer that 20cm).
- Planting season should be well selected so that the planting could be most successful with less effort and the possible collapse during raining season could be protected, especially for the embankment formed by sand or loamy sand texture. Besides, soil analysis should be done before planting in order to design different measures for different soils.

Three Technical Bulletins Published by the Pacific Rim Vetiver Network

During 2001, three technical bulletins have been published by the Pacific Rim Vetiver Network with financial support from the Office of the Royal Development Projects Board of Thailand. Following are the titles, authors, and abstracts of these three bulletins:

1. "The Utilization of Vetiver as Medicinal and Aromatic Plants with Special Reference to Thailand", No. 2001/1, September 2001, by Narong Chomchalow, Office of the President, Assumption University Bangkok, Thailand.

Vetiver is a tall, tufted, perennial, scented grass with a straight stem, long narrow leaves and a lacework root system that is abundant, complex and extensive. Vetiver has versatile uses, particularly as an inexpensive yet effective and eco-friendly tool to combat soil erosion. Medicinal and aromatic plants (MAP) are two related groups of plants having in their part chemical constituents that are active in curing ailments (i.e. MP) or in providing flavors and/or fragrances (i.e. AP).

Vetiver has traditionally been utilized as MAP since ancient times, particularly in India, Indonesia, Pakistan, Senegal, Sri Lanka and a few other countries as well as in Thailand. This publication describes potential utilization of vetiver, both as MP and AP. It also highlights the utilization of vetiver as MAP in Thailand that includes the utilization of vetiver in traditional medicine, for pest control, and as fragrant materials. Research on the production of vetiver oil and the R&D of industrial potential of vetiver as aromatic plants in Thailand are also described. It ends with the discussion on the main objective of planting vetiver, environmental implication, socio-economic aspects, and industrial potentials.

2. "Vetiver System for Wastewater Treatment", No. 2001/2, October 2001, by Paul Truong Queensland Department of Natural Resources and Mines, Brisbane, Queensland, Australia and Barbara Hart Codyhart Environmental Consulting Pty., Ltd. Gold Coast, Queensland, Australia.

Clean water is becoming one of the most scarce and valuable resources in the twenty-first century as its supply is finite and its traditional source is easily polluted by industries and population growth. Existing and traditional wastewater treatment methods are expensive and in most cases are either impractical or unsuitable for smaller communities and certain industries.

The vetiver system (VS) was first developed for soil and water conservation purpose but in the last six years its role has been extended into environmental protection field, particularly in the field of wastewater treatment and solid waste landfills. Research in Australia and China has shown that VS is a very effective method of treating polluted water, domestic effluent, industrial wastewater, and landfill leachate.

3. "Development of the Vetiver System in Guangdong, China", No. 2001/3, December 2001, by Hanping Xia, South China Institute of Botany, Guangzhou, Guangdong, China.

The Vetiver System (VS) is a new phyto-reclamation technique based on the use of vetiver grass (*Vetiveria zizanioides* (L.) Nash) for erosion control and pollution mitigation applications. VS began to develop in China in 1988 and in Guangdong Province of South China in 1990. However, as early as the 1950s, vetiver was introduced into Guangdong from abroad for the purpose of extracting essential oil. Furthermore, there are natural vetiver communities in Guangdong that have existed naturally for hundreds of years.

During the past 11 years, research on vetiver and VS has made a great progress in Guangdong, and initiated a new concept, "The Vetiver Eco-engineering". Its demonstrations and applications have been extended into numerous fields such as reservoir and river, highway slope, landfill, quarry, mine land, and even city park from the original soil and water conservation purpose in agricultural field. In recent years, there have been more and more institutions, agencies, and 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 Guangdong as compared with other provinces of China.

Copies of these three technical bulletins have been sent to key personnel in the vetiver circle including the Coordinators of vetiver networks around the world. Those who have not yet received them may write to the Secretariat, Office of the Royal Development Projects Board, 78 Rajdamnern Nok Avenue, Dusit, Bangkok 10200, Thailand, Fax: (66) 2280-6206, 2280-8915.

Change of Responsible Officer for Vetiver at ORDPB/PRVN/THVN

A recent reshuffle in the administration of the Office of the Royal Development Projects Board which handles all the vetiver matter for the Pacific Rim Vetiver Network as well as the Thailand Vetiver Network results in the change of personnel responsible for the vetiver matter as of the beginning of 2002. Mrs. Suwanna Pasiri, who has been promoted to be the Director of the Project Evaluation Division, will be no longer officially responsible for the vetiver matter. The new person responsible for vetiver is Mrs. Kamollinee Suksriwong, Chief of Foreign Affairs Section of the Planning Division. Please direct all your official correspondence to the new responsible officer at the same old postal address of ORDPB.

Please note also that for all e-mail correspondences regarding vetiver to the Office of the Royal Development Projects Board and the Pacific Rim Vetiver Network, the mail address has been changed from pasiri@mail.rdpb.go.th to vetiver@mail.rdpb.go.th.

New Vetiver-Grass Plant Pot is Touted as World-First Invention: Set to Boost Incomes, Tap Export Markets*

Cashing in on the increased popularity of environmentally friendly products around the world, Thailand has developed a new plant pot made from vetiver grass, or 'Ya Faek'. It may come as a surprise that vetiver grass, regarded in some circles as a worthless weed, is set to be turned into a money-spinner, just as another weed, the water hyacinth or 'Pak Top Chawa', has been turned into handicrafts.

Developed by the Department of Science Service in the Ministry of Science, Technology and Environment, the vetiver-grass plant pot is being touted as a world-first by its inventors. "We plan to register a patent for the innovation by the end of 2002", said Dr. Itti Pichyentrayothin, the Department's Director-General.

The Department has invested Baht 38 million over the past six years in research into vetiver grass. Dr. Itti said the resulting products, under the Doi Tung Development Project, would help provide an alternative source of income for households and rural communities.

A cooperative in Doi Tung, near Chiang Rai, is training its members to make the products at three factories funded by the Ministry. In the production process, vetiver grass is shredded and blended with Doi Tung clay in a 1:8 ratio. Water is then added to the mixture, which is placed in a kiln for eight hours at a temperature of 1,230^{o}C. Finally, the pots emerge and are painted with a variety of colors to appeal to shoppers. Production costs for each pot range from eight to Baht 18, while unpainted products cost Baht 5.50 to make.

"Promoting vetiver grass as a way to make pots will help eliminate the hill subsidence problem in local communities and also make money", Dr. Itti said. "Vetiver grass products had bright export prospects, particularly in Japan and Germany where people like hand-made products from natural materials", he said. "However", he said, "the process needed further refinements to meet international quality standards. The thickness, durability and finish of the products all could be improved. The Department is working with metropolitan administrations and cooperatives in the provinces to train artisans to produce and design the new plant pots. A cooperative in Yala has asked the Department to train its members to make the pots and at least a dozen people have applied for the training course". Dr. Itti said the pots were highly suitable for potting flowers such as orchids, which means they could be identified with one of Thailand's best-known exports.

Sales of potted orchids in the United States are worth about US$75 million a year and the plants are also popular in Japan and the European Union. Dr. Itti hopes the vetiver-grass project can emulate the success of the water hyacinth handicrafts industry. In 2000, Thailand's exports of water hyacinth products to Japan doubled compared with the year before, and were worth Baht seven million. "In the future", he said, "the Ministry would conduct research into all of Thailand's water weeds and plants, to assess their potential for further development as value-added products."

· *By Srisamorn Phoosuphanusorn. Reprinted from 'Bangkok Post', 4 January 2002.*

Announcement for the Training Course on Vetiver Handicraft-making

Further to our previous announcement on the organization of the Training Course on Vetiver Handicraft-making (Vetiverim 17, July 2001), the Office of the Royal Development Projects Board (ORDPB) would like to confirm our strong desire and sincere intention to hold such training in order to meet the requests from many vetiver-using countries. The ORDPB would like to invite all vetiver users interested in learning other aspects of vetiver utilization, apart from the conservation of soil, to apply for this training course for which the number of participants will be limited to between 10 and 15 persons. Thai experts in the field of using vetiver for handicraft-making are ready and very pleased to pass on their knowledge to, and share their experience with, the participants. The date of the Training Course on "Vetiver Handicraft-making" has been set tentatively on 11-25 November 2002.

Regarding the funding support, unfortunately the ORDPB has not been successful in finding a source of funds to support the organization of this training course. Therefore, it will be necessary to collect the fee for the training course from interested participants at the amount of US$500 exclusive of international travelling expenses. Please note that for the training course to be effective and beneficial there should be at least 10 participants attending the training course. Interested persons are invited to submit letter of application for the training course within *31 July 2002*, via postal address: The Office of the Royal Development Projects Board, 78 Rajdamnern Nok Avenue, Dusit, Bangkok 10300, Thailand; by Fax No.(66) 2280-6206; or via e-mail address: vetiver@mail.rdpb.go.th.

Announcement of the Third International Conference on Vetiver (ICV-3)

The Third International Conference on Vetiver (ICV-3) will be held in Guangzhou, Guangdong province, China, 6-9 October 2003 under the theme "Vetiver and Water" (see details on pages 7-12).