

# VETIVERIM

## A Quarterly Newsletter of the Pacific Rim Vetiver Network

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**Editor:** *Narong Chomchalow*

**Asst. Editors:** *Samran Sombatpanit*

**Advisors:** *Sumet Tantivejkul*  
*Manoon Mookpradit*

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### Publisher:

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, 629-8915

E-mail: [pasiri@mail.rdpb.go.th](mailto:pasiri@mail.rdpb.go.th)

Editor's E-mail: [journal@au.ac.th](mailto:journal@au.ac.th)

Homepage: <http://prvn.rdpb.go.th>

## 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:

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.:

THVN = Thailand Vetiver Network

VNVN = Vetiver Network Viet Nam

There are some networks, however, which use a three-letter acronym, 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 follows this Editorial, the Editor compiles comments on the proposal to standardize the vetiver network acronyms 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.

## **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 5?) letter acronym, ending in “VN” for “Vetiver Network”. I suggest 5 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 VN that the acronym for Tanzania Vetiver Network is now changed to read 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 be 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 ("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 an 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 languages, 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 the proposal to standardize the vetiver network acronyms. However, based on the majority of responses, it is also 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 global vetiver network acronyms:

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 which 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 e-mail country code, e.g. India = IN, Indonesia = ID, China = CN, Cameroon = CM. In case the first two letters are already 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. 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 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 within the region, RLV may be used. Similarly, BRVN for Brazil Vetiver Network should be used in international contact instead of RBV – the Portuguese acronym for Rede Brasil Vetiver.

2.4 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 used before, 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 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 10200, Thailand  
Tel. (66-2) 280-6193; Fax: (66-2) 280-6206, 280-8915

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

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

| Network Name                             | Acronym <sup>1</sup> | Contact Persons & E-mail Addresses  |
|--|----------------------|---|
| <b>A. Global Network</b>                 |                      |   |
| The Vetiver Network                      | <u>TVN</u>           | Jim Smyle/Joan Miller <vetiver@vetiver.org>                                     |
| <b>B. Regional Networks</b>              |                      |   |
| Pacific Rim Vetiver Network              | PRVN                 | Suwanna Pasiri <pasiri@mail.rdpb.go.th><br>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>                                       |
| <b>C. Subregional Networks</b>           |                      |   |
| Andean Vetiver Network*                  | ?                    | M.C. Calderôn Sanchez <rialmoca@conaf.cl>                                       |
| El Salvador/Nicaragua**                  | ?                    | Ronald Chavez <nobs@navegante.com.sv>   |
| <b>D. Country Networks</b>               |                      |   |
| <i>1. Asia</i>                           |                      |   |
| 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***           | <u>VETINET</u>       | Ed Balbarino <vnp-ed@mozcom.com>  |

## 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   | <u>RCV</u>   | O. Torres Jimenez <ambyagro@LatinMail.com>   |
| Costa Rica Vetiver Network | ?            | Linda Moyher <organic@racsaco.cr>            |
| Ecuador Vetiver Network    | ?            | Piet Sabbe <bospas22@hotmail.com>            |
| Mexico Vetiver Network     | <u>MEXVN</u> | 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

|                        |   |                 |
|------------------------|---|-----------------|
| Italy Vetiver Network  | ? | Claudio Zarotti |
| Israel Vetiver Network | ? | Leo Toledano    |

## 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.

<sup>1</sup> Acronyms which do not conform to the agreed system are underlined.

## Vetiver Glossary 6: Vetiver Parts Used in Propagation

This is the sixth part of the series on Vetiver Glossary. The first part, on “Vetiver and Its Related Terms”, was published in Vetiverim 15; the second part, on “The Vetiver System”, in Vetiverim 16; the third part, on “Species and Related Taxa”, in Vetiverim 17; the fourth part, on “Use and Utilization of Vetiver” in Vetiverim 18; and the fifth part, on “Vetiver Propagation” in Vetiver 19. The format used includes the definitions from: (i) Webster’s New World Dictionary, Third College Edition, (ii) <www.dictionary.com>; and (iii) the Editor’s, known as Vetiverim’s. Their explanations are also provided.

*Vetiver in cultivation rarely produces seeds. Thus, only asexual reproduction is used extensively in vetiver propagation. In the vetiver literature, several terms have been used, sometimes indiscriminately, to designate the parts of the vetiver plant that can be used in propagation. Their definitions and explanations are given below:*

### Tiller:

Webster’s: *n.* a shoot growing from the base of the stem of a plant

www.dictionary.com’s: *n.* a shoot, especially one that sprouts from the base of a grass

Vetiverim’s: *n.* a shoot sprouting from the base of the stem of a grass

Explanation: ‘Tiller’ is the most valid term used to describe the part used in vetiver propagation. It is also the most popular part of the vetiver plant used in propagation since it is available in large quantity, employs simple technique, and gives good result.

### Slip:

Webster’s: a stem, root, twig, etc. cut or broken off a plant and used for planting or grafting:

**Explanation:** Many authors used this term synonymously with tiller. Some even erroneously called it a 'root division'. (*In vetiver, the structure from which the slip grows is the base of the stem, not the root!*). As it is a rather confusing term, and the fact that the term 'tiller' is more appropriate, it is suggested NOT to use this term in the future to avoid confusion.

### **Culm:**

**Webster's:** a stalk, stem; the jointed stem of various grasses, usually hollow

**www.dictionary.com's:** the stem of a grass

**Vetiverim's:** the above-ground part of the stem of a grass, usually hollow

**Explanation:** The culm of the vetiver grass is strong, hard, and lignified, having prominent nodes with lateral buds that can form roots and shoots upon exposure to moist condition. Laying the cut pieces of culm on moist sand, or better under mist spray, results in the rapid formation of roots and shoots at each node.

### **Cutting:**

**Webster's:** a slip or shoot cut away from a plant for rooting or grafting

**www.dictionary.com's:** a part of stem removed from a plant to propagate new plants, as through rooting

**Vetiverim's:** a part of stem with at least one node each used to propagate new plant

**Explanation:** Although commonly used as propagating material in horticultural crops, 'cutting' is rarely used in vetiver. This term is synonymous with 'cut culm' or 'culm-cutting' referred to by P.K.Yoon [1991: Extracts from Look-See at Vetiver grass in Malaysia – First Progress Report. Vetiver Newsl. 6: 86-96].

### **Culm-Branch:**

**Webster's:** (none)

**www.dictionary.com's:** (none)

**Vetiverim's:** a branch developed from the lateral bud of a culm

**Explanation:** Culm-branch is a term derived from similar structure in bamboo and other ramified grasses. It was Yoon (1991) who used this term in vetiver literature for the first time to mean a branch developed from the lateral bud of a culm of more than three months old whose main culm has been repeatedly cut down to induce tillering.

### **Clump:**

**Webster's:** a cluster, as of shrubs or trees

**www.dictionary.com's:** a thick grouping, as of trees or bushes

**Vetiverim's:** a cluster of tillers developed originally from a mother plant in all directions

**Explanation:** In vetiver, a clump is formed when a plant has been grown for a certain period of time and produces numerous tillers in all directions.

### **Ratoon:**

**Webster's:** *n.* a shoot growing from the root of a plant (esp. the sugar cane) that has been cut down

**www.dictionary.com's:** *n.* a shoot sprouting from a plant base as in the banana, pineapple, or sugar cane

**Vetiverim's:** *n.* a shoot growing from the base of a plant that has been cut down to induce sprouting

**Explanation:** As vetiver (or even the sugar cane!) does not seem to re-sprout from the root when the clump is cut down to the ground, but rather from the base of the stem, thus the re-sprouting structure is actually a 'tiller' which has been induced to sprout by cutting down the top part. This term should NOT be used in vetiver propagation to avoid confusion.

### **Tissue Culture Plantlet:**

**Webster's:** (none)

**www.dictionary.com's:** (none) (plantlet is defined as '*n* - a young or small plant', 'a little plant')

size, these 'plantlets' can be transplanted in the containers or in the fields similar to the tillers, although much smaller in size. Tissue culture plantlets can be produced within a relatively short time at a reasonable expense. They also have certain advantages over other planting materials in that they are small in size, easy to transport, and free from pathogen (as they are grown, and still remain, in aseptic condition) which make them safe for international movement, especially across the countries with strict plant quarantine system.

*Of all these plant parts, only the first (tiller) and the last (tissue culture plantlet) are used extensively in most vetiver-growing countries to propagate the vetiver grass, simply because they are the convenient parts to be used in propagation. Besides, the cost of their production is relatively lower than that of the other parts while the success is higher. Of the remaining structures, culm (including cutting and culm-branch) and clump are also used in propagation to some extent while the rest are either not used for practical reason, or do not exist.*

### **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 problem, the availability, the quality, and the destructiveness of water. Although around 71% of the earth surface is covered by water, the fresh water accounts for only 2.53%. 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 about 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, as recent investigation in Guangdong Province of China showed that the new constructions 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<sup>3</sup> of water, i.e. about 3,333 ha of forest can act as a reservoir for 1,000,000 m<sup>3</sup> 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<sup>2</sup>, or about 90% of the total area, with annual water loss of 20,000 million m<sup>3</sup>, 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<sup>2</sup> every year in China; the total desertified land 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 1990 to one sandstorm every two

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<sup>3</sup> 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 transporting into rivers and lakes, and reduces flood disasters.

Recent research showed that the non-agricultural practice could cause serious soil erosion. Vetiver has dense and massive root system with mean tensile strength of about 75 MPa at 0.7-0.8 mm 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 (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 capacity dramatically.

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 stop water and 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

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 was 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 handicraft production.

Since 1990, lots of researches, led mainly by South China Institute of Botany, the Chinese Academy of Sciences lied in Guangzhou, have been conducted in Guangdong, including the physiological 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 the southern provinces of China. Because VS is not only very effective, but also economical (about 1/5~1/10 of the hard measures 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 and 15 accessions were obtained from the US Germplasm Bank.

VS 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 grew very well.

The University of Hong Kong and Guizhou Agriculture Academy joined together to study the effect of VS on red soil erosion control and the effect of fertilizers on vetiver grass.

The Hong Kong Baptist University is working on phytoremediation mechanism of vetiver with their colleagues in Australia.

The Hong Kong Baptist University and Zhong Shan University in Guangzhou are working on vetiver application for acid drain of mines in Guangdong.

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 anticipated 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 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

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 Proceedings (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 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**

Prof. Luo Fuhe  
President, ICV-3  
Guangdong Academy of Agricultural  
Sciences  
Wushan, Guangzhou, China  
Tel.: (020) 8551 4254  
Fax: (020) 8750 3358  
E-mail: fhluo@gdstc.gov.cn

Mr. Hong Hao, Secretary, ICV-3  
Guangzhou, China  
Tel.:  
Fax:  
Email: kelvin@grassae.org

### **Vetiver System for Xinchang Railway Embankment Stabilization\* (Continued from *Vetiverim 19*)**

#### *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 had less moisture. However, even on the same slope vetiver growth was different especially in the first 2 months. In addition, tillering differentiated from 5 to 45 tillers/per clump. Analysis showed that soil nutrients differed from place to place (Table 4). It is because the soil

nutrients which 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.<br>(g/kg) | T-N<br>(g/kg) | T-P<br>(g/kg) | T-K<br>(g/kg) | S-N<br>(mg/k) | S-P<br>(mg/k<br>g) | S-K<br>(mg/k<br>g) | pH<br>(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          |

O.M. = organic matter, T- = total, S- = soluble, NO = soil sample numbers

### 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 first generation and the beginning of the second generation. To control the insect Tameron was used on 6 August, 28 September, and 15 October.

## 6. Function on Erosion Control

Generally, the grass that was firstly planted on 20 April reached around 80 cm high two months after planting and formed a preliminary hedge and started to exert the protection function. Investigation at the end of July, 3 months after planting, the whole embankment was fully protected with vetiver grass reached over 2 m high. The roots reached 80 cm – 110 cm. The embankments were well protected and past 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 would collapse and bury near by rice field. 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 a small slide with about 4 m<sup>3</sup> found and then repair and replanting were provided. Soil sampling and analysis showed that although the particle size distribution looked no great change, the NO.4 sample had a texture of sand and loamy sand because it had a little less clay particles, which explained why this section of the slope had a small slide (Table 4). However, the slide happen at a time two months later since planting when vetiver hedges were not fully formed caused by continuously rainfall during plum-raining season. Once the 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

| 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 |

## 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 where usually contained rock fragments, some clay particles and mixed with forest soil containing certain organic matters. Although the best planting season in this area was March in the dormancy period, vetiver could grow up in 3 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 an absolutely technical issue. However, once seeing the planting procedure, he or she may look down upon the technology and therefore 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 for separating.
- Organic manure is recommended to be used as basic manure. If chemical fertilizer is used calcium-magnesium-phosphate might be used to avoid possible root damage.
- Planting materials should be very carefully prepared (not longer than 20 cm).
- To select suitable planting season so that the planting could be most successful with less effort and to prevent possible collapse during raining season, especially for the embankment formed by sand or loamy sand texture. Besides, soil analysis should be conducted before planting in order to design different measure for different soil.

### 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. The titles, authors, and abstracts of these three bulletins are given below:

**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 which 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 paper 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, in pest control, and as fragrant materials. Research on production of vetiver oil and the R&D on 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.**

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 purposes 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 which 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, named “The Vetiver Eco-engineering”. Its demonstrations and applications have also 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: (66-2) 280-6206, 280-8915.*

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| <b>Change of Responsible Officer for Vetiver at ORDPB/PRVN/THVN</b> |
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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 no longer officially responsible for the vetiver matter. However, for any other non-official matters, she will be happy to provide any assistance as deemed necessary. The new person who is taking her official responsibility 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 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](mailto:pasiri@mail.rdpb.go.th) to [vetiver@mail.rdpb.go.th](mailto:vetiver@mail.rdpb.go.th).

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| <b>New Vetiver-Grass Plant Pot is Touted as World-First Invention:<br/>Set to Boost Incomes, Tap Export Markets*</b> |
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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

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 38 million Baht 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°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 18 Baht, while unpainted products cost 5.50 Baht 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 seven million baht. "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."

### Letters to the Editor

#### ICV-3 in China

It is heartening to see the diverse and extensive applications of vetiver in southern China, as outlined in your email. I received the hard-copy report yesterday, and the wonderful photos reinforce both that vetiver is well-suited to the myriad applications shown, and that the area is appropriate for I fully concur with your recommendations, and certainly defer to future judgments that may be appropriate regarding the relative roles of the Continuing Committee, the Guangdong Academy of

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

Agricultural Science, the Chaipattana Foundation, The Vetiver Network, and other stakeholders. The outstanding work in Fujian also merits the highest recognition, and I am confident their continued activities will inform the overall presentation of Chinese vetiver.

I also strongly endorse John Greenfield's comments on the economic value of vetiver. Many things in the built environment -- roads, drainage systems, landfills -- provide no direct return; we invest in them because they provide an enabling environment for enhanced economic activity. Vetiver serves to stabilize and reintegrate the landscape, thus providing economic activities with a dependable platform that reduces risk and enhances profit, while also yielding environmental services that allow us to sustain our soils, cleanse our waters, and isolate our wastes. The scale of these benefits extends from the individual user to continental watersheds controlled by national or

US National Academy of Science, <VetiverNet@aol.com>

*Thanks for your kind comments on the organization of ICV-3 and the economic value of vetiver. I fully agree with all your views. - Ed*

### **Vetiver Disease in Viet Nam**

I was in Viet Nam recently and noted that vetiver plants in some of the nursery plots, and also advance plants in polybags were infested with brown spots, look like some sort of fungal infection. The leaves died back slowly and completely necrotic in a few weeks. Infection was most common in older leaves. The disease has been noted only in the dry season. I have not seen this before.

Paul Truong

Department of Natural Resource, Brisbane, Queensland, Australia

*Thanks for sharing your valuable observation with us. - Ed*