

## *Closing Speech*

by

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# **Vetiver and the Environment - The Future**

This conference has brought together Vetiver users and promoters from 33 countries and has successfully demonstrated and confirmed that Vetiver Grass Technology (VGT) based on the Vetiver System (VS) is being adopted at accelerated rates for a wide range of environmental applications.

In looking to the future it is necessary to visit the past.

First and foremost commitment by key leaders has done much to assure success. In the case of Thailand, His Majesty the King of Thailand, has been a leader in the promotion of R&D of the Vetiver System. He, with the support of Dr. Sumet Tantivejkul, Dr. Narong Chomchalow and others, have built on the past experience of people like John Greenfield of New Zealand (the latter was responsible for the initiation of the modern day development of VS), and by their example have assured that this commitment and dedication has been extended to others.

Thai and other Vetiver research carried out over the past 10 years demonstrates a wide range of applications and uses as well as better understanding of the physiology and mechanics of the plant and system. The Vetiver System is a "biological" or "soft" engineering method that is responsive to environmental mitigation needs over a broad range of ecological conditions for a range of applications that are normally treated with "hard" engineering solutions or not at all.

### **ACCOMPLISHMENTS**

This conference has confirmed that the Vetiver System will:

- Reduce soil loss by more than 90%.
- Reduce rainfall run-off by up to 70%.
- Increase crop yield by as much as 40%.
- Improve tree seedling growth (15%) and survival rate (95%).
- Stabilise engineering structures, and reduce point source erosion from highway and building sites at reduced costs, often less than 90% of the cost of the "hard" solution.

- Improve polluted sites (landfill stabilisation, removal of excess nutrients, herbicides and pesticides from farmland).
- Improve ground water recharge.
- Rehabilitate wasted land (gullies, mining, extreme degraded lands).
- Prevent or reduce natural disasters caused by hurricanes, land slides and flooding.
- Vetiver grass was also demonstrated as an excellent material for thatch, building materials, handicrafts, natural pesticides, and aromatic oils.

## **VETIVER SYSTEM PROMOTION**

This conference confirmed that VS has been successfully promoted because:

- Networks and promoters focused on a single, low cost technology that works.
- VS is based on a unique grass that has a wide range of ecological adaptation and functions.
- End users come first.
- Leaders and users are committed to the Vetiver System.
- Generous, fast and free sharing of information.
- Conflicts of interest are minimal.
- Recognition of R&D contributors.
- Networking and close linkage between networks.
- Because bureaucracy has been minimized and controlled risks have been taken.

## **FUTURE NEEDS AND FOCUS**

This conference also confirmed that:

- There is a need to highlight the importance of grasses, especially a unique grass like Vetiver that has many unique characteristics.
- The general population, particularly school children need to be educated about Vetiver grass and the Vetiver System.
- Environmental and other policy makers should be made aware of the value of the Vetiver System for environmental mitigation programs in tropical and semi-tropical countries. VS should, where appropriate, be a mandated system.
- The adequate supply of good quality plant material is critical to any Vetiver program.
- Improved marketing of VS to potential clients should receive priority.
- More national networks need to be established,
- VS is not used by many development sectors, it is no longer the "property" of the agricultural sector, therefore cross linkages need to be established between sectors.
- For even quicker VS adoption rates, particularly in the engineering sector, the private sector must become fully involved.

## **A THEME FOR THE NEXT FOUR YEARS**

I am very happy to report that at the meeting yesterday of the Committee on the Constitution of the International Conference on Vetiver, chaired by Dr Narong on behalf of the Organizing Committee, China was elected by a popular vote to be the host of the Third International Vetiver Conference in 2004. The Committee also agreed that the theme of the next conference should be "Vetiver and Water". Thus supporting a global focus on water quality and availability for which the Vetiver System has great potential.

In readiness for the Third International Vetiver Conference, some thoughts and consideration for this theme are listed below to provide some focal points for R&D programs.

### **Vetiver and Water**

The Vetiver System will continue to address many of the areas of need that have been identified over the past fifteen years. There is much to do, and there is much being done to extend the technology to new applications that reflect the need to restore our planet to a better ecological condition.

However, in this first year of the new Millennium there is a world focus on water - its quality, its availability, and its destructiveness. The Vetiver Network and those attending the second International Vetiver Conference in Thailand support this global focus.

Vetiver grass and the Vetiver System could play a crucial role in improving the availability and quality of water in tropical and semi-tropical countries. Since it behaves as a biological sieve in preventing the movement of soil (and the attached pollutants), by conserving and "cleaning" water, and by strengthening, through its root system, soil profiles, thus preventing water induced slippage and collapse and subsequent damage to property and life. The Vetiver System can also be used to stabilise riverbanks, small dams, and levees and thus help prevent catastrophic events due to structural failures. These failures result in enormous losses of water, and sometimes appalling damage to property and people.

One way of bringing focus to the Vetiver System and its special relevance to water is to view the watershed - drainage system (rivers) from mountain to sea as the essential ecological unit on which improvements can be made - the river receives and the river gives. How do we optimise what goes in and out of a river system? How can the Vetiver System play a part in making sure that what goes in is good? The following takes the main sections of a river system and summaries the potential Vetiver System applications for each section.

#### **Note the following abbreviations:**

WQ - water quality impact

WA - water availability impact

DC - water related damage control

#### **River System -- Upper Reaches -- A Place for Vetiver**

- Spring (water source) protection. (WQ,WA)

- Watershed rehabilitation and conservation. (WQ,WA)
- Improved soil moisture -- crop yield increases. (WA)
- Modification of hydrographic characteristics. (WA)
- Flood control. (WA, DC)
- Ground water recharge. (WA)
- Mine tailing protection and clean up. (WQ)
- Handy crafts - alternative income for headwaters communities to reduce pressure on land and subsequent erosion and water losses. (WA, WQ)

#### River System -- Middle Reaches -- A Place for Vetiver

- Watershed rehabilitation and conservation. (WQ,WA)
- Ground water recharge. (WA)
- Stabilisation of check dams and reservoirs. (WA, DC)
- Control of rainfall runoff from construction sites. (WQ)
- Riverbank (buffer) stabilisation. (WQ,WA)
- Construction site stabilisation. (WQ, DC)
- Protection of small rural communities. (WQ, DC)
- Improved soil moisture and crop yields. (WA)
- "Cleaning" of water runoff from fields and industrial sites. (WQ)

#### River System -- Lower Reaches -- A Place for Vetiver

- Ground water recharge. (WQ)
- Stabilisation of check dams and reservoirs. (WA, DC)
- Control of rainfall runoff and sediment flows from construction sites. (WQ,DC)
- Riverbank and levee stabilisation. (WA, DC)
- Irrigation canal and drainage protection. (WA, DC)
- Flood control. (WA, DC)
- Improved soil moisture and crop yields. (WA)
- "Cleaning" of runoff from polluted sites (agriculture and industry). (WQ)
- Constructed wetlands. (WQ)
- Protection of urban areas. (WQ; DC)
- Landfill stabilisation. (WQ)
- De-silting. (WQ, DC)
- Leachate and other industrial waste control. (WQ)
- River bank protection from boat "wake" wash. (DC)
- Livestock feedlot effluent clean up. (WQ)

#### Coastal areas -- A Place for Vetiver

- Pollution reduction of coastal agriculture. (WQ)
- Tourist resort and property effluent runoff reductions. (WQ, DC)
- Beach and coastal lagoon stabilisation -- filtering. (WQ)
- Barrier reefs - silt reduction flows to barrier reefs. (WQ)

### Associated research needs

- Vetiver cultivars suitable for "water" uses.
- Vetiver breeding to extend genetic variation.
- Continued research on Vetiver growth.
- Water "cleaning" (pollutant removal) mechanisms of Vetiver.
- Hydraulics of river bank stabilisation.
- Planting and propagation techniques for "water".
- Technical standards.

Most of the forgoing has already been demonstrated and put into practice. A systematic approach as outlined above when applied by the relevant sector agencies could, in association with the private sector, have an immense impact on the availability and quality of water.

These are just some of the many benefits that Vetiver can bring to the water sector. We know it works, but in many cases we need more quantitative data and "application architecture" to put in front of potential clients. These needs should provide an interesting challenge to researchers and developers.

How fortunate it is for the world to have a low cost, simple, and effective technical solution to help provide a solution for some of the water related environmental problems that face the world today. This conference has done much to renew our vigour and determination to see wider application of the Vetiver System and a very much faster rate of adoption.