

## VETIVERIM

### A Quarterly Newsletter of the Pacific Rim Vetiver Network

Number 9 July 1999

#### Editorial

#### From Myanmar With Love

During 12-19 June 1999, the Editor and two other Thai colleagues from RDPB, visited Myanmar as consultants of an FAO-executed project, "Environmentally sustainable food security and micro income opportunities in critical watersheds (southern Shan State)". They introduced 200,000 plantlets from the Doi Tung Development Project. During their stay, they gave lectures on various aspects of vetiver grass technology to project officials, demonstrated the techniques of planting vetiver for multiplication purpose and for embankment stabilization, and guided the farmers in five townships to properly plant vetiver in their own farmlands as contour hedgerows across the slopes.

Shan State is blessed with favorable growing conditions such that it is one of the most agriculturally-productive regions of Myanmar. However, due to population pressure and the need for more land for crop cultivation, deforestation is taking place. Magnificent panoramic view of the country side where very few trees remain on the sloping land planted with cash crops such as potato, sorghum, upland rice, etc. is a familiar sight. Amazingly enough, these crops are healthy in spite of the fact that little or no fertilizer is applied. This is because the soil is still fertile, with deep layer of top soil.

Evidence of massive soil erosion can be seen as the formation of large gullies, most of which are expanding further, destroying valuable soil mass which is washed away into the waterways down below. It is anticipated that high yielding capacity of the land will soon come to an end if no conservation measure is enforced.

It is indeed timely that the project initiates the use of vetiver as a means of erosion control, especially as contour hedgerows across the slope and along the rim of gullies. Both UN agencies, namely FAO which executed the project, and UNDP which provides funding support, should be congratulated for such a far-sighted action. With continued action, it is hope that Myanmar would be able to reap a fruitful harvest of her fertile soil in a sustainable way. This is what the project would like to accomplish, i.e. *to have environmentally sustainable food security and micro income opportunities in critical watersheds in southern Shan State.*

## **Conference on Vetiver Bioengineering Technology for Erosion and Sediment Control and Civil Construction Stabilization**

The Conference on Vetiver Bioengineering Technology for Erosion and Sediment Control and Civil Construction Stabilization will be organized by the China Vetiver Network (CVN), in cooperation with multiple national and provincial institutions, including the National Natural Science Foundation of China, the Chinese Academy of Sciences, etc. It will be held in Nanchang, Jiangxi Province, China, on 19-21 October 1999. The main objectives of the Conference are to : (i) introduce most up to date successful experiences obtained by both international experts and Chinese scientists in vetiver bioengineering techniques; and (ii) establish linkage and cooperation between scientists from china and from foreign countries, and between institutions with different disciplines, such as agriculture, forestry, environment, and engineering, etc.

### **Program**

The program of the proposed conference will include:

- ◆ Pre-conference investigation on *jiji* grass in Shanxi Province, northern China, 14-18 Oct.
- ◆ Conference in Nanchang, Jiangxi Province (19-21 Oct.): Keynote addresses by experts from China and other countries, plenary sessions, panel discussions, poster session, visit to demonstration sites of using vetiver for the protection of farm land, highway embankment and other earth works, exhibition of various papers, photos, and publications, and video/computer medium.
- ◆ Post-conference survey to Wuyi Mountains (22-24 Oct.): Visit large demonstrations and contracted erosion control projects in Fujian Province and possibly Jiangxi Province as well.

### **Participants**

It is expected that 60 Chinese participants will attend the conference. In addition foreign experts from Australia, Thailand, Madagascar, etc. will also be invited to share their experience, possibly with financial support from the Chinese Academy of Sciences. Experienced Chinese scientists in the fields of agriculture, civil construction, environment, ecology, etc. from Fujian and Guangdong and other provinces will also be invited to participate.

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## **Vetiver Grass Technology Research and Development in China \***

As a natural gift to mankind, the vetiver is a miracle plant for erosion control. When planted as a narrow hedge across the slope, vetiver grass will stop soil erosion, reduce rainfall runoff, safeguard infrastructure against degradation, sequester heavy metals and carbon dioxide, promote re-vegetation of native species on denuded land, provide missing organic matter in tropical low-fertility soils etc. Many conservation technologies take years to be effective. Vetiver, on the other hand, begins to have impact on the environment within the first year, and even within the first few months. Once established, it cannot be burnt out; it does not spread, i.e. it stays where it was planted; it cannot be flooded out (remains viable even after 12 months underwater!). Based on these and many other characteristics, the technology was recently recognized by a panel of international judges to be the best of 70 sustainable technologies that were nominated for the "John Franz Sustainability Award".

As early as 1988, Mr. Richard G. Grimshaw, President of The Vetiver Network (TVN) introduced vetiver to China for soil erosion control through Red Soil Project, funded by the World Bank. In 1996, China Vetiver Network (CVN) was established under financial support from TVN. To introduce vetiver to China effectively and more rapidly, a Workshop was organized by CVN with participants from limited provinces in southern China in 1997. Since then, the grass has been experimented and field tested in many places, from Hainan Island in the south to Hebei Province in the north, including such provinces as Anhui, Fujian, Guizhou, Guangdong, Guangxi, Gansu, Hunan, Hubei, Jiangxi, Jiangsu, Sichuan, Yunnan, and Zhejiang. Experiments were carried out by research institutes and universities on various topics such as biological characteristics; hedge establishment and maintenance on newly built terraces and slopes; hedgerow impacts on soil fertility, moisture, crop yield, and soil loss. The followings are examples of vetiver research and development conducted in China:

- In Fujian and Guangdong Provinces, large scale demonstrations were implemented and have shown the effectiveness of vetiver for barren land (Red Desert) rehabilitation, river bed stabilization, and embankment stabilization for railroads and highways.
- Vetiver grass and other bioengineering technology was widely used by the Red Soil Project in Hunan Province by the Dutch scientists.

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\* Extracted from the Announcement of the Conference on "Vetiver Bioengineering Technology for Erosion and Sediment Control and Civil Construction Stabilization", to be held in Nanchang, Jiangxi Province, 19-21 October 1999.

- Reproduction bases were established in several provinces in southern China.
- Vetiver hedgerows were established to protect tea, tea oil (camellia), and citrus plantations.
- Vetiver grass has been used to feed fish and livestock, to mulch ground surface of orchards, and as a medium to grow edible mushroom.

*Because vetiver grass has many advantages that other plants do not have, it is welcomed not only by agricultural scientists but also by engineers. Such advantages include:*

◆ Vetiver has a strong fibrous root system that penetrates and binds the earth to a depth of over 3 m and can withstand the effect of tunneling and cracking. The grass is more effective than hardwood roots in reinforcement of soil slopes, and can stabilize the loosing materials of disturbed soil, and prevent the removal of slope surface soil layer, as clearly demonstrated on extremely unstable and massive highway embankments and cuts in Malaysia.

◆ Compared with other short grasses, vetiver can more quickly form a dense, permanent hedge, and need very little management, as pointed out by engineers during the National Super Way Conference held in November 1998 in Kunming, Yunnan Province, China. It is much cheaper using vetiver grass than using rocks for embankment protection. For example in Fujian Province, it costs 30 Yuan/sq.m. using rock to protect embankment, while only 3 Yuan using vetiver.

◆ Vetiver is tolerant to hot, dry or waterlogged condition with low-fertility and a wide range of pH and heavy metals. It is much suitable for erosion and sediment control civil construction protection.

◆ Vetiver can protect soil from water erosion and from serious wind erosion as demonstrated in sandy dunes along the coast of Fujian Province. Thus, it can appropriately fix embankments consisting of loose sand that is a common material in some coastal provinces of south China.

◆ Vetiver can stabilize embankments and also 'green' them up while the traditional rock-protected embankment usually needs to clear the vegetation and cause environmental problem. Having such advantages, Chinese engineers from civil constructions, and highway constructions in particular, in recent years, expressed high enthusiasm in testing and using the grass.

*Vetiver has recently received much attention in China through various means such as:* 4

- In addition to many national journals on agriculture, soil science, forestry, ecology, and environment, vetiver technology was also introduced by several regional and provincial highway publications, such as East China Highway Journal, Guangdong Highway Journal, Newsletter of Highway

publications, such as East China Highway Journal, Guangdong Highway Journal, Newsletter of Highway Society of Jiangsu Province, Science and Technology of Communications of Zhejiang Province, Proceeding of National Super-Way Conference, Kunming, Yunnan Province, and Highway Survey and Design of Fujian Province.

- Vetiver grass technology formed one of the most important topics in the East China Highway Conference held in Xianmen, Fujian Province on 8-11 June 1998, and China's National Super Way Conference Held in Kunming, Yunan Province on 26-29 Nov. 1998.

- In Aug. 1998, the Highway Bureau of Fujian Province released an official document to each city and county and asked them to learn and use vetiver technology to protect highway embankment.

### **Report of the Ground and Water Bioengineering Conference\***

The Ground and Water Bioengineering Conference was held in Manila, the Philippines on 19-21 April 1999. The goal of this conference was to share knowledge, to discover solutions and explore applications of bioengineering for the purpose of environmental improvement. The main aim of this conference was to bring together researchers, engineers, agriculturists, foresters, and mining industries, erosion control material manufacturers and construction and hydro-mulching contractors from around the globe, to update their bioengineering knowledge and to share their experience.

There were more than 300 delegates at the conference from over 20 countries, including North American, Asia Pacific, European, Oceania, the Indian sub-continent and African countries. They represent the public sector such as government departments, universities, international research institutes as well as the private sector such as consultants; mining, civil construction companies and seed companies; geo-textile manufacturers; and hydro-mulch companies.

### **Vetiver Presentation**

Of the total 63 papers selected for presentation at this conference, 21 papers mentioned vetiver in their texts. More importantly, out of the five Plenary Session papers, two dealt with vetiver and another one also mentioned vetiver. Of these 21 papers, ten were in the Infrastructure, Mining and Transportation strand and 11 were in the Agriculture, Forestry and Watershed strand. In addition, poster presentations, a

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Vetiver Short Course and a vetiver field trip were conducted. The overall vetiver presentations are described below:

**Plenary Session:** Two papers were presented, viz. (i) Vetiver grass technology for land stabilization, erosion and sediment control in the Asia-Pacific Region, by Paul Truong, and (ii) 15 years of bioengineering in the wet tropics: From A (*Acacia auriculiformis*) to V (*Vetiveria zizanioides*), by Diti Hengchaovanich.

**Infrastructure and Mining Strand:** Three papers were presented in this session, viz: Vetiver grass technology for mine tailings rehabilitation, by Paul Truong, (ii) An overview of the use of vegetation in bioengineering in China, by Xu Liyu and Zhang Jing, and (iii) Application of the vetiver eco-engineering for the prevention of highway slippage in South China, by Xia Hanping, Ao Huixiu, Liu Shizhong and He Daoquan.

**Posters:** Posters from Vetiver Network Philippines and Vetiver Farm Inc. were displayed.

**Agriculture Strand:** Only one was presented in this session, viz.: Vetiver, the grass for watershed management, by Prakash Pawar.

#### Vetiver Short Course

A short course on “Vetiver Grass Technology For Erosion and Sediment Control, Slope Stabilization and Environmental Protection” was offered to the participants (Course Coordinator-Paul Truong): The topics presented were: (i) Introduction to the Vetiver Grass Technology – *Presenter:* Paul Truong, (ii) VGT Applications in the Philippines – *Presenter:* Edwin Balbarino, Coordinator Philippines Vetiver Network; (iii) Planting Materials Propagation and Supply – *Presenter:* Noah Manarang, Vetiver Farms Inc., Quezon City; (iv) Stabilization, Erosion and Sediment Control of Steep Slopes-*Presenter:* Diti Hengchaovanich, APT Consulting Co., Bangkok, Thailand; (v) Erosion and Sediment Control in Agriculture and Forestry Lands – *Presenters:* Frank Mason, District Soil Conservationist, Queensland Department of Natural Neutral Resources, Mackay and Paul Truong, Australia; (vi) VGT for Environmental Protection – *Presenter:* Paul Truong, Australia.

Twenty – three delegates paid between US\$ 70-95 each for this one-day course. People from a wide range of background enrolled for this course, most of whom are engineers from highway and other civil construction companies and mining companies, although quite a few are government officials, agriculturists and foresters form Asia, Australia, Europe and Africa. Although further details of VGT

were presented, the course was mainly an open forum for discussion between participants and presenters. A lot of case studies were discussed.

***Vetiver Field Trip:*** The participants visited the Famy-Infanta road where VGT was used in 1997 on the recommendation from the World Bank. This road is now in the process of being fully protected by VGT, and Vetiver Farm Inc. is the main supplier of planting material to the Department of Highway and Public Works for this project.

### **Medicinal Uses of Vetiver**

The use of vetiver as a therapeutic agent in the healing of diseases goes back to antiquity in many countries, particularly in Asia where vetiver is a native grass abundantly found in many localities. For the benefit of the readers who are inclined to use herbal medicines for treatment of ailments, the Editor has compiled information on the use of vetiver as raw material for curing ailments in India and Nepal Which is presented below. Scientists from other countries are invited to prepare similar information to be published in future issues of the *Vetiverim*.

**India** (Local name: Khus Khus): Ayurvedic – a traditional Hindu system of medicine recommends vetiver-root infusion to reduce thirst, micturition and fevers. It also recommends applying a paste made from vetiver roots to the skin to bring down body temperature in cases of fever or heat stroke, and rubbing a liniment made from vetiver's essential oil to relieve rheumatic pains.

*Other related uses:* The oil which is safe for consumption is used to flavor summer sherbets, ice creams and digestives (drinks that aid digestion). This is an example of how Ayurvedic knowledge overlaps in India with traditional practice.

**Nepal** (Local name: Khas Khas): An excerpt from a book, *Medicinal Plants of Nepal*, published in 1979 by the Department of Medicinal Plants, Thapathali, Kathamandu, Nepal concerning the use of vetiver as herbal medicine, is as follows: "Roots used in infusion, considered refrigerant, febrifuge, diaphoretic stimulant, stomachic and emmenagogue; pulverized and paste in water as a cooling external application in fevers; their essence used as a tonic."

### **Vetiver Grass Introduction Mission in Myanmar**

One of the FAO-executed projects in Union of Myanmar, namely "MYA/96/007 – Environmentally Sustainable Food Security and Micro Income Opportunities in Critical Watersheds (Southern Shan State)", is in urgent need to introduce vetiver grass in its project areas around Taunggyi

township, Shan State to help solve the prevailing problem of soil erosion. Having learnt the great success in the development of vetiver grass technology in Thailand through the coordination of the Royal Development Projects Board (RDPB), this FAO-executed project requested the assistance of Thailand to provide technical guidance as well as to procure plant material for use in demonstration and field plantings. In particular, a request is for a mission from Thailand to provide guidance for the development of upland area of Myanmar and for the transfer of technology in introducing this promising grass there.

The mission members consisted of the following three members of the RDPB's Subcommittee on Technical Matters, Planning and Monitoring of the Committee on the Development and Promotion of the Utilization of Vetiver under His Majesty's initiative), namely: Dr. Narong Chomchalow, former Regional Plant Production Officer (Industrial Crops), FAO Regional Office for Asia and the Pacific, as Mission Leader; Dr. Weerachai Nanakorn, Director of the Queen Sirikit Botanic Garden Chiang Mai; and Dr. Uthai Charanasri, Adviser, Doi Tung Vetiver Development Project (Chiang Rai) and Nong Nuch Garden (Phattaya). The Mission was in Myanmar during 12-19 June 1999 to perform the following duties:

#### **Introduction of Vetiver Plantlets**

Through the coordination of Dr. Narong Chomchalow, Mission Leader, prior arrangements have been made with the Doi Tung Vetiver Development Project at Doi Tung, Chang Rai Province, northern Thailand, to provide 200,000 tissue-cultured plantlets, at the cost of Baht 1.50 per plantlet, FOB Doi Tung. The plantlets in used, fertilizer-plastic bags and transported to Myanmar in three batches, viz.: (i) by truck from Doi Tung to Taunggyi (170,000 plantlets), (ii) by air from Thai Khi Lek to Heho (20,000), and (iii) by air as accompanied baggage form Chiang Rai via Bangkok, Yangon to Heho (10,000). All batches arrived Taunggyi, in southern Shan State, in time for use by the Mission on 13 June.

#### **Demonstration Planting**

This was done at Taunglone Nursery near Taunggyi. About a dozen raised beds (2 x 20 m) were prepared prior to the arrival of the Mission. Many beds were used to transplant air-transported materials in order to be used as stocks for later use. A close spacing of 15 x15 cm was employed. Some of these beds were used as propagation plots. A number of beds were also used to demonstrate the planting technique to the trainees who are project staff and other high-ranking government officials. Hedgerows of 10 cm spacing between plants and 50 cm between rows were also planted for demonstration.

#### **Farmer's Field Planting**



During the entire period of visit, the Mission visited several farmers' fields where field plantings were done by the farmers under the Mission's supervision. These included: (i) multiple hedgerows – along the contour strips on gently sloping areas, along embankments of newly made roads and dams, and along cut surfaces of steep slopes; (ii) inverted V – shaped rows across the gullies; (iii) multiple hedgerows encircling the rim of large gullies; and (v) single semi-circle hedgerow facing up slope along the crown line of fruit tree. Many alternate methods of planting were also attempted, e.g. on raised bunds, on flat land with shallow soil preparation, on sloping land without soil preparation but in the holes made by using a wooden stake driven down by force.

### **Training**

The Mission members gave a half-day lecture to about 30 trainees on various aspects of vetiver grass technology. Slides on various topics of the lecture such as ecotypes, multiplication, and utilization were also shown to the trainees. A duplicated set of slides will be provided for the Project for further duplication and use.

### **Institutional Twining**

During the entire period of visit of the Mission members, several discussions have been made with senior project officials regarding the institutional twining. The following approaches have been suggested and agreed upon by both parties:

- Study tour of senior project officials to visit: (a) Doi Tung Vetiver Development Project in Doi Tung, Chiang Rai, and (b) Queen Sirikit Botanic Garden in Chiang Mai, to observe their vetiver-related activities as well as to take back more materials.
- Intensive training for both senior and junior project officials on various aspects such as (a) tissue-culture technique, (b) nursery management, (c) field planting in various condition, (d) propagation techniques, (d) handicraft making ,etc. These can be arranged with RDPB to provide lecturers to give instruction either in Myanmar or in Thailand.
- Participation in the Second International Conference on Vetiver (ICV-2): As ICV-2 is planned to be held in Cha-am in Cha-am, Phetchaburi, Thailand, 19-22 January 2000, there is a good chance for senior project officials to participate at relatively small costs, i.e to travel by air from Heho to Tha Khi Ldk and continue by microbus to Cha-am with a stop over at Doi Tung. It was suggested that the

project selects the candidates (about 6-8 persons) to attend ICV-2 and prepare a poster paper describing the project's activities on vetiver for presentation at ICV-2.

#### Comments

During this short visit to the southern part of Shan State, the Mission has witnessed a great potential for agricultural development due to the presence of many favorable conditions, such as fertile soil, abundance of water, good weather, etc. However, many are now deteriorating as the result of over-exploitation and lack of proper management. A few examples can be cited to illustrate the severity of the situation:

- ◆ Deforestation of vast sloping areas now used to grow cash crops without conservation measures. Soil erosion has already occurred in these areas, some of which are very severe as in the case of the formation of large gullies caused by water running down the slope.
- ◆ Sedimentation of Inle Lake near Taunggyi as the result of soil erosion of the catchment area. It is expected that Lake will soon be shallow and natural condition of the Lake will soon deteriorate if no prevention measure is enforced.
- ◆ Extensive use of pesticides, especially on 'floating vegetable gardens' in Inle Lake, results in the accumulation of toxic residues in the water.

#### **Letters to the Editor**

##### **A Request from Vanuatu**

I am very interested in the vetiver grass as one the solutions to deal with a broad and ever increasing range of environmental problems. I am from a small island in Vanuatu, called Paama. It is only a dot in the Vanuatu map. But is is over populated with 4,000 people. I came to know your network through a friend who is working on erosion control project in Anetymn, another island south of Vanuatu. The purpose of this letter is to ask for information which I can draw my own conclusions as to vetiver's application and utility to our own need. Please let me know of any meetings or conferences which I can participate. I have already started building a nursery for the propagation of vetiver grass and very soon I shall plant them in our problem areas. I want to start slow small. I look forward to your good response.

Johnny Tomately

Local Coordinator, Rural Skill Trining Program

Liri, Paama, vanuatu

*We are glad to receive your letter. We have arranged to send you back issues of our newsletter which can answer most of your queries, including the Second Conference on Vetiver. May we ask you to help us by being your country representative in our PRVN. – Ed.*

***A Request from Australia***

I am about to finish a new CD ROM “VGT for Infrastructure Protection” for the Manila Conference and will ask Diti to bring one back to you for PRVN. You are welcome to copy it for distribution to country representatives of PRVN. I am now in the process of gathering information and photographs for my next CD for the ICV-2, entitled “VGT for Environmental Protection”. I now have quite a bit of information in Australia and other countries but nothing from Thailand. So could you please let the Thais know and supply me with information and photographs. After all, the conference is to be held in Thailand, thus we need a lot of information from the host country.

Paul Truong

Resource Sciences Centre

Indooroopilly, Queensland, Australia

*Thanks for your offer. May I pass on this request to our Thai scientists to respond by sending the information/photographs he needs for his CD ROM - Ed.*