VETIVERIM

A Quarterly Newsletter of the Pacific Rim Vetiver Network

Number 6 October 1998

EDITORIAL

Amazing Vetiver Grass

Vetiver grass is really an amazing plant. The more we know about its 'miracle' , the more we are impressed with its ability to do so much for us and the environment we live in. Among those amazing properties of the vetiver grass are the following:

Living Nail: The act of vetiver roots which are able to penetrate deep layer of soils whose texture may be quite hard, and at the same time its ability to hold soil particles together thus avoiding soil erosion due to wind and water, makes it well known among road engineers as the 'living nail'. The direct benefits of this living nail are as follow:

- Hold soil particles together especially on steep slope where soil cover is cut to make highways or railroads.
- Prevent soil erosion of the embankment.
- Penetrate hard-pan soil layer impervious to water, thus making water to pass through such layer.

Living Wall or Barrier: The act of its clumps which are able to slow down the rapid movement of water and wind is really amazing. The direct benefits of this living wall or hedge are as follow:

- Increase organic matter and moisture in front the hedgerow.
- Act as a sieve, not allowing and debris to pass through but to accumulate in front of the hedgerow.

Living Dam: The act of both the roots and the clumps as a living dam is amazing. Their direct benefits are as follow:

- Adhere soil particles thus reducing soil erosion.
- Increase the amount of organic matter collected in front of the hedgerow.
- Increase moisture content in front of the hedgerow as the result of accumulation of organic matter and water.

- Filter out toxic substances brought in by water ad, after being absorbed in the plant tissues, these will slowly disintegrate, while clear and clean water is able to pass thorough this living dam.

It can be clearly stated that vetiver is really a versatile plant with multiple uses and benefits to mankind. Amazing Vetiver!

Multiple Uses of Vetiver*

(Con't. form Vetiverim-5)

6. Conserving Soil Moisture: Vetiver is grown with fruit trees in their initial stage of development, or in alternate rows with other trees. For example, in Malaysia, vetiver is planted in lines between rows of rubber trees. When the vetiver is about one year old, its leaves can be cut for use as mulch around the tree base to conserve moisture, as vetiver leaf cuttings will not diseases or pests. Planting of vetiver to maintain soil moisture may be done in two way: (i) in rows in parallel with rows of fruit trees at an interval of 1 m using vetiver leaves to cover the tree base to conserve soil moisture and to increase soil fertility, (ii) in a half-circle around each tree at the radius of 1.5 – 2.0 m from the base of the tree.

7. Preventing Siltation in Irrigation and Drainage Canals and Farm Reservoirs Farm Reservoirs and Ponds: Growing vetiver in rows along both sides of irrigation canals prevents the inflow of silts. In Planting vetiver around ponds to trap silt, one row should be grown along the top water line and an additional 1-2 rows planted above the first one, depending on the space availble up to the pond's edge In the initial stage, additional planting should be carried out if necessary to ensure a dense vetiver row. Silt from runoff will be trapped by the vetiver, while water will slowly seep through and drain into the pond. Vetiver roots will stabilize the soil along the bank. The pond-dredging costs will also be reduced accordingly.

8. Rehabilitating Deteriorated Soil: In the Deteriorated Soil Rehabilitation Projects at the Khao Chan-ngum, Ratchaburi Province, and Nong Phlap, Prachuap Khiri Khan Province, vetiver grass was planted in rows across the slope on deteriorated laterite soil. Erosion had stripped off the topsoil and made the soil dry, hard and devoid of natural cover. Growing vetiver helps reduce runoff velocity, allows water to permeate deep into the soil and provides sufficient moisture for trees to grows.

---

* From "Concepts and Theories of His Majesty the King on Development" published by ORDBP and UNDP.

9. Vetiver on Hard-pan Soil : A study was conducted on the growth of vetiver on hard-pan soil at the Huai Sai Development Study Center. Hard pan is a rock – like layer of aggregated sand, clay, limestone and minerals. It was found that vetiver roots were able to penetrate the hard pan, breaking it up, making the soil more friable as well as increasing its moisture content. Many tree species such as the neem tree *(Azadirachta indicc), Acacia mangium* and *Pterocarpus spp.* can be grown along a row of vetiver. When fruit trees are planted together with vetiver, the roots of the grass will break up the hard pan before it is reached by the tree roots.

10. Preventing the Collapse of Road Shoulders: Vetiver may be planted along roads on back slopes and side slopes to prevent the collapse of road shoulders. The grass stabilizes the soil and diverts the water channels in the road shoulder area. It should be planted across the slope to prevent landslides or collapse.

11. Preventing Contamination of Water Sources: Nowadays, in order to achieve higher plant growth and output, chemical fertilizers are being increasingly used especially nitrogenous fertilizers as soils in the tropic often lack this amount. Nitrate from the fertilizers, as well as heavy metals and toxic chemicals from pesticide and herbicide spraying, if allowed to seep into water sources, will cause environmental pollution. Experiments at the Huai Sai Royal Development Study Center have proved that vetiver planted in lines across the slope can stop and reduce the losses of topsoil to a certain extent, while its root system, compact and penetrating the soil vertically, forms an underground barrier that prevents water-borne soil and toxic substances from flowing down to the water sources below. Moreover, it is believed that, compared to other plants, vetiver should be more efficient in absorbing certain heavy metals and chemicals in view of the capacity of its root system to reach greater depths and widths.

Reprinting of PRVN's Technical Bulletin

Dr. Paul Truong, senior author of the PRVN's Technical Bulletin No. 1998/1, "Vetiver Grass System for Environmental Protection", has requested the Secretariat of PRVN to produce 1000 extra copies of the Bulletin in order for him to distribute copies to scientists of Vetiver Networks of the other regions around the world. This was done by reprinting procedure and copies have already been sent to him in Queensland, Australia for further distribution.

Erratum:

Please note that there was an error in the inside back cover page of this Bulletin. In the third paragraph, the first sentence, *"Thailand's vetiver project was initiated by His Majesty the King on the*

Royal advice of Her Royal Highness the late Princess Mother", is a wrong statement. It has now been replaced in the new version (Reprint) by, *"With agriculture being the backbone occupation in the Thai society, His Majesty the King understood the vital need in preserving natural resources and there fore, initiated the vetiver grass project in Thailand".*

It would be appreciated if the members of PRVN who received the old version to please correct the above error in your own copy accordingly.

Erratum in Vetiverim-5

The article heading "Fund for Vetiver*" was miraculously dropped from the article starting in the second coulmn of the last page (p. 8) of Vetiverim-5, July 1998. The Editor apologizes Mr. Richard Grimshaw, Coordinator, the Vetiver Network, whose article appeared in the aforementioned section without the heading.

For those who still need funding support for vetiver research, it is still not too late to cantact the Swiss Development Corporation (SDC) in your country who might be able to provide some fund for your research project.

DLD's Annual Conference on Vetiver

The Department of Land Development (DLD) of the Royal Thai Government organized its "Annual Conference on Vetiver" at Sri Nagarindra Reservoir, Si Sawat district, Kanchanaburi province, western Thailand on 27-29 July 1998. The participants, totaling about 100, were mostly the concerned officers of DLD who are working on vetiver in different regions of the country. The objectives of the Conference were: (i) to present the result of vetiver researches conducted over the year by DLD scientists, (ii) to summarize the works on vetive in order to promote technology transfer by officers of DLD as well as by those of other departments, (iii) to exchange views and experience among scientists and extension workers in order to adjust the approaches of vetiver research and extension order to be able to provide better services to the farmers in the future.

The Conference's program was divided into four sessions, namely: (i) Special Invitational Lectures, (ii) Technical Paper Presentation, (iii) A Roundtable Discussion on Accomplishments derived form ORDPB's Sponsored Budget, and (iv) A Panel Discussion on the Approaches for Research and Utilization of Vetiver.

Session I: Special invitational lectures include the following topics: (I) Operation and Development Policy for the Campaign on the Utilization of Vetiver Grass under His Majesty's Initiative by Mr. Panthep Klanarogran of the Office of the Royal Development Projects Board, (ii) The Policy on Vetiver of DLD by Mr. Sompong Thirawongse, D-G, DLD (iii) Vetiveria Memoire-An Experience in R&D and in Utilization of Vetiver by Dr. Narong Chomchalow of FAO/RAP, Bangkok, (iv) A Farmer's Experience in Growing Vetiver on Hard-pan Soils by Mr. Songsak Kheokhli, a lime grower of Klat Luang Sub-district, Tha Yang district, Phetchaburi province, and (v) An Experience in Vetiver Utilization in Malaysia by Mr. Diti Hengchaovanich of APT Consult Co. Ltd.

Session II: There were altogether 17 technical papers presented by DLD scientists. The topics range from basic studies like taxonomic study of Thai native vetiver, seed germination, root growth, salt tolerance, etc. to applied research such as spacing trials, planting date, erosion control, root development on hard-pan soils, etc. For those who are interested in these papers, the titles of all papers are presented the next section. Scientists who would like to obtain further details of these papers are advised to contact the Director-General of DLD directly (Address: Department of Land Development, Phahonyothin Road, Chatuchak, Bangkok 10900, Thailand)

Session III: Mr. Chaiyasith Aneksamphant, DLD Soil and Water Conservation Expert, led the group discussion on the accomplishments of vetiver R&D works using the budget provided by the Office of the Royal Development Projects Board. It was concluded that in the budget year 1998, DLD has received budgets for three projects, namely: (i) using of vetiver for development and rehabilitation of land use problem soils which include nine sub-projects covering acid sulfate soil, salinity soil, deteriorated (hard-pan) soil, peat soil, abandon shrimp-farm soil, steep-slope (mountainous) soil, shallow (laterite) soil and road-shoulder area; (ii) study on bio-diversified activities of and surrounding red zone soil in rehabilitating and reducing soil pollution and deteriorated soil; and (iii) study on impact of vetiver hedge row on growth and product of field crops. The three main sub-projects are under the stage of data collection and analysis. Their progress will be reported in the year 1999.

Session IV: The panel discussion was concentrated on research methodology different approaches of utilizing vetiver. Four panelists, namely Mrs. Nuansri Kanchanakul, Director of Soil Analysis Devision, DLD: M.R. Samjamjas Rajani, Director of H.M. the King's Highland Project, DLD; Mr. Chaicharn Chalothron, Chief of Research Section, Region 10 Office, DLD; Mr. Lerdchai Pulporn, Chief of Rayong

Land Development Station, DLD, discussed their views with respects to research and utilization of vetiver. Mr. Pitsanu Attaviroj was the discussion leader. Mr. Councluded that in the past, DLD has conducted both research and extension works focusing on the farmers, government organizations and private sectors, emphasizing on making them aware of the capacity and advantages of vetiver grass. However, social evaluation, utilization of vetiver for industrial and tourism activities, utilization of vetiver in breaking hard pan, soil fertility improvement, and utilization of vetiver for improving ecological and environment should also be included.

Titles of Technical Papers presented at DLD Annual Conference on Vetiver

Technical papers which were presented at the Department of Land Development's Annual Conference on Vetiver in Kanchanaburi, 27-29 July 1998 include the following topics:

1. A study on vetiver grass grown on Ban Thon Soil series.
2. The use of vetiver grass for slope stabilization and erosion control on the road shoulder.
3. A comparative study on the vetiver ecotypes in Thailand.
4. A study on planting date of vetiver grass on different soil series in Thailand.
5. Root distribution of the DLD-recommended vetiver ecotypes.
6. The use of vetiver grass for soil and water conservation on sloping land: (a) A test of different vetiver vertical intervals, (b) A test of different number of rows and plant spacing.
7. Comparison of soil loss and moisture content by using different cropping patterns for soil and water conservation on sloping land.
8. The test of vetiver grass hedge for soil and water conservation at Ubon Ratchathani Land Development Station.
9. The effect of number of rows and plant spacing on vetiver grass for erosion control on sloping land.
10. A study on growing vetiver grass for soil moisture conservation in the orchards.
11. A study on the rate of seed germination of vetiver grass from vetiver hedge rows.
12. Salinity effect on the growth of vetiver grass
13. A Comparative study on growth, root system and yield of different ecotypes of vetiver grass.
14. Vetiver grass slashing management.
15. The utilization of vetiver grass in developing and rehabilitating Narathiwat soil series.

16. A field test on the use of vetiver grass in conjunction with some soil conservation and improvement measures for sustaining soil in cassava-based cropping.
17. A comparative study on the efficiency of vetiver grass and contour bank on the rate of soil erosion.

Vetiver Grass in the Agriworld*

The 'Agriworld' is an acronym for the Suzhou Future Agriculture and Forestry World Exhibition held in spring this year in Suzhou, Jiansu province, China. It is supported by the Singapore WBL Co., Ltd. Which is situated on the east bank of Taihu Lake.

The miracle grass vetiver was distributed at the 'Agriworld' as one of the most important component of modern agriculture and forestry technology. Over 10,000 tellers of vetiver planting materials were transported to and planted in the 'Agriworld' in March 1998. After 5 months, the grass grew pretty well without any management. It could stand both drought and water-logging conditions. Now, the 'Agriworld' is going to propagate the grass with a modern technology in order to disseminate the vetiver grass technology to the whole country. With 3,000 Mu (200 ha), the 'Agriworld' is to demonstrate the most modern agricultural technology in the world to the Chinese farmers and to analyze and introduce development tendency of agriculture into China. The 'Agriworld' will help upgrading China's agriculture by collecting and providing scientific information and personnel, exploring and designing the direction of China's agricultural development, as well as promoting the exchange of international scientific and economic issues.

Vetiver Grass for Slope Stabilisation and Erosion Control

The Secretariat of the Pacific Rim Vetiver Network is proud to announce the publication of its second Technical Bulletin, entitled, "Vetiver Grass for Slope Stabilisation and Erosion Control (with particular reference to engineering applications) written by Mr. Diti Hengchaovanich, Principal and Director of APT Consult, Bangkok, Thailand.

This 16-page document (including 4 color pages) is published for PRVN by the Office of the Royal Development Projects Board with financial support from the Chaipattana Foundation and technical support from the FAO Regional Office for Asia and the Pacific (which provides the editorial service by

---

* By Xu Liyu, Coordinator, China Vetiver Network

Dr. Narong Chomchalow and Dr. Hans V. Henle, both of whom are retired officers and Consultants of the FAO Regional Office for Asia and the Pacific).

The document describes the use of vetiver in slope stabilisation practice. Due to conciousness of the environment, the use of vetiver for treating shallow mass movement problems in slope stabilisation process is becoming popular only in the last decade. Vetiver first stabilises the erodible ground, particularly steep slopes, thus improves its micro-environment so that other volunteered or sown plants can establish later. In highly-erodible soils on steep slopes with high rainfall, vetiver can easily replace the more costly and unsightly 'hard, and 'inert' solutions. Since vetiver is a 'live' material, acting as a 'living wall' for both erosion control and slope stabilisation, the success of its application depends largely on good agricultural practice to exploit the full potential of the plant.

Vetiver did Miracle in Haiti Hurricane*

I go to Haiti about every three months to do volunteer work on soil erosion control using vetiver grass and garden development work. I got back just before Hurricane Georges made its way across the Island, doing a lot of damage. Today's news said that 80-90% of the crops on the Island have been destroyed. I just got through on the telephone to missionary Carol Herget, who confirmed that there was lots of rain and that many houses and people have been washed away. According to Carol, the winds at the Village of Hope school and at her residence were not "too bad". No roofs were lost. I feared the worst and so was happy to hear that damage was minimal. And best of all, Carol was excited that *the vetiver grass in the garden areas had done a wonderful job of protecting the sites. Where vetiver has been established for just one year, we have essentially stopped all the soil erosion, and saved the gardens. Of course I was elated to hear this news. Carol and others are now big believers in vetiver.*

The damage in Haiti is severe and there are some real needs to help the people. The Government of Haiti claims to have only $130,000 to help the people – it won't go very far. At Carol's school, several of the children lost their homes and everything they had. I will be in contact with Carol and will be returning in November—hoping to take her some extra dollars and supplies for the children, etc. In November, I will be working with the Village of Hope school, the local farmers, and Mennonite

---

* Extracted from an open e-mail letter of Mr. Calvin F. Bey of the Zing-Step Services <cfbey@eerols.com> to various people including Mr. Richard Grimshaw, Vetiver Network Coordinator, The Vetiver Network (15 Wirt Street NW, Leesburg, Virginia 20176, USA) who passed on the information to be published inVetiverim.

missionary group to get more vetiver planted. *It is unbelievable what vetiver can do to protect our precious soil resources in situations like this.*

Proceedings of ICV-1 now available

The PRVN editorial staff is pleased to announce that publication of the Proceedings for the First International Conference on Vetiver Grass in Chiang Rai, Thailand, 4-8 February 1996 has been completed. Limited copies are available to the public by simply writing to us and pay the postage fee for the delivery. The fee is to be paid by a cash transfer to the following account:

Account Name: The Secretariat – Vetiver: A Miracle Grass

Account number: 2010252175

Bank Name: Bangkok Bank Company Limited, Ko. Pho. Branch

As for the postage amount, the following are rates for delivery via air mail and surface mail:

Air Mail

Asia	US$ 10
Oceania or Europe	US$ 12
North & South America	US$ 14
South Africa	US$ 7

Surface mail

All countries	US$ 7

Vetiver Grass and Greenhouse Gasses*

Vetiver grass, Vetiveria zizanioides, offers a way to benefit the earth's atmosphere as well as its surface environment. This tropical grass sequesters large quantities of carbon dioxide from the atmosphere – it may, in fact be the ideal plant for the purpose. But hedges of vetiver also stop soil erosion, rejuvenate degraded lands, keep pollutants in their place, and much more. Nobody yet knows how much greenhouse gas vetiver can remove, but is likely to surpass anything generally imagined.

A rough estimate can be gained from measurements made on a closely related grass, Andropogon guyanus. In 1995, CIAT (a respected international agricultural research institute in Cali, Colombia) reported that this species and another deep-rooted African grass grow so widely and so prolifically in the savannas of South America that they "may remove as much as 2 billion tons of CO_2 from the atmosphere

* By Noel Vietmeyer, National Academy of Science (retired). Washington, DC, USA.

yearly." Andropogon guyanus roots penetrate 1 m into tropical soils and CIAT scientists found that the plant sequesters as much as 53 tons of CO_2 as organic matter/ha/yr.

Vetiver roots, by contrast, are more extensive and penetrate tropical soils to depths of 5 m and beyond. Its rate of absorbing the gas is likely to be at least twice that of its botanical cousin. Back-of-the-envelope calculations suggest that a single vetiver plant may absorb 5 kg of CO_2 a year. International efforts to propagate vetiver grass are underway in more than fifty countries. To give one example, the Chiang Rai Land Development Station in northern Thailand produces new vetiver plants at rate of 100 million a year, which means that its annual output of plants might be removing 500 million kg of CO_2. According to CIAT, that's as much CO_2 as emitted by 100,000 gas-guzzling cars, each driven 20,000 km. Vetiver's many advantages include the fact that it:

- Thrives in acid, tropical soils that now support little or nothing;
- Is adapted to widely different conditions and climates;
- Thrives in the tropics where the year-round heat fosters tremendous biomass growth;
- Produces root matter rapidly;
- "Buries" CO_2 so deep as to keep it out of the atmosphere for decades;
- Benefits the soil and surroundings;
- Provides multiple benefits in addition to any greenhouse-gas removal;
- Is easy to use and understand;
- Can protect roads, pipelines, natural-gas wells and other installations;
- Can stabilize spoil from mining and other industrial operations; and
- Is adapted to the most erosion prone, hunger prone and forest-depleted regions.

These days, interest in planting vetiver is widespread throughout the tropics. People want to plant it for their own benefit – it doesn't have to be done for them. Small amounts of funding can there fore be put to immediate use without overheads or delays. The funds can produce huge multiplier effects. They can, for instance, be used to establish nurseries, which then go on producing planting materials in a self-sustaining manner into the foreseeable future. Vetiver seems like an exceptional tool for sequestering CO_2. It can be propagated by the millions in tropical lands, and could be used to trade off against considerable volumes of emissions made elsewhere in the world. All in all, this remarkable plant has the ability to turn large amounts of greenhouse gases into underground solids – all the while benefiting local

soils and environments. Vetiver hedges will likely hold their stored carbon for decades. They will also benefit the lives of millions in the pats of the world that most need help.

The 3rd Thai National Workshop on Vetiver

Since His Majesty the King graciously delivered the royal initiative about vetive grass in 1991, concerned agencies have carried out studies, experiments, and researches on its utilization as well as evaluated the outcome from the operation on a continual basis. In order to celebrate His Majesty's Sixth-Cycle. Birthday Anniversary (to take place in 1999), the Office of the Royal Development Projects Board (RDPB) is organizing the "Third Workshop on the Development and Promotion of the Utilizaion of Vetiver Grass", on 14-15 January 1999 at the 50th Anniversary Information Building, Kasetsart University, Bangkok. The Workshop mainly aims at presenting His Majesty's various initiatives on vetiver. The program includes two keynote speeches, scientific paper presentations, and three panel discussion sessions (on research, utilization and extension of vetiver). The number of participants is expected to reach 300. Comprising representatives from 33 concerned agencies of both government and private sectors.

Letter to the Editor

A request from Cambodia

I am currently managing a "Sustainable Agriculture and Integrated Farming" project in Cambodia. We have helped the farmers to re-excavate few drainage canals to reduce the flood affect in the project area. Recently we have observed some erosion of the canal banks. We are interested to test the feasibility of planting hedgerows of vetiver to control and also as a possible source of feed for animal during the dry season. We really need information about the cultivation practices of this grass. Where shall we be able to find the initial planting material? Is it available locally in Cambodia? How can we identify this grass? Are there any variation of vetiver grass from country to country? If yes, what would be our best source of the grass? We shall appreciate your assistance to initiate a vetiver grass projcet in our project area.

Numa Shams

Technical Program Manager, CRS

P.O.Box 493, Phonm Penh, Cambodia

Concerning your request for information about vetiver, we are happy t o inform you that we have a Secretariat Office located at the Office of the Royal Development Projects Board. You can also obtain a lot of information on vetiver from our internet homepage. Planting material can be obtained from the Department of Land Development (for suckers and slips), and Doi Tung Project and/or Kasetsart University's Department of Botany (for tissue – cultured material). Wild material should also be found in Cambodia but you need someone who knows the plant in order to be able to identify them. Yes, there is a lot of variation as seen from existing collection in Thailand. For Cambodia, the best source of planting material is probably from Thailand. Please contact PRVN for further arrangements. We shall be mast happy to provide any assistance to you in order to incorporate vetiver into your project. May we request you act as the Country Representative of PRVN in Cambodia? Copes of all back issues of Vetiverim are being sent to you, together with a number of other publications on vetiver. – ***Ed.***