VETIVERIM

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Special Issue on Venezuela, the proposed venue for ICV-4

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Editorial

From Venezuela with Love

The Editor, in his capacity as the Chairman of the Continuing Committee of the International Conference on Vetiver, has been invited by the Polar Foundation, the main actor to organize the Fourth International Conference on Vetiver (ICV-4), to visit Venezuela during 11-17 July 2004 with the main objective of attending the Preparatory Meeting for the organization of ICV-4 and to present two keynote addresses to convince potential sponsors and co-organizers of the importance and relevance of hosting ICV-4 in Venezuela. He also observed the vetiver activities presently carried out by various agencies in Venezuela, which could be the sites for technical visits during ICV-4.

From the minute he landed in this beautiful country with so many natural wonders and friendly people, all the way to the last minute he left Venezuela, the Editor has received a red-carpet welcome from various people, including those of Polar Foundation, Central University of Venezuela, various businesses attached to Polar Enterprises, and many other agencies.

Details of his visit are separately presented in this issue of Vetiverim, together with other articles and the photo-essay of his visit and of other concerned persons. During his week-long visit, he traveled to observe the sites where vetiver is grown, for experimental purpose, for multiplication, and for use in soil and water conservation, both in agricultural fields and for bioengineering and phytoremediation purposes. All has been quite successful and of high standard of performance.

In contrast to the situation in most other countries where vetiver is mainly grown for soil and water conservation or for use in bioengineering and phytoremediation with little or no utilization of the leaves, a by-product of vetiver growing, the approach implemented by the Polar Foundation Vetiver Project started with the reverse, i.e. by concentrating on the utilization of vetiver leaves through handicraft making. This has attracted the interest of the poor people in the community such that they could earn a sizeable income from the sale of their handicrafts. It was really touching to see the happy faces with starry eyes of these people during several of the Editor's visits to their communities, reflecting their complete

satisfaction of the work they are doing which earned them a good income from the sale of their proud handicrafts.

Report on the Visit to Venezuela by the Chairman of CC/ICV*

Venezuela has been selected by the Continuing Committee of the International Conference on Vetiver (CC/ICV) to be the host of the Fourth International Conference on Vetiver (ICV-4), to be held in Caracas, Venezuela in October 2006. The author, in his capacity of the Chairman of CC/ICV, was invited by the Polar Foundation (PF), the main actor responsible for the organization of ICV-4, to travel to Venezuela during 11-17 July 2004, with the main objective of attending the ICV-4 Preparatory Meeting where the representatives of the organizers, co-organizers, and potential sponsors from various national and international agencies and NGOs were invited to attend, in order to convince them of the importance and relevance to have ICV-4 in Venezuela. Other objectives include visits to several sites in Venezuela where vetiver research and development activities have been conducted by various government agencies and the private sector, in particular, the Polar Foundation, and to observe the interaction of the community involving in vetiver handicraft making under the supervision and support from Polar Foundation Vetiver Project (PFVP). The present report contains a brief account of his visit, together with his personal comments on what have been observed during the visit.

The Visit

The following paragraphs briefly describe the events taking place from the first day to the last day of the author's visit to Venezuela.

Sunday 11 July: Arrived in Caracas, and met by Oscar Rodriguez (OR), Coordinator of the Latin America Vetiver Network (LAVN), and Oswaldo Luque (OL), Coordinator of PFVP.

Monday 12 July: *Morning:* Courtesy visit to PF, welcomed by Dra. Graciela Pantin, PF General Manager. He explained the objectives of his visit and presented vetiver documents produced by the Pacific Rim Vetiver Network, together with the Proceedings of the last three ICVs. He explained the origin and organization of ICVs, the selection of Venezuela as the host of ICV-4 during the Business Meeting of ICV-3 in Guangzhou, China. Although her general impression is in favor of hosting ICV-4 in Venezuela, Dra. Pantin is cautious about financial situation, particularly the need to obtain additional financial supports from various international and national donors. She assured the author that PF would provide necessary in-kind supports to ICV-4. A formal reception luncheon was given together with senior PF staff.

Afternoon: Accompanied by OR and OL, a visit was made to the mineral water plant belonging to Polar Enterprise, 50 km NW of Caracas. Ing Juan Alberto Seijas, General Manager, explained the long-term project related to the use of vetiver to protect the watershed of the area. The local communities are actively involved in handicraft making, using vetiver leaves obtained from those planted for soil and water conservation of the watershed, as well as to stabilize the steep slopes. We visited the field where vetiver hedgerows and tree seedlings were interplanted on the slope of the mountain. From our observation the soil along the vetiver rows was quite wet, indicating that vetiver hedgerows really improve soil moisture. As a result, tree seedlings grow luxuriantly. The system that is being used is quite effective without having to water vetiver plants and tree seedlings. The actual forest is located in the main drainage and the bare slopes definitely require protection and stabilization.

Tuesday 13 July: *Morning:* Meeting with Ing. Armando Hernandez (AH), Coordinator of Agriculture, Environmental Area and Science of PF to consider financial requirements and general budgeting of ICV-4. We finalized the draft budget with a total expenditure of $ 250,000, and an estimated donation of US$ 100,000. Thus, a deficit of US$ 150.000 would have to be sought from other sources. In the late morning a press conference was arranged for the author to explain the purpose of his visit to Venezuela and the importance of ICV-4 at national as well as the international level. He also described the virtues of vetiver in relation to its uses and utilization.

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* *By Narong Chomchalow, Chairman, Continuing Committee of the International Conference on Vetiver*

Afternoon: We traveled to Maracay, 120 km S of Caracas, to visit Carmen Teresa Farm of the Antierosion Co. owned by Rafael Luque. Community leaders from Guarico watershed area, who are working in the PFVP, exhibited several items of vetiver handicrafts and furnitures. Several other vetiver activities are also being conducted on the 4-ha area, namely:

- One is a new propagation technique using wires attached at one end to a steel bar and extended along the length of the plot of about 20 m, with a disdtance of 10 cm apart. A black plastic sheet is rolled across the wires and the loops between two wires are filled with soil. Vetiver slips are planted at the spacing of 5 cm along the entire length of the plot. After about two months, the shoots grow to a height of about 40 cm with extensive roots fully developed in the soil. A long patch with many vetiver plants of any length can be pulled off for planting in a single operation. The facility for propagation is reusable.
- The second activity is that of several large multiplication plots of vetiver planted in the field, all in excellent condition.
- The third activity is the harvesting of vetiver leaves for use in handicratft making. The freshly harvested leaves are dried on a raised platform made of wire mesh and covered with plastic sheet to protect from the rain.

Evening: A dinner reception was hosted by OL and his family. Among those who were invited were Gerardo Yepez Tamayo (GYT) - the Venezuela Vetiver Network Coordinator; OR, Coordinator of LAVN; Prof Ernesto Andreu, Universidad Romulo Gallegos; Prof. Adriana Florentino - President of Venezuela Soil Science Society; and Jose Gregorio Luque - Vetiver Antierosion Co.

Wednesday 14 July: *Morning:* Listening to presentatation by the professors and graduated students of the Faculty of Agronomy, Central University of Venezuela, who are involved in vetiver projects partly supported by PFVP. Summaries of the presentations are given below:

- The first presentation was made by OR who presented a summary of the result of his research project since 1984, which covered many topics from soil and water conservation, vetiver propagation, modeling of erosion control, and water and soil contamination treatment.
- Prof. Oscar Silva discussed runoff plot with shifting cultivation system, cassava and fallow protected with hedgerows, erosion control efficiency, modeling erosion practices with EPIC (erosion prediction impact calculator) and WEPP (water erosion prediction projects).
- Monica Scavo explained her work with tertiary water treatment system (ADIVOCA) at Pepsi Cola Plant with promising results in reducing BOD, nutrients, etc. This project is partially supported by PFVP and Pepsi Cola Entersprise.
- Yazmin Ruiz described the preliminary result of her project on using vetiver to absorb fluorine in the water from a contaminated community well. This project is partially supported by PFVP.
- Prof. Meliton Adams provided preliminary result of his study of growing vetiver in the soil that has been contaminated with mercury.
- Prof Josefina Paez described the technique of vetiver propagation through tissue culture and other techniques. After that, we visited her lab and multiplication plots.

Afternoon: Visited Polar Brewery Plant where OL gave a briefing on the vetiver plant in San Joaquin, and Edo. Carabobo, highlighted the need for water management in the Valencia Lake Basin and how vetiver can help to solve many water-related issues. Later, we visited Casa Alejo Zuloaga, an old colonial-style house used for exhibition and training activities. On display are items of vetiver handicrafts from Thailand, India, and locally-produced ones made through the community project under PF assistance and support.

Thuesday 15 July: *Morning:* Attended the ICV-4 Preparatory Meeting at PF Headquarters in Caracas where representatives of many national and international agencies, such as World Bank, FAO, Telcel Foundation, British Embassy, Venezuelan Guyana Corporation, Yacambú Project, Ministery of Environment, Ministery of Sciences and Technology, and several others attended. Alicia Pimentel, PF Coordinator for International Relations moderated the discussions. Presentations

were made by:

- ***OL*** on PFVP's role and its social impacts.
- ***OR*** on academic and ecological impacts of vetiver in Venezuela and Latin America.
- ***GYT*** on the role of the private and public sectors in Venezuela and their impacts.
- ***NC*** on the importance of vetiver, particularly its conventional and non-conventional uses, and utilization, and on the origin of ICV and the outcome of the previous ICVs.

(Abstracts of the above presentations are given in the articles which follow)

- ***AH*** on general affairs of ICV-4 in terms of the number of participants, the subject and contents of the conference, budget, and other logistic details, and the the need for external supports to host ICV-4 in Venezuela.

After the last presentation, a discussion session followed. The World Bank representative, Maria Magdalena Colmenares, Social Senior Officer, expressed her confidence on the proposed ICV-4 and agreed to approach the World Bank office in Caracas to support ICV-4. She offered to provide facilities for videoconference for the international experts prior to the conference.

At the end of the meeting, OL presented a video showing the main outputs of the PFVP with vetiver credo and Venezuelan song.

Afternoon: A briefing session was held with OR, OL, and AH to discuss the strategy and future activities for the preparation of ICV-4. Later on, a meeting with Dra. Graciela Pantin was held in her office where NC, OR and OL presented their briefings on the results of the morning meeting. Dra. Pantin expressed her deep gratitude to NC for devoting his valuable time to be in Venezuela and for overall support for Venzuela to host ICV-4. She is optimistic that ICV-4 will be conducted successfully in Venezuela in spite of financial problem now encountering for the fact that to organize such a huge international meeting like ICV requires a lot of financial supports from various national and international agencies. As far as PF is concerned, she assured NC that it would do its utmost to make ICV-4 a success, with the in-kind supports including all needed facilities for the conference such as the main auditorium (capacity 270 persons), small meeting rooms for concurrent sessions, space for the display of the exhibits and poster papers, luncheon facility, etc.

Friday 16 July: *Morning:* Visited Birongo, near Curiepe, Miranda State, 150 km E of Caracas, where a small chocolate factory is being constructed on excavated mountain side; the cut and fill slopes of the mountain are planted with vetiver to prevent soil erosion. This factory belongs to the local community and is supported by PF. Nearby, there is also a PFVP training center to train the local people on vetiver handicraft making as well as techniques of establishing horticultural plots with a boundary of vetiver hedgerows. A lot of samples of handicrafts from this community and a demonstration on how they made were exhibited.

Afternoon: Reporting and final discussion on ICV-4 issues. It was agreed to revise the theme and sub-theme of ICV-4 as "Vetiver and People: A Green Investment for Sustainable Development - Green Gold for Crafting a Better World". It was agreed that the First Announcement will be made after the final decision of the Organizer to host ICV-4 in October 2004 when more information about sponsors and organizers is available.

Comments

During the week-long period the author spent in Venezuela, he has witnessed various successful achievements in vetiver R&D, both by the staff of the Central University of Venezuela and by those of the private sector associated with PF like Pepsi Cola Plant, Polar Brewery, Antierosion Co., all of which are of high standard. It is unfortunate that many vetiver activities which are being conducted by large industries such as oil refinery, mining (gold, bauxite, etc.) suported by Bauxilum-Los Pijiguaos, etc. through their contracted vetiver private companies (see GYT's report), are located in the southern and other parts of the country which are too far to travel within a short time available during his visit.

The most impressive activity associated with vetiver in Venezuela is that of community

development supported by PFVP. This is evident from the visits to many sites where local people gathered to welcome NC to eagerly show him their valued products, even to sing vetiver songs composed by themselves. This get-together is an excellent means of bringing people close together, and to unite them. The visit to see vetiver handicraft exhibit only strengthened his great admiration on the concept of using vetiver as a means of helping the poor people to earn extra income, most often the only income, which has tremendously improved their quality of life.

It may be concluded that by utilization of vetiver as a source of raw material for handicraft making, the poor people in the community not only earn extra income, but are united in their mutual activity in the community. This has culminated in more and more vetivers are planted for soil and water conservation in the farmlands and elsewhere. This is in contrast with the conventional approach in which the farmers are encouraged to grow vetiver to protect their soil, and to use vetiver as a by-product for handicraft making and other utilization, which are often ended up with little or no planting at all as the farmers earn no income from such planting. Judging from the look at the smiling faces with starry eyes of the poor villagers as they sang the vetiver song or while they made the handicrafts, and even the young children who are brought to involve in such activities, the author could say that they are quite happy with their involvement in the vetiver project.

Acknowledgements

The author wishes to express his sincere thank to PF for inviting him to visit Venezuela during 11-17 July 2004. He is grateful to the staff of PF, namely Dra Graciela Pantin, General Manager, Dr. Ricardo Alezones, Technical Manager, Lic. Alejandro Reyes, (Coordinator of Agricultural Area), Ing.Armando Hernandez, (Coordinator of Environment Area), Lic. Elizabeth Monascal (Coordinator of Culture Area), Lic. Orlando Briceño , Carmen Mideros (AH's secretary), and Raul Ravelo. Thanks are due to staff of PFVP, including Oswaldo Luque, Grace Rivero and Edgar Ceballos.

The author is indebted to the staff of the School of Agronomy of the Central University of Venezuela, for the brief presentations of their works on vetiver research. Thanks are also extended to Prof. Rafael Castro, Director of Casa Alejo Zuloaga for showing the author the vetiver handicraft products; Dr. Anibal Castillo, Director of Caracas Botanical Garden for show the author the herbarium specimens of vetiver, and to guide him around the garden. Lastly, he is greatly indebted to Oscar Rodriguez and Oswaldo Luque, who accompanied him everywhere from the first to the last minute he was in Venezuela, who have given him a very warm hospitality, and all the nice thing about Venezuela, which make his visit to Venezuela, one of his most memorable journeys.

Abstracts of Papers Presented at the ICV-4 Preparatory Meeting*

"The Vetiver and Their Relationships with the Social Development in Venezuela" *by Dr. Oswaldo Luque, Coordinator, the Polar Foundation Vetiver Project*

According to the Conservationist Society of Aragua, vetiver has taken its roots deep in Venezuelan soils for more than a hundred years. It was postulated that vetiver was brought into Apure State, and then extended to Bolívar both in the South of the country, and other central states of Venezuela. Their main uses were for the construction of house (as a roof thatch and walls, blended with mud) and traditional medicine.

The handicraft use was limited to the fabric of furniture and wallets. There was a reference of Mr. Evelio Paz, a schoolteacher who affirmed that about 50 years ago there was a program of the extinct Council of Rural Well for making handicraft from vetiver. Vetiver was planted in the patios of the houses of the participating members.

Three years ago, Polar Foundation started the Vetiver Project (PFPV) with the following general objectives: (i) alleviate social disparities, (ii) promote the making of vetiver handicraft as an initial step in the execution of an integral project in the economic, ecological and social

development, (iii) develop markets for the vetiver handicraft produced by the villagers of the diverse communities, (iv) foment the participation of populations of scarce economic resources through the empowerment of the leaders and local instructors of the communities, (v) motivate the fight against the destruction of natural resources with special reference to the conservation of soil and water, and (vi) enhance the spiritual and moral values through appropriate dynamics.

At present some 6,000 people have assisted in the Project; they are located in eight states of Venezuela. These villagers live under critical economic, ecological and social conditions. The working methodology is guided to generate an economic interest through the development of the handicrafts and markets. The Project began with the delivery of harvested vetiver leaves to the villagers who were trained to make articles such as furniture, wallets, handbags, etc. At the beginning the articles were very simple, and as the course advanced they made more complicated articles. The orientation from the beginning was to sell in the cooperative stores and through exhibitions that were carried out like complement in conferences, or programmed for such ends.

Once the economic interest spans to the second stage, vetiver planting took places in the nearby places of the communities where erosion and/or polluted water occur. When vetiver plants have grown, a new cycle was started when the villagers were trained to harvest and to produce the leafy materials for handicraft making. These activities were supplemented with a program of family agriculture, based on simple technology on the production of seeds for planting, the production and use of compost, and biological or manual control of insects and diseases. The small plots were surrounded by vetiver hedgerows.

The social aspects are covered with a methodology that includes songs, short readings on the topics related the self-esteem and dynamics to motivate the integration of the community around the vetiver project.

The PFVP partially supports the research, especially in using vetiver for wastewater treatment, in collaboration with the Faculty of Agronomy of the Central University of Venezuela, and Romulo Gallegos University.

At the beginning of 2004, the Venezuelan Corporation of Guayana was interested in handicraft-making project. It supported the creation of the Project Vetiver CVG-Los Pijiguaos, in the region where the bauxite mines are located with the same philosophy of PFPV. There are 14 indigenous ethnic groups participating in this pilot project because these populations have a tradition in weaving, especially in using a locally well-known palm, moriche (*Mauritia minor*), which is now more and more scarced. Vetiver is considered an excellent and highly competitive resource to improve the family economy, to protect the environmental, and to support the social development of the region.

"Vetiver Research and Development in Venezuela and Latin America" ***by Prof. Dr. Oscar Rodriguez, Coordinator, Latin America Vetiver Network***

Vetiver was introduced to Venezuela more than a hundred years ago, probably from the British colonies in the Caribbean. It got naturalized along the Orinoco river border. It has benefited the country since the beginning. Thirty years ago, it was re-introduced as a soil and water conservation tool, and during the last 15 years, thanks to the support of The Vetiver Network and the ICVs, among other sources, dissemination and research development programs of the Vetiver System (VS) as a set of technologies and practical uses of the vetiver grass got started. The VS has been applied at different levels and situations such as: agricultural development, bioengineering and land restoration in service corridors (water, electricity, oil and gas, communications), oil industry and mining, construction sites, and recently as a tool for community development in very poor rural areas, with the project of PF as one of the main examples. Phytoremediation and wastewater treatment have recently used vetiver that are being tested under experimental conditions. Success in vetiver on many uses and applications have stimulated research and technological studies related to the basic aspects such as agro-ecology, propagation and agronomic management of the grass. University scientists and students at undergraduate and graduate levels have been involved in their research projects with

different vetiver issues, especially those from the Faculty of Agronomy, Central University of Venezuela, and also from the Romulo Gallegos University, Simón Rodríguez University and Yacambú University. More than 30 published papers and several thesis and research projects have been completed since 1984. Many presentations have been performed at national and international scientific and technical events. The Venezuelan Vetiver Network (VEVN) has been involved in vetiver dissemination programs since 1996, when it was created, and since 2000, after Costa Rica, Venezuela hosts The Latin America Vetiver Network (LAVN), both are supported by Sociedad Conservacionista Aragua in Maracay. The author, as the LAVN Coordinator, has participated in all previous ICVs. In our effort to disseminate knowledge on the VS, we have received the national and international recognitions such as the EUREKA prize for academic innovation, a recognition from The Vetiver Network, and the King of Thailand Vetiver Award in 2000. LAVN has 11 national and subregional networks and distributes its bulletins to their members, which are about 800 in 19 countries throughout Latin America. It supports activities related with the dissemination of the VS and distributes materials, such as videos, CDs, brochures and other publications. Examples from many countries in Latin America demonstrate its usefulness and big scale project applications, such as bioengineering experiences in Panamá, Colombia and El Salvador, as well as soil and water conservation tool in agricultural areas, and in land restoration and watershed management projects, and demonstrates that vetiver is already known in Latin America. However, there is still a need to spread these experiences and possibilities to many other areas within the region.

It will be a great honor and a great opportunity for Venezuela and Latin America to host ICV-4. This will strengthen the works that have been conducted in research and development programs since many years ago, introduce new advances of the VS in the region, and also provide the opportunity to many researchers, technicians, developers and business men to attend this important event and share with their peers from other parts of the world, with the advantage of being within their region, in their own language and at a more affordable way. ICV-4 will encourage research and development activities with vetiver throughout the region which is "hunger of technology" that can help solve a great variety of environmental problems, and at the same time can help alleviate poverty and support community development.

"The Impact of Expansion on Seed Exhange: Vetiver Use by Private and Public Enterprises - The Venezuelan Experience", ***by Prof. Gerardo Yépez Tamayo, Venezuelan Vetiver Network Coordinator***

The use of vetiver in Venezuela by the private and public enterprises is of recent origin, even though vetiver has had popular applications in the country for more than a century.

Since 1984, research studies were started at the Faculty of Agronomy, Central University of Venezuela in Maracay, and after a large extension campaign conducted by that faculty and the NGO, "Sociedad Conservacionista Aragua" (SCA), started in 1996, that several small companies started to apply bioengineering uses of vetiver in different regions in Venezuela.

* One of the first contracts was financed by a public institution, INVIALTA-Aragua State Institute for Roads and Highways, where 13,000 vetiver slips were produced by ***SCA*** and ***Biogranja*** nurseries.

* Another contract was given by a private club, ***Magnum***, in Caracas, the capital, and executed by Carlos Gomis, an agronomist who just graduated and whose thesis was oriented to find out how the ecological conditions influence vetiver. A very steep slope was stabilized with about 50,000 plants grown at the construction location using the slips brought from Apure State in the southwest of the country. This agronomist propagated the plants, and later founded ***CGS Ecology***, an innovative company located in San Antonio de Los Altos, very close to Caracas, that offers landscaping and bioengineering services. Recently, the company carried out a large-scale project using vetiver to stabilize road cuts and fills contracted by ***Criogenic Complex JOSE***, a subsidiary of the national oil company, PDVSA, located in Anzoategui State.

* Many other companies were also established, namely:

- ***Paisagreen***, which is doing stabilization of slopes on important construction sites in El Hatillo, Miranda State, and owns a nursery in Guigue, Carabobo State.

- ***Vetiver Antierosión***, a new company with multiplication fields and a nursery, which originally obtains planting material from ***Biogranja***. It conducted projects in Lara and Yaracuy States, west of the country, and for the Government Aluminum Company Bauxiven in Los Pijiguaos, Bolívar State in the south. It also provides the leaves for different purposes, like handicrafts and thatching.

- Promoted by Vetiver Antierosión, ***Vetiver Andina*** was established in Palmira, Táchira State in the Venezuelan Andes.

- ***Biotécnica***, directed by Germán Trujillo with the main projects executed by Biotécnica, located in the Tuy Valley, Miranda State along the new railroad under construction as well as in Caracas, and also in Camatagua, Aragua State, where a big project on poultry and pig production needed to stabilize huge terraces and embankments. Cooperative organizations are in charge of two or three large sheds and have purchased vetiver plants from Biogranja, and have executed the planting work on their own. Biogranja has also provided planting material for projects in the private Club Izcaragua in Miranda State, in El Hatillo, in Club Monte Líbano in Maracay, and in the Municipal Park of Mario Briceño Iragorry Municipality.

- Finally, ***BioAmbientes***, another landscaping company, has carried out bioengineering projects with vetiver in Caracas and La Encrucijada.

Among the public enterprises that are promoting vetiver and providing planting materials are the ***Faculty of Agronomy, Central University of Venezuela*** in Maracay, and the ***Faculty of Agronomy, Romulo Gallegos University*** in San Juan de los Morros, Guárico State.

At present, there are several small vetiver plantations in all the sites where Polar Foundation has social projects and promotes handicraft works. Consequently, the communities are no longer dependant of planting material and the leaves for their local needs. In the recent past years, a governmental company, ***PALMAVEN***, presently extinct, promoted the use of vetiver along the oil and gas pipe service corridors.

"Vivacious Vetiver Virtues: Uses and Utilization of Vetiver – A Miracle Grass" ***by Dr. Narong Chomchalow, Coordinator, Pacific Rim Vetiver Network***

In order to provide the participants from various donor agencies who are not so familiar with vetiver to appreciate the value of vetiver, the author first explained the characteristics of vetiver in relation to its special structural features and its performance in soil and water conservation, embankment stabilization and environmental protection, then went on to describe the various uses and utilization of vetiver.

Live vetiver plants are conventionally used in agricultural applications (soil and water conservation and trapping of agrochemicals and nutrients) and non-agricultural applications. The latter includes bioengineering (erosion control, slope stabilization, and embankment stabilization), disaster prevention (landslide and mudslide prevention, flood prevention, and forest fire prevention) and phytoremediation (reclamation of problem soils, and rehabilitation of contaminated soils and water).

Non-conventional uses of *live* vetiver plants include forage for livestock grazing, ornamentals (landscaping, decorative potted plants), field/plot boundaries, windbreaks, dust and heat reduction, as a trap crop for insect pests, and in wincing a car out from a ditch.

Harvested vetiver plants can be utilized in the following ways:

-Agriculture-related activities: mulch, compost, nursery block and planting medium, fodder, mushroom cultivation, botanical pesticides, allelopathy, and livestock bedding.

- Construction-related activities: roof thatch, hut, mud bricks, prefabricated vetiver-clay blocks, vetiver-clay composite silo, cement replacement material, particle board and panel, termite-repelling board, veneer, fiber board, and straw bale.

- Miscellaneous activities: handicrafts, traditional medicines, herbal drinks, perfumery, flavor, potpourri, aromatherapy, pottery, water containers, melamine utensils, ethanol, green fuel, pulp and paper, bouquet, household appliances and souvenir, mattress and other stuffing, coolant, and brooms.

"The International Conferences on Vetiver: From First to Fourth and Beyond" ***by Dr. Narong Chomchalow, Chairman, CC/ICV***

The author describes the origin of ICV which stemed from the "International Conference on Vetiver:A Miracle Grass" held in Chiang Rai, Thailand in February 1996 to commemorate the 50th Anniversary Celebrations of His Majesty the King of Thailand. An *ad hoc* meeting was convened by the author during the conference in which all attendants expressed their felt need to continue this international conference on a regular basis and renamed this conference as the First International Conference on Vetiver (ICV-1). The meeting also considered the draft Constitution prepard by the author and endorsed it for preliminary use. The main feature of the Constitution is the formation of the Continuing Committee consisting of 11 key persons from five regions of the world whose mandate is to oversee the continuity of ICV by selecting potential host for immediate future ICV. The essential features of the past three ICVs are briefly described below:

ICV-1: Held in Chiang Rai, Thailand, 4-8 Feb. 1996, with the theme, "Vetiver: A Miracle Grass"; it had 400 participants, 100 of which were from 40 foreign countries. All expenses were covered by the Office of the Royal Development Projects Board (ORDPB). South Africa was nominated to host ICV-2 in AD 2000.

ICV-2: As South Africa could not make it, Thaliland agreed to host ICV-2. It was held in Cha-am, Phetchaburi, Thailand, 18-22 Jan. 2000, to commemorate the 6th Cycle Birthday Anniversary of His Majesty the King of Thailand, with the theme, "Vetiver and the Environment and Its Implication". It had 400 participants, 100 of which were from 30 foreign countries. As in ICV-1, all expenses were covered by ORDPB. China was nominated to host ICV-3.

ICV-3: Held in Guangzhou, China, 6-9 Oct. 2003 under the theme, "Vetiver and Water: An Ecotechnology for Water Quality Improvement, Land Stabilization and Environment Enhancement", with 280 participants from 28 countries, one-third of which were from foreign countries. A registration fee of US$300/participant was charged. Venezuela was nominated to host ICV-4.

ICV-4: To be held in Caracas, Venezuela, most likely in October 2006 under the theme "Vetiver and People: A Green Investment for Saustainable Development – Green Gold for Crafting a Better World". Polar Foundation, the main actor for the organization of ICV-4, hopes to receive adequate funding supports from various national and international agencies, in addition to a registration fee of US$300/participant. A total of 200 participants are expected, with 50 participants from Latin America, 50 from other courtries, and 100 local participants.

Beyond ICV-4: The past ICVs have provided an insight into the significant role that vetiver plays in crafting a better world through sustainable development and environmental protection. Its creation, organization and succession have been brought about through initiatives of the host countries, with some support from various vetiver networks. It is hoped that there will be an unending succession of ICVs as every previous ICV has witnesed new research findings and development which are of practical uses and utilization.

Vetiver System for Erosion and Sediment Control*

The Vetiver System (VS) is based on the use of vetiver grass (*Vetiveria zizanioides* L.) for

* Abstract of paper presented at the 13th International Soil Conservation Organization Conference, Brisbane, Australia, 4-7 July2004 by P.N.V. Truong, Veticon Consulting, Brisbane, Australia, and R. Loch, Landloch Pty Ltd, Toowoomba, Australia. Senior author's contact truong@uqconnect.com

various applications in erosion and sediment control. VS was first developed by the World Bank for soil and water conservation in India in the 1980s. Research and Development conducted in Queensland and overseas since then have also shown VS to be a very effective in:

- Water erosion control in agricultural lands such as flood erosion control Darling Downs, where it has been used to replace strip crop layouts, in contour bank substitution and in gully stabilisation. As well, recent research on the use of vetiver grass to control erosion of drains in acid sulfate soils and to improve water quality will be discussed.
- Erosion and sediment control on steep slopes as a bioengineering technique. It has been used successfully for steep batter stabilisation on highway and railway constructions, and for protection of mine infrastructure such as steep outer batter slopes on dams.
- Mine rehabilitation, vetiver grass is highly tolerant to heavy metals as well as to extreme edaphic and climatic conditions. This makes it an ideal species for colonising and ameliorating landfills and tailings dams.

Vetiver for Sustainable Watershed Management in the Dabie Mountains*

Soil Erosion and the Dabie Mountains

Erosion caused by water force has been a problem ever since man started to cultivate land. It became more critical with increasing population. In recent decades, forests have decreased dramatically in China and water-borne erosion became more serious. The area under such erosion has expanded to 1.5 million km^2.

Due to water-induced erosion, the level of river bed is raised considerably. In the rainy season, flooding causes disastrous consequence. For example, in 1998, heavy flooding caused 4,150 deaths and a direct economic loss of 255, 090 million Yuan RMB in China (about US$31, 108 million). To control water erosion and protect natural resources is one of the most urgent tasks of human beings.

The Dabie Mountains, the launched project area, 90-1,700 m above sea level, has a total area of nearly 100,000 km^2. Caused by various factors, the Dabie Mountain area remains under developed and forms one of the poorest regions of the country. Soil erosion caused by water force is one of the main factors influencing agricultural development. Since soil in the Dabie Mountains was mainly derived from coarse granite rocks, soil erosion was a serious consequence. To control soil erosion, the Vetiver System (VS) was introduced to the Dabie Mountains by the China Vetiver Network in 1998. Field trials in Yuexi County of Anhui Province, and Huanggang Prefecture of Hubei Province showed that vetiver grass grew very well and played an important role in soil conservation and slope stabilization.

The Swiss Re-supported Project

The objectives of the Swiss Re-supported Project is to help the farmers to be able to control water-induced soil erosion, protect natural resources and increase income at the same time by:

- Introducing and raising awareness of water, soil and natural resources protection and the effectiveness of vetiver in water and soil erosion control, watershed management and sustainable agriculture, earth work stabilization, disaster prevention, and other numerous multiple uses among policy makers, farmers, extension workers and technicians in the whole Dabie Mountains and other mountain areas in China.
- Training the farmers on vetiver characteristics, vetiver planting, propagation, pruning and management and the application of multiple uses of the pruning.
- Introducing and extending proper vetiver-based agroforestry technology, such as vetiver-chestnut-wheat system, contour planting technology, crop diversity for erosion control, etc.
- Generating income by establishing vetiver-protected high quality commercial trees.

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- Helping the women to improve social and economic condition by training and demonstration on vetiver management, tea production, etc.
- Extending the above technologies and experiences to the whole Dabie Mountains and other mountain area of China through various activities.

Agroforestry will be introduced and demonstrated; a total of 120,000 tea seedlings, 900 chestnut trees, and 210,000 vetiver tillers will be established in the demonstration plots. A series training courses will be organized, and over 1,000 persons will be directly trained. The experiences and information will be most widely distributed through in-direct training, information dissemination, visiting, and national and international networking.

The Initiation of the Project

To start the project, a group from the China Vetiver Network went to the project area at the end of May 2004. Discussion was held with local party secretary, and the technicians from the soil conservation bureau and soil and water conservation institute. At the meeting the China Vetiver Network introduced the VS and its function for water and soil erosion control. A set of technical materials were distributed, including posters produced by The Vetiver Network and Taiwan University, that contained numerous color pictures vividly showing how vetiver grass control water and soil erosion and protect farming production. Local people expressed high interests in vetiver application and their thanks to the donor's generous support. A Working Group was formed consisting of village director, technicians, farmers, and member of the China Vetiver Network. The responsibility of different groups was also discussed and decided. At the end of the meeting a contract was signed.

As an initiation, the Working Group members went to the field to investigate the demonstration site (an area of 400 Mu or 26 ha) at Shao Huo Shan Mount. It has a slope for 15-25^{o}. Two patches on the slope were selected for the demonstration of vetiver hedges protecting tea bushes and chestnut trees.

To implement the project more smoothly a timetable was proposed, which included two major components: technical training mainly in September 2004 and planting in March 2005.

Contents of the training and the extension include:

- Why erosion should be controlled?
- Water and soil conservation and reconstruction of eroded slopes and terraces.
- Vetiver: its characteristics, growth behavior, management, applications, and reproduction technology, and benefit.
- Vetiver-based agroforestry technology and crop diversity for water conservation, income generation, and food security.
- Nitrogen-fixing trees, shrubs, and plants for soil fertility maintenance and sustainable farming.
- Contour-planting techniques, commercial tree production and management (chestnut and tea).

Methods of training and extension include:

- *Formal training*: Training causes will be carried out at two-stages, i.e. township level for middle school graduates and villager-group level for less educated farmers, respectively. The former will be the trainer for the latter. All trainings will be combined with practical exercise and field demonstration when appropriate.
- *Self study*: Supplemented by supervision and multiple training materials, self-study of printed materials is a very cost-effective training method. Small supervision group will be organized to spread technologies and to answer farmers' questions.
- *Field visit:* One of the challenges in this project is to create opportunity for farmers, government officials, and extensionists to learn and grasp technology through visiting demonstration plots.

Some other aspects were also discussed:

- To meet the needs of the training, multiple training materials will be prepared and produced in June, July and August 2004, in addition to extension materials.
- Land preparation will be carried from October 2004 to January 2005, which includes bush clearing, terrace establishing, hole and ditche preparation for economic trees.
- Manuring and economic tree and vetiver planting in March 2005.

- To collect more vetiver planting materials, a small nursery will be established in June 2004.

All partners and participants believe that the project could be implemented smoothly and successfully through joint effort of all of partners.

New Improved PRVN Web Site

The Office of the Royal Development Projects Board is pleased to announce the new improved PRVN web site. Click at http://prvn.rdpb.go.th and meet our *more resourceful and up-to-date information*. Here you will find news and information about vetiver and PRVN, ICV papers, manuals, technical bulletins, picture archive and PRVN Newsletters. Those who are interested to join the network can subscribe directly through the website to be part of our community and to receive all documents produced by PRVN. You can also voice your opinion and suggestion as well as share information in the website's web board or via e-mail: vetiver@rdpb.go.th.

Visit PRVN's web site today to get the latest information on vetiver!!!

Using Vetiver for Gully Erosion Control*

The Beaudesert Landcare Group, a community based group, with funding support from the Australian Government Envirofund, initiated a gully stabilization demonstration project using vetiver. Vetiver hedgerows in conjunction with jute matting have successfully stabilized a severely eroded gully on a highly erodible soil in the district. Due to very dry weather, initial watering was required after planting and following establishment, drought and hot weather did not affect vetiver survival. One important observation was vetiver was almost immune to armyworms, which devastated crops and pasture adjacent to the site. The result of this trial confirmed the effectiveness of vetiver in controlling gully erosion in Queensland and also overseas. They also clearly demonstrated to local landowners that a simple and low cost method of erosion and sediment control can be implemented by themselves.

* Abstract of a paper by Mavis Rostedt, Beaudesert Landcare Group Inc., Beaudesert, Queensland, Australia. The full paper will be published in October 2004 issue of the AU Journal of Technology of Assumption University, Bangkok, Thailand. Editor's contact <narongchc@au.edu>