

**Report on the Viet Nam Visit**  
**(18 Jan –6 Feb 2002)**  
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**Background and Purpose**

The main purpose of the trip was to select trial sites and to discuss the design for trials funded by the Donner Foundation:

- Riverbank stabilisation against wave erosion in the Mekong Delta conducted by staff of Cantho University
- Soil and water conservation in plantations in the central Highlands, conducted by staff of the Thu Duc University in Saigon.

In addition I also spent quite a bit of time with commercial companies, which are promoting and using VS. I also met up with Elise Pinner and Tran Tan Van, who have obtained a grant from the Dutch Embassy (Poverty Alleviation Program) to use vetiver for flood erosion control in central coastal VN.

The overall impression was overwhelming, from just a few plants this time last year, in less than 12 months, the total nursery area now must be at least 50 ha producing millions throughout the year for several projects (with irrigation in the dry season). To be more exact the whole thing took off only 8 months ago after locating an old vetiver nursery near Saigon. With so many projects now underway that I only had time to visit a few more important ones and I was told it would take another 4 weeks to see them all, from the Gulf of Thailand all the way to the Chinese border in the north!

**Donner Foundation Projects**

Both universities have done a great job, more than what they were set out to do for the first year, each has at least 4 ha of nursery, ready for planting out. They developed their own methods of producing slips and polybags and at Thu Duc University they have produced and sold planting materials for various commercial applications.



*Nursery at Cantho University*



*Nursery at Thu Duc University*

It was noted for the first time that the plants grown at Thu Duc Uni nursery in Saigon were badly infested with probably a fungal disease. The disease was observed at the beginning of the dry season, starting with older leaves infected with brown spots on the tips and then gradually spreading and the whole leaf dried up. There was suggestion that it might be a viral disease as small native flies often appeared on these dead leaves, suspected of spread the virus. However it is most likely to be a fungus.

Another nursery established 200 km from Saigon by The Thien Sinh Co. was also infested with this disease; this nursery used the planting material from the infested source from Thu Duc Uni. The problem is quite serious and need urgent attention, both the University and Thien Sinh Co. are working on it.



*Infected plant, with dead leaves*



*Dead leaf showing brown spots*

In addition to the establishment of nurseries and the development of methods for mass slips production, both universities have several student research projects on Acid Sulfate Soil, herbicides tolerance and wastewater treatment. In the Plain of Reeds, the Al acid sulfate has pH as low as 2.0, which requires lime and mulch for good establishment. On the Fe acid sulfate, with pH at 3.5 and above, results confirmed my findings in Australia that vetiver can be planted without lime but fertilisers are needed.



*Wastewater treatment trial at Thu Duc Uni*



*Piggery effluent trial at Thu Duc Uni*



*Acid Sulfate Soil trial at Cantho Uni*



*Roots affected by high soluble Al level*



*Research at Thu Duc Uni showed that on extremely acidic Acid Sulfate Soil (pH 2.0-3.0) liming is needed establishment and good growth*

### **Mekong Delta**

In the Mekong Delta, suitable sites have been selected for the wave erosion control on both rivers and canal bank near Cantho city.



*Site for comparison between vetiver and Phragmites on this canal bank*



*Riverbank site*

In addition to these sites, due to the recent very bad floods in the region and on the request of Dr Dung, Project Leader and Dr Ve, Dean of the Agriculture Faculty, I have agreed to extend the project to cover flood erosion control instead of more sites for wave erosion control.

In the past, the upper reach of the Mekong River in South Vietnam, near the Cambodian border, is known as the floating rice region because of the annual flooding, up to 2-3m deep. A very fast growing but low yielding variety of rice was the main crop due to its ability to grow up with the fast rising flood water, hence the name 'floating rice'.

However, in recent years, the local authorities have built a massive system of dykes and canals for flood mitigation and irrigation, thousands of kilometres in each province in this floating rice region. These dykes were built firstly to protect the double or some times triple cropping system, which are widely practised now, and secondly to protect their homes. The canals are needed for both irrigation and transportation thus suffering from wave erosion also.

There are two types of dykes, one to keep water out completely during flood time and the other for the very low areas where the dykes only keep the water out during the small floods but completely submerged during high floods. Most of these dykes were built with acid sulfate soils, built up from canal dredging. Both of these dykes are dry nine months of the year so I think VS should work even in muddy water. I have selected several sites for the wave and flood erosion control trials.



*The demonstration site on a submergible dyke at Tri Ton.*



*The double crop area which the dyke protects from floods*





*The demonstration site on a large dyke at Tan An, An Giang Prov.*



*Trees are not effective against flood erosion, note the exposed roots*

### **Central Highlands**

The crash of coffee price in recent years has changed the landscape completely. People has stopped clearing indiscriminately the little forest left and even have abandoned their planted crops, just walked off their land, let the Bank and the weeds to repossess it. So erosion is not so serious on the steep land for now but the focus should be on the ‘better managed’ crops including rubber and Cocoa. One or two sites have been selected and at least two more will be identified before the wet season.



*Abandoned coffee crop, background and good coffee crop foreground.*



*Abandoned cleared land, highly erodible*

### **Commercial Applications**

Commercially the application rate has been very fast in the last year through Thien Sinh Company, an organic fertilizer company in Saigon, which has signed an MOU supporting/sponsoring the vetiver research program conducted at Thu Duc Uni. Thien Sinh funded a study tour to Thailand for its staff and Dr Phuoc, the Program Leader. The

company subsequently initiated and sponsored the vetiver seminar in Hanoi last October and later obtained a letter from the Deputy Minister of Agriculture recommending VS to all provinces for various applications from wastewater treatment to infrastructure protection.

With the agreement (but not support) from the Transport Ministry, Thien Sinh, at their own expenses (several of tens of thousand USD), have established several demonstration sites on a number of newly built or under construction highways from the north near the Chinese border, through the Central Highland to the Plain of Reeds in the south.



*This semi trailer load of 300 000 polybag of vetiver is on the way to a site near the Chinese border, 2 500km north of Saigon*



*Demonstration site on Ho Chi Minh Highway in central Vietnam*

Some of these are highly effective and successfully convinced the engineers of VS effectiveness and its low cost alternative to conventional rock structures.



*Before and six months after VS application on Route 14C*

However, the most challenging and important site is on the Ho Chi Minh highway, at a location called ‘Spring Pass’ (Deo Lo Xo) so called ‘SPRING’ because it is so twisting and winding like a metal spring. The highway is normally winding enough; I was told this Spring Pass is on the worst spot, right up near the top of the mountain -1060m altitude- on the border with Laos. The demonstration is on a cut batter of 55m high, on a supposed to be 1:1 slope (but I think it is steeper) and to my great concern there is not a



single drainage bench on that 60m slope. I was also told that this site was selected by the Transport Dept to test the effectiveness of VS, to see if it worked here it would work anywhere along the highway !!



*Spring Pass demonstration site, showing the steep slope and no on-slope drainage bench*

From the information supplied, Thien Sinh has done a superb job technically, under the extremely difficult conditions, the planting crew had to use ‘abseiling’ rope to plant and fertilise and to their great credit they planted on near perfect contour lines. As the crew had no previous experience in doing any vetiver planting, leave alone planting on such a steep slope, Thien Sinh took out very costly insurance policies for the crew and trained them first on a lower slope (30m) on Highway 14, near Saigon.



*Training sessions on Pass 38, Highway 14, note the safety rope.*

Thien Sinh was also successful in inviting President Tran Duc Luong of VN to plant the ‘first sod’ at the Spring Pass in January 2002.



*Inaugural planting*



*Presidential interest*



*Properly laid out and highly professional planting at Spring Pass*

In addition to this Spring Pass site, the Company is going to establish at least one, may be more on this highway and I was told that these sites are ‘equally challenging’.

Logistically, the whole operation was very well planned and executed, from training, watering, fertilising and supplying. An excellent idea was the establishment of an onsite nursery preparing fresh planting material for the site, producing 200K-300K polybags from clumps supplied from the main nursery. Full credit for this operation is due to Mr Tran Ngoc An, Director of Thien Sinh and full time “Operation Manager” of these sites, and Mr Pham Ngoc Sinh, Vice Chairman of Thien Sinh for his initiative and relentless support of VS applications in VN.

### **Recommendations**

Although highly impressed with the progress and particularly the standard of VS applications carried out by Thien Sinh Company, I am deeply concerned with the extent of application as demonstration sites on the HCM Highway, because of the following reasons:

- The design and construction standard of the highway may not stand up to the edaphic, topographic and climatic conditions of the region.
- The soils are highly erodible loess, ranging from almost pure sand to silty or sandy loam, with very little clay to provide structural strength.
- Most of the cut batters are too steep for the soil and climate of the region
- Most of the fill batters are not properly compacted; some are loosely deposited on its angle of repose.
- Very few on-slope drains were incorporated into both types of batter.

Just to name a few.

Having considerable experience in batter stabilisation in Australia and have also seen good examples and their high standards in this application in Malaysia, Thailand and China. I have great reservation that VS will be effective in the stabilisation of all these batters. For example, if the batter is not adequately consolidated, too steep for the soil



type, VS will not protect it from landslide. On this basis I advised Thien Sinh to be more selective in carry out future demonstrations. Three classes of batter were identified:

1. The badly designed and built slopes: too steep (1:1 or steeper), unconsolidated, slope length too long with no on-slope drainage benches, no protection from runoff above slopes, highly erodible soil (eg pure sand or silt) etc
2. Similar to the above but with gentler gradient ( 1.5:1 and greater) shorter slope length, less erodible soil (eg sandy loam to loam)
3. Properly designed and constructed batters with gradient (minimum of 1:1) and adequate benching on slope and protection from runoff above slopes.

With the Company technical standard and experience I am confident that VS will be highly effective in stabilising Class 3 batters.

As for Class 2, VS could be effective, provided that planting was carried out in the dry season with adequate watering to ensure maximum growth before the onset of the monsoon. But most importantly, it needs to be pointed out to the highway engineers that full effectiveness of VS cannot be assured because of their poor design and construction standards, not because of the VS.

For Class 1, I do not think VS can provide effective protection here. It is better not to use it rather than giving VS a bad name, because of someone else bad designs.

### **Conclusion**

Overall I was very impressed with the preparation and progress achieved in the last 12 months, both on the Donner projects and commercial promotion. However, I would advise caution, not to push VS technology too fast and too far into untested ground where failure will bring bad name to VS. Again as I mentioned many times before, failure is due to application methods rather than VS *per se*.

Another point of concern was the extent of the leaf disease, this need urgent attention to control its spreading.