

VETIVER SYSTEMS TECHNOLOGY

New Britain Island Papua New Guinea

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INTRODUCTION

In Papua New Guinea, Vetiver grass was firstly introduced by the Division of Agriculture & Livestock (DAL) sometimes back in the late 1980's (Humphreys, G.S 1984). DAL introduced it to Kerevat (East New Britain Province) to control soil erosion, under the program called IBSRAM. This program was supported by the World Bank. Initial trials were done in the Highlands of Papua New Guinea and in Madang Provinces where the grass was used only for soil conservation purpose. In the Highlands it was done in the rural areas of Simbu Province by extension officers from the Department of Primary Industries. During that time there was little information available on the culture of Vetiver Grass to the DAL Extension Officers, thereby extension was minimal. Robert Shelton of CARE (Australia) also did some extension work in 2001 (Shelton, 2001) with farmers in many different villages in Simbu. The concept was widely accepted, however with limited technical information and expertise, no further extension work done to promote the proven system.

About Eagle Vetiver Systems

Is a newly established company in Kimbe (PNG). Core aim of EVS is to embark on promoting the Vetiver System Technology here in Papua New Guinea. The VS is a proven technology which has been in use in over 100 countries all over the world. EVS is associated with The Vetiver Network International.

INTRODUCTION - continued

A survey was conducted under the World Bank Drought Response Project in 2002 by Debbie Kapal and Issac Taraken to assess the adoptability and adaptability of the Vetiver Grass Technology which was introduced to farmers in Simbu to control erosion through the SALUP and NRMP programs between 1993-1996 and 1997-1999 respectively. The project was mainly to stabilize soil in gardens on mountains and other minor uses such as roof thatch (Shelton and Mondo, 2001). The adaption, if introduced and given ample demonstrations and technical expertise, the grass has the potential to be fully adaptable in Papua New Guinea.

Little was known about the Vetiver grass on the Island of New Britain where it was first introduced into East New Britain Province in early 90's by NARI. Tillers were given out to rural people in the villages by government extension officers to people who live on steep slopes pronged to erosion. Little follow up extension was given to farmers to encourage them to persist with the grass or manage it in any way as DAL Extension Officers were provided with few resources for this purpose.

In West New Britain vetiver was introduced by Technical Services (Dami OPR) in 2004 from a single cutting obtained from Kerevat. It was multiplied in Dami to increase planting stock and then later multiplied in a large scale multiplication at the Haella nursery. It was used for erosion control on Oil Palm Plantation roads and also used as a hedge on terrace wall stabilisation.

Papua New Guinea, with areas of steep land, high rainfall, large rural populations and limited government capacity to monitor and deal with natural hazards, is very vulnerable to disastrous events which put the population and infrastructure at a very high risk. This is particularly for areas in the Highlands of Papua New Guinea, where population and land pressure make it difficult for rural subsistence farmers to maintain sustainable farming practices. They also have very limited capacity to generate income to purchase inputs that could be used to maintain the productivity of their land and thus any additional difficulty can have a disastrous effect on their ability to cope. The government has a very limited capacity to provide them with relief of any kind as seen from so many disasters that has happened over the years in most parts of the country. The ongoing landslides on the major highway (Okuk Highway), which links the five highlands provinces is testimonial evidence of the government's incapacity to manage disasters.

Because of the growing population and its demand, human intervention in the environment such as clearing forests for gardens, building roads, opening new mines, extracting timber from vulnerable areas that the frequency and severity of landslides and their effect on the population becomes a major problem. With not so much emphasis on sustainable practices such as the Vetiver System Technology (VGT), we are heading for a catastrophic disaster. As the saying goes; **“PREVENTION IS BETTER THAN CURE”**. Preventative measures such as VST should be implemented to prevent disasters from taking its cause.

The Vetiver Grass Technology, because it is low cost, provides a partial long-term solution to soil degradation, fits in with traditional technologies farmers are familiar with, can be controlled and managed by farmers and is proven to work under such conditions. It also fits in well with attempts to make life easier and more sustainable for the at-risk rural population in disaster-prone areas.

With lack of funding assistance and technical information from the Government, this vital and very important and low cost system can be hindered. A proven system that will have an impact in our rural communities should be promoted and implemented.

With assistance from Dr. Paul Truong from The Vetiver Network International (TVNI) and Veticon Consulting Australia, Eagle Vetiver Systems is embarking on and will actively promote the very vital proven Vetiver System Technology here in Papua New Guinea.



VS Application to Stabilize Road Batter



Plantation office road batter stabilized (Kimbe PNG)



Waisisi Mini Estate road (Kimbe PNG)



VS are a proven technology that has greatly stabilized road batters on plantation roads.

Vetiver planted to stabilize plantation road and protect landslips from falling onto the roads. These roads are main excess roads used by trucks to transport Palm Oil Fresh Fruit Bunches to the processing mills. The soil structure is mainly pumice soil which very light and vulnerable and prone to heavy sheet erosion.

VS Application for Erosion Control.



Flood prone area on Waisisi plantation with VS, soil stabilized and the plantation Genset house being built on it. Vetiver also used as a sound barrier to reduce noise pollution towards the labor housing.



Vetiver Hedge planted on both sides of a drain to stop erosion. Soil was stabilized so workers decided to plant rural food to supplement their meal.



Thick hedge against erosion on Waisisi Mini Estate.

Vetiver on Volcanic Soil for vegetative rehabilitation



Vetiver can grow on any soil type, as seen on this picture. These photos were taken in Rabaul where the town was devastated by the 1994 twin volcanic eruptions. Other vegetative weeds were seen growing.

VS Application for Terrace Wall Stabilisation.



The Vetiver rooting system as seen on a terrace wall. Vetiver planted to stabilize walls whereby Oil Palm seedlings are planted. Terraces are dug across slopes less than 40%. The roots were at 2.9 meters and it's 13 months old.

VS Application for Landscaping



Landscaping on general workers housing estates and office roads.



VS Application for Environmental Protection

The above applications of VS are well under control in New Britain, however other applications such as application of the Vetiver System (VS) for environmental protection is a new and innovative phytoremedial technology which is yet to be implemented in Papua New Guinea. VS has been used widely in more than 100 tropical and subtropical countries for treating polluted wastewater from domestic and industrial discharges as well as mine rehabilitation. This is not the case for Papua New Guinea.

Extensive R&D in Australia, China and Thailand over the last 15 years have established vetiver tolerance to elevated and sometimes toxic levels of salinity, acidity, alkalinity, sodicity as well as a whole range of heavy metals and agrochemicals. It is a green and environmentally friendly wastewater treatment technology as well as a natural recycling method. Its end-product has several uses including animal fodder, handicraft and material for organic farming.

Treating polluted wastewater such as treatment of domestic effluent, sewage effluent, municipal wastewater, stagnant pond infested with blue green algae and piggery effluent are areas where VS can also be used. Others such as treating landfill Leachate, trapping of herbicides on large farms and plantations to prevent downstream fish kill, mine rehabilitation to control dust storms and reduce heavy metals dumped into mine tailings.

Other uses that would also be of significance to the rural communities of Papua New Guinea are the leaves to be used for roof thatching which can easily replace the famous kunai grass which is mainly used in the highlands of Papua New Guinea.

VS for wastewater treatment in Australia



Vetiver cleaned up blue green algae in four days (left) sewage effluent containing high Nitrate (100 mg/L) and Phosphate (10 mg/L). (Right) sewage effluent after four days: VS reduced N level to 6 mg/L (94%) and P to 1 mg/L (90%).



Vetiver pontoon in pig farm ponds in Bien Hoa.



VS Application for Mine Rehabilitation



Before and after vetiver planting on a bentonite tailings dump in Queensland



***Before and after vetiver planting on a gold tailings dump in Queensland.
Wind storm blowing highly contaminated gold tailings dust (left) Vetiver planted as windbreak
protecting cover crop to control dust storms (right) Vetiver planted as windbreak protecting cover
crop to control dust storms***



***Before and after vetiver planting on a old coal tailings dump in Queensland. Very steep and highly
erodible old dump (left) Vetiver planted to control erosion and rehabilitation***

VS Application for Effluent Disposal in Indonesia



Vetiver domestic effluent disposal system built by American Red Cross for Tsunami Victims, Aceh, Indonesia, which can be adopted for similar housing development in PNG (Left & above).

Vetiver effluent disposal system built by American Red Cross for a school in Aceh, Indonesia, which can be adopted for use in PNG (Right). These have been used successfully elsewhere and there is great potential for development and application in PNG



LANDSLIDES – BEACH REHABILITATION – ROAD BATTER



The pictures above are common problems that are seen all over Papua New Guinea. These problems have no erosion control measures in place; they will be left neglected over a time for erosion to take its cause. With the introduction of Vetiver System in Papua New Guinea, most of all of these problems will be minimized, and or in some cases completely eradicated.

Summary

Vetiver System is at its juvenile stage in Papua New Guinea due to lack of funding from the government. Another contributing factor would be lack of technical information on Vetiver System readily available which can be used to embark on carrying out extension work in Papua New Guinea.

The governments input, more awareness, extension programs and feasibility studies are to be carried out in a lot of the at-risk rural areas on the effective use of the Vetiver System. The implementation phase will be smoothly carried out with support and funding from the government. I have done awareness in some affected areas and the response I have received is overwhelming. Stakeholders are enthusiastic to implement the system if given every opportunity. The pros and cons of the various methods to be applied will be discussed in length. I started planting vetiver out of interest since 2007 and since then it is gaining popularity in Kimbe.

With further technical assistance and background expertise from Dr. Paul Truong from The Vetiver Network International, I have no doubt the outcome of this program will be successful in Papua New Guinea.

ACKNOWLEDGEMENT

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