

## PLENARY 4

### COMMUNITY DEVELOPMENT AND POVERTY ALLEVIATION OPPORTUNITIES ASSOCIATED WITH VETIVER SYSTEM APPLICATIONS

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#### INTRODUCTION

In addition to the extraordinary impacts on Agriculture, Infrastructure Stabilisation and Environmental Protection, application of the Vetiver System Technology also has a significant impact on the development and poverty alleviation of the local community, where it is carried out. The following case studies will demonstrate this enormous impact:

1. **Poverty Reduction, children education and social development Bali, Indonesia** (Booth et al.2008).

Around half of the estimated 230 million people of Indonesia's archipelago of more than 17,000 islands live in rural areas, dependant on agriculture for their livelihoods. A good number dwell on arid, steeply sloping volcanic mountain slopes. Often there are no rivers or irrigation canals, and the inhabitants rely primarily on key dry land crops such as cassava (tapioca) and corn as their staple.

Ekoturin Foundation's East Bali Poverty Project (EBPP) was established in 1998 by **David Booth (Coordinator Indonesian Vetiver Network)**, as a non-profit organisation, with the specific goals of reducing poverty and promoting culturally sensitive sustainable social economic development, prioritizing children, in Desa Ban, the most impoverished and isolated mountain village in Bali. In March 2000 EBPP introduced vetiver systems (VS) to the most isolated and impoverished region of Bali where 19 scattered communities had never seen the outside world, to facilitate first-time, all weather access roads through steep and sandy volcanic mountain terrain, giving choices for the future that their ancestors had never known.



***Children preparing vetiver for planting to protect potato and carrot crops***



***Mountainous rural roads protected by VST***

VS was introduced to the project as the only practical and sustainable solution to ensure the stability of a newly cement-stabilised access road we had facilitated for thousands of families to get out of their village – a previously narrow and dangerous dirt track, via the saddle between the two mountains of Agung and Abang. Lack of any previous vehicular access meant that most government services could not get into the village and thousands of people from many mountain hamlets had *never* left their village. Without electricity, schools or any other form of communication, they were effectively cut off from the outside world, living as their ancestors: cassava and corn subsistence farmers with one or two cows, frequent sickness and high child mortality as the norm.

Vetiver System rapid acceptance by this impoverished community was a direct result of the close partnership established with the whole community at the outset and farmers seeing for themselves the benefits of the VS. By 2005, VS conservation and stabilisation had become one of the many indispensably necessary elements in EBPP’s comprehensive, holistic and integrated approach towards model sustainable social and economic development programmes for one of the most arid and impoverished regions of Indonesia, as documented in EBPP’s 2006 paper, ***“Vetiver Improving Lives of Impoverished Indonesian Subsistence Farming Mountain Communities, Led by Children”*** (Booth & Adinata). By bringing profitability to the rural sector, the economy of the whole area benefited.

Community cooperatives are now developing to sell vetiver slips commercially from well-established mountain nurseries. VS bio-engineering properties have transformed village infrastructure enabling schools, clinics, roads and water resources development. Abject poverty and despair for all villagers before they embraced VS, are now being overcome to

provide a future of hope and sustainable social and economic development, the key benchmark of progress.

Successful dissemination of these wide ranging VS applications and promotion of comprehensive VS hands-on field training courses has resulted in a steady expansion of successful vetiver projects being implemented throughout Indonesia for the private and public sectors.

## 2. Poverty Reduction and rural employment in Vietnam (Tran Tan Van et al. 2006)

There are many examples of positive impact of the VST on socio-economic development of rural communities in Vietnam. But the followings are most significant:

- ***The Ho Chi Minh Highway***

This 3 000km highway stretches from the Chinese border in the North to the Gulf of Thailand in the South, passing through mountainous regions in the North and Central Vietnam then on to flood prone, acid sulphate soil of the Mekong Delta. The application of VST in protecting the highly erodible slopes along this highway is the key feature in the success of this highway, due to its effectiveness, simplicity and most important of all, its low cost of implementation and maintenance. The Ho Chi Minh Highway is probably the longest infrastructure protected by VST. The economy of the rural and often subsistent communities along its 3 000km course benefits enormously by providing income, for supplying Vetiver planting material, and job as planting labour and long term maintenance.



***Ho Chi Minh Highway with community nursery and vetiver planting before and 2 years later***



- ***Flood mitigation in the Mekong Delta*** (Le Viet Dung et al. 2006).

This region is known as the floating rice area, it is next to the Cambodian border, it is characterized by annual flooding, averaging 2-3m deep and occasionally up to 5-6m deep. The soil is deep alluvial, silty loam in texture and highly erodible when wet.

In the past 15 years, a regional policy aimed at increasing the rice production by constructing dyke and canal system, thousands of kilometers long, surrounding rice-growing areas. These dykes are used for flood mitigation in rain season and the canals for irrigation transportation in the dry season. With this set up farmers will be able to increase the existing double cropping to triple cropping system. However, this policy combines with deforestation in upstream regions of Mekong River has serious effects on environment as water level in recent years came up to 5.5 m. To protect people and rice crop in flood season, local government invest millions of USD to uplift the dyke systems. Furthermore, in dry season, they must spend more millions to dredge the canal systems, due to soil eroded from the banks into streams during flood season. The VS will provide an effective and cheap method to stabilize dyke banks and stop soil erosion during flood season.

A very large multiplication program was initiated to rapidly increase planting materials for this massive project. The School of Agriculture, Cantho University produced about 3,000,000 slips by tissue culture to supply various villages in the region to polybag these plantlets and look after them until they are ready to plant out. This operation provided a unique opportunity for local people, particularly women and children, to earn an income without leaving the village, and the men jobs in planting and maintaining the VST.



***One of the community nurseries preparing vetiver for this 3 million plant project***

#### **Poverty Reduction and Resource Protection in China (Xu, 2008).**

A project entitled: ***Poverty Reduction and Resource Protection in a Guangxi Province Minority*** was initiated in 2008. The aims were:

- To apply the VS for soil and water conservation on the farms and to improve its productivity and income
- To provide employment and income to rural people, particularly women and children by producing Vetiver Handicrafts

***Improvement of farm productivity and income.*** One of the most important project components was to protect agriculture environment with vetiver. The grass planted early in 2008 generally forms hedges on sloping land growing fruit trees. Observation in September 2009 showed that most of the economic trees planted have new shoots and almost all of the planted trees grew well with some trees that were planted in 2007 already blooming.

In addition it was found that some vetiver grasses were attacked by stem borer. However, it was reported that vetiver can attract stem borer from maize to produce egg inside vetiver stem. Results indicated that vetiver grass was highly preferred for oviposition but that larval survival on vetiver grass was extremely low. Thus, vetiver has potential as trap crop component of an overall “push-pull” strategy to concentrate stem borer oviposition away from the maize crop and reduce subsequent population development. This technology may also have application in rice pest management. In general, the insect may not damage vetiver seriously, but it can help food crops reduce insect damage

***Providing income by vetiver handicraft.*** After the successful vetiver handicraft training course, women farmers organized a Women’s Vetiver Community. A total of 27 women participated in the Community and each person contributed 100 Yuan. Since there was no vetiver materials at that time farmers could not continue their work until autumn when vetiver grass that was planted in the spring of 2008 was tall enough to be cut. In July 2008 Community members started the process of vetiver handicraft production. They cut grass, treated them with boiling water, dry them under air, and dyeing and weaving. This is the first time for them to produce vetiver handicrafts independently. They planned to produce more beautiful handicrafts and sell them on the market. Since the plastic bags were prohibited in the market by authority the vetiver products may have more potential in the market.

To encourage more visitors and tourists to buy vetiver handicrafts, the sell and exhibition of vetiver handicrafts is combined with science popularization. Numerous photos were prepared and exhibited with necessary explanation. The exhibition shows visitors and tourists the function of vetiver on soil erosion control, farmland protection, and slope stabilization. As a result, vetiver handicraft production could be more closely combined with local tourism, generating more interest among tourists and more profit for farmers.



***Handicraft training, production and marketing***

Due to the success of this project, a new project in Cili County, Hunan Province will be set up, where 18 000 orange trees, 7 500 chestnut trees and 7 500 plum trees to be planted with 2 400 000 vetiver seedlings be established as hedges; involving 600 farmers.



***Female local workers preparing vetiver slips and planting on the riverbank and male workers planting on the steep slope***

### **3. Poverty alleviation and rural employment in Madagascar. (Noffke and Coppin 2010).**

Madagascar, the fourth largest island in the world is one of the poorest countries on earth with approximately 80% of the population being engaged in subsistence farming where only 4% have access to potable water. Life expectancy is 52 years and the infant mortality rate is 89 per 1,000.

Economic isolation of many communities resulted from the deterioration over the past 25 years of the regional road network and in 2004 80% was then impassable for 12 months per year. This is however slowly improving but the roads are still in a serious state of disrepair with transportation still remaining excessively expensive reducing the movement of people & essential goods.

In May 2006 Rio Tinto/QMM awarded Hydromulch (Pty) Ltd, a vegetation restoration & environmental contracting company from the Republic of South Africa to provide rehabilitation and vegetation restoration of approximately 40 hectares of exposed side slopes on the newly constructed access roads between the quarry and the new Eholia Port, MSP plant site and the construction villages on the Ilmenite project in Fort Dauphin, Madagascar. This project necessitated the propagation of approximately 4,000,000 Vetiver plants which was to be used in sand fixing, erosion control and slope stabilization in addition to Hydroseeding and the implementation of other erosion control techniques. These areas were stabilised by the implementation of wind control barrier netting and sand fixing techniques using VGT.

***Vetiver Supply:*** HYDROMULCH in conjunction with QMM Environmental initiated a Vetiver nursery program utilising members of the local community surrounding the entire project, who would be able to “sell” their production crop. Fifteen communities were initially approached during December 2006, which expanded to 32 communities by August 2008. These communities had been involved in the propagation of Vetiver plants at their respective villages, 133 families jointly became involved in these programs. It was important to first establish the Vetiver source close to the site so that progressive stabilisation of the civil works on the construction site could take place.

**Community Participation:** The Vetiver farmers (growers) received potting bags, NPK fertiliser, spades, rakes, plastic watering cans, wheelbarrows and the plant material (Vetiver slips) from HYDROMULCH. Communities in close proximity to water sources were approached to set up “Vetiver” nurseries. Basic on-site propagation training was given to these farmers and they were guided through the initial process.

Payment to the farmers was structured as follows:

- First payment once Vetiver slips planted into potting bags and well watered.
- Second payment once the plants are satisfactorily established with evidence of a developed root system – 3 to 6 weeks.
- Third payment when plants were ready for collection by Hydromulch – 10 to 12 weeks.



*The Vetiver farmers received potting bags, fertiliser, garden tools and Vetiver slips from HYDROMULCH.*

The table below reflects the number of farmers/communities and the number of plants that were grown up from May 2006 up to October 2008.

<b>Nursery</b>	<b>Name of Source</b>	<b>Location</b>	<b>No. Vetiver Plants Supplied</b>
<b>P1</b>	Garry I	Beloto	<b>320,000</b>
<b>P2/P3</b>	André/ Auguste	Mangaiky	<b>1,080,000</b>
<b>P4</b>	Marie-Agnès	Mandromo-Dromotra	<b>250,000</b>
<b>P5</b>	Antahova	Mangarivotra	<b>250,000</b>
<b>P6</b>	School	Morafeno	<b>35,000</b>
<b>P7</b>	Jean Marie	Montifeno	<b>20,000</b>

<b>P8</b>	Arthur	Ampasy	<b>300,000</b>
<b>P9</b>	Marie Mariette	Ambaniala	<b>120,000</b>
<b>10</b>	Claudia	Andrakaraka	<b>30,000</b>
<b>P11</b>	Cascade	Manantantely	<b>210,000</b>
<b>P12</b>	Hydromulch	Beloto	<b>55,000</b>
<b>P13</b>	Guillaume	Andramaka	<b>24,000</b>
<b>P14/P15</b>	Razafy/Jonesy	Analabendra	<b>410,000</b>
<b>P16</b>	Garry II	Andranara	<b>200,000</b>
<b>P17</b>	Bari	Belavenoka	<b>10,000</b>
<b>P18</b>	TomTom	Manambaro	<b>20,000</b>
<b>P19/P26</b>	Masy Flomene	Befeno	<b>555,000</b>
<b>P27/P28</b>	Pelakoa Julienne	Manantantely	<b>60,000</b>
<b>P29</b>	Doda Mbola	Manambaro	<b>40,000</b>
<b>P30</b>	Pelavao	Befeno	<b>30,000</b>
<b>P31/P32</b>	Rakotonirina Berton	Manantantely	<b>80,000</b>
	<b>TOTAL</b>		<b>4,099,000</b>



***Farmers Vetiver nurseries provide secure income and full family employment at home***

***Employees of the Company:*** Hydromulch employed 52 people from the local community on the project. They were trained in various skills ranging from seed collection, Vetiver propagation & planting techniques on contours, maintenance of vegetation, placing barrier netting, soil preparation and hydroseeding.



A recent visit to the mine site was carried out where it was found that many of these people had now been employed there in a permanent capacity for the rehabilitation of the mined dune sand. Some of the ex-Hydromulch staff from Fort Dauphin, are now employed on the Ambatovy Nickel Slurry Pipeline, between Moramanga and the Malagasy port town of Tamatave. They are engaged in the hydroseeding operation of approximately 360 hectares along the right of way.

*This community based “Vetiver propagation program” has generated approximately (US\$250,000.00) collectively to the respective communities within the construction period. This excludes the establishment cost paid for by Hydromulch for plant material, potting bags, fertiliser, watering cans & loose tools.*

*It is most interesting to experience the positive outcome that has been generated by the community program where some farmers have benefited from the financial returns on their efforts and invested their returns in buildings and cattle.*

#### 4. **Poverty Reduction and rural employment in Venezuela, (Pantin et al. 2006), (Febres et al. 2013).**

Although Vetiver has been in Venezuela for more than one hundred years, it is in the last 20 years that it has reached a very important height, and its presence has been expanded to many places of the country.

In 2006 VFEP, the “Fundacion Empresas Polar” Project started the Vetiver Project with the following general objectives:

- To alleviate social disparities,
- To promote the making of vetiver handicraft as an initial step in the execution of an integral, economic ecological and social development project.
- To develop markets for vetiver handicraft in Venezuela.
- To increase participation of the poor population.
- To stimulate the fight against the destruction of the natural resources and
- To enhance the spiritual and moral value through appropriate dynamics.

The innovative approach of the PVFEP is aimed at raising interest in vetiver handicraft in participants: women, young people, children and later, to the whole family. The activities begin through the conference *Why vetiver? An economic, ecological and social project*. Shortly after that the training of the vetiver handicraft begins and connecting the participants to the market, setting basic principles for quality; which occurs very quickly (in some cases in a month). It provides extra income to the families, the community develops a great interest in the Project, the reason why the planting of vetiver with the intention of producing fiber is promoted, on sites close to the houses where erosion, and contaminated waters are the common ecological problems. The social aspect is focused on the principle of motivating the self-esteem, the community participation, the respect to their political,

religious and cultural values. Music is a very important companion through sharing songs, directed readings and games, whose contents have been analyzed previously by professionals in the educational area. The groups consolidate through the local leaders and the position of the local coordinator is selected within the participants, by their personal conditions and disposition towards the handicrafts.

The participation of the PVFEP in each locality has a minimum of three years, and a maximum of five years, until the participants have been consolidated through businesses, companies, association or cooperatives. This methodology of work has been transferred to other government and private institutions, through strategic associations with the intention of promoting the use of vetiver in Venezuela. The development of the VFEP is sustained by academic activities, supported too by national universities, and Research and Development projects.

From 2001-2006 VFEP conducted in a wide and diverse geographic zones, having trained approximately 11.000 people.

The Vetiver “Fundacion Empresas Polar” Project (VFEP) has been conducted in an wide and diverse geographic zones, having trained approximately 11.000 people.



***Participation of women and children at home in Handicraft production and marketing***





***These Handicrafts have brought significant income to the subsistent farming remote communities***

## **CONCLUSION**

The above presentations clearly demonstrate that vetiver projects can contribute to an integral community development, and poverty alleviation through generating short term economic resources, which motivates to reach ecological and social objectives that are effective and easy to implement. The integral contribution of this impact is to benefit the quality of life of the participating communities, particularly the long term effect of vetiver handicraft production to communities - especially in the indigenous and remote area - is a solution that can supplement ancestral customs.

## **REFERENCES**

- Booth ,D., Adinata,A. and Dewi, R. (2008). Vetiver Systems for Community Development and Poverty Alleviation In Indonesia. *Proc. Vetiver system for environmental protection and natural disaster management*. Cochin, India
- Le Viet Dung, Le Thanh Phong, Luu Thai Danh and Paul Truong. P. (2006). Vetiver system: its application in the Mekong Delta, Vietnam. *Proc. Vetiver system: Disaster mitigation and social impact in Vietnam*, Cantho, Vietnam
- Febres, D, Rivas, M, and Luque, O, (2013).Vetiver social impact on communities of Venezuelan Andes. *Proc. Vetiver system Second Latin American Conf*. Medellin, Colombia
- Noffke, N. and Coppin Y (2010), The vetiver system for sand dune stabilization & Poverty alleviation in Madagascar. *Proc. Vetiver system First Latin American Conf*. Santiago, Chile
- Pantin, G., Luque O. , Rivero, G.,Ceballos, E. and Fontana, H. (2006). An innovative focus on community development and poverty alleviation in rural Venezuela. *Proc. Fourth Vetiver International Conference (ICV4)*. Caracas, Venezuela.
- Tran Tan Van, Le Viet Dung, Pham Hong Duc Phuoc (2006). Vetiver System for Natural Disaster Mitigation in Vietnam - An Overview. *Proc. Vetiver system: Disaster mitigation and social impact in Vietnam*, Cantho, Vietnam

Xu, L. (2008). Twenty Years Experience in Vetiver Development in China. . Proc. Vetiver system for environmental protection and natural disaster management. Cochin, India