

# Contribution of VST in Alleviating Climate Change Disasters



**Paul Truong**  
*TVNI Technical Director*  
*Director for Asia and Oceania,*  
**Brisbane, Australia**

[p.truong@veticon.com.au](mailto:p.truong@veticon.com.au)

[paultruong@vetiver.org](mailto:paultruong@vetiver.org)

[www.vetiver.org](http://www.vetiver.org)

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# INTRODUCTION

**With the advance of climate changes the Vetiver System has been widely used and proven around the world for its effectiveness in alleviating and rehabilitating damages from disasters and extreme events such as landslides and flood erosion.**

**This outstanding achievement can be attributed to the remarkable characteristics of Vetiver Grass:**

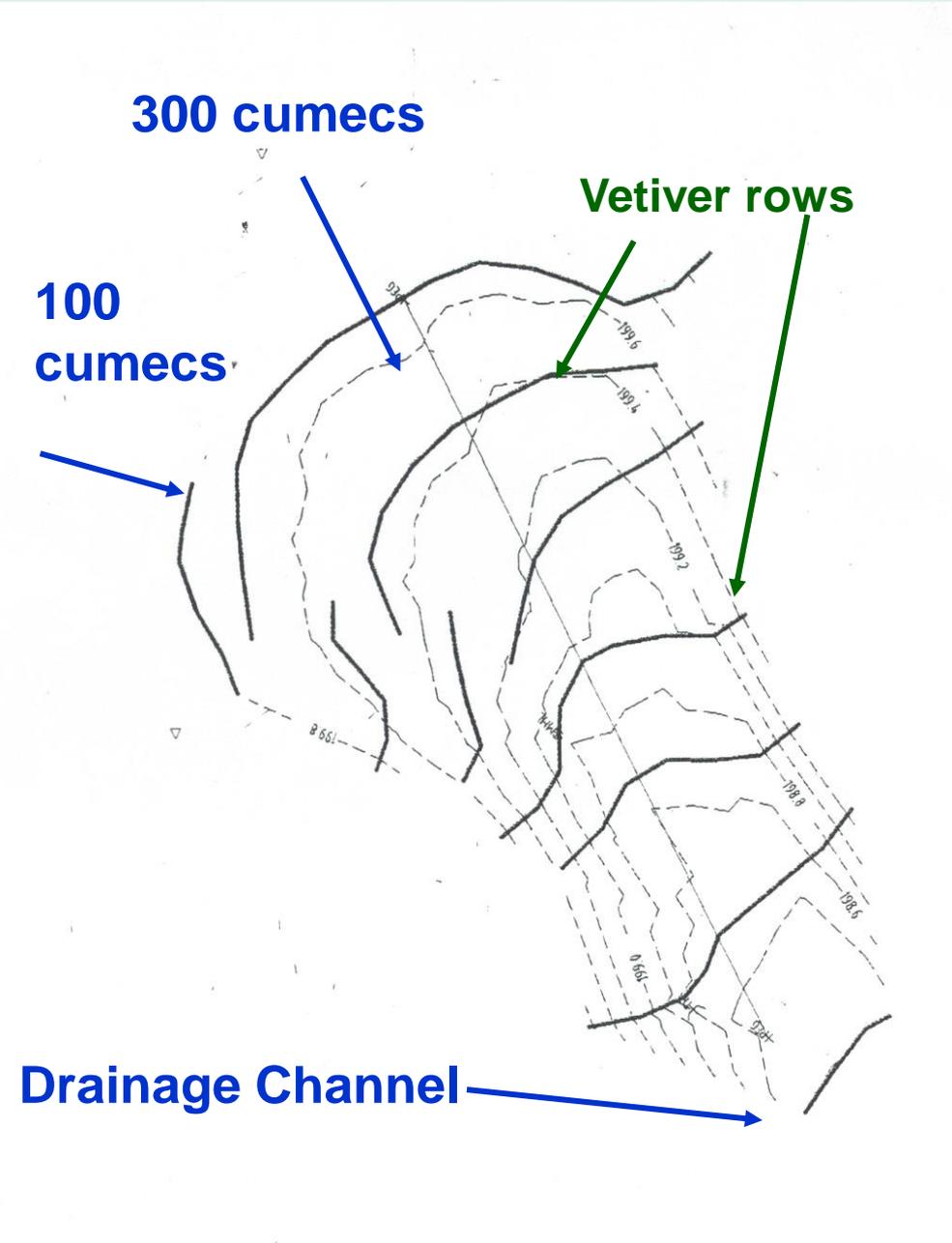
- 1. Extremely deep and massive finely structured root system, with high tensile and shear strength**
- 2. Dense hedges when planted close together**
- 3. Tolerance to extreme climatic variation**

# CASE STUDY: Flood erosion control in Australia

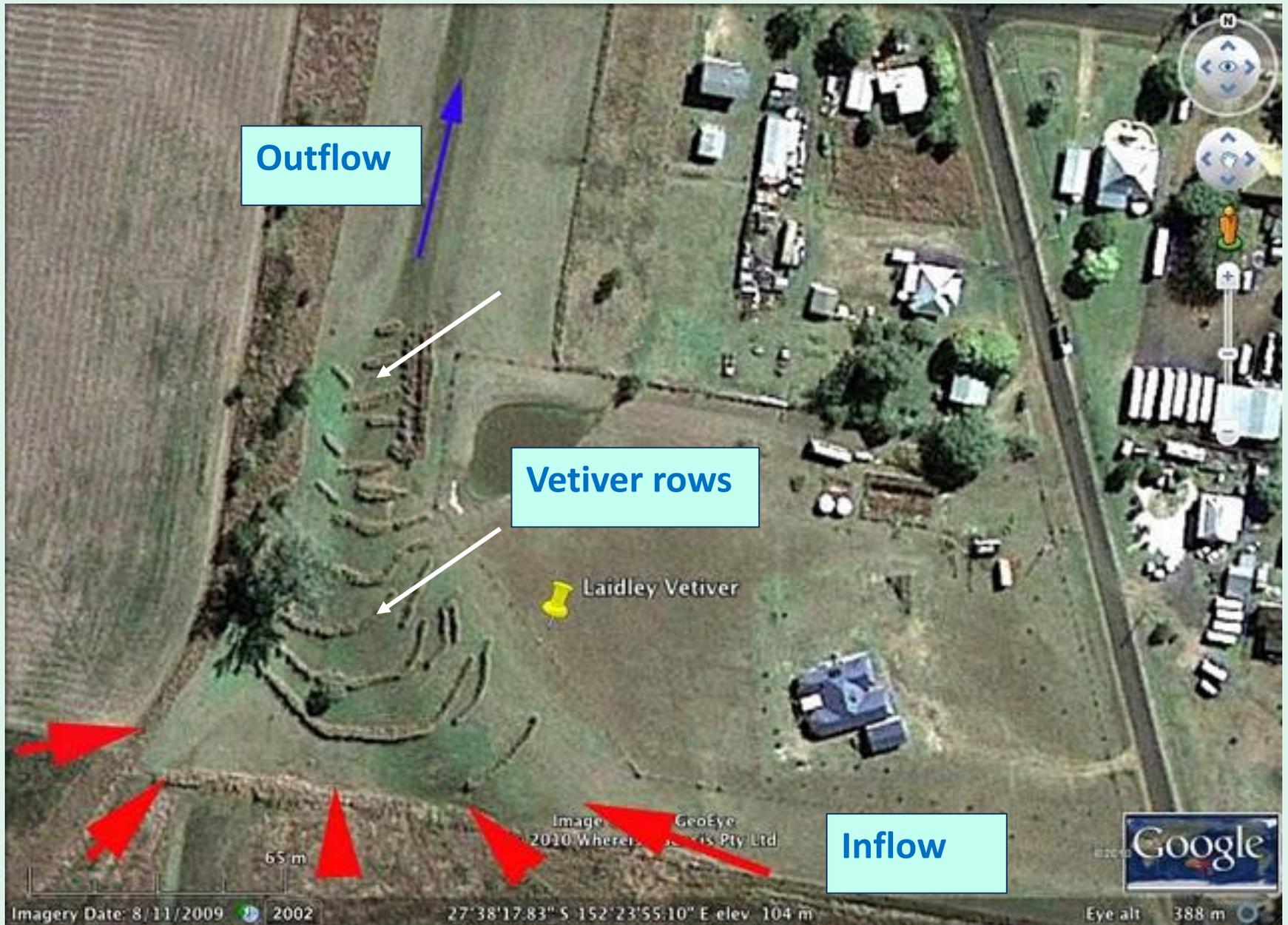
(Truong P.2011).

## Flood erosion control in drainage channel at Laidley

Vetiver hedges were established to spread water out and also to divert water to the drain



# Flood Erosion Control at Laidley



# Flood Erosion Control at Laidley



**Flow direction**

**A big storm hit the area 3 months after planting and the whole site was flooded (Upper section)**

**Submerged Vetiver hedges**

**Drainage channel**



**Although only 3 month old, the young hedges provide a very effective protection with only minimal erosion at the head of the channel**



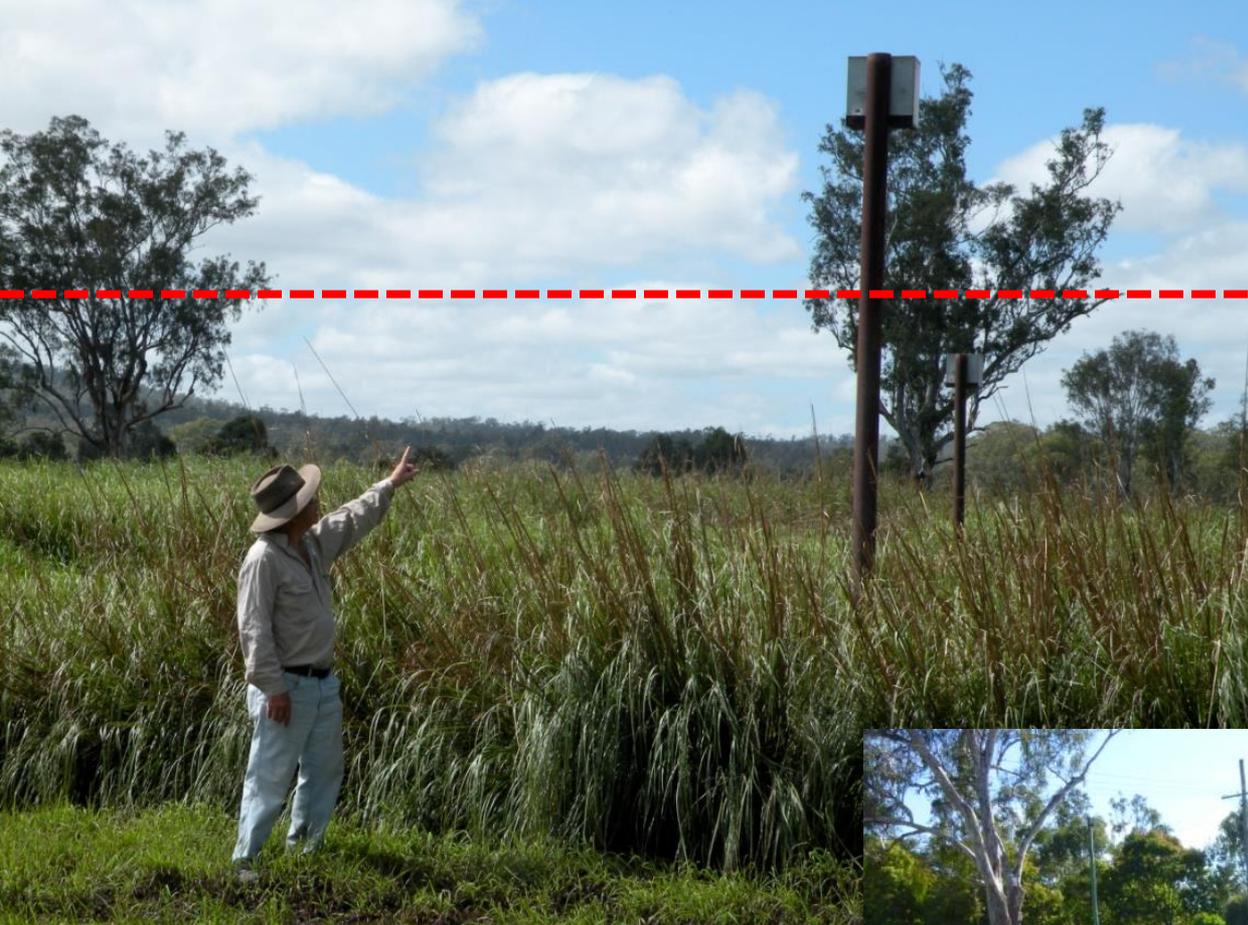
**Small erosion**

8 201



## Vetiver hedges before January 2011 flood





**Flood level**





**Vetiver hedges after flooding**



**Shipping container from 23km upstream**

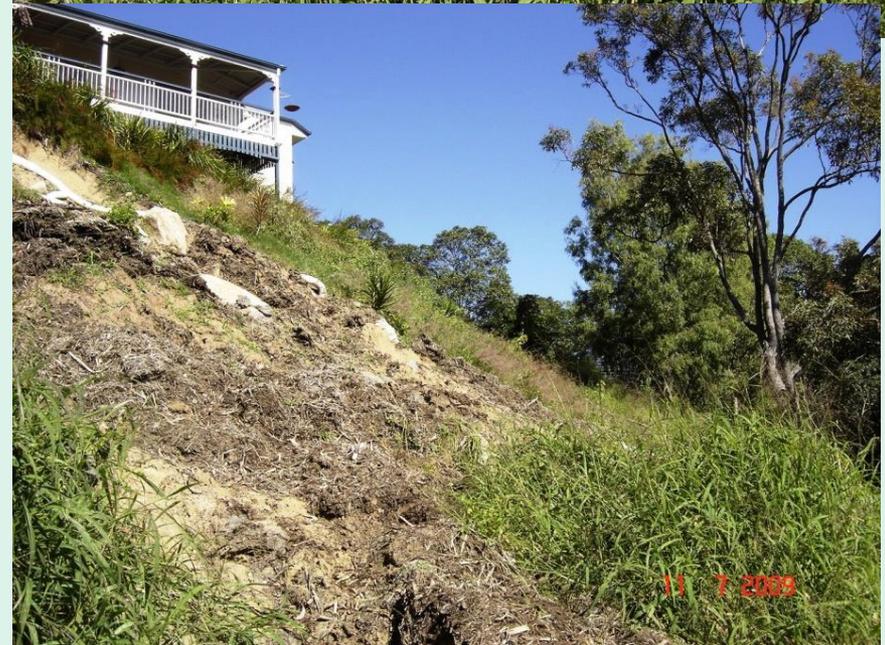


**While little damage to the vetiver, the fence posts were “uprooted”**



# CASE STUDY: Landslide Prevention in Australia

Landslide caused by a prolonged high intensity storm.



# Site preparation and planting before the intense rain in Jan 2011.



**Undamaged by the same record breaking rain**



# **CASE STUDY: Ravine stabilization in Brazzaville Congo**

(Ndona, A. 2011)

## **Boukeni site, February 2009**



**Initial status at the Boukeni ravine, before placing sandbags containing soil and planting vetiver**

**Placing bags containing topsoil and vetiver planting on the Boukeni site**

# Sandbag installation and vetiver planting





**Boukeni site, 2 months  
after planting vetiver  
directly into the bags of  
topsoil (April 2009)**

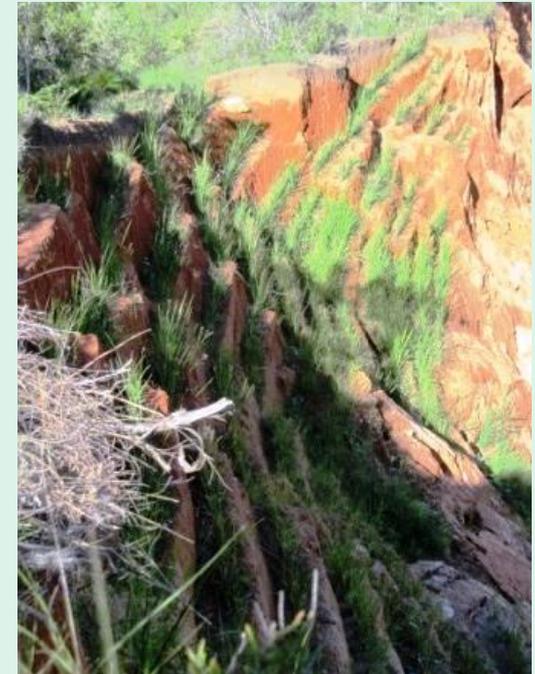
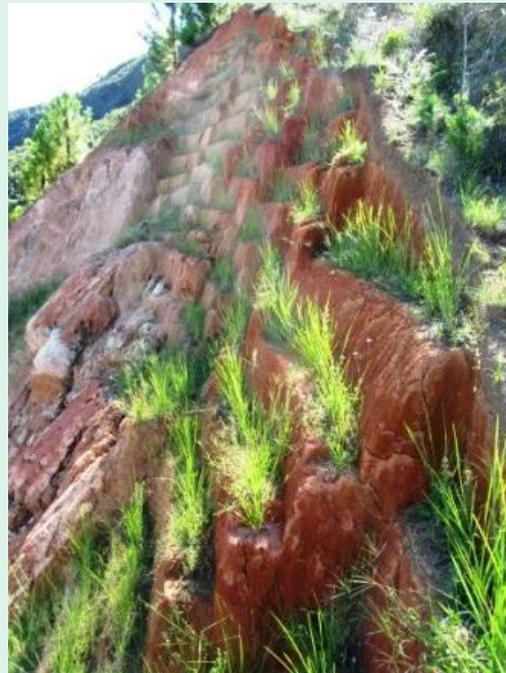


**Boukeni site, status of  
the vetiver cover 10  
months after planting  
(November 2009)**



# CASE STUDY: Lavaka stabilization in Madagascar

(Coppin, Y. 2013).





# **CASE STUDY:** Landslide Rehabilitation in Itaipava, Petropolis, Rio de Janeiro, Brazil



**Landslide like this is common in Brazil due to highly erodible soil and extreme weather caused by climate change**

# Landslide site at Itaipava, Petropolis, Rio de Janeiro

(Eboli, J. and Lucas Vieira, C. 2013)



Google map showing the site landscape



**Site before Landslide**

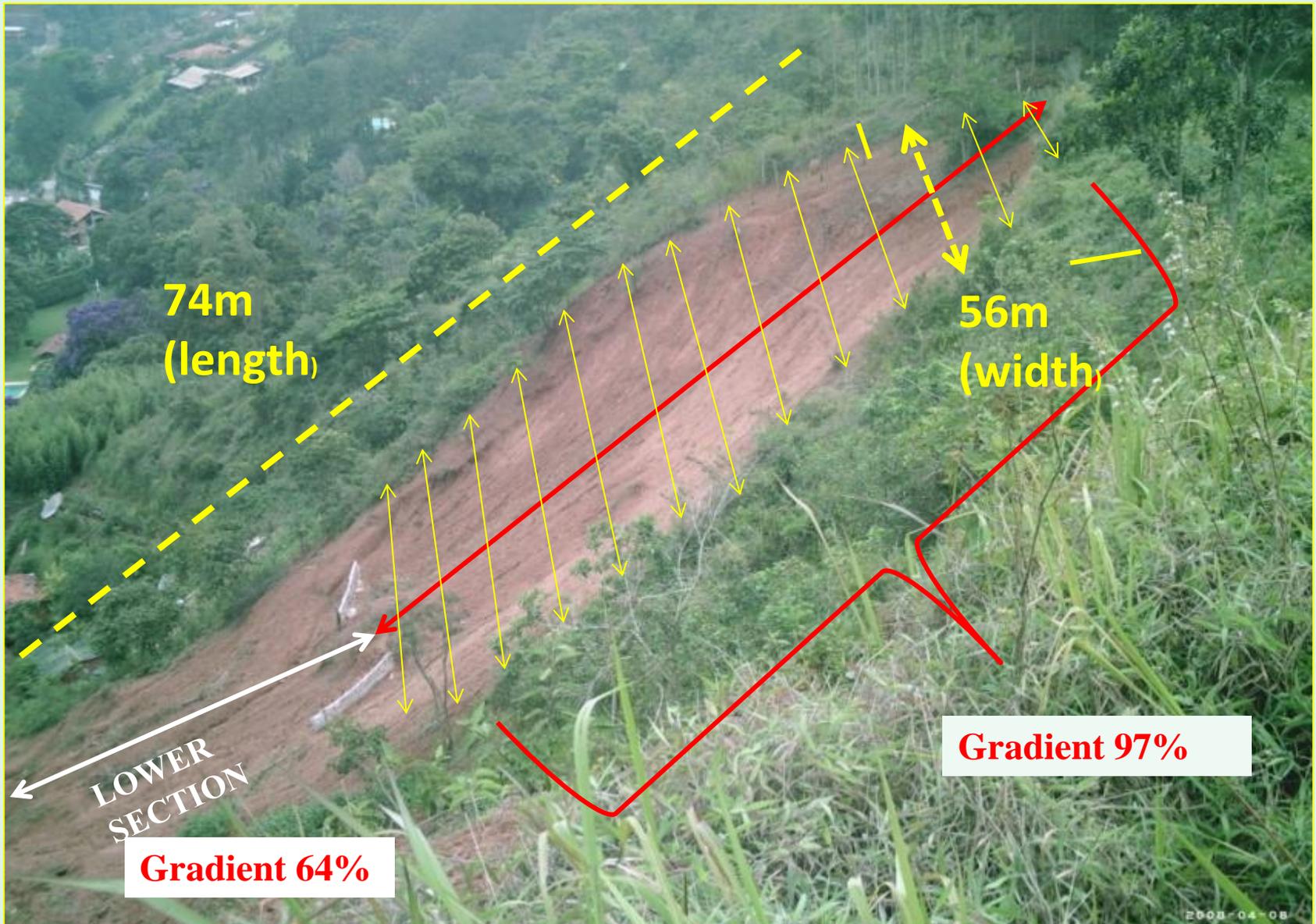
**Site after Landslide**



# Landslide direction



# Site steep gradient (66%-97%) and planting layout



# Site clean up and preparation for Vetiver planting





**Planting on contour lines ay 1m Vertical Interval**



## Steep slope planting overview





**Vetiver planting has successfully stabilized this landslide**

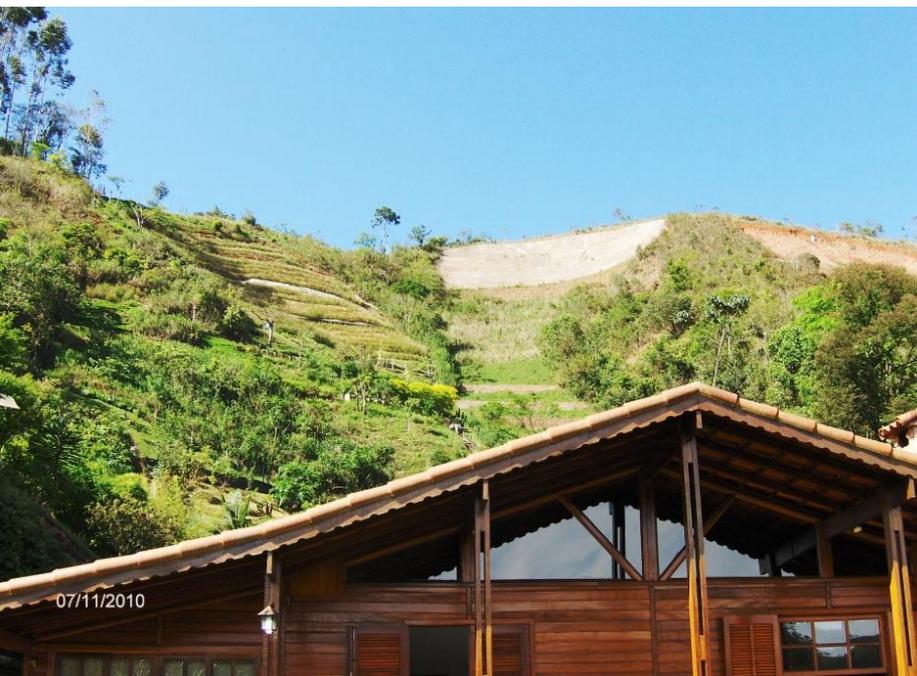


# One year after planting





**Three years after planting and withstood several intense storms**



# A green solution: Four years later



# Conclusion and Recommendations

## (Joao Eboli)

- After four years the slope has maintained its integrity demonstrating and proving that Vetiver grass can rehabilitate and maintain slopes affected by landslides.
- The use of VS for the stabilization of slopes not steeper than 1:1
- The VS will fail when not properly applied or not well maintained.
- The Vetiver when installed and following the correct technical guidelines is a guaranteed success

*Perhaps the only real defect of the Vetiver solution is: Too cheap to be true, too cheap to believe when compared to heavy stone structures.*

THANK YOU

01/11/2010