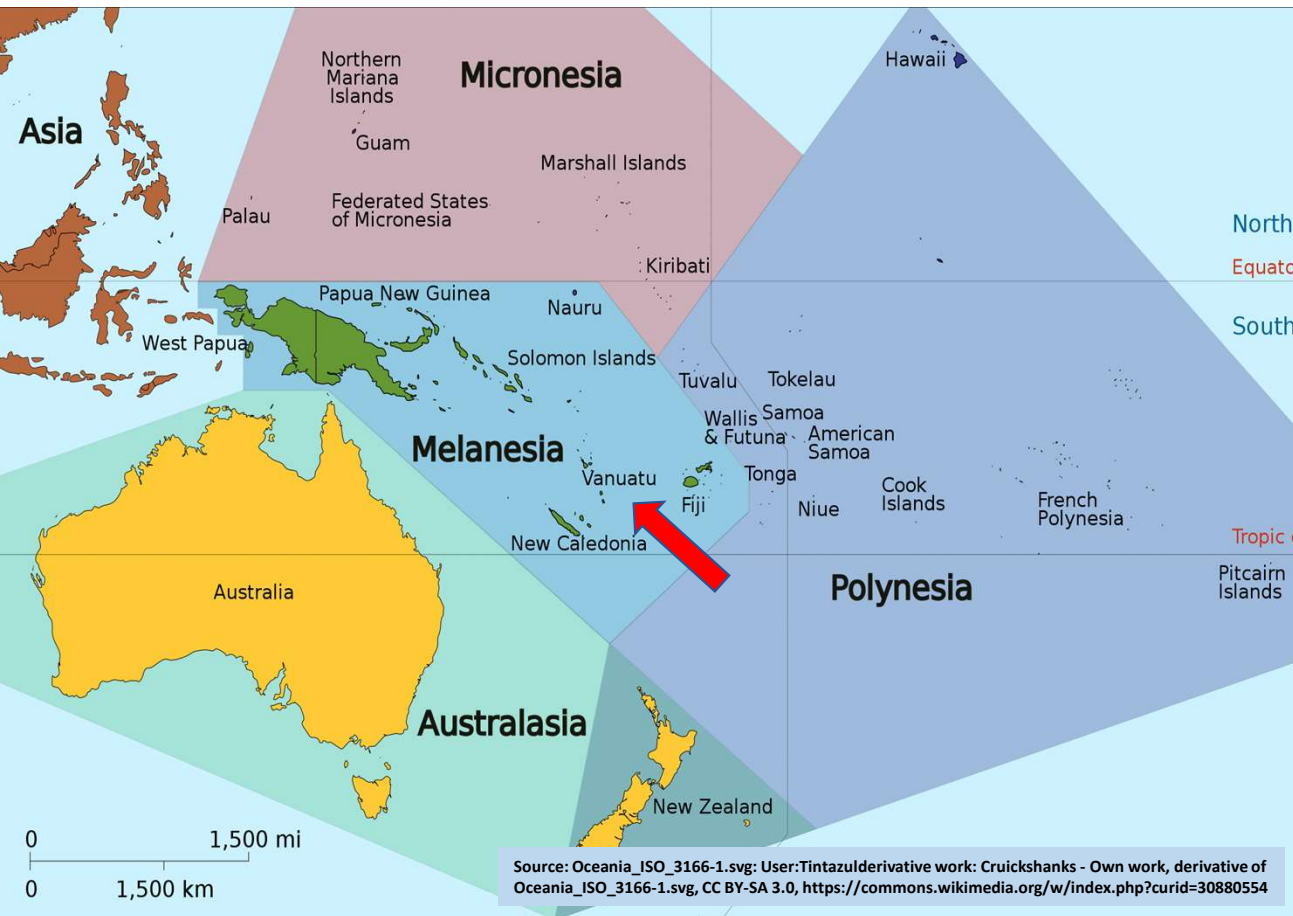


# The Nutritional Needs of Vetiver in Toxic Soils

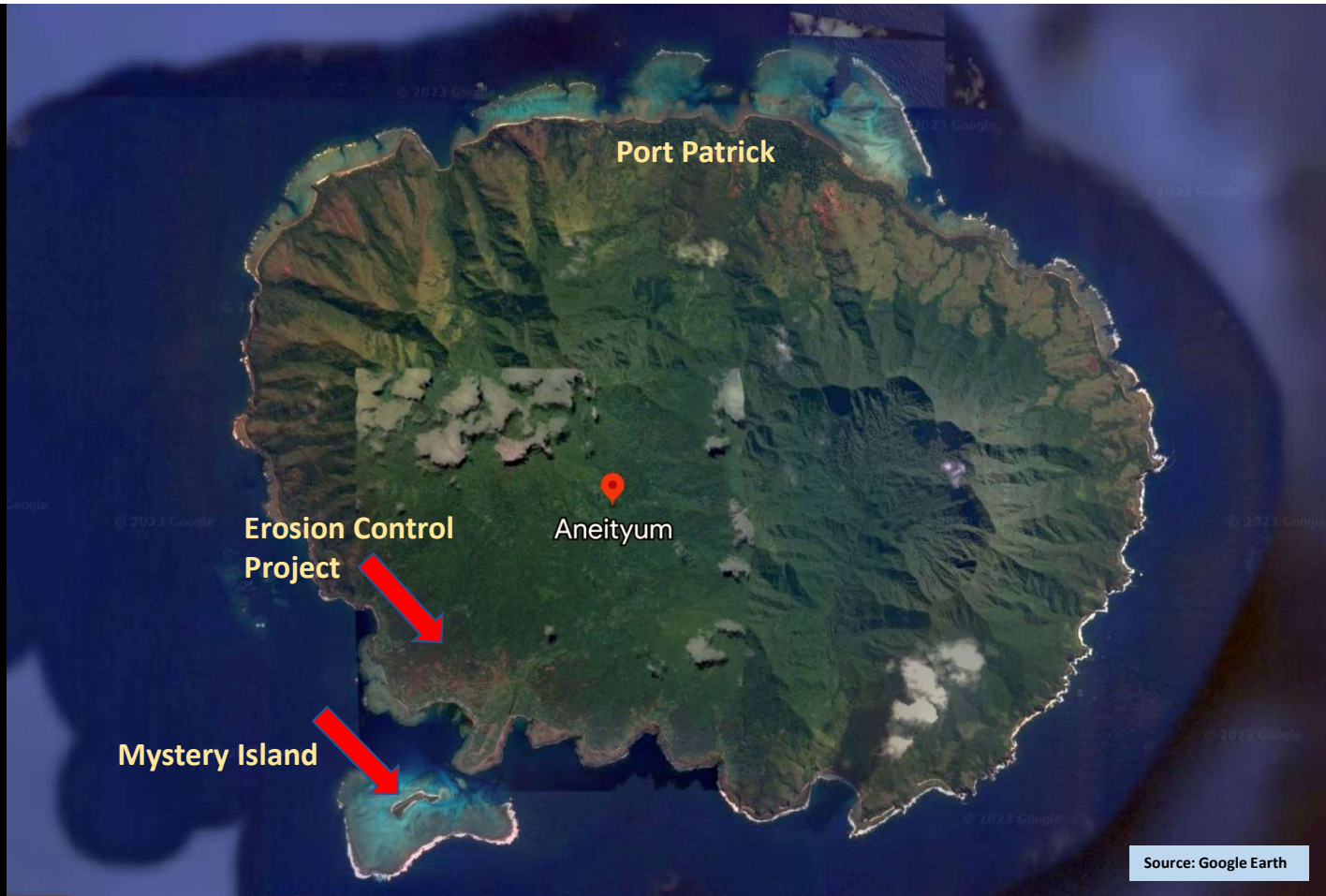
Experience from the Aneityum  
Erosion Control Project




*Don Miller and David Price*



# Aneityum Island, Vanuatu



# Aneityum Island, Vanuatu

An aerial photograph of a tropical lagoon. In the foreground, a small, narrow island with a sandy beach and dense green vegetation is visible. The water around the island is clear and turquoise, showing the underlying reef structure. In the background, a larger, more developed island with a village and buildings is visible. The water in the lagoon is a deep blue-green color.

**Valuable marine reserve and  
managed-breeding experimental area**

**Local people come from the  
village seen in the distance  
to sell goods and food**





**source of the red sediment**

**~1,200 ha of actively eroding gullies**



Mystery Island



“we had to wade through deep clinging red mud”





**Sediment polluted sand**



**Muddy streams**



**Polluted foreshore**



**Thick red mud on a reef**



# The Physical Weathering Process



Drying and wetting cycles

Rock rapidly breaks down

Fine surface material easily washed away



**25-50mm of fine surface material lost/year<sup>-1</sup>**

**100 years of Vetiver on  
Aneityum to mark coastal tracks**

**Introduced from New Caledonia**

**People eager to use it for erosion control**



**Some early Vetiver plantings  
on Aneityum failed**

**Lower roots black and stunted**


**Roots in the upper soil keeping them  
alive**





**Sad plants from early Forestry Department trial**





**Earlier experience with Vetiver on Atiu, Cook Islands was invaluable**

**Trial planting in eroding abandoned pineapple field**

**The same site one year later in 1993 showing good growth due to residual fertilizer in the soil**





**Soil pH as low as 4.3**

**New Zealand soil tests returned  
*Soluble Aluminium Saturation* of 89%**

**Vetiver is tolerant of soluble Al but growth is  
is restricted above 86% (Paul Truong, pers comm)**

*Acacia spirorbis*

Important indigenous species, tolerant of very high soluble Aluminium levels

Note leaf litter under tree



Organic acids can form *Chelate Compounds* with soluble Aluminium, making the Al ions harmless

*Spirorbis*' deep leaf litter gradually decays releasing organic acids



## Fertiliser Trials



Where Al not a problem,  
N, P, K and Mg still needed

**Further fertilizer trials**



***Pterocarpus indicus*  
to support Vetiver plants**

# Fertiliser Regime

500gm Agricultural Lime

300gm Reactive Phosphate Rock (RPR)

100gm granulated N, P, K and Mg  
per metre of Vetiver hedge

The mix was incorporated into the soft rock in the bottom of a 200mm deep trench dug on the slopes using taro spades



## **How it worked**

**Lime increased soil pH and reduced Al toxicity in Vetiver root zone**

**Acid soil gradually made RPR available, leaching reduced**

**Placing the N, P, K, and Mg in trenches reduced losses**

**The 89% Al saturation site where Vetiver roots were black and stunted**



**Chalk Hill Gully, 2001**



**One year old and two year old Vetiver hedges  
ready for *A. spirorbis* planting**

**Two year old Vetiver with  
*Acacia spirorbis* seedlings**



**>100,000 Vetiver plants annually**



**Chalk Hill Gully, 2008**



**Same location as the previous slide**

**Terraces well developed**

***Acacia spirorbis* thriving**

**Leaf litter**

**Soil forming**

**Ready for sandalwood planting**



**Stream draining Chalk Hill Gully**





**No more mud smothering beach and reef**



***Aneityum Erosion Control Project, 1995 – 2011***



## Acknowledgements

The results of this project reflect the dedication and effort of the small band of workers who carried on with minimal supervision for 10 years, growing many thousands of plants, carrying heavy sacks of grass and trees to remote sites and wearing out numerous taro spades. These include Henry Kathecau, Henry Naumu, David Waniymek, Lauthep, Peter and the many other men and women who pitched in and helped make a difference to their island's future. Thanks team.

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Contact: [donmillernz@gmail.com](mailto:donmillernz@gmail.com) Home: +64 3 573 5118 Mobile: +64 21 189 1525