

# Vetiver Grass

## Propagation and Management

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## A Training Guide for Communities and Field Workers

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The Vetiver Network International

## PREFACE

As part of outputs under the Tuvalu R2R Project (Towards Seaweed Monitoring Survey), this guide on best-practice propagation and management was developed.

The project funded by (Tuvalu Ridge to Reef Project) TCAP and GEF was implemented over 2 years starting in October 2017 by the Pacific Centre for Environment and Sustainable Development of the University

of the South Pacific. The main objective of the project was to empower the local communities to undertake sustainable management decisions in managing wastewater sources, managing seaweed growth and distribution in the lagoons on the atolls. The project takes the “ridge to reef” approach highlighting the connectivity of land-use practices at the landfill, residences (bottomless sep-

tic's) and the Tafoa pond directly impacting the marine environment.

Lessons learned from demonstration activities of the project on Funafuti will be documented, and later upscale and applied to the other seven atolls.

## ACKNOWLEDGEMENT

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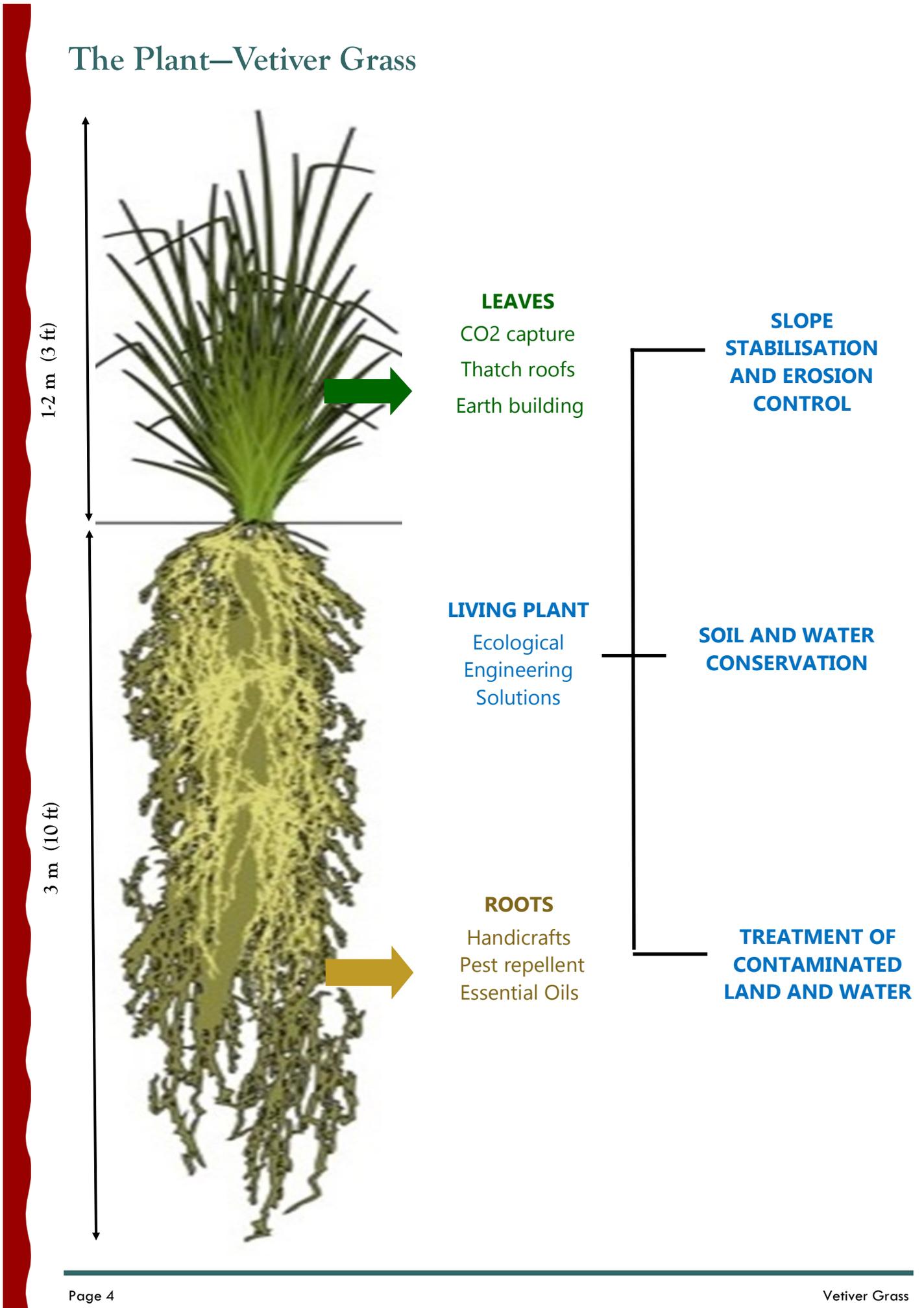
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# The Plant—Vetiver Grass



# Introduction

Since most major applications require a large number of plants, the quality of the planting material is important for the successful application of the Vetiver System. This requires nurseries capable of producing large quantities of high quality, low cost plant materials. The Vetiver Network International promotes the exclusive use of sterile Vetiver culti-

vars (*C. zizanioides*) to avoid it becoming a weed in the new environment. The vetiver cultivar used around the world is originally from the oil producing cultivar from southern India, which is genetically identical to Sunshine in the US or Monto in Australia. Because of its sterility, vetiver grass has to be propagated vegetatively.



High quality, low cost plant materials are very important for the success of projects

## Methods of Propagation

### The four common ways to propagate Vetiver are:

1. Splitting mature tillers from Vetiver clump or mother plants, which yields bare root slips for immediate planting or propagating in polybags.
2. Using various parts of a mother Vetiver plant
3. Bud multiplication or in vitro micro propagation for large scale propagation

4. Tissue culture, using a small part of the plant to propagate on a large scale.

### Splitting Mature Plants to Produce Bare Root Slips

Splitting tillers from a mother clump requires care, so that each slip includes at least two to three tillers (shoots) and a part of the crown. After separation, the slips should be cut back to 20 cm length. The resulting bare

root slips can be dipped in various treatments, including rooting hormones, manure slurry (cow or horse tea), clay mud, or simple shallow water pools, until new roots appear. For faster growth, the slips should be kept in wet and sunny conditions until planting out.

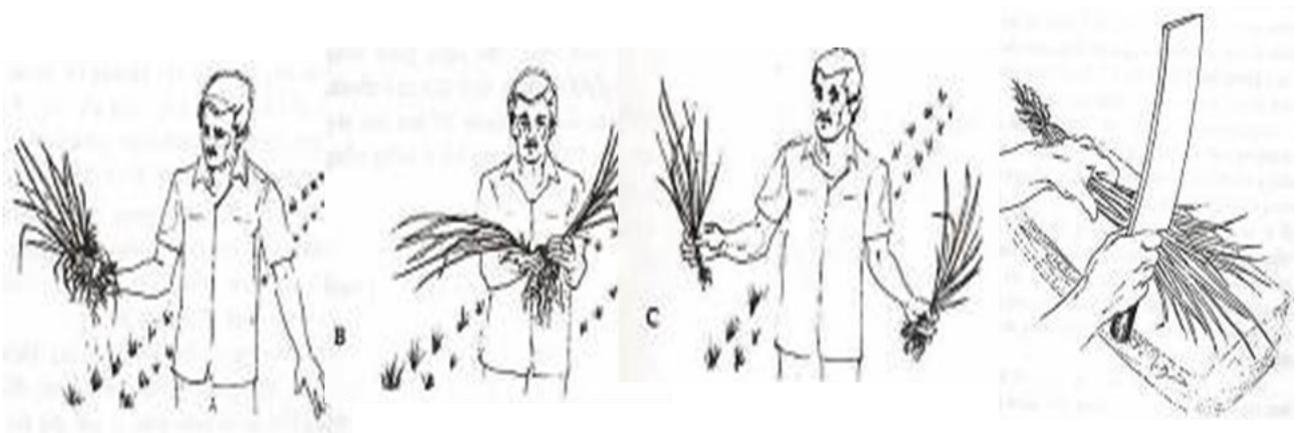


Figure 1: Demonstration of how to prepare vetiver slips for propagation

## Propagating Vetiver from Plant Parts

Three parts of the Vetiver plant are used for propagation:

### Vetiver tillers

- ◇ Select mature tillers with at least three or four well-developed leaves.
- ◇ Separate tillers carefully, and be sure to include the bases and some roots.



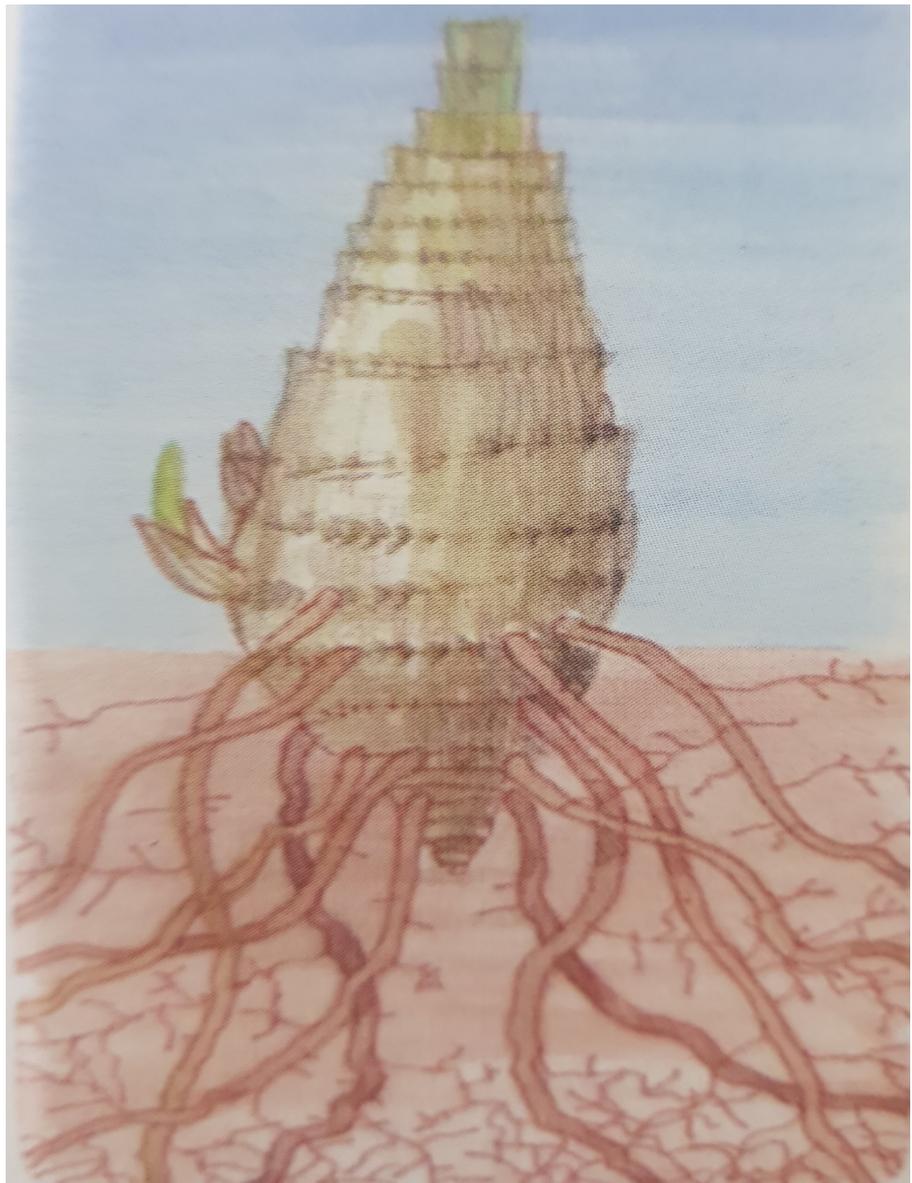
### Vetiver culms

A culm is the stem or stalk of a grass. The Vetiver culm is solid, stiff, and hard; it has prominent nodes with lateral buds that can form roots and shoots when exposed to moist conditions. Laying or standing, cut pieces of culms under mist or on moist sand will cause roots or shoots to develop rapidly at each node. Select old culms, which have more mature buds and more nodes than young ones. Cut culms in 30-50mm (1-2") lengths, including 10-20mm (4-8") below the nodes, and strip off the old leaf covers. Expect new shoots to emerge



## Vetiver crown or corms

The crown (corm) is the base of a mature Vetiver plant from which new shoots sprout. Use only the top part of the mature crown. Le Van Du, Agro-Forestry University, Ho Chi Minh City, developed the following four-step method of propagating Vetiver from cuttings: (Du *pers.com.* and Truong *et al*, 2008)



- ◆ Preparation of Vetiver cuttings
- ◆ Spray the cuttings with a 10% water hyacinth solution
- ◆ Use plastic bags to cover the cuttings completely, and leave it alone for 24 hours, and
- ◆ Dip clay mud or manure slurry, and plant

## Preparing Water Hyacinth Solution

Water Hyacinth solution contains many hormones and growth regulators, including gibberellic acid and many Indol-Acetic compounds (IAA). To prepare rooting hormone from Water Hyacinth:

- ◆ Remove Water Hyacinth plants from lakes or canals
- ◆ Put plants into 20 litre-plastic bag, and tie it closed
- ◆ Leave the bag for about one month until the plant material has decomposed
- ◆ Discard the solid parts and keep only the solution
- ◆ Strain the solution and maintain in a cool place until use.



Spraying cuttings with 10% water hyacinth solution (left) and cover cuttings completely with plastic bags, and leave them for 24 hours

## Advantages/Disadvantages of using bare root slips and culm slips

### Advantages

- ◆ Efficient, economic, and a quick way to prepare the planting material
- ◆ Small volume results in lower transportation cost
- ◆ Easy to plant by hand

- ◆ Large numbers can be mechanically planted in large areas.

### Disadvantages

- ◆ Vulnerable to drying and extreme temperatures
- ◆ Limited on-site stor-

age time

- ◆ Requires planting in moist soil
- ◆ Needs frequent irrigation in the first few weeks
- ◆ Recommended for good nursery sites with easy access to irrigation.

## Planting Strips

Planting strips are a modified form of poly-bags. Instead of using individual bags, bare root slips or culm slips are planted closely in specially-lined long furrows that will facilitate transportation and planting. This practice saves labour when planting on difficult sites such as steep slopes, and enjoys a high survival rate since



Preparation and Planting of Vetiver Grass in strips in Funafuti—Tuvalu Atolls by the R2R team.

## Polybags or stock cube (nursery trays)

Plantlets and bare root slips are planted in small pots or small plastic bags containing half soil and half potting mix and maintained in the containers for three to six weeks, depending on the temperature. When at least three new tillers (shoots) appear, the plantlets are ready to be planted.



## Advantages/Disadvantages of planting in polybags & Strips

### Advantages:

- ◆ Plants are hardy and unaffected by exposure to high temperature and low moisture
- ◆ Lower irrigation frequency after planting
- ◆ Faster establishment and growth after planting

- ◆ Can remain on site for longer before being planted
- ◆ Recommended for harsh and hostile conditions.

four to five weeks or longer

- ◆ Transporting large volume and increased weight is expensive

### Disadvantages:

- ◆ More expensive to produce
- ◆ Preparation requires a longer period to prepare,

- ◆ Increased maintenance cost following delivery, if not planted within a week.



Planting strips (left) in containers and removed from containers (middle) and ready to be planted (right).

# VETIVER NURSERY

Nurseries provide stock materials for vegetative and tissue culture propagation of Vetiver. Establishment of a nursery is very important to supply adequate and quality plant material. The following are criteria will facilitate the establishment of productive, easily managed Vetiver nurseries:



The Vetiver Kid in front of his family nursery in Lae—Papua New Guinea

## Soil Type

Sandy loam nursery beds ensure easy harvesting and minimal damage to plant crowns and roots. Although clay loam is acceptable, heavy clay is not.



Nursery on sandy loam soil near river bank in Kimbe—PNG

## Topography

Slightly sloping land avoids water-logging in case of over watering. Flat site is acceptable, but watering must be monitored to avoid water-logging, which will stunt the growth of young plantlets. Mature Vetiver, however, thrives under waterlogged con-



Nursery on a slightly sloping land in Kimbe—Papua New Guinea

# Nursery Upkeep

General upkeep of the nursery is very important to ensure quality vetiver slips are produced. Supply of quality slips is also very important for success for any projects.



Trimming of vetiver to encourage tiller growth—Lae

Well trimmed nursery in Lae—Papua New Guinea



Propagating vetiver slips in nursery trays

Well managed nursery in polybags—Africa

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problems, we have the  
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The main vision of Eagle Vetiver Systems Limited is to effectively coordinate and implement the Vetiver System Technology for bio-engineering and to promote sustainable environmental protection and waste management (phytoremediation) in Papua New Guinea and the South Pacific Region.

Our vision also is based on assisting and developing the rural socio-economic sector and provide community initiative participation and ownership.

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