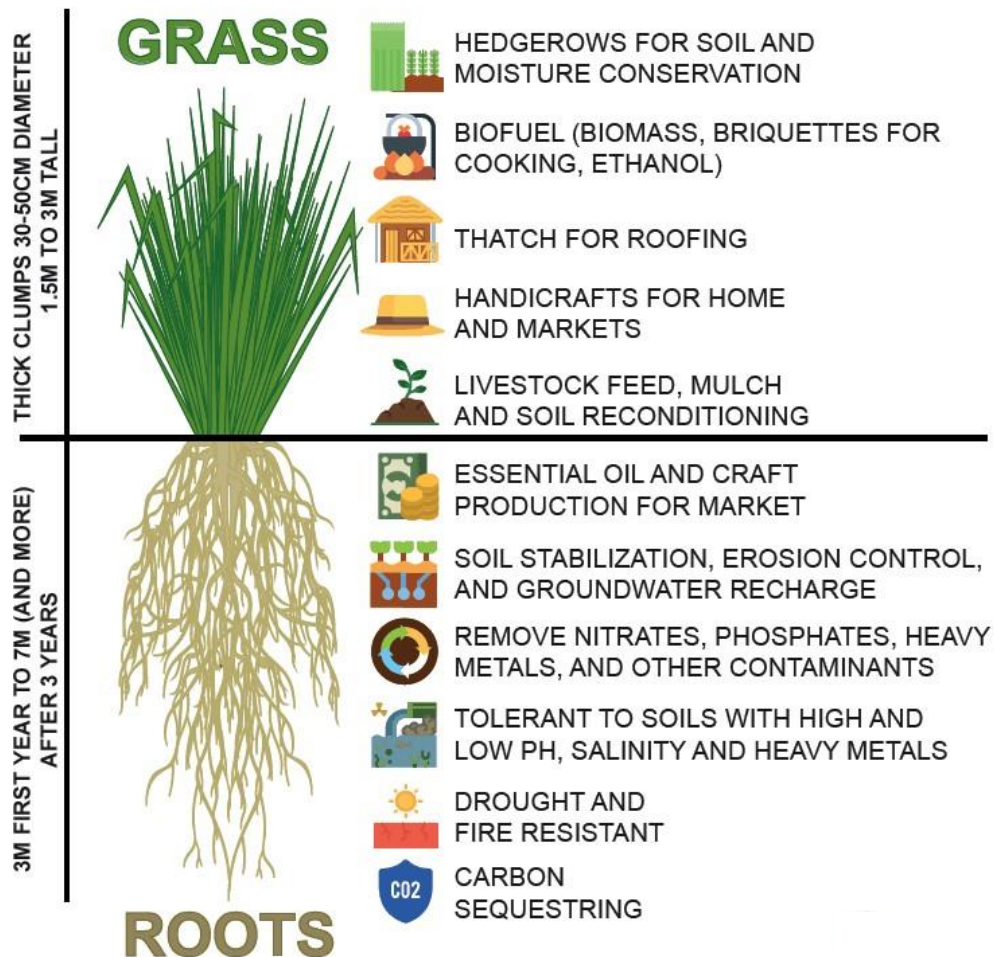


# HANDBOOK

## VETIVER GRASS

*Chrysopogon zizanioides*



## THE VETIVER SYSTEM (VS)

Vetiver Grass (*Chrysopogon zizanoides*) is the main component of The Vetiver System. When slips (bare-rooted plants) of Vetiver grass are planted in close formation on contour, a thick hedge with a deep & strong root system is created. It is this hedge that slows down and spreads out water, silt & topsoil, in time creating a fertile terrace behind the hedge, recharging the groundwater and preventing erosion & loss of nutrients lower down the slope. Multiple hedges spaced apart can create a sustainable environment for short crops or tree crops in between, especially when the crops are mulched with the trimmed Vetiver leaves which capture CO<sub>2</sub> and return minerals to the topsoil while keeping the soil cool and reducing weeds.



A lot of the existing Vetiver in Grenada was planted somewhat haphazardly, preventing it from being as effective as it could have been had the Vetiver System been known and employed at the time.





## PROPAGATION



It is necessary to have access to mature Vetiver plants in order to subdivide and create new plants. 95% of Vetiver planted worldwide is done using barerooted plants (slips). This can be done easily by anyone anywhere and costs little or nothing, labour being the main input. Fortunately, there are many established clumps of Vetiver that can be used for subdivision in most areas of Grenada that were planted many years ago when the use of Vetiver was known and encouraged. If done carefully, many slips can be divided from these clumps without destroying them or, if completely dug up, a few slips can be replanted in the spot to maintain the island's Vetiver 'bank'.

If large numbers of plants are required, a nursery should be planted and maintained for a minimum of four to six months, after which time each mother plant will have thickened to produce up to 50 slips. Plants in the nursery should be established 50 cm apart, have access to water & kept weed-free. Every 4 months the tops should be trimmed to encourage tillering & thickening at the base.





SLIPS ARE PRODUCED AS FOLLOWS:-

1. Dig up the mature clump or a narrow strip from the back of an existing hedge.



2. Separate the clump into individual slips consisting of 3 to 4 tillers (shoots) & a part of the crown. Cut the tillers to 20 cm & the roots to 5 cm.





3. If necessary, the slips can be kept in shallow containers with their roots in plain water, water with rooting powder or a manure slurry for up to a week before planting out.



Vetiver slips can also be propagated in polybags for 45 days before planting but this tends to be a more expensive method requiring purchasing of bags & planting medium, labour to plant, water & weed & timing production to meet the demand.





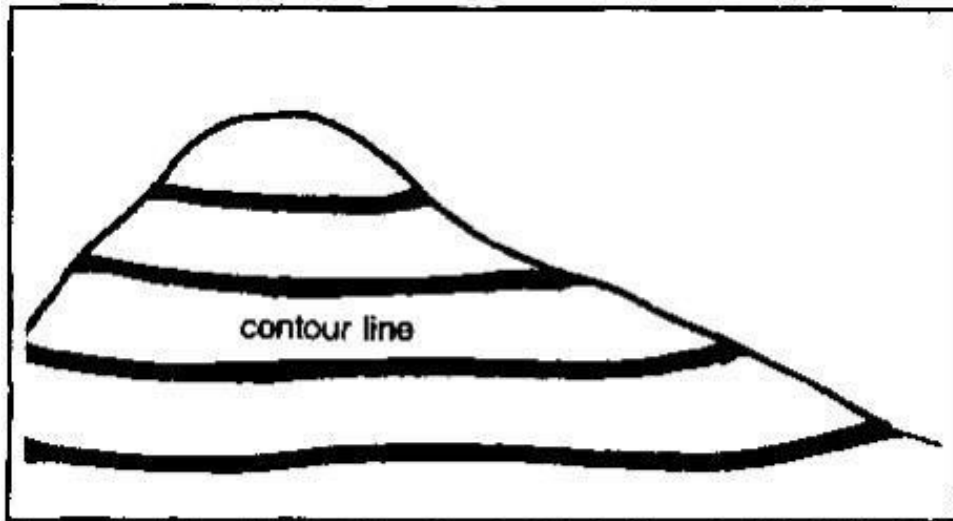


An innovative method which gives good results is to plant multiple Vetiver slips close together in 3ft or 4ft lengths of pvc guttering. After two months, the roots will be bound together, creating a 'mat' which can then be peeled out and laid down in a dug-out trench, creating an instant hedge. These matted strips are easy to lift out, transport and install if they are allowed to dry out slightly before lifting. Planting strips have a high survival rate & are the best option when planting on steep slopes.



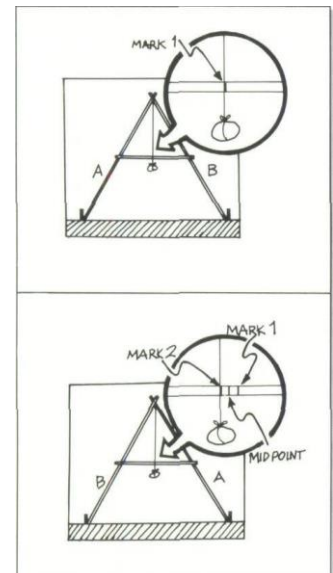
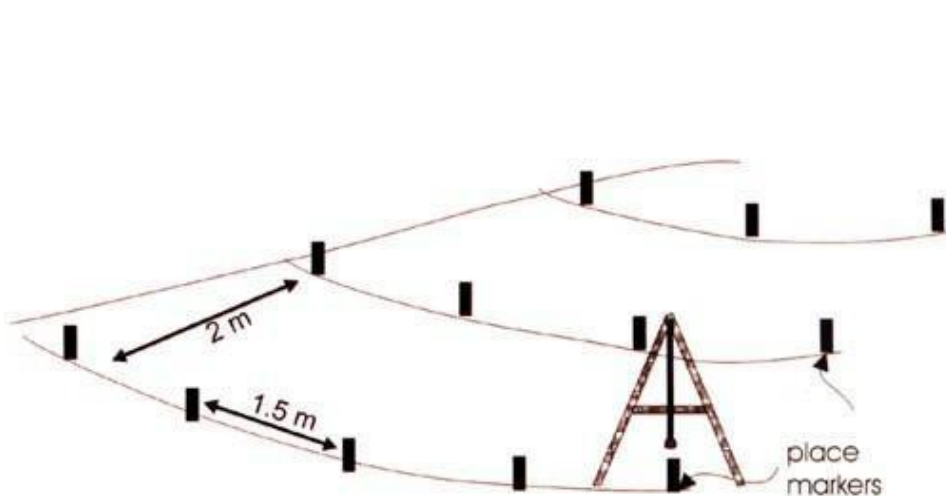
## PLANTING VETIVER ON CONTOUR

To stop erosion & improve the soil on a slope, Vetiver hedges are most effective when planted on contour. The contour strips intercept downslope flowing water & trap soil particles, creating fertile terraces behind each hedge.



*A contour line follows the same height so that it neither falls down the hill nor rises uphill.*

A contour line, marked out using an A-frame, connects points of equal height across a slope. The contour lines can be between 2 m & 5 m apart, depending on the steepness of the slope, leaving room between for tree crops and short crops which can thrive in the improved soil fertility and moisture retention. Starting at one side of the slope, plant one leg of an A-frame on the ground. Swing the other leg around till the spirit level or weighted string show that both legs are touching the ground on the same level. Mark the spots where the legs are resting & repeat the process across the slope.

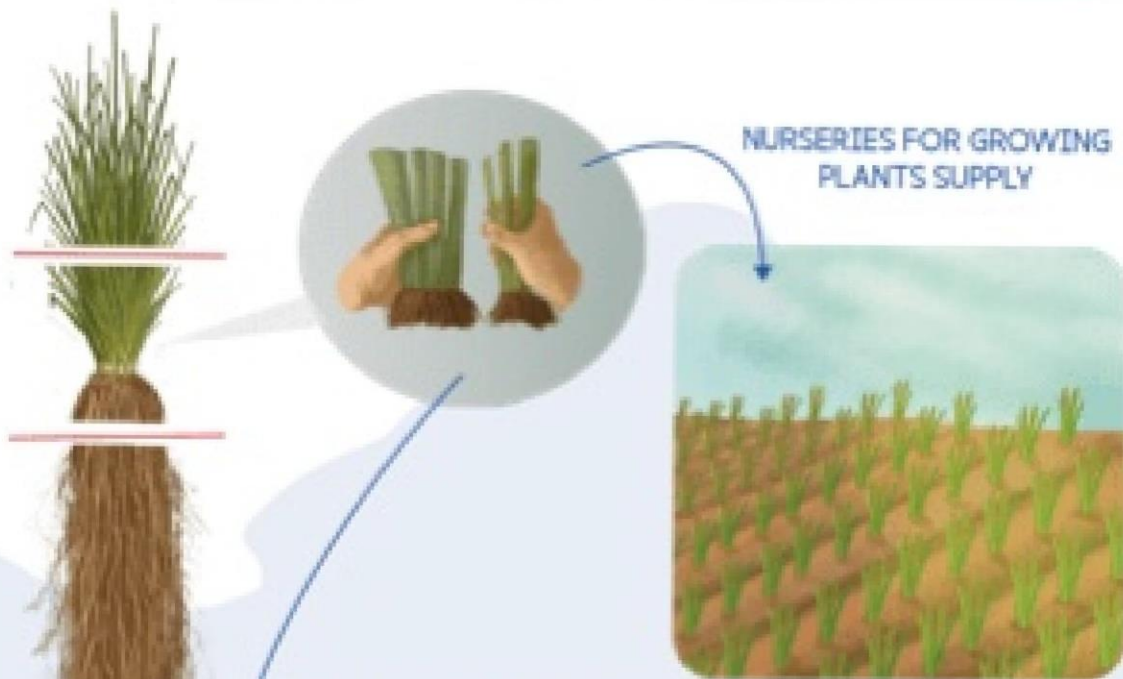




Having prepared the planting material and marked out the contour lines:- Dig a trench 15 - 20 cm (6-8 ins) deep & wide. Place the slips in the centre of the trench 10 - 15 cm apart, or 3 slips per running ft. Cover the roots with soil & compact firmly. Water the day of planting & twice weekly till plants are established. Mature plants require no further watering.

During the first month replace all plants that fail. After 5 months, regular trimming promotes the growth of new tillers from the base & reduces the volume of dry leaves that otherwise can overshadow young slips. Fresh cut leaves can be used for mulch, fodder, bedding, handi-crafts & roof thatching.

## THE VETIVER SYSTEM (VS)



To develop effective vetiver hedgerows as per the Vetiver System (VS), vetiver slips or cuttings should be planted on contour using an 'A-frame' at a distance of 10-15 cm apart.













## HANDICRAFTS

After drying the cut leaves in the sun for 4 to 5 days they can be woven into plaits and formed into baskets, mats & other attractive items for sale in the tourist and local markets.





## The Many Uses of Vetiver Grass

<b>Construction material</b>			
			
Tongue & groove clay/vetiver blocks (Thailand)	Vetiver Thatch roof (Zimbabwe)	Young vetiver leaves for cattle feed	Vetiver roots can purify contaminated soil and water
			
Mushroom grown in cut-leaves of Vetiver	Riverbank stabilization	Fragrant essential oil from Vetiver roots	Dried leaves used to make artisanal products

Valuable essential oil can be extracted from dried Vetiver roots.  
Roots between 12 and 18 months old yield the best oil for selling to the perfume industry.



Great care should be taken to protect the soil from degradation when the roots are dug up. It is recommended that Vetiver grown for roots production is planted in large bags, making harvesting easier and more eco-friendly.



## PHYTOREMEDIATION

The natural ability of certain plants to bioaccumulate, degrade or render harmless contaminants in water, air or soil.



Vetiver plants, established on a floating pontoon that can be constructed using PVC pipe & wire mesh, extend their roots into the water and absorb heavy metals, pesticides and bacteria, creating an ideal environmental solution for the remediation of pollution.

Vetiver pontoons, floated on polluted rivers, are highly capable of removing 100% of coliform bacteria in 6 months and 100% of mercury and lead in 4 months.





Wishes to acknowledge and thank our partners and friends who contributed material and support to our project to encourage utilization of The Vetiver System as a readily available soft engineering green technology to mitigate land erosion in Grenada and reintroduce an avenue for self-employment in rural communities utilizing the by-products.



The Vetiver Network