A Vetiver Initiative for Wayanad and Beyond

This initiative is a tribute to all those affected by the Wayanad landslide in July 2024, including the victims, their families, the missing individuals, and the brave rescue workers. Let's do some proactive bioengineering work together to prevent future disasters.



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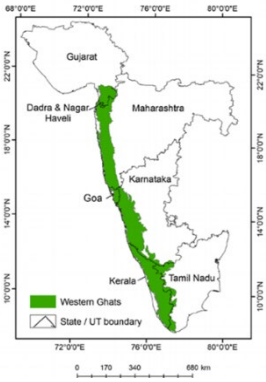
As an agricultural scientist and citrus entrepreneur in Texas, I am aware of the actual impacts of extreme weather, events such as hurricanes and freezes that have affected my citrus business. In response, my company, US Citrus, has proactively invested in soil and water conservation, sustainability, and carbon sequestration starting in 2021.



US Citrus Vetiver in three-gallon pots

As part of our conservation efforts, we are launching a project to plant a million Vetiver plants in our citrus orchards in Texas. Vetiver plants are known for stabilizing soil, absorbing excess water, carbon sequestration, and preventing landslides. To this effect, we collaborated with Dr. S. Mentreddy at Alabama A&M University, and we hired Dr. Lam Duong from Vietnam in 2021 to spearhead our Vetiver initiative at the US Citrus company.

The recent tragic landslide that originated in Punchirimattam, Wayanad, July 31, 2024 (Lat/Long: 11°28'56N 76°09'06E, at 997 Meters) in the Western Ghats region of India have highlighted the urgent need for proactive soil conservation measures. The death toll crossed 400 as of now, besides, 150 people are missing (with or without partial body parts) should not have happened. Despite warnings from ecologists, a lack of preparedness in Kerala is alarming.



Western Ghats spread in six states, picture credit ISRO remote Sensing, S.R. Chintala. WG is 1000-mile long, covers six states.



The Skaria family supports to create a Vetiver awareness in Wayanad and beyond.
Granddaughter, Lilah, among Vetiver plants in Hargill, Texas, symbolically offers it to the Wayanad people.

Monsoon rain in India typically starts around June when the southwest monsoon winds bring moisture-laden air from the Indian Ocean. It brings widespread rainfall across the country, bringing relief from the scorching heat of the summer months, covering the entire country by July. It is a vital water source for agriculture and sustenance for millions nationwide.

Unfortunately, a persistent problem plagues the inhabitants of areas nestled within the undulating hills: landslides will be triggered by monsoon rains. People helplessly watch their agricultural land erode, undermining their livelihood and

safety of people and animals. *The July 31, 2024, Wayanad incident caused 400 people to lose their lives and many more are missing. This should not have happened – it is unacceptable*. Besides, 310 hectares of crops were destroyed – cardamom 50, coffee 100, pepper 70, tea 55, coconut 10, arcanut 15, and banana 10 hectares.



Left, Dr. Lam with his 8-month-old Vetiver grass, 12 ft long, grown in a glass chamber in Vietnam. Right. Punchirimattam, the point of origin of July landslide in Wayanad.

We can seek a solution grounded in ecological resilience, for example, via "Ramacham," English name, Vetiver (*Chrysopogon zizanioides*), a unique perennial grass renowned for its soil-stabilizing properties by planting Vetiver along the vulnerable slopes. Vetiver grass features an extensive and dense root system that can grow up to 3-4 meters deep within the first year. These roots penetrate the soil vertically, binding it tightly and enhancing the shear strength of the soil profile. This deep root penetration contrasts sharply with the shallow root systems of most plants, which are less effective at securing substrate layers. Empirical observations have confirmed Vetiver's effectiveness as the roots create an underground network that significantly reduces soil erosion and enhances soil moisture retention and groundwater recharge. Such a dual action mitigates the hydraulic pressures that often precipitate landslides during heavy rainfalls. Additionally, Vetiver's ability to tolerate extreme growing conditions, such as heavy metal contamination and high salinity, ensured its robust growth even in marginal soils. The scientific community has long recognized Vetiver's phytoremediation capabilities and its efficacy in slope stabilization, supported by numerous studies and field applications worldwide. We can expect a marked decrease in landslide incidents by integrating Vetiver grass as a proactive measure. This biological engineering with Vetiver grass planting, can yield sustainable and scientifically sound solutions to environmental challenges, promoting resilience and stability in vulnerable terrains and landslide control.

In response to this tragedy, I have initiated a Vetiver planting project for Wayanad, India, to make and distribute a million Vetiver plants in the region. To support this initiative, I seek assistance and collaboration from various stakeholders, including scientific communities, local ecologists, NGOs, influencers, artists, scientists, and the people of Wayanad and beyond.

The hydraulic pressure of soil in the monsoon can trigger landslides depending on factors such as soil type, slope gradient, and amount of rainfall. Understanding these factors is crucial as the hydraulic pressure increases significantly when soil becomes saturated with water during heavy rainfall in the monsoon season. This increased pressure can reduce the strength and stability of the soil, making it more prone to landslides. The exact hydraulic pressure threshold that triggers landslides is challenging to determine as it varies from region to region. However, it is generally accepted that a combination of intense rainfall and high-water content in the soil can lead to landslides in monsoon-prone areas. **The extensive root system of Vetiver grass plays a crucial role in controlling landslides as the deep and dense root system can extend up to several meters into the soil in one year**. These roots help to bind the soil together and provide stability to prevent erosion and landslides. Vetiver is an under-utilized bioengineering tool in Kerala.

To ensure the success of the Vetiver project, I am seeking support in the following areas:

1. Developing a clear vision for the Vetiver planting project in Wayanad, including selection of the right Vetiver plants, planting techniques, and funding.
2. Input and collaboration from scientific communities, research foundations, government agencies, nurseries, and other stakeholders.
3. Assistance in site selection from ecologists with remote sensing to identify optimal planting sites with slopes and contour planting for maximum impact,
4. Engagement with the local community to ensure long-term sustainability and acceptance of the project through education and collaboration.

By working together and following these steps, we can establish a successful Vetiver project in Wayanad that will benefit erosion control, soil stabilization, and environmental conservation. It has the potential to expand to other parts of the Western Ghats region and beyond. Your support in any form, be it financial, time, effort, or expertise, will be crucial in ensuring the success of this initiative. Please join this initiative to bring a bioengineering solution to landslides effectively.

Acknowledgment: I am genuinely grateful to all the individuals, organizations, and institutions who have shown their support and interest in our initiative. Special thanks go to the talented High school senior Aaron George and his parents for accepting my invitation to join me as a student ambassador in this endeavor.



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