



VETIVER

Ancient Biological Solutions
... for a Modern Environment

VETIVER GRASS

Environmental Bio Solutions, founders own a broad patent in the United States on the **Adaptive Technologies for Vetiver Grass Propagation and Transplantation and Related Methods of Repurposing Vetiver Grass.**

USDA Determines Vetiver Grass is Non-Invasive:
http://plants.usda.gov/plantguide/pdf/pg_chzi.pdf

USDA Plant Data on Vetiver Grass:
<http://plants.usda.gov/core/profile?symbol=VEZI80>

Environmental Bio Solutions, Inc. (EBSI) is a South Carolina Corporation headquartered in Summerville, South Carolina. EBSI is in the business of environmental mitigation and remediation, focused on the use *Chrysopogon zizanioides*, a non-invasive plant also known as Vetiver Grass, as a natural, biological solution for environmental problems, targeting the southeastern United States.

EBSI's CEO and founding partner, **Roley Noffke**, owns an Environmental firm in South Africa, **Hydromulch, (PTY) LTD** (<http://hydromulch.co.za>) and has performed environmental mitigation and remediation projects all over the continent of Africa, and around the world. Mr. Noffke is a Director of **The Vetiver Network International** (TVNI - <http://vetiver.org>), a global non-profit organization, founded by the World Bank for purposes of education and introduction of the use of Vetiver Grass as a biological solution to many of the world's environmental problems. Mr. Noffke is also the current president of Region 2 (half the world,) of the **International Erosion Control Association** (<https://www.ieca.org>.) Noffke brings over 20 years of Vetiver-based environmental project experience, ranging from mining site remediation, waste water treatment, erosion control, and much more. Hydromulch's hydro seeding division is the dealer for **FINN** equipment; and is the dealer for **Gyro-Trac** mulching machines for the continent of Africa.

EBSI's President and founding partner, **Bruce Coy**, is a Civil Engineering graduate from Clemson University, and attended NJ Institute of Technology's master's program in Industrial Management. While with **De Leuw Cather & Co.**'s NYC office (a subsidiary of **Parson's Corp.**, <http://parsons.com>), Mr. Coy worked on large infra-structure projects including the Washington D.C. Metro system, New Jersey Transit and various projects in the United Arabian Emirates. Mr. Coy now owns **DCI**, (<http://DCIwebsite.com>) a marketing firm that has served hundreds of small to mid-sized businesses and a dozen Fortune 500 firms, including **Nucor Steel** and **Cummins Engine**. Under contract through his firm, Mr. Coy served as an executive officer of the environmental mulching manufacturer, **Gyro-Trac** (<http://gyrotrac.com>) for seven years, becoming president of the company.

Chrysopogon zizanioides is a non-invasive clump grass native to southern India, and can be found in most countries around the world. It is also known as Sunshine Grass, and more commonly, as **Vetiver Grass**.

When fully grown, Vetiver Grass has a root system that grows mostly in a downward direction for several meters which has significant structural properties, making it useful as a biological erosion control solution, protecting soils from wind, water and other dynamic erosive agents.

Its dense above ground clumps create a hedge barrier, prohibiting runoff sediment from entering watersheds and riparian areas. The roots and leaves exhibit a phytoremediation property, absorbing significant amounts of nitrates, phosphates, heavy metals and other contaminants out of water and soils. It has even been shown to reduce biological contaminants such as e-coli.

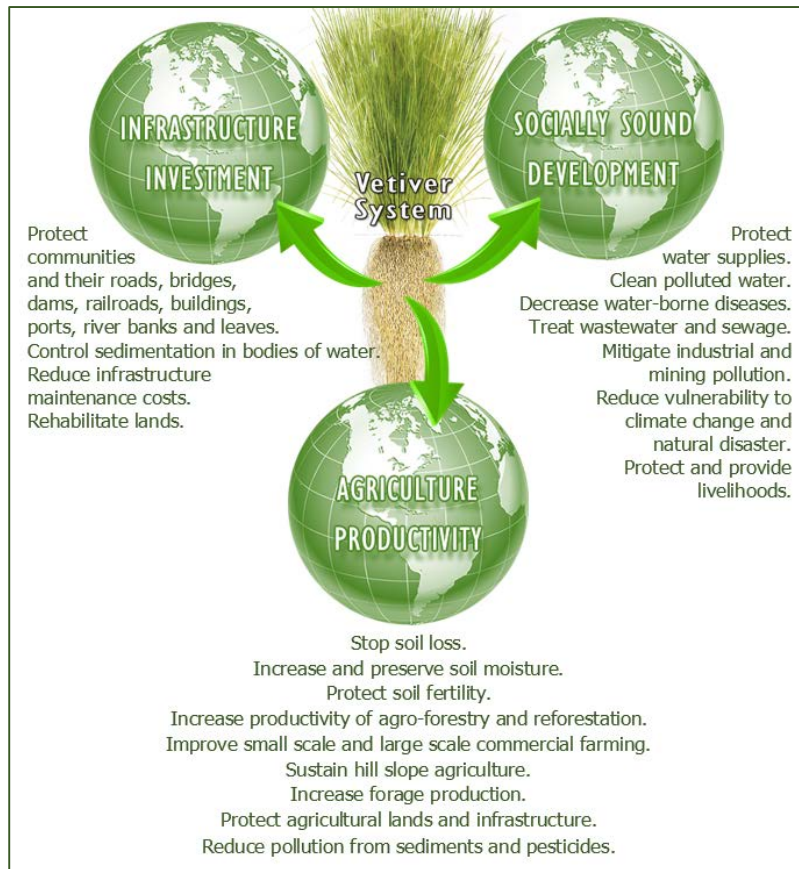
Because of these and many other known beneficial properties, Vetiver Grass has been used around the world as a biological environmental solution for erosion and contamination mitigation. It has been identified as having a high cellulosic content with a significant percentage of fermentable sugars. With its decades-long lifespan and rapid regeneration cycles, Vetiver Grass may be an ideal biomass feedstock for energy production.

Vetiver's ability to inhibit parasite growth in livestock has been established. The essential oils in the roots are commonly used for perfumes; Vetiver is distilled for wine all over the world; its anti-microbial properties has driven its use as an air filtration medium; it repels termites and behaves as a sacrificial host for food crops against destructive pests; Vetiver also has a high Xylan content, a natural sugar substitute for diabetics.

For more information on Vetiver Grass, please visit **The Vetiver Network International (TVNI)** at <http://vetiver.org>. **EXCERPT:** TVNI promotes the Vetiver System (VS), a concept integrating simple scientific principles of hydrology, soil mechanics, and similar natural processes to manage soil and water on a landscape scale.

The concept excels best when implemented using clones of a remarkable domesticated plant – Vetiver (*Chrysopogon zizanioides*), a non-fertile, noninvasive Indian clump grass cultivated for centuries for essential oil. Vetiver is central to a wide range of applications, generally installed as

narrow linear barriers (hedgerows): its roots hold soil in place and dense ground-level stems



restrain sediment flows. Unlike “hard” engineering approaches that weaken over time, VS grows stronger. It is a renewal of a traditional approach that has been validated scientifically, and expanded and promoted by TVNI. The VS provides significant economic, environmental and social benefits. VS is now used in most tropical and semi-tropical countries, north to Italy and south to Chile.

Based on research and demonstrations through TVNI

“partners,” including research institutions, development agencies, NGO's and the private sector, VS has expanded from a technology primarily for farm soil and water conservation to include major applications for:

- slope stabilization of public infrastructure (e.g., roads, railways, canals, rivers, construction);
- prevention and treatment of contaminated domestic and industrial waste water;
- reclamation of toxic mine-tailings and polluted industrial land;
- disaster mitigation (e.g., stabilizing potential landslide sites, dikes and levees, dampening wind scour, and area protection against flooding);
- soil improvement, wetland and marginal land restoration, and crop pest control;
- renewable natural fiber for handicraft production, mulch, and thatch, etc.
- bio-fuels

All these applications impact positively on sustaining the environment and natural resources, while improving human welfare.