Vetiver Solutions

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Executive Summary

Haiti’s agricultural sector, which provides livelihood to over 8 million Haitians, faces an unprecedented threat from soil erosion and climate change. Soil erosion is the deterioration of topsoil containing organic matter essential for fertility. Haiti is on the path to becoming a destitute island, and, without a sustainable solution, may become permanently dependent on foreign aid to feed its population. We propose a self-sustaining and simple solution to this threat.

Vetiver is a tall, multi-use grass with an incredible root system. Currently grown in the southwestern region of Haiti for its aromatic roots, vetiver has been shown to be effective in mitigating erosion. Promoted by the World Bank as a living-plant barrier (plant hedge to prevent erosion) since the 1980s, vetiver has been proven to be the most cost-effective erosion intervention in various countries and climates. For our venture, we will plant vetiver along hill farms in Haiti, beginning on La Gonâve. Once established, we will harvest the shoots, a renewable resource, process them into fibers, which we will then spin into thread. This thread will be sold wholesale to local non-profits. The roots of the plant will protect the crops and the soil from erosion. This plan will create a supplemental income for the farmers, while simultaneously improving agricultural soil quality and crop production.

Mission
To increase the income of rural Haitians by sustainably improving agricultural soil through living plant barriers while simultaneously creating jobs for local women.

Vision
To grow a poverty-free Haiti.
The Problem

Soil erosion in Haiti is currently the worst in the Western hemisphere, at an estimated 140 times greater per kilometer than in the United Kingdom. In a country where the agricultural sector provides livelihoods to 80% of the population, Haiti faces a severe threat to its peoples’ survival as a result of soil erosion. Forced to live harvest-to-harvest, farmers must practice unsustainable agricultural techniques known to increase soil erosion in hopes of maximizing crop yields. Unfortunately, over the course of many years, the loss of soil due to soil erosion degrades arable farming land, reducing crop yields. If this process is not reversed soon enough, the land may eventually be rendered unproductive to any crops.

Soil erosion is known to be a major problem amongst Haitians, impacting farmers’ everyday lives. When farmers in the central plateau were surveyed, 21% ranked soil erosion as their most severe obstacle to further development. In another survey, 70% of farmers said that a major agricultural problem they faced is “Tè a fatige,” or “The Earth is tired.” On the island of La Gonâve specifically, over 90% of farmland was abandoned between 1990 and 2010, largely due to soil erosion. Despite the saturation of Non-Governmental Organizations (NGOs) in Haiti, very few of the thousands of NGOs are targeting efforts towards agriculture including reversing soil erosion. Farmers in Haiti need a solution to the immense soil erosion they face without compromise of their profits or seasonal crops.

The Catalyst

An intervention shown to reverse the effects of erosion on farms is the use of a living-plant barrier surrounding crops – especially when grown in sloped regions. Research by the World Bank has shown vetiver to be the best such living-plant barrier in the world. Vetiver is a non-invasive, multi-use, tall grass which can be used for stabilizing soil and protecting against erosion. Root networks from properly installed hedges effectively control water and wind erosion by preventing runoff. The vetiver root structure is deep, strong, and filters soil, water, and sediments, and stabilizes soil to prevent land deformation.

Our goal is to improve soil quality of Haitian farms which will ultimately increase farmers’ crop yields. Using vetiver as a catalyst, our plan will reduce erosion, enabling better agricultural growth.

Vetiver currently exists in Haiti and is both flood and drought resistant, allowing it to thrive in diverse environments. Vetiver has been shown to survive in drought conditions for up to 15 months, as well as regions with average rainfalls of over 16 feet per year – conditions more extreme than any region in Haiti, making it a reliable genus.

As an example, in October 2016, Category 5 Hurricane Matthew devastated the southern arm of Haiti, leaving over 1,000
people dead. Despite the horrendous damage, one farmer noted that his vetiver crops were some of the only crops to survive.\textsuperscript{11} Overall, only an estimated 15\% of vetiver crops in that region were affected, compared to 90\% of all other crops.\textsuperscript{12} Its durability through extreme conditions makes vetiver a secure option. We plan to introduce vetiver as a living-plant barrier on pre-existing food-crop farms, which will take up only a small portion of the farmland and will serve to reverse the effects of soil erosion.

Additionally, the shoots of the vetiver can be harvested multiple times per year and processed into fiber, thread, or fabric to be sold. This dual-usage of vetiver will allow farmers to simultaneously increase profits, while also preventing soil erosion.

## Business Plan

### Location

Long known as the “forgotten island of the Caribbean,” Haiti is the poorest country in the Western Hemisphere with a GDP per capita of only $814.\textsuperscript{13} The island of La Gonâve, known as the “forgotten island of Haiti,” is among one of the poorest regions in the world. With a population of 130,000, La Gonâve’s population consists mostly of subsistence farmers living on a harvest-to-harvest basis.\textsuperscript{14} With the help of our partner Association Amis des Enfants de L’île de la Gonâve (AAE, described below), we plan to help these farmers gain long-term security by increasing their profits and creating a sustainable farming solution, both for the planet and the farmers.
Products and Services

Our venture revolves around planting vetiver hedges on hill farms of local farmers who choose to participate in our venture. We plan to buy vetiver from another region of Haiti through an individual who harvests solely the vetiver roots for their oil. The shoots, which we will propagate, are currently a waste product in the oil extraction process. Once we acquire the vetiver, we will teach farmers how to plant and care for the vetiver. The vetiver will be planted along the contour of the crop plots, with hedge rows every 30-40 feet, to prevent erosion.

As part of the agreement we will make with the farmers, we will use some of the vetiver grown to propagate the grass and later plant it on additional farms. This will allow us to expand to additional farms without having to purchase further vetiver, thus lowering our costs.

Research has shown that for every plant, 15 new plants can be propagated the next season, each vetiver season lasting approximately six months. The rest of the shoots will be harvested twice per year and purchased from the farmers to be processed into a thread, which can be used to make commercial items such as belts, aprons, or clothing. This thread will be sold to local NGOs that provide work and training for Haitians. There are currently hundreds of ongoing projects in Haiti with local and foreign NGOs employing and teaching skills such as sewing and weaving to local women. Most of the raw fabric materials used in these initiatives are imported into Haiti, creating a cycle of dependence on foreign goods. Our plan offers these NGOs a comparable alternative at a competitive price, sourced locally and sustainably. This will multiply the number of people benefitting from our vetiver, as well as reducing Haiti’s dependence on imports.

Our direct role in the venture will consist of installing the vetiver on farms, and post-harvest, processing it into thread to sell wholesale to a local co-op. The farmers will be responsible for the maintenance and harvest of the shoots, and the NGOs will be responsible for creating and selling their products created with the thread. All workers hired for our portions of the process will be paid and treated in accordance to Fair Trade regulations.

Vetiver fiber can be used similarly to other alternative fibers such as coconut and hemp, but will have the unique erosion-preventative value of the vetiver plants. To our knowledge, vetiver products are not currently commercially produced, though studies done in Thailand have successfully created vetiver fabrics and concluded that vetiver fabric accessories and clothing will likely be produced in the near future. Vetiver thread has great tensile strength, however, is not considered an exceptionally flexible or soft material. We therefore believe that vetiver fabrics will be most successful when made into accessories such as belts, handbags placemats, coasters, and prayer mats. We expect these products will especially appeal to the millennial crowd, as have many other Fair Trade products. This thread will generate profits that we can use to sustain the project. The vetiver shoots will be purchased at the time of harvest from the farmers at 50% of the expected profit, while the remaining 50% will be reinvested to continue to support and expand Vetiver Solutions.

Competitive Advantages

Vetiver offers a competitive advantage for several reasons: First, the maximum dry biomass yield for vetiver is up to 132 tons per hectare per year (t/ha/yr), approximately 6.5 times the maximum dry yield biomass of hemp, which is currently the most prevalent alternative fiber. The amount of thread that can generated from the same land area will thus be significantly greater. Secondly, vetiver is a powerful living barrier and helps to prevent erosion,
unlike other natural fibers. We believe that this dual usage of vetiver can be used to our advantage in promotion of the products. Finally, vetiver is a plant that is more flood and drought resistant than other natural fiber plants. As a result, vetiver growth will be stable despite the unpredictable future effects of global climate change.

Key Partner

Our main partner during our pilot phase will be a local non-profit named Association Amis des Enfants de L’île de la Gonâve (AAE). AAE has been operating in La Gonâve since 2000 and has offered a partnership with Vetiver Solutions. They have offered three acres of their land to devote to our partnership and have confirmed relationships with farmers who would be interested in taking part of the venture. Additionally, AAE has offered accommodations for our team during the pilot phase.

Value Proposition

Adopting the vetiver system generates several benefits for farmers. The use of the vetiver system will stabilize the soil of the farmland, as well as the surrounding area. The vetiver system has been shown to increase crop yields in as little as one year, and completely reverse the effects of erosion in fewer than 10 years when properly implemented. Additionally, the fibers made from the vetiver will serve as an added source of income, especially during the dry seasons when farmed crops cannot be harvested, creating a steadier income for families throughout the year. We hope that this will allow families to purchase additional food through the local markets, thereby decreasing the rates of malnutrition. Using vetiver for economic advantages has been shown to significantly increase socioeconomic status for rural farmers in many countries, including: Bangladesh, Nigeria, Kenya, and Venezuela, who have faced similar types of agricultural and economic difficulties. We are confident that a similar model in Haiti could be equally successful.

Little risk is involved in adapting this system: less than 1% of cropland otherwise used for the primary crop will be used for vetiver. This equates to an average income loss of $6 per hectare from crops. However, by our estimates, participation in this venture could increase the average farmer’s profits from a baseline of $600 per hectare to as much as $1,500 per hectare, easily making up for the lost crops. Losses may occur due to incorrect planting and maintenance of the vetiver, or unusually extreme weather conditions. Despite the risk, the potential benefits reassure us that farmers will want to try such an initiative.

For the groups, which we plan to sell the threads to, our program will decrease reliance on imported threads, helping them financially by reducing import costs. This will also allow the entire product creation process to be Fair Trade and Haitian-made.
## Theory of Change

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Outputs</th>
<th>Outcomes</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Vetiver used as a living-plant barrier</td>
<td>- Increased crop yields</td>
<td>- Increased food supply</td>
<td>- Improved socioeconomic status</td>
</tr>
<tr>
<td>- Shoots for thread</td>
<td>- Vetiver thread</td>
<td>- Increased profits</td>
<td>- Improved soil quality</td>
</tr>
<tr>
<td>- Materials to make thread</td>
<td>- Shoots for propagation and thread</td>
<td>- Sustainable farming practice</td>
<td>- Decreased reliance on imported goods</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Increased financial and nutritional stability</td>
</tr>
</tbody>
</table>

## Marketing

### Current Industry

Worldwide, there are several materials that lead the market of renewable fibers. Among these are: hemp, bamboo, flax, jute, and kenaf. Because hemp has been the most successful, it will be cited for comparison. As of 2015, the U.S. market for hemp clothing and textiles was valued at approximately $100 million/year. The global natural fiber composites market is forecast to grow at a compound annual growth rate of 8.2% from 2015 to 2020, meaning that an increase in supply of natural fibers will be necessary to meet the increasing demand. The major driver for the growth of this market is the rise in demand for lightweight and environmentally sustainable composite materials. Concurrently, traditional cotton fiber supply, use and trade has been decline over the last five years, showing a 5% decrease just between 2014 and 2016. With the increasing demand for alternative fibers and a decreasing demand for traditional products, we believe vetiver will fill a niche in a changing textile market and help direct the alternative fiber landscape in the coming years.

### Customers

Our primary customers will be the NGOs who will be purchasing our thread for use in their own products. Haiti is considered the “NGO republic of the world,” currently housing anywhere from 3,000-10,000 NGOs. Hundreds of these NGOs work to empower local women through vocational training, including sewing and jewelry making. We will market the thread wholesale to these NGOs as our primary customers for use in their products as locally sourced,
sustainable alternatives to their imported threads and fabrics. These NGOs can then create and sell their goods on their preexisting markets. Because our focus is combating the poverty and malnutrition in Haiti, we will start by approaching NGOs based in La Gonâve and mainland Haiti. Eventually, we plan to consider international expansion as this model is scalable nearly worldwide. Additionally, because we will be acting in accordance with Fair Trade regulations and plan to obtain Fair Trade certification, any NGO using or aspiring for Fair Trade status will be able to use our thread and sell their products as Fair Trade, which has been shown to increase sales by approximately 10%.29

It is also necessary to consider the farmer a customer, though not in the traditional sense. The farmers are customers in the sense that they must “buy in” to our venture yet we are not asking them for money in exchange for a product or service. To promote participation in this operation, the farmers will not be required to financially participate in the pilot, and Vetiver Solutions will never ask farmers to pay for the vetiver planted on their farms. We will incentivize the farmers to continue participation through the profits they receive from the fiber sales. The farmers will be able to discontinue their relations with Vetiver Solutions with no financial consequences. The primary role of the farmers is to grow and harvest the vetiver shoots that we will use to produce thread. In a sense, the farmers pay Vetiver Solutions in the form of land and skilled labor.

Barriers to Entry

One of the largest barriers to entry in this market is attempting to enter a fiber market that already has a number well-established, eco-friendly alternatives. However, we believe that by selling our product to local organizations who already have a presence in the international market, we can bypass this barrier.

Competition

We have not identified any direct competitors for implementing the vetiver system on the farmers’ land, nor for vetiver thread. There are a number of other competitors for the NGOs when attempting to enter the fiber industry. Hemp, bamboo, coconut fiber, flax, and other natural fibers may be direct competition, however none of them are grown in great quantity in Haiti. These may limit the likelihood of NGOs opting for our vetiver thread. We have also identified a number of indirect competitors such as the vetiver perfume industry, which harvests the roots for their aromatic qualities. Pulling out the roots counters the erosion control of vetiver. However, harvesting vetiver roots is incredibly labor intensive and results in relatively little profit relative to the projected income farmers would receive from selling their vetiver to us. As a result, we expect there is little risk that the vetiver would be taken out of the ground. This has never caused major problems in implementation of vetiver as a living-plant barrier in other parts of the world and we do not have reason to believe that there will be problems in Haiti.30

Strategy and Implementation

Pilot

In the pilot phase, Vetiver Solutions will rely on grant money and private donations to cover the start-up costs. Based on current projections, a profit can be expected after 12-18 months. For our pilot, we will work to improve agricultural practices beginning on the Haitian
island of La Gonâve. As mentioned, we have established a key partnership with AAE, who has graciously offered us three acres of land for our pilot, as well reliable and skilled workers. With their help, we will acquire the vetiver planting materials and plant it on their land. While the plants are establishing, through their pre-existing relationships with local farmers, we will identify appropriate hill farmers who are willing to participate in our program. AAE has confirmed that there would be interest among their farmers in such a venture. We plan to communicate with farmers through AAE’s local interpreters to answer all questions, and to hand out booklets to further explain our intentions.

After planting on the farmer’s land, while we wait to harvest the shoots, we will acquire excess shoots from additional vetiver oil farmers who otherwise dispose of the shoots. We plan to test and refine the process of extracting fibers from the shoots to ensure that the thread is comparable to alternative threads in production, quality, and profitability. After we have perfected this method, we will purchase and harvest the shoots from the farmers, which will be processed into thread. After processing, we plan to sell our initial thread to Beautitudes Inc., a local cooperative in La Gonâve that employs women to make jewelry, cloth items, and other accessories to sell internationally. We have been in contact with Beautitudes Inc. who has shown interest in purchasing vetiver thread.

Scalability

We believe that this process can be scaled to the national and even global levels. Vetiver is currently grown in many African nations, most of Central and South America, and much of Southern Asia. We believe that these locations can benefit from this initiative, creating end products fitted to each country’s culture. Within Haiti we anticipate expanding to five additional farms after the second biannual period and ten additional farms joining every biannual period thereafter. However, vetiver can be propagated at a 15:1 ratio each year, which would allow growth to hundreds of thousands of farms within 4-5 years.

Risks and Assumptions

<table>
<thead>
<tr>
<th>Risks &amp; Assumptions</th>
<th>Impact of Risks &amp; Assumptions</th>
<th>Mitigation Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers willing to plant vetiver on their farms</td>
<td>If no farmers willing, fail at overall goal of reducing soil erosion for local farmers</td>
<td>Using farmers that already have relationships with AAE</td>
</tr>
<tr>
<td>Vetiver will receive enough water</td>
<td>Lower: yields, production of fibers, rate of propagation, profit</td>
<td>Will plant vetiver during wet season. Will budget money to pay for well water. Vetiver is drought resistant, so any damage would be minimal</td>
</tr>
<tr>
<td>Correct use of vetiver</td>
<td>Incorrect use of vetiver may increase soil erosion</td>
<td>Interpreters will explain use of vetiver and have booklet of vetiver use</td>
</tr>
<tr>
<td>Thread production will be comparable to other fibers</td>
<td>Vetiver can be made into many other things, including: woven into handicrafts and furniture, animal fodder, briquettes for fuel</td>
<td>Major part of what we will find out during pilot</td>
</tr>
<tr>
<td>Ability to create large amount of fiber in Haiti</td>
<td></td>
<td>Major part of what we will find out during our pilot</td>
</tr>
<tr>
<td>Ability to hand card and spin vetiver into thread that can be used</td>
<td></td>
<td>Plan to speak with expert beforehand</td>
</tr>
<tr>
<td>Farmers maintain relationships with Vetiver Solutions</td>
<td>Less vetiver to be used to make thread. Less ability to scale</td>
<td>Incentivize farmers with up-front purchasing of shoots</td>
</tr>
</tbody>
</table>
Farmers do not attempt to pull up vetiver to harvest roots for oil  

Soil erosion made worse by root harvesting  

Will discuss with farmers that we will not purchase shoots if they pull up roots. Will show farmers considering harvesting roots that we are a more profitable use of vetiver  

NGOs interested in vetiver thread  

No source of profit from thread. Must consider other utilization for vetiver  

Create large amount of thread during pilot to show NGOs  

Ability to consistently transport materials (such as lye) to La Gonâve  

Processing into shoots would become much more difficult and time-consuming  

Will search for local suppliers once in Haiti  

Ability to mass-produce vetiver thread  

Significantly less profit. Must consider other utilization for vetiver  

Major part of what we will find out during our pilot  

Financials

Based on assumptions, market research, and analysis of the alternative fiber market, it has been determined that a fully functional 6-month long pilot project could be implemented for approximately $6,550, outlined in the appendix. After the initial 6-month pilot (Year 0) where we will not harvest, we can expect to recover these expenses and make a profit after the first harvest, or 12 months’ total. Our increasing costs every year deal with the increasing labor and processing costs for expanding to additional farms. This model assumes a 95% vetiver survival rate and full farmer cooperation. This model also assumes expansion to 5 additional farms in the first year and 10 additional farms biannually beyond that.

<table>
<thead>
<tr>
<th></th>
<th>YEAR 0</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
<th>YEAR 4</th>
<th>YEAR 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>-</td>
<td>$76,500.00</td>
<td>$162,900.00</td>
<td>$248,300.00</td>
<td>$333,700.00</td>
<td>$376,900.00</td>
</tr>
<tr>
<td>Costs</td>
<td>$6,550.00</td>
<td>$14,408.80</td>
<td>$19,699.53</td>
<td>$41,020.13</td>
<td>$62,340.73</td>
<td>$83,661.33</td>
</tr>
<tr>
<td>Profit</td>
<td>($6,550.00)</td>
<td>$62,091.20</td>
<td>$143,200.47</td>
<td>$207,279.87</td>
<td>$271,359.27</td>
<td>$293,238.67</td>
</tr>
<tr>
<td>Cumulative Earnings</td>
<td>($6,550.00)</td>
<td>$55,541.20</td>
<td>$198,741.67</td>
<td>$406,021.54</td>
<td>$677,380.81</td>
<td>$970,619.48</td>
</tr>
</tbody>
</table>
In order to understand how Vetiver Solutions began, we must go back to 2013 when Jesse Abelson traveled to Haiti for the first of what would become a regular trip for Jesse. Traveling with Project Medishare to volunteer at a hospital in Port-Au-Prince, Jesse’s life was changed forever in just one short week. During that time, Jesse saw countless illnesses and deaths due to the extreme poverty and malnutrition that is devastatingly prevalent in much of Haiti. Returning home to begin his studies at the University of Minnesota, Jesse was determined to do something to help prevent any further unnecessary suffering and death from these causes.

That opportunity arose in the summer of 2016 when Leeore Levinstein, a friend and co-worker of Jesse’s mentioned that she would be taking her second Grand Challenge Course in the upcoming fall: Seeking Solutions to Global Health Issues. Immediately Jesse was on board to take the course and by the first week, the two of them began brainstorming an idea for a project. Little did they know at the time, but another member of the class, Dalton Schutte had similar experiences on his first trip to Haiti. It wasn’t until all three of the members came together at the end of September 2016 that the idea of Vetiver Solutions born.

Over the course of the past 6 months, we have worked tirelessly to do whatever it takes to help stop the unnecessary deaths that are occurring every single day in Haiti, and the rest of the world. As three pre-med students, we are not afraid to admit that were not experts at agriculture or business. However, what we may have lacked initially in knowledge, we made up for in passion and ambition. We have spent thousands of hours of research to become experts on vetiver. We have exchanged hundreds of emails with experts in their fields, and met with a number of them, taking in as much of their knowledge as they were willing to give us. We have quickly become knowledgeable in the fields of business, soil, plant science, and even creating fibers from plants. In fact, we have tested and successfully created vetiver fiber, as well as another grass fiber. We are Vetiver Solutions and we are fully committed to making this world a better place through the use of vetiver.

“Never doubt that a small group of thoughtful, committed people can change the world. Indeed, it’s the only thing that ever has.”

-Margaret Mead
## Appendix

### Pilot and Follow-up Expenses

#### Year 0 (Pilot) Costs

<table>
<thead>
<tr>
<th>Material Purchasing</th>
<th>$1,500</th>
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</thead>
<tbody>
<tr>
<td>Travel Expenses</td>
<td>$2,000</td>
</tr>
<tr>
<td>Initial Vetiver Plugs</td>
<td>$2,250</td>
</tr>
<tr>
<td>Labor</td>
<td>$800</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$6,550</strong></td>
</tr>
</tbody>
</table>

#### Post-Pilot Quarter 1 & 2 Costs

<table>
<thead>
<tr>
<th>Sodium Hydroxide</th>
<th>$654</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>$1,800</td>
</tr>
<tr>
<td>Labor (excluding processing)</td>
<td>$800</td>
</tr>
<tr>
<td>Processing Costs</td>
<td>$1,170</td>
</tr>
<tr>
<td><strong>TOTAL STARTUP EXPENSES</strong></td>
<td><strong>$4,424</strong></td>
</tr>
</tbody>
</table>

### Yield and Revenue Projections

<table>
<thead>
<tr>
<th>Projected Dry Mass Yield</th>
<th>9,000 kg</th>
<th>Projected conversion percent to fiber</th>
<th>25%</th>
<th>Projected Fiber Yield</th>
<th>2,250 kg/ha</th>
<th>Cost of processing (excluding labor)</th>
<th>$1.36/kg</th>
<th>Fiber sale price</th>
<th>$5/kg</th>
<th>Projected Revenue</th>
<th>$11,250/ha</th>
</tr>
</thead>
</table>
Break-Even Analysis

Cumulative Earnings
Additional Uses of Vetiver

There are many additional uses of vetiver that can be taken advantage of if we have excess vetiver shoots after the harvesting process. These uses include:

- Roofing
- Animal fodder
- Soil fertilizer
- Handicraft weaving
- Briquettes for fuel
- Vetiver latrines

These uses will be considered if we are unsuccessful in selling vetiver thread or if we have excess shoots.

18 Month Timeline
The Vetiver System

Figure 1: Above left: contour bank; below left: banks divert the water; above right: Vetiver hedges create banks or terraces over time; below right: Vetiver hedges slow the runoff to increase infiltration, and the water remains in the field (Greenfield 1989)

For more detailed description of vetiver system for erosion control, see pages 94-125 of the “Vetiver Systems Application: Technical Reference Manual”.
Acknowledgements

Dozens of individuals contributed to the creation of Vetiver Solutions. We would like to extend our sincerest gratitude to anyone who gave us their time, listened to our ideas, and provided insight, feedback, and opinions. Our work would be incomplete without acknowledging:

Fred Rose, Cheryl Robertson, Leo Sharkey, and Megan Voorhees for their guidance and patience through every stage of our development through the better part of a year;

Kenton Spading, Aruna Raman, Tom Fisher, and the entire Acara and Grand Challenge network for their time and insight in countless meetings;

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Rose Gbadamassi and the Haitian Community of Minnesota;

Dick Grimshaw and Paul Truong, vetiver experts;

Professor Jay Bell;

Professor Nicholas Jordan;

Rebecca Desens, Rachel Hagen, and our many other peers for their feedback;

And Acara, for this incredible opportunity, for forcing us to push past our limits and grow, as individuals and as a team, and for empowering us to believe that we can change the world.
References

23. Vetiver, the Magical Grass spreads in Busia County Vetiver, the Magical Grass spreads in Busia County (Kenya).