2022 ECHO International Agriculture Conference

ECHO Staff

The Vetiver System: A Toolkit in Support of Community-Led, Climate Change Adaptation

Jim Smyle, Chairman and President of The Vetiver Network International (https://www.vetiver.org/), presented The Vetiver System as a practical and affordable option for community-led adaptation to climate change. The Vetiver System, as a concept, refers to the many uses of vetiver grass (*Chrysopogon zizanioides*), a clumping, long-lived grass that thrives in the tropics and subtropics. Smyle pointed out that the benefits of vetiver grass are well documented. Applications of vetiver serve as a valuable toolkit of proven technologies.

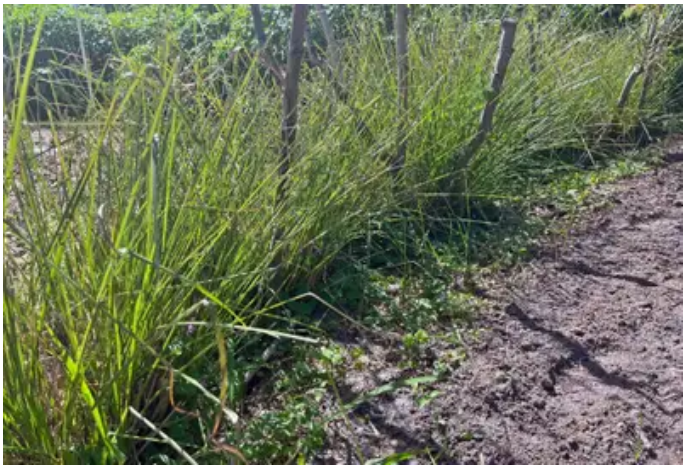

Figure 12. Vetiver hedgerow along the contour of sloping ground at the ECHO Global Farm in southwest Florida. *Source:* Tim Motis

Smyle presented many positive traits of vetiver that contribute to its usefulness. One of the most significant of these is its fibrous roots that grow downward, reaching a soil depth of 5 m or more. Vertical instead of lateral root growth minimizes competition with nearby crops. Moreover, vetiver is non-invasive, due to its sterile seeds.

3Obtain planting material of vetiver grass by dividing a clump into slips, with each slip consisting of at least three shoots (also called tillers) and associated roots. Trim the shoots and roots for ease of transport. A Vetiver Network International photo guide illustrates this process in more detail.

Vetiver is multiplied by division3 and planted close together to form a hedge (Figure 12). With deep, extensive roots and dense, stiff shoots, vetiver hedgerows along slope contours are extremely effective in protecting soil from erosion.

Many climate-related challenges can be addressed by making use of vetiver. Table 1 lists a few examples that Smyle mentioned.

Table 1. Some of the ways vetiver can be used to cope with climate-related challenges.

Challenge	How vetiver help
Drought	Conservation of soil moisture and improved infiltration of water
Flooding	Reduced runoff along with trapping of sediments and ground stabilization
Land degradation	Conservation of soil moisture, reduced soil erosion, retention of sediments, and removal of toxic chemicals and heavy metals

Smyle's presentation, available on here (https://www.echocommunity.org/resources/16fb7944-2117-4082-a55b-5a7a34e92fa4) [http://edn.link/a2z344 (https://www.echocommunity.org/resources/16fb7944-2117-4082-a55b-5a7a34e92fa4)], featured many more applications of vetiver. You can also find a wealth of information on The Vetiver Network International website, vetiver.org (https://www.vetiver.org/).

Meeting Needs with Service: Improving Livelihoods of Smallholders Through Service

Dr. Marjatta Eilittä presented [http://edn.link/xjkhkp (https://www.echocommunity.org/resources/94c8c011-ae2e-418a-858a-05265358aed3)] on behalf of farmers and international volunteers. Dr. Eilittä implements Farmer to Farmer (F2F) expert volunteer exchanges for Cultivating New Frontiers in Agriculture (https://www.cnfa.org/program/farmer-to-farmer/) (CNFA). CFNA's mission is to stimulate economic growth and improve livelihoods by cultivating entrepreneurship in international agricultural development. Volunteers work with farmers, farm groups, and other agriculture sector institutions. CNFA builds partnerships that meet the world's growing demand for food in 47 countries.

F2F provides technical assistance from the United States (US) to the Global South. CNFA responds to the expressed local needs of host-country farmers and organizations by leveraging agricultural expertise from volunteers in the US.

In addition, F2F facilitates trainings by Feed the Future Innovation Lab (https://www.feedthefuture.gov/feed-the-future-innovation-labs/) experts and collaborates with the private sector. Over a two-to-three-week period, US agricultural professionals (from farmers to business and communication specialists) share their skills and knowledge in new places with new people, engaging in citizen diplomacy. Of all volunteers, 43.9 percent volunteer for faith-based reasons. Over half have a bachelor's or graduate degree. Below are few examples of assignments undertaken by volunteers:

- In Zimbabwe, volunteers provided an irrigation association with business management and leadership training for 99 people (43 women), including bulk messaging to potential clients, use of demand analysis products, and formation of a regional marketing board. Volunteers also served 21 women members of a one-hectare garden project by providing training in business development and crop diversification.
- In Madagascar, volunteers advised a livestock feed producer, making feed from soybean cake. Their efforts, which included training in support of soybean oil processing, were undertaken to improve the potential of soybean as a new cash crop and source of fortified livestock feed for smallholders.
- Volunteers have also increased honey production (Madagascar), improved aquaculture (Zambia), and strengthened organic agriculture (Moldova).

If you have resources or skills you can share with others and are interested in improving food security and incomes in developing countries please contact Marjatta Eilittä <meilitta@cnfa.org (mailto:meilitta@cnfa.org?subject=Interest%20in%20F2F%20program)>

Establishing Fruit Trees

"Trees belong in a forest," speaker Bryan Beachy reiterated throughout his talk. He challenged the audience to think through the differences between monoculture fruit tree orchards and forests and to consider how trees should be managed considering those differences. Beachy shared examples of establishing fruit tree plantings using syntropic agriculture principles on his farm in Haiti. His personal experience and success with syntropic agriculture, compared to many other systems he has attempted on the farm, is supported by his video timelapse (https://www.echocommunity.org/resources/38a3a86e-d528-43ee-b7ef-3b3655d07637) of his planting [http://edn.link/beachy2022 (https://www.echocommunity.org/resources/38a3a86e-d528-43ee-b7ef-3b3655d07637)]. He stressed the importance of protecting young trees from the hot sun, wind, and roaming animals. Soil fertility management through organic matter inputs is also important for the overall health of the system.

Beachy then walked the audience through the phases of designing (Figure 13) and establishing a syntropic agriculture system, using his own design for his farm as an example. Syntropic agriculture systems include a multitude of different plants. Some trees and grasses are planted for the primary purpose of producing biomass that is later pruned or cut and added to the system. Other trees that have rapid growth habits can be used as "emergent" trees that provide shade and early biomass for the system, but are not utilized in the long-term. Fruit trees of varying canopy sizes are important productive components of the system. Lastly, annuals are grown in the spaces where sunlight reaches the canopy floor. Over time, there may be less area for annuals in the system.

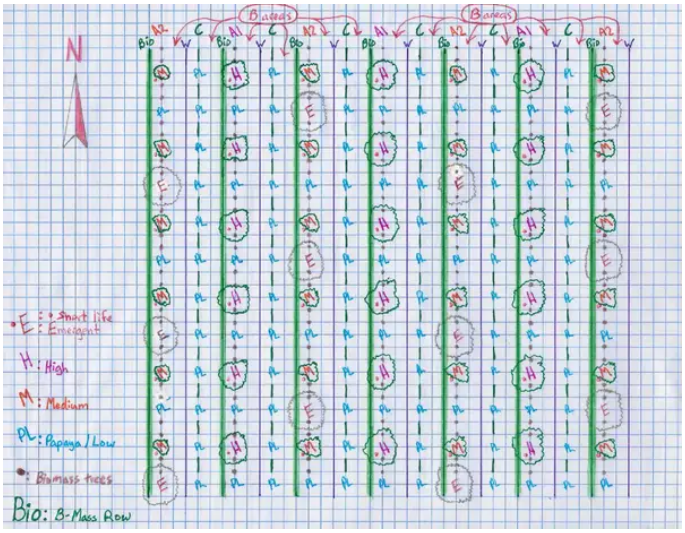

Figure 13. Design with all three phases included. *Source:* Bryan Beachy

1. Phase 1– Design

    1.1. Marking placement of biomass (centerline) rows
    1.2. Marking placement of trees rows (either side of the centerline with high and low trees on one side of the centerline and emergent trees on the other side of the centerline)

2. Phase 2 – First round of planting

    2.1. Planting biomass trees in centerline rows
    2.2. Planting emergent plants (papaya or annuals) in areas between centerlines and tree rows

3. Phase 3 – Second round of planting

    3.1. Planting Fruit Trees (30-60 days after phase 2)

For step-by-step instructions for how to design a syntropic agriculture planting, see the free PDF *Abundance Agroforestry – A Syntropic Farming Guidebook* (https://www.echocommunity.org/resources/ae1d762e-d561-4a7e-80b3-de9ddeaa6259) by Roger Gietzen [http://edn.link/eyajg4 (https://www.echocommunity.org/resources/ae1d762e-d561-4a7e-80b3-de9ddeaa6259)].
Beachy's presentation slides are available here (https://www.echocommunity.org/resources/7526dce2-2cd1-41d5-8717-e7a344aefcf6) [http://edn.link/wemx7g (https://www.echocommunity.org/resources/7526dce2-2cd1-41d5-8717-e7a344aefcf6)].

Unlocking the Power of Genetics: New Crop Selection for Gardens and Farms

Josh Jamison, owner of Cody Cove Farm and Nursery (https://codycovefarm.com/) in Babson Park Florida, is an experienced grower of tropical crops. His passion for germplasm evaluation lent many insights into production optimization opportunities that farmers may overlook. Jamison stressed the importance of diversity for not only agricultural purposes but also for human nutrition and whole communities. Some reasons for seeking out new crops include widening seasonal availability (having mulberries for a longer period of the year), economic opportunities, and expanding crop uses. So, how do you know if crop genetics may fill a gap in your community? Jamison shared practical considerations to address this question:

- Study the local environment and select crops that thrive there. Look for native plants in climate analogues (other places in the world with similar climates).
- Conduct variety trials to explore what variety may perform best in your region.
- Grow more plants from seed that would otherwise be propagated from cuttings or by grafting. Growing plants from seed takes time but can widen the genetic base for a crop.
- If grafting, select rootstock that allows for more resilient production (Figure 14).
- Look at close (sometimes wild) plant relatives that might thrive better under local conditions.
- Breed your crop. You don't have to be a scientist to make your own crosses.4 Most early varieties came from growers who wanted something specific.

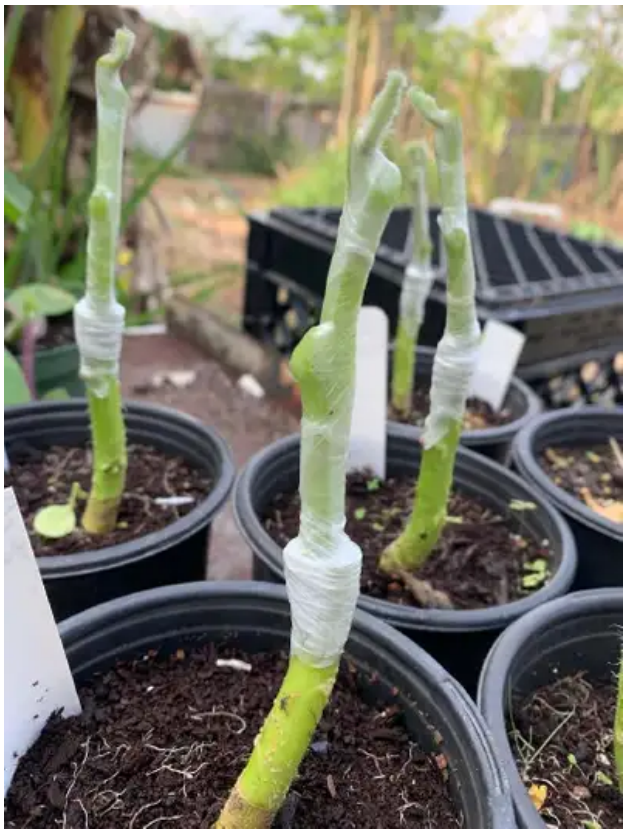

Figure 14. *Solanum macramthum* serves as a nematode resistant rootstock to tree tomato. *Source:* Josh Jamison

4For a photo guide on how to pollinate pumpkins for genetic preservation or for out-crossing, see Langford, 2006 [http://edn.link/7e7ere (https://www.echocommunity.org/resources/c6a0eeea-c797-4b43-8977-8b0f62f7a50a)].

If you are looking for local sources for plant genetics, try government or university research stations, seed banks, fresh markets, international collectors, immigrant populations or wild plant specimens. Jamison's presentation slides are available here (https://www.echocommunity.org/resources/7526dce2-2cd1-41d5-8717-e7a344aefcf6) [http://edn.link/yw2kwk (https://www.echocommunity.org/resources/7526dce2-2cd1-41d5-8717-e7a344aefcf6)].