Climate Smart Agriculture
in the Eastern Caribbean States

Climate Smart Agriculture in St. Vincent and the Grenadines: A Brain-Stormed Organic Approach to Agriculture

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National ECS CSA Competition Winner

Richmond Vale Academy

Caribbean Climate Smart Agriculture FORUM

Contributions to Climate Smart Agriculture

Organic farming and permaculture practices make efficient use of natural resources, enhancing soil fertility and composition. Gray water recycling and landscape management have increased water use efficiency. Capacity development efforts have increased human capacity for resilience in the broader community.

Diversified production, extension of the growing season through protected agriculture, cost savings, and organic practices contribute to enhancing the food and nutrition of the students and community members.

Reforestation efforts, mulching, agroforestry, use of renewable energy, and the elimination of agro-chemicals during production minimize greenhouse gas emissions and enhance carbon sequestration, thus contributing to mitigation efforts.

Climate change signals:

- Increased climate variability
- Increased temperatures
- Changes in precipitation patterns
- Increase in frequency and/or intensity of floods

Climate smart practices and technologies:

- Diversification
- Alternative farming methods
- Renewable energy
- Landscape management
- Soil Management
- Water management
- Agroforestry
- Capacity development

The challenges posed by Climate Change

Over the past several decades, multiple climate changes have occurred across the islands of Saint Vincent and the Grenadines (SVG), located in the Lesser Antilles, including increasing temperatures, changes in water availability and precipitation, and increasing instances of floods. The December 2013 floods, for example, adversely affected many agricultural zones across SVG and several regions are still recovering.

These changing climatic conditions, especially over the last twenty years, have presented multiple risks to the country's agricultural sector, affecting the productivity and quality of crops. Marked changes in rainfall dynamics, with more frequent and intense precipitation events, and more frequent and pronounced drought events that disrupt farming and other economic activities, have presented new challenges for farmers. Farmers are now forced to respond to these adverse changes that affect the way they are accustomed to farming and threaten to destabilize the economic viability of many farming communities.

These changes, along with increasing climate variability, have influenced soil fertility, crop selection, and harvesting times. The emerging challenges have prompted a need for change in agricultural practices and technologies on the islands. Innovators in the community of farmers in SVG have realized that to tackle these issues, both mitigation and adaptation measures need to be implemented, and have thus committed to working towards creating more resilient agricultural systems.

The solution

Located on 30 acres of farmland on the Leeward coast of St. Vincent, beyond the town of Chateaubelair, Richmond Vale Academy is a non-profit educational institution that seeks to train local and international youth in climate change, food security and poverty reduction through on-farm education. Established

in 2002, women and youth represent over 70% of the current student body, which consists of both local (1/3) and foreign (2/3) individuals.

The Academy's philosophy embraces environmental sustainability, as an initial assessment by the institution indicated a need to transition from the widely practiced conventional approach to farming, to the use of practices that foment a food, energy and disaster secure production system. Now focused on organic crop and livestock production, composting and water harvesting techniques, the Academy leads on-farm capacity building programmes, environmental education drives and awareness raising efforts to encourage resilient crop production, improved livelihoods and a healthy environment. The Richmond Vale Academy has employed multiple climate-smart techniques including:

Organic production: Organic production is promoted to help enhance the resilience of production while decreasing greenhouse gas emissions through the use of non-fossil fuel based inputs. In the intensive permaculture garden, a variety of herbs and flowers including rosemary, thyme, chives, aloe, marigolds and others are planted along the borders of the beds to deter pests. Bio repellents, such as cayenne and garlic, are also applied to plants with a spray can. On the farm, some crops are introduced as pest repellants, while other crops are cultivated to assist in nitrogen fixation of soil and pollination.

Permaculture and integrated farming: On the farm there are large, designated areas for rearing animals and spaces allocated more exclusively to crop production. Livestock are grazed in strategic areas to aid in weed removal and allow for the spread of manure as organic fertilizer to revitalize and maintain the pH balance of the soil. Within the intensive garden, a system of continuous intercropping is used, mixing up to nine plant families within each bed. These are planted in a guild system that takes into account plant growth characteristics and root structure. Outside of the intensive system a traditional fruit, leaf, root, legume rotation cycle corn/legume system is also being developed.

Protected agriculture: There are now three greenhouses where vegetables and herbs are grown. This helps to ensure optimum conditions for growth throughout the distinct wen and dry seasons. By extending the growing season, these vegetables help to auto-sustain the group of persons living at the institution, improving food security and accessibility to fresh local produce.

Energy efficiency: The use of solar water heaters and a new solar panel system will contribute to greater energy efficiency on the farm and reduce the fossil fuel footprint of the Academy. They have been installed in each of the dormitory and administrative sections of the farm and will be connected in September 2016.

Erosion control: New swales are constructed in the areas prone to the most erosion damage. The swale has a number of benefits as it slows run-off whilst recharging ground water and providing extra nutrients and water for trees and other productive and support species planted along the swale line.

Water recycling and management: A system was designed to enable the reuse of gray water for irrigation purposes, thus addressing water availability issues. Four gravity-fed mega tanks were constructed to allow for the reuse of water from showers, washing machines and sinks. Water is recycled and channelled to irrigate specific crops. From an educational standpoint, the system facilitates education on the water cycle and raises awareness of how individuals can actively contribute to reducing pollution of water bodies.

Agroforestry: Trees have been incorporated into the farming system to help sequester carbon and other nutrients, such as nitrogen, to improve soil health. The orchard is being converted to a thriving food forest by increasing diversification in layers and enhancing productivity. After several failures in cultivating bananas using chemicals, an experimental organic banana patch on half an acre, in which a grove of gliricidia trees existed, was established. The gliricidia branches are periodically cut and dropped to enhance the soil around the bananas. A plan is in place to add vanilla and cocoa, together with other support species. There are also ongoing reforestation projects in strategic areas helps to aid in the sequestration of carbon.

Mulching and Composting: Dry leaves and other organic matter (gliricidia leaves and vetiver grass) are left to decompose on agricultural beds, and help to increase soil fertility, composition and, combined with other practices, optimize nutrient flow through the production system. This helps ensure that the crops cultivated can grow and be nurtured without the use of chemicals, while the continuous enrichment of the humus layer creates a buffer against harsh climatic conditions. Erosion from heavy rainfall is avoided and soil moisture is maintained during dry conditions.

Capacity building: Farmers and other persons who come to visit are given the experience and opportunity to participate within the framework of the academy. Different methods are used, including field discussions and practical sessions that seek to incorporate Good Agricultural Practices, climate compliance, school outreach, hikes, tree planting and workshops. Among the topics taught are climate adaptation, pest and disease management, recycling, greenhouse management, composting, and diversification. Leadership development and other soft skills complement the technical topics. Members of the North Leeward community, including schools and community groups, actively participate in open day sessions and outings.

The key beneficiaries of the work of the Academy are the 500+ students, farmers and persons who come to the institution to be engaged in organic farming, permaculture and climate change resilience activities. Several local families also benefit. Many women within the neighbouring communities have benefited from the investigative and direct approaches of these technologies. Schools and communities would have learned about climate risk and how they can play their role in reduction of chemicals, food security, improvement of their livelihoods and contributing holistically to the agricultural sector.

Results and contributions to the 3 pillars of climate smart agriculture

When its efforts began, there was limited knowledge of these climate-smart practices in the area, and varying perceptions of their feasibility. The implementation of these practices has helped to address various climate risks and has had positive socio- economic impacts on production and farmers, while fostering broader awareness of sustainability and environmental issues.

- Organic farming practices and permaculture are contributing to climate resilience by maximizing the effectiveness of natural resource use, while minimizing the use of agro-chemicals and fossil fuel intensive techniques. By promoting the use of organic production on the island, RVA is promoting the health and longevity of agro-ecosystems and the sustainable use of natural resources.

- Integration of sustainable practices has become more common around the island, as awareness has been raised and people now realize that climate change is real and the risks affect all community members. Increased knowledge of climate smart practices has led people to improve their production as they better understand the benefits of organic and climate smart agriculture, both for the environment, human health, and production. The community of North Leeward has advanced its production and many people have also begun to diversify and expand their levels of production.

- Enhanced carbon storage and sequestration were achieved through the appropriate management of livestock (preventing damage to native grasslands and avoiding deforestation), soil carbon sequestration as well as agroforestry and reforestation activities.

- Since the inception 500 + persons, primarily youth and women, improved their knowledge of sustainable agriculture. Schools and communities have learned about climate risk and how they can play a role in improving food security, livelihoods and contribute holistically to the agricultural sector.

- Minimal soil compaction as a result of low impact agricultural techniques has helped maintain soil fertility and soil composition while reducing runoff, damage to soil ecosystems and nutrient leaching.

- Many women and youth have been empowered to become part of the solution. Many previously thought it impossible to cultivate and practice farming without a viable income/ start-up to buy tractors and other chemicals etc. This initiative has helped persons to learn how to increase their income in a sustainable manner; while at the same time protecting and conserving their environment.

- Economic savings have been achieved through the use of renewable energy sources, reuse of gray water, elimination of agro-chemical use and utilization of organic inputs. On a yearly basis, approximately $400-$700 is saved through reductions in consumption of agrochemicals and in public water supply usage.

- Diversification and integrated farming has improved farm management, enhanced productivity and enabled more efficient use of both land and capital. Permaculture and mixed farming have helped to provide diverse foods and nutritional benefits for the students and farmers at the institution.

Lessons Learned

One of the primary lessons learned on which RVA will build future efforts is that climatic risks have serious implications, especially for SVG's farmers. Understanding the risks and how to address them is key to enhancing the resilience of production systems, and sustainable development must always be considered in efforts to mitigate and adapt to climate change. It is imperative to create a strong link with the 17 newly reformulated Sustainable Development Goals agreed upon in 2015.

Education on and promotion of sustainable agricultural practices with youth is an important step in ensuring the future of food security in local communities, and proactively responding to actual and anticipated climate change impacts enhances the effectiveness of action. As the population grows and more food is required, farmers must be encouraged to continue to work in the sector, and not be afraid to be innovative and creative in their approaches. While climate change can be seen as a frightening phenomenon, it must be acknowledged that it is here to stay, and the positive opportunities must also be considered. Farmers must advance amidst the challenges to achieve a more viable and sustainable agricultural sector and world.

Climate Smart Agriculture (CSA) is an approach to developing the technical, policy and investment conditions to achieve sustainable agricultural development for food security under climate change. The goal of CSA is to enable the sector to transition towards more climate-resilient production systems and more sustainable livelihoods in the presence of climate change stressors and climate variability. The three pillars of CSA interventions and practices are intended to:

1. Sustainably increase agricultural productivity and incomes (i.e. strengthen livelihoods and food security, especially of smallholders);

2. Adapt and build resilience to climate change;

3. Reduce and/or remove greenhouse gases emissions, where possible and appropriate.

Caribbean countries are particularly vulnerable to climate change related risks, and in response, are actively seeking to develop agricultural production systems that are resilient to climate related risks and stressors and make efficient use of the limited natural resources available. In that regard, efforts are made to develop, identify, promote and disseminate innovative farming systems, farm technologies, strategies and measures that will help to build resilience and increase the productivity and viability of the agriculture sector in the region.

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