Trinidad & Tobago, Port of Spain, November 15, 2016 – A quick glance at agricultural practices in developed countries around the world will tell a story; the practices, innovation and even the look of agriculture have definitely changed. The mid-western United States is no longer home to hundreds of small, family farms but rather host to mega-farms, boasting over 20,000 acres of cultivated land. The APP supported a group of 16 Caribbean stakeholders (CARDI technicians, farmers, extension officers, researchers) got to witness the advances in farming technologies first hand, through a training tour to several cities in the United States organised by the International Fertiliser Development Company (IFDC). New tools in use across the globe can provide the latest updates on water and fertilizer levels in a field and automatically turn on irrigation systems, and the latest and most efficient greenhouse structures can offer altered growing seasons for high demand fruits and vegetables. Technology is quickly becoming the farmers’ new best friend.

But, how have things changed in Caribbean agriculture? And, how is the Region to compete in global, and even local markets, in the world of mega-farms and technology enhanced farming?

There is no single answer to this concern. Much needs to be done to bolster agriculture in the Caribbean, from improving crop varieties to building strong cooperatives. However, a step in the right direction can also be found in the application of green farming technologies.

“Green farming technologies are experiencing a resurgence not only for their ecological benefits, but they also offer opportunities in niche markets, the expansion of existing products and the development of new products”, said Mr. John Calixte, the EU Representative in Saint Lucia. He made these remarks at an Agriculture Policy Programme (APP) supported technical forum on Green Intensive Farming Technologies, also known as GIFT, held in Saint Lucia in December 2015. “These technologies can significantly increase the profitability of agricultural enterprises if adequate and appropriate knowledge and capacities can be developed at national and regional levels”, he said.

Global competition is not the only factor which is prompting Caribbean farmers towards the use of new technologies. Climate change impacts such as changes in rainfall and temperature patterns and new pests and diseases, as well as the growing frequency of catastrophic climate events such as, droughts and floods, all impact productivity and have brought new realities for farming in the Region. Additionally, reduced demand from Europe for traditional commodities such as bananas, sugar cane, rice and coffee have had negative impacts on profits and are forcing farmers to look to new high value commodities.

The philosophy of GIFTs is to optimize production, reduce environmental impacts, address environmental changes and create more sustainable farming systems. GIFT technologies include protected agriculture (PA) structures such as,
greenhouses, alternative water sources such as rain fed irrigation systems, and alternative growing systems that can be found in the science of aquaponics. GIFTs also boast the ability to use smaller areas of land and while producing increased volumes of crops.

“There is competition for space to grow food in the Caribbean”, says Akeim Ali, the project manager for the GIFT Project, which is a collaborative effort between CARDI and the University of West Indies (UWI), under the APP. “This project will allow the growth of more food per square foot than traditional practices.”

The GIFT project has set out to design, build and test the Caribbean’s first sustainable, tropical greenhouse. The project itself is really defined by its name.

The entire set up is designed to be ‘green’, or environmentally friendly. From the use of solar power to provide electricity to the harvesting of rain water to provide irrigation, the GIFT project significantly reduces the environmental footprint left by the use of traditional greenhouses.

The GIFT model also uses aquaponics as a growing system. This system grows fish and plants together. The fish waste provides an organic food source for the growing plants and the plants in turn purify the water, allowing for limited monitoring and measuring, reduced land use and no requirements for environmentally harmful fertilizers. As pointed out by Mr. Ali, if managed properly, this system can even foster the production of additional fish which can be marketed, putting much needed local food into the hands of consumers.

Dr. Ruel Ellis is a lecturer in the Industrial Engineering programme at UWI and the lead engineer in charge of the GIFT project. He is encouraged about the opportunities that this project offers for ‘intensive’ productivity.

“Farmers have been experimenting with the greenhouses for a while in the Caribbean”, he says, “but most have failed because of temperature. Because of the intense Caribbean heat, greenhouses in the Region can often reach temperatures of 50 degrees Celsius. Vegetables and fruit crops simply cannot survive in this kind of heat and many greenhouses have been abandoned.”

The GIFT greenhouse uses a ground to air heat exchange system to create a cooler environment. This system takes the air from the greenhouse, pumps it underground where the temperature in the test region is around 27 degrees Celsius. The trip through the pipes about two metres underground cools the air to around 28 or 29 degrees and then the air is pumped back into the greenhouse, greatly reducing the temperature.

With the technologies employed in the GIFT greenhouse, abandoned greenhouses “can be retrofit”, says Dr. Ellis, “and produce to their potential.” With the proper implementation of GIFTs, the potential output of food per square foot of land is more than quadruple that of traditional systems.

The additional ‘technologies’ employed in the operation of the GIFT greenhouse include solar tracking for efficient capture of the sun’s power as it moves across the sky, remote monitoring of the systems through the use of laptops, cell phones and tablets and eventually remote control of systems in the greenhouse such as water levels, fan activation and light intensity.

The GIFT project is currently being tested in Trinidad and Tobago but Mr. Ali and Dr. Ellis look forward to introducing it to farmers across the Caribbean. Experience has taught them that sometimes farmers can tend to shy away from technology and hold fast to traditional practices, but with the benefits that the GIFT project can bring to both the agricultural sector, the environment and food security in the Region, they are encouraged that it can be well received.
“We hope the engagement of farmers will help bring them on board to improve the system and make it more palatable for the end user”, says Dr. Ellis. They are just in the beginning stages of the project right now but their “aim in the end”, he says, “is to increase local input and make this a viable solution for the average Caribbean farmer.” Construction and operational systems for the house will be fully installed and operational by mid-December 2016. When fully operational, the Caribbean’s first cost-effective tropical greenhouse, cooled by a ground to air heat exchanger, fed by integrated rainwater harvesting and aquaponics systems, powered by solar and controlled by smart technologies, will itself, become a site for training tours for Caribbean stakeholders to witness the promise of adopting advancing technologies for food production.