



Mr. Elijah Njoroge, the Chief Executive officer of Vintage Greens showing some of their products at Jomo Kenyatta University of Agriculture and Technology (JKUAT) - Juja Campus

Young Turks invent new technologies for **greenhouse** farming

Greenhouse farming is undergoing a dramatic change. Farmers are exploring new forms of growing their produce such as vertical greenhouse farming, fertigation, aquaponics, sterilization, hydroponics and aeroponics.

With the agricultural industry suffering from loss of topsoil, sterilization of lands due to overuse of synthetic fertilizers and disruption of eco-systems due to indiscriminate use of pesticides, greenhouse farming has proven to be the most viable solution to the agricultural industry's woes.

These farming techniques require a good interaction with the information technological systems for one to be up to date with the current trend in agriculture technology. It means that the most potential

group of people who are capable to tap these new skills are the youth since they are the most enthusiastic to technology and have a lot of time as compared to the old.

As we transverse different parts of the country with the aim of getting informative insights about the horticultural sector, we meet this group of 18 young men aged averagely 25 to 28 at the Jomo Kenyatta University of Agriculture and Technology (JKUAT) - Juja Campus who have incorporated technological techniques for greenhouse farming.

The eighteen former alumni of the university have formed a group by the name Vintage Greens with Mr. Elijah Njoroge, a Biotechnology and Microbiology graduate as their Chief Executive officer. The group has gone far in



Inside one of their greenhouses

innovating its own technological systems for fertigation and control of temperature; that would have required millions of shillings to import from European countries. They are involved in construction of greenhouses and installing modern technological greenhouse facilities to achieve excellent crop yield.

They comprise of resident architects who are tasked with the responsibility of designing different greenhouse designs which are sent to clients for approval through sending design photos online. Afterwards, the civil engineers who are part of the set are

then involved in the construction part of the greenhouse upon approval by the clients. In addition, the cluster has horticulturalists that advice farmers on how best to undertake greenhouse farming while employing technological techniques and there are also agronomists within the bunch to check on the vulnerability of the crops to diseases. At the end of the day, the company works as a team in order to achieve excellent results.

Vintage Greens was established in March 2013. It was founded on three pillars: to offer quality greenhouses and hydroponic systems, to solve soil borne diseases and to link farmers to markets. Just shy of two years in business, the company has successfully constructed over 300 greenhouses in Rwanda, Uganda, and South Sudan and all over Kenya. It boasts corporate clients such as

cannot get in.”Mr. Njoroge shares.

At the same Vintage’s greenhouses have an automated roll up system inside the structures to control temperature. Normally the preferable temperature for tomatoes is between 32 and 38 degree Celsius. On the part of height, Vintage green structures have a height specifications of 2.0m to 2.5m with the length and width measurements being 15m by 8m.

The structures also have a well enabled water supply system with it with water tanks of 300 litres capacity and drip irrigation system that is included in the package. In addition, the group has been able to construct greenhouses for different flower farms that have contracted them. Their greenhouses go at a price of Ksh 210,000 each minimally.

Greenhouse farming is a popular

or even a laptop. When combined with an efficient irrigation system both nutrients and water can be manipulated and managed to obtain the maximum possible yield from a given quantity of these inputs.

Often, solid fertilizers side-dressings are timed to suit management constraints rather than the horticultural requirements of the crop. Through use of the digital fertigation system, continuous small applications of soluble nutrients overcome these problems, save labour, reduce compaction in the field, result in the fertilizer being placed around the plant roots uniformly and allow for rapid uptake of nutrients by the plant. “To capitalise on these benefits, particular care should be taken in selecting fertilizers and injection equipment as well as in the management and maintenance of



Some of members of Vintage Greens group, at their farm in Jomo Kenyatta University of Agriculture and Technology (JKUAT) - Juja



One of Vintage Greens greenhouse

the Catholic Church, JKUAT, Kiambu County Government and JICA. The company has a large list of individual clientele especially among the youth. Its structures have certain unique specifications which are different to other greenhouses. First and foremost, the entrance to their greenhouse has two doors with a space between them. “The aim of this kind of design is to deter insects from outside from getting into the greenhouse; the space between the two doors is for trapping insects. Normally when one outside door is open, then the one inside is closed hence the insects

farming practice among the youth. It does not require much land and it is easy to manage crops in a greenhouse.

Having successfully positioned itself as a quality provider in greenhouse construction over the past year; Vintage Greens is currently working to achieve its second objective, to solve soil borne diseases.

The Group is rolling up a fertigation system of supplying dissolved fertilizer to crops through an irrigation system which will be run digitally using a smartphone

the system.”Mr. Njoroge notes. The system will be measuring the quantity of fertilizer used, radiation determined by sensors and moisture content that can be added through a programmed system. The programmed system will help to monitor the nutrients used and the PH levels and then offer the technical assistance required.

As a result of their excellent work in construction of greenhouses, Vintage Greens as secured a contract with the County of Kiambu after beating other big and well established companies in the binding process and are currently undertaking a tomato grafting project.



Some of Vintage Green's greenhouse products , at their farm in Jomo Kenyatta University of Agriculture and Technology (JKUAT) - Juja Campus

The company is providing Kiambu County with research material for the project and grafting the first crop of wilt resistant tomatoes in each of the 19 wards of Kiambu County.

Mr. Njoroge highlights how they go about the grafting process. "To make a cleft graft, first remove the top of the rootstock plant, cutting its stem horizontally above its seed leaves and beneath the first set of true leaves.

Discard the upper part of the plant and use the razor blade to make a 1/2-inch cut straight down into the middle of the remaining stem." He indicates "Next, slice off the top of the scion plant, also above its seed leaves and below its true leaves. If it has more than one pair of true leaves, remove all of them except the uppermost pair.

After throwing out the scion seedling's root, use the razor blade to create a point on the bottom of its stem by making a slanted 45-degree, 1/2-inch-long cut on either side. Insert the pointed base of the stem into the vertical cut on top of the rootstock plant, fastening it in place with a grafting clip or a piece of tubing, either of which should curl around the stems to hold them tightly together. If you prefer, you can make a top graft instead of a cleft graft by cutting both the rootstock and scion stem at a 35- to 45-degree angle. If you choose this method, fit the cut edges together,

and hold them together with a grafting clip or piece of tubing." It takes two months to get a proper seedling from the process. The seedling helps the group to undertake the molecular program of wilt resistant tomatoes supported by JICA. The benefits of these kinds of tomatoes are that they are high yielding. "They produce three times more than the normal tomatoes." Mr. Njoroge states. At the same time they are bacterial resistant and mature faster.

Vintage Greens are undertaking hydroponics techniques in their greenhouses as well. The process allows plants to be grown in various containers, even vertically if proper stabilization is included, so that you can grow a garden all year round. The system is especially helpful to those who want to grow plants in a limited environment such as an apartment building where you do not necessarily have access to a garden plot or regular sunlight.

Hydroponic gardening revolves around providing specially formulated nutrients to your plants through a carefully devised watering system. This way you do not need soil to house your plants, but can simply allow them to grow in a water bath. "In some cases, plants are stabilized by dry materials such as small stones to keep them growing in the proper direction, but this step can easily be

skipped if you do not have enough of space to house the system. You can customize your hydroponic growing however it is necessary to meet the spacing limitations you have or to increase the productivity of the plant type you have chosen." Mr. Njoroge shares. The Vintage Greens Chief Executive officer notes. Some of the benefits of hydroponics are that one is able to recycle water for other uses, there is no waste of fertilizers, production levels rise thrice while vulnerability to diseases is minimal.

The two year-old group has been able to partner with JICA who are supporting their fertigation system project at Juja, the German and Chinese governments who have offered them pieces of land to construct their up to date greenhouses. At the same time some companies have approached the visionary, brilliant and industrious youths for future partnership. To them one does not go to school to get employed after finishing his or her course but rather to replace an empty mind with one that is full.

All in all the young men see a great future ahead of them since the government is supporting the youths to uplift their lives through Uwezo fund and other monetary assistance and for them the sky is the limit and there are looking towards growing to greater levels in the industry.