

# ucf Undercover farming

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## THE SCRIPTURES

Matthew 17:20

And Jesus said to them, "Because of the littleness of your faith; truly I say to you, if you have faith the size of a mustard seed, you will say to this mountain, 'Move from here to there,' and it will move; and nothing will be impossible to you."

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Greenhouse farming still remains a major positive option for growing vegetables and fruit in controlled conditions. The majority hectares under shade netting against open land fruit tree production have made major strides forward in optimal production. Maybe this is 'preaching to the converted', but many of our readers still hesitate to invest in undercover farming – mainly because of the high initial investment costs. But the industry proved over and over that with proper management of the various facets of greenhouse or shade netting production, and the much higher production per square meter, culminates in a short repayment period where after excellent profits are achieved. In times of most adverse climate conditions as experienced in most South African regions and many other countries, it is of essence that we rethink our food production methods. With population explosion as it stands and still increases, faster ways of food production and delivery to consumers will have to be developed. City people have to put up with lower quality fresh produce from supermarkets coming at high prices. The top grade produce is exported to foreign markets. Just a thought; more schools around the country are offering agriculture as a subject. When these pupils and new entrepreneurs catch up with the knowledge of undercover farming, we should have many more smaller greenhouse and shade netting farmers in close proximity to larger towns that offer them good and solid markets. This could be established through cooperation with local governments to assist with weekend market sites. This will save the smaller producers delivery costs and with proper management, offer employment to locals and a 'buy from our local producers' culture. It takes courage, will and faith to enter this farming practice and the possibilities are endless. It is the turn of winter to spring season and we sincerely hope our greenhouse and shade netting (undercover farming) industry will take the lead in producing fresh foodstuffs within means of our country's population. 🌻

*Johan Swiegers*



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## INSIDE ...



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# ROGANIC GROWERS are truly farming for the future



Meeting Dr. Rogan Pillay, an otorhinolaryngologist specializing in head and neck oncology surgery, owner, and farmer at Roganic Growers, leaves you with an undoubtful impression that this is a

man deeply steeped in science and research. But, above all, Dr. Pillay is highly focused on growing food that will not only enhance health but will also be at the forefront of proven technology to ensure the highest sustainable quality. To him, farming is not only a passion but also the fulfilment of a lifelong ambition to amalgamate science, technology, and best practice to produce the best food for humans to underpin good health and longevity.

"We have been on the farm since 1996 and started farming in 1999. We paid a lot of school fees trying various technologies, which ended up in me visiting international destinations and researching how they did undercover farming, as I was very interested in greenhouse horticulture farming. In addition, I was very

interested in climate control systems as we are situated on the highveld and did not want any restrictions on our production activities. In 2004, we went professional with a fully climate-controlled greenhouse. At that time, we were the only facility on the continent with a carbon dioxide condensation facility," says Dr Pillay. He knows it's an expensive route, but as a perfectionist, he wanted to minimise carbon emissions while achieving good climate control in the greenhouses. It served them well as it led Roganic Growers to export peppers, under contract, to the Netherlands, and "we all know how high their standards are as they are known as the pepper barons," said Dr. Pillay.

"Rijk Zwaan came into our production programs quite early as we primarily focused on niche markets because of our size. We are quite small in comparison to the large growers and stay away from low-value items. So instead, we focused on specialty peppers; that's what we are known for," said







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**RIJK ZWAAN**

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## ► Roganic growers from p 4

Dr Pillay. "We grew the Rijk Zwaan Kappy varieties for many seasons, and we did exceptionally well with that."

Currently, Roganic Growers, although a mixed farm; growing elephant garlic and turmeric and other produce on open fields, exclusively grows Rijk Zwaan Snacking Peppers (Yellow Zuppa RZ F1, Red Tatin RZ F1, and Orange Tarta RZ F1) and Sweet Palermo® Peppers undercover in full climate control conditions in a 5000m<sup>2</sup> Greenhouse. The Rijk Zwaan Snacking peppers and Sweet Palermo Peppers are grown exclusively for Woolworths. Although their quality control standards are very high, 85% yield is accepted, with the other 15% delivered to the secondary market. The increased production standards of Roganic in their 5-star production greenhouses ensure a very high-quality approval with wastage at



**Rogan Pillay, Owner of Roganic Growers, Ruan de Bruyn, Rijk Zwaan Technical Advisor Gauteng Area and Suzanne Oosthuizen, Rijk Zwaan Marketing Specialist SA & SSA**

around 2%. Because of their state-of-the-art, fully automated climate control system, they have attracted the admiration of and recognition by their peers as "Winter Producers."

Roganic Growers is Global Gap and Farming for the Future certified. Although they are not heavily invested in mechanical handling in their packing facility, they passed the Woolworths inspections and audits easily.

Being very aware of their impact on the environment, Roganic uses their carbon dioxide condensation facility on their gas operated boiler to reduce emissions and feed the carbon dioxide into the greenhouse production facility, increasing yield by up to 30% per m<sup>2</sup>. In addition, because there is no recycling of Rockwool in SA, Roganic changed to coir imported from Sri Lanka to limit their impact on the environment.

Furthermore, all their waste is composted and used on the farm thereby further reducing their impact on the environment.

50% of the electricity required by Roganic comes from their solar installation, with plans to increase this in the near future. At the same time, UPS systems support the software programs of the automated climate control systems during electricity outages. Rain is harvested from the roofs of the greenhouses at a rate of 1L per 1mm of rain, running into a 44 000m<sup>3</sup> holding facility. From there, the water is treated in different treatment stations before being introduced into the greenhouses.

Driving away from Roganic Growers and Dr. Pillay, one cannot help thinking: What a perfect match. A man steeped in science and constantly engaged in intensive research. His enthusiasm and dedication to helping mankind and saving lives are matched with a 5-star production facility. Producing healthy food stacked full of vitamin C and anti-oxidants for people striving to live healthy. No wonder Dr. Pillay chose his business partners very carefully. Partners are setting high standards on quality, sustainability, and yield above just financial gain. **(MO)** 🌹





Installation of dripper irrigation in plants grown in a soilless substrate showing the success of even dripper function. Pic: Seeds for Africa

# Nutrient Recipes for specific crops



Using inert soil-less substrates, only the roots interact with the nutrient solution that may change ratios between the different ions due to different uptake tempos. More changes are found in organic substrates where N-reserves may be used and bicarbonate levels may increase during decomposition of the organic matter.

To prevent significant deviations in nutrient levels, frequent irrigations with fresh nutrient solution is done in drain-to-waste production systems. The applied volume of nutrient solution must exceed the plant's need, allowing about 10-20% drainage. This prevents salt accumulation and ensures that the relatively small root volumes are flushed out a few times per day, to be replaced with fresh nutrient solutions.

Dutch growers mainly use rock wool, whereas most South African growers use organic substrates, such as pine sawdust or coir. Apart from the chemical N- or bicarbonate changes in decomposing organic substrates, its physical properties also change. Its water holding capacity will increase to the detriment of its aeration, necessitating less frequent

but bigger fertigation pulses per day.

By allowing more time for air to move into the substrates and root zones between fertigation pulses, root respiration will be sustained, enabling the uptake of water and nutrients. By ignoring this or with too many fertigation pulses per day, waterlogging may be induced at a late stage of the crop's development.

This will be associated with symptoms of premature ageing, such as yellowing of leaves that may be confused with nutrient deficiencies.

To optimize plant nutrition developed procedures to change input nutrients, as soon as root zone solutions indicate that imbalances are developing. This practice is essential where solutions are re-cycled, but it is also effective to optimize plant nutrition in drain-to-waste systems where nutrient needs may change when plants develop from vegetative- to reproduction stages or with changes in climatic conditions.

## Drain-to-waste

The crop recipes should produce these EC values with zero Na and Cl in the feeding water. The EC may be increased with 10 to 20% by concentrating the nutrient solution

during cold and low radiation conditions. During sunny, hot and low humidity conditions (with poor climate control structures) the EC values can be reduced by lowering the nutrient solution concentration with 15 to 25%.

The relatively high sulphate levels may be reduced with 2 up to 3 meq L-1 and replaced with equivalent levels of Cl, only with a drain-to-waste system and with feeding water Cl levels < 2 meq L-1. Addition of silicon (Si) to these nutrient solutions may reduce the incidence of powdery mildew.

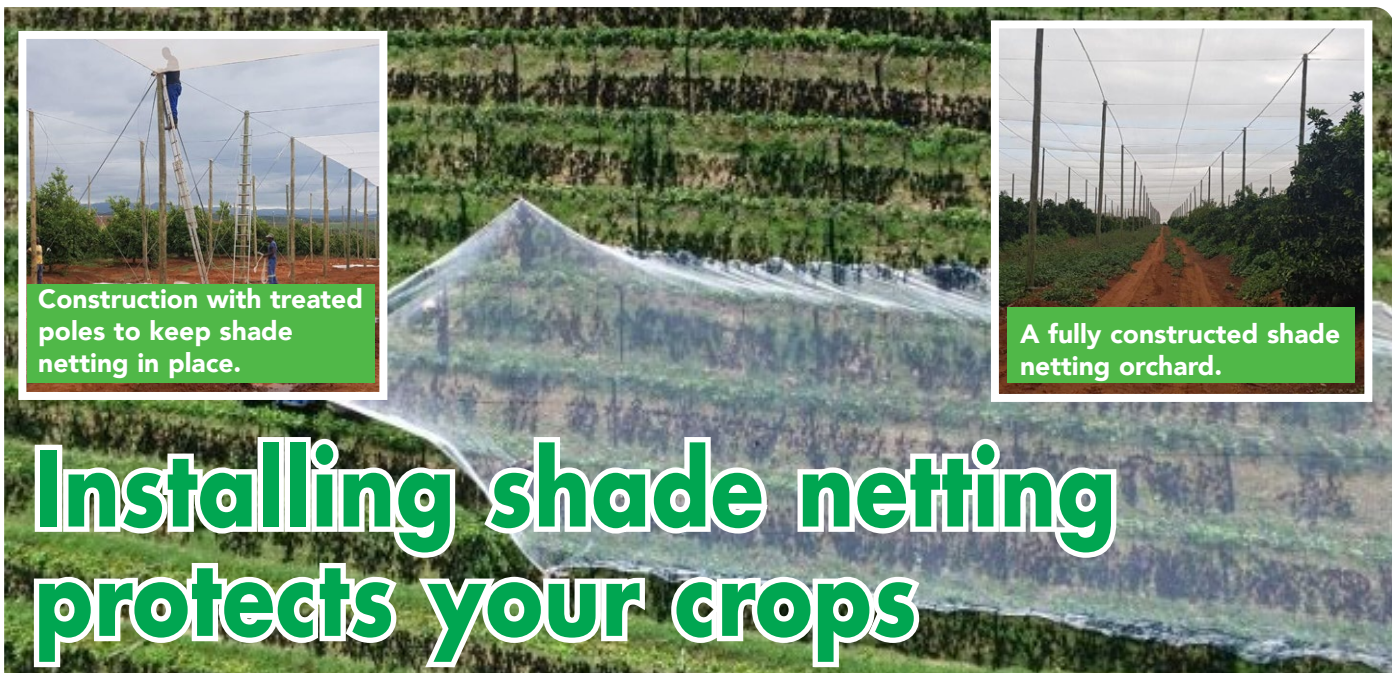
## Closed production systems

In a closed system, the drained nutrient solution is re-used. When the solution is recirculated, the input solution should be less concentrated than 'drain-to-waste' solutions in anticipation of the accumulation of some ions.

Despite these well-planned nutrient solutions, imbalances may develop during production. The same root zone target values, as mentioned for the drain to waste production system are also used to check deviations from optimum levels in closed production systems. 📌

By Dr NJJ Combrink





Construction with treated poles to keep shade netting in place.

A fully constructed shade netting orchard.

# Installing shade netting protects your crops

Farming is changing in South Africa and many of the country's farmers change to more intensive products for a higher yield and are more lucrative markets. This includes fruit varieties such as blueberries, citrus and even kiwi fruit.

As land is in short supply, farmers are also looking to other areas of the country to plant their crops, including the dry semi-arid and hotter interior zones. One way that farmers are able to control these crops in these challenging regions is through netting.

## Shade netting advantages

Netting provides farmers with a range of advantages. Citrus fruits such as naartjies, lemons, clementines, mandarins, and oranges as well as macadamia nuts, mangos, avocados and even table-grape vineyards can all benefit from netting. As there is an increased pressure from consumers for better quality fruit, nets are a way for farmers to control the quality and yield of specific crops.

## Main considerations

Nets protect orchards and fruits from a range of harsh weather conditions, including extreme temperatures, harsh sunlight and frost or hail. One of the biggest advantages to using shade nets is that sunburn on fruit is greatly reduced.

Air temperatures can be reduced through the use of shade netting which in turn leads to a decreased

temperature for the fruit and leaves themselves and a decrease in soil temperature. Lower temperatures allow plants to transpire at a natural rate, taking up nutrients throughout the day, rather than during specific times of the day.

Nets also help to protect fruit from damage caused by birds, resulting in better quality of fruit and larger and more uniform berries. Due to less damage, fruit will also need less preparation and this also helps to reduce labour costs. Nets can act as windbreaks, reducing the wind speed through an orchard by up to 50% and greatly reducing wind damage to crops.

Pest and disease management are one of the main drivers for using agricultural netting, however snails can become a factor due to the reduced presence of birds.

Less water is used due to less evaporation while drip irrigation is also easier under netting. For some farmers this has resulted in a higher yield while using 40% less water. Due to netting changing the microclimate beneath the nets, this form of agriculture can help to grow citrus crops on poorer soil.

## Installing Agricultural Netting

There are a variety of ways to install netting in an agricultural environment. As farmers are dealing with food products it is essential to avoid any products that are likely to cause contamination to the ground, water

or plants. As plants absorb any chemicals that are present in the water supply or soil, it is necessary to use products that are safe and won't negatively affect the growth and yield of your crop.

While the cost of setting up the right netting can be significant in the beginning, by choosing the correct netting and poles for your environment, the long-term costs are lowered as little maintenance is required and the yield should exceed the costs in a couple of years.

Another thing to bear in mind is that the right quality and treated netting poles will anchor the entire structure and thus good quality poles are essential for ensuring the integrity of the structure. To create the most secure structure, the best option is to place netting poles in a diamond pattern, spaced between 12 and 16 metres in each row with wires running in between to support the netting.

For hail nets, it is necessary to also create sections where the hail can fall through, while hail nets will also require a stronger material than netting used for shade. When determining the length of your netting poles it is essential to also leave around a 1 metre space above your fruit for bee activity. It is also essential that nets are properly tensioned and attached to their poles as excess wind can cause rubbing against poles and wires and lead to your nets wearing prematurely. 🍷

By E. Beyers



# Importance of climate for tomato yield prediction

Tomato growers face the challenge of predicting yields accurately, which is crucial for their business operations and forecasting. However, traditional yield prediction models often fail to account for sudden spikes or dips in actual yield, known as yield swings. These unpredictable variations can be caused by biological, environmental, or external factors.

A team of crop science and data scientists conducted a study to shed light on the factors leading up to yield swings and propose a more holistic approach to yield prediction.

Tomatoes are one of the most widely grown fresh produce crops globally. While outdoor cultivation remains prevalent, many growers have turned to protected environments such as plastic houses, greenhouses, or glasshouses to ensure year-round production and mitigate unfavourable weather conditions, pests, and diseases.

The controlled environments provide opportunities for manipulating climate, water, and light, resulting in significantly increased production compared to traditional methods.

Dr. Tharindu Weeraratne, Director of Crop Science & Agronomy, says: "Accurately predicting yield is crucial for growers as it drives short-term response and long-term strategy. It helps steer crops towards desired

production outcomes, provides certainty in available produce for sale, and aids in fulfilling supply contracts.

However, consistently achieving high accuracy in yield prediction is a challenge due to the occurrence of yield swings, which can significantly impact business operations and forecasting."

WayBeyond's study challenges the sole pursuit of high accuracy yield prediction and instead focuses on identifying and understanding the biological and environmental events preceding yield swings. By adopting a more holistic approach to interpreting yield prediction, growers can improve their confidence in predicting yields and optimize production.

The study analysed anonymized data from 20 tomato growing cycles in varied protected growing environments, using the organisation's proprietary digital data collection, analysis algorithms, and AI models to study the data encompassing plant genetics, environment, and crop management practices.

Dr. Mpatisi Moyo, Head of Artificial Intelligence, explains: "Our findings highlight the correlation between yield prediction accuracy and the occurrence of yield swings. We identified common patterns

associated with low and high yield swings, including environmental factors like temperature and light, as well as biological indicators such as plant growth measurements and plant balance."

Dr. Weeraratne concludes: "This study emphasizes the importance of considering environmental and biological data alongside yield prediction models. By collecting and analyzing data on climate, crop development, and contextual factors, tomato growers can gain a comprehensive understanding of their growing environment and make informed decisions. We believe this approach allows for the anticipation and management of yield swings, leading to more consistent crop management and higher-quality data."

The study opens the door to improved decision-making capabilities for tomato growers, providing them with the tools to anticipate yield swings, interpret yield predictions with greater accuracy, and mitigate risks to their crops and business. By embracing a more holistic approach to yield prediction, growers can maximize their yield potential and minimize financial and produce losses. 🌱

**By Christelle Blanchet-Aissaoui,  
Waybeyond**



# DECIDE which SOLAR technology for your greenhouse prediction

**G**reenhouse cultivation is a form of modern agriculture in which crops are grown under a controlled environment to obtain higher yields and better crop quality. Implementing solar technologies in a greenhouse application would help to enhance its performance sustainably. The following explains the different technologies.

Photovoltaic (PV) shows promising results to cover the electrical energy demands and ensure adequate crop production. However, the main issue with static conventional PV solar modules is the shading effect that causes a reduction in the photosynthetic efficiency of greenhouse crops.

Solar thermal collectors (STC) with and without concentration and storage technologies, heat the greenhouse's interior and decrease fossil fuel needs. Whereas the hybrid PV/T were analyzed for greenhouse application, it was found that PV/T modules are gaining interest due to their high efficiency and generation of electrical and thermal energy from a single panel.

A study concluded that by employing these solar technologies in greenhouses, crop yield and quality could be enhanced while ensuring sustainable and

environmentally friendly energy production. However, these solar technologies must be further optimized to make them more attractive.

Rapid climate change and the soaring world population have heightened the problem of food scarcity and prompted people to do extensive research on food security using technology such as greenhouses. Greenhouses offer significant advantages, such as year-round crop production independent of external climate conditions, physical blockage from insect attacks, and minimum consumption of water and fertilizers.

## Photovoltaic (PV)

Photovoltaic (PV) technologies convert sunlight directly into electricity through the photovoltaic effect. PV technologies are classified into conventional PV modules and semi-transparent modules, which are used for greenhouse applications. Most conventional PV modules are made of silicon, mono-crystalline and polycrystalline silicon, whereas semi-transparent PV modules are made of either organic solar cells, dye-sensitized solar cells, or other emerging technologies.

## Solar thermal collector (STC)

Solar thermal collectors (STC) convert

solar radiation into useful thermal energy. When the sun's rays strike on STC collectors, the collector's absorber surface heats up and transfers thermal energy through a heat transfer medium such as water or air. The solar conversion efficiency of STC collectors can reach up to 70% depending on the collector type and configuration and heat transfer mechanism. STC collectors are used in many applications such as water heating,

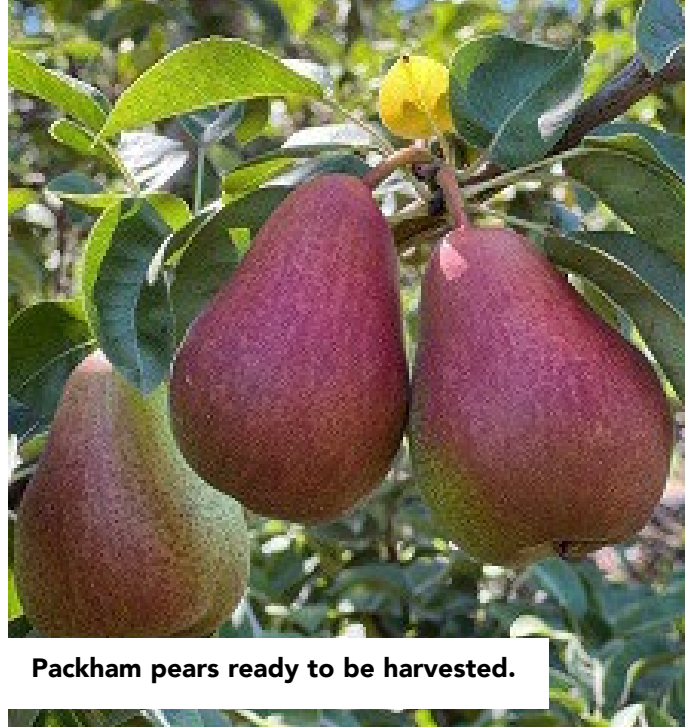
## Photovoltaic/Thermal (PV/T)

The electrical performance of the PV module declines as its temperature increases. As a result, the operating cell temperature dramatically influences the PV module's efficiency. Cooling the PV module with a heat transfer fluid is an effective way to increase its electrical efficiency. The heat transfer fluid helps to lower the PV's temperature and can supply thermal energy at low temperatures.

Over the past few decades, solar power generation by photovoltaic and solar thermal technologies has significantly developed due to their remarkable efficiency and improvements in their cost. 🌅

**By: Didier Haillot and Stéphane Gibout**





Packham pears ready to be harvested.



Shade net structures protect fruit trees from hail, wind and birds.

# China blows a fresh breeze into South African pear industry

The start of the top fruit season wasn't auspicious but, as poorly as it had started, it could be heading to a strong run for South African pears.

Marketing the early Williams or BC crop was complex, with Packhams from the previous season still available. That in itself is not unusual, says a pear exporter who wishes not to be named, and can be managed when the two varieties are sent different places.

"Packham will always be a level above a BC but we feel that the previous season's pears should be marketed before the new season's big pears start, or should be sent to a market where the new season BC

pears can't go, like China or India, because of the cold regime," he opines. The Middle East, too, doesn't pull green BC pears.

Therefore, Europe and Russia remain as the main markets for South African BC pears.

The pear market in Europe has been good for South African pears all along, he says and it's having to compete with a new market for South African pears: China. "Access to China has just lifted the entire market on pears," he says.

"South African products are popular in China and they do like a South African Forelle. The buyers look out for our PUC code." Being able to

send pears to China has brought, he says, a "fresh breeze" to the pear industry.

However, Forelle orchards in the Langkloof were hard hit by hail in February, a few months after hail storms had moved through topfruit orchards in the Ceres area. For the past few years the industry has been hard at work erecting hail nets in areas for whom hail used to be an oddity. Without the acreage under nets, he remarks, the losses would have been much worse.

The Forelle market has remained quite strong and, slowly but steadily, he adds, they can see an improvement in the economies where they trade. **Fresh Plaza**

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**Kiwi fruit trees under shade netting to prevent hail damage.**

## EXCEPTIONAL KIWI CAMPAIGN marked by stability of prices

*At almost 1,700m above sea level, Nooyenskopje in Magoebaskloof, Limpopo, has had an exceptional kiwi crop, running across all colours.*

"In February we started with kiwi berries of which we had our first commercial crop this year. The yellow and red kiwis followed in mid-March, and by the end of March the Hayward kiwi harvest started," says Danie Meyer, one of South Africa's largest kiwi producers.

A trial block for all of the world's commercial kiwi varieties – green, red and gold, plus kiwi berries – has long been established on the farm.

Yellow kiwis were exported under the Nooyenskopje brand to Spain and Singapore, Hong Kong by Origin Fruit.

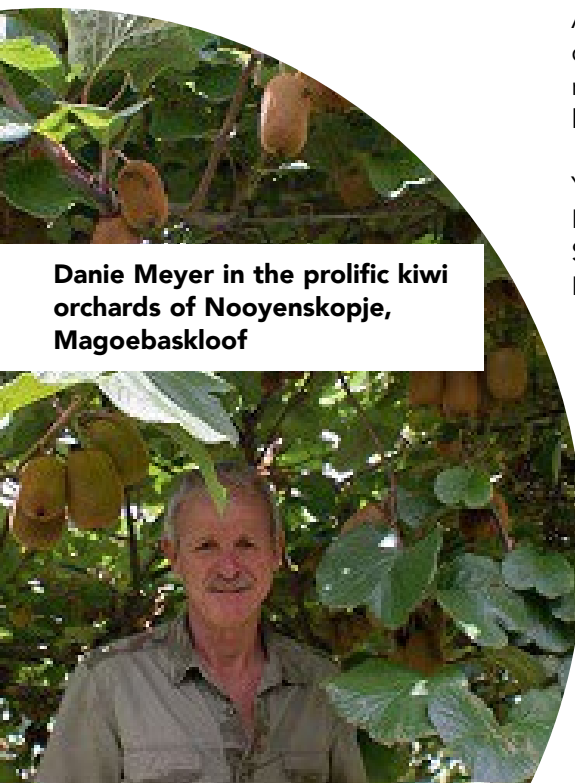
"On the kiwi berries, and the green kiwis, especially, it was a record crop with which we supplied the Shoprite Checkers group nationwide," he says, noting that demand was so strong that they couldn't stay ahead with orders but 6ha of new plantings will in the near future ensure sufficient supply for the local demand. He observes that domestic

prices for Hayward kiwis have been fantastic.

"Prices remained high and stable on green kiwis at almost R10 for a fruit on the retail shelves. We're now at the end of the volumes for Shoprite Checkers and then we also market our one kg boxes on the municipal markets."

Towards next month, South Africans will eat imported kiwifruit from New Zealand, Greece and Italy but the latter has had significant flood damage to its kiwi orchards while New Zealand's crop has been late.

"We've been so blessed by the wonderful crop we had this season," Danie remarks 🍷



**Danie Meyer in the prolific kiwi orchards of Nooyenskopje, Magoebaskloof**





# GREENHOUSE SEED PRODUCTION Techniques

Commercial greenhouse production relies heavily on the production of transplants, involving highly mechanized operations beginning with seed germination and ending with transplanting the plants into containers. At the present time, greenhouse producers have adopted plug production as the preferred method for transplant production.

A plug is a containerized transplant with a self-enclosed root system. There are a number of pros and cons to consider when deciding whether to grow plugs from seed or to purchase plugs and grow them to transplant size. The advantages of producing one's own plugs include rapid production, efficient use of greenhouse space, choice of species and cultivars, and self-reliance.

The disadvantages can include extra labour to handle an exacting crop and increased heating costs in winter (since plugs are quite sensitive to temperature fluctuations). For most small to medium sized growers, especially "beginners," it is often more economical to purchase plugs from specialized growers and concentrate on producing finished containers. This avoids the cost of equipment, cost of skilled plug growers, germination problems, and other problems associated with the seedling stage.

## Growth Stages

Sseedling production is generally described in four observable stages. The first two stages account for actual seed germination and emergence. Stage 1 includes the starting process from seed sowing and medium wetting to the emergence of the radical or root initial. Stage 2 continues from root emergence until the seed/cotyledon leaves are expanded. Stages 1 and 2 comprise the germination stages, meaning that all germination should be finished by the end of Stage 2.

## Plug Production

A plug is a seedling produced in a small volume of medium contained in a small cell, of which between 72 to 800 are contained on a single sheet of polystyrene, Styrofoam, or other suitable material that are inserted into a tray.

As the number of cells per tray increases, the size of each cell decreases. Standard plug trays are typically 28 x 55 cm and 7 cm deep.

The use of plug trays for germinating seed offers many advantages. Seeding machines (seeders) can sow up to 600 plug trays per hour; therefore, labour costs are reduced. Each seedling is grown in its own container (cell) so it does not have to compete with other plants for water

and nutrients. Seedlings produced in plug trays are spaced further apart and thus receive more light. If a soil-borne disease attacks a seedling or seedlings, the disease will be confined to that particular cell(s).

## Mechanical Seed Sowing

Efficient plug production requires the use of a mechanical seeder. The choice of seeder depends on several factors including cost, seeding speed, number of flats to be seeded, and the need for flexibility to sow a variety of seed shapes and sizes. Four types of seeders are commonly available to plug growers—template, needle, drum seeders, and optical seeders.

## Covering Seed

Seed of some crops needs to be covered to get the best germination. Generally, the larger the seed, the more covering it needs.

A covering will provide more humidity or moisture around the seed for germination, may provide dark conditions to improve germination, and help the initial root to go into the soil. Improper covering will result in reduced or erratic plant stands.

You can cover the seed in a number of ways. 🌞

## Seedling Production US Mass.





# MICROGREENS: THE WHAT, WHY AND HOW TO GROW

**M**icrogreens are basically the shoots of salad vegetables such as rocket, celery, beetroot, etc., picked just after the first leaves have developed. Studies have shown that microgreens contain up to 40 times the nutrients of mature vegetables, including vitamins C, E, and K, lutein, and beta-carotene.

Growing microgreens is becoming ever more popular with home and commercial growers, market gardeners and chefs.

To grow, a flat tray of 25cm x 50cm is filled with substrate (such as coco coir or hemp mats). The substrate is then completely saturated with water. Then a thin layer of microgreen seeds are evenly distributed on top of the substrate and covered with another tray (or humidity dome). The seeds will germinate in the dark for 3–4 days. After 3–4 days, the cover is removed to expose the sprouts to light and move the tray to the open spot in the greenhouse troughs. The microgreens will start to turn green and grow leaves over the following 6–8 days.

## Harvesting

The microgreens should be ready to harvest after 10–12 days total, any time between when they've formed cotyledons (seed leaves) and when their first true leaves have emerged. To harvest, cut as close to the substrate as possible with a sharp knife or scissors. If grown in a greenhouse during very cold weather, resolve to slight heating or use heating pads. In locations with temperatures that rarely reach below freezing, an unheated greenhouse or cold frame should work.

Growing microgreens requires first

building or buying a greenhouse and obtaining seeds for your microgreens. Then, choose the variety of microgreens you want, set up automated watering and create an optimal climate in your greenhouse for your greens.

## Greenhouse requirements

Before building a greenhouse there are a number of things to consider. The owner needs to research a building permit is required to build a greenhouse in the area he is looking to set up. Depending on the area, you may need to consult the city before building any new infrastructure.

Next, the location of your greenhouse is going to be critical in the success of your plants. You are not going to want to put a greenhouse in a spot that is constantly shaded, especially if you plant greens that need sunlight to thrive. Remember, it's easier to provide shade than create sun. You can buy shade cloths if you build your greenhouse in an area that is in full sun.

It is better to have too much space and have the potential to expand than to not have as much space as you want to have and need to break down a wall to expand the greenhouse. Building an addition is going to end up being more expensive than buying a larger greenhouse in the first place.

## Location

Location within your greenhouse is important for ensuring your microgreens to grow healthy. They will not grow if they are cold. If you expose them to freezing

temperatures they will die. However, they also need a bit of moisture in the air with decent ventilation. Therefore, if you are trying to grow microgreens in your home they may not be as successful as in a greenhouse.

You do not need a full concrete floor within your greenhouse, however, if you do have some kind of path it will make it easier for you to bring your wheelbarrow up for planting. Remember if you do put concrete down, you will need to include a drain in your flooring to avoid pooling water. Concrete can also get slippery when wet if you do not choose concrete with texturing.

If you use pavers as the flooring you are likely to get weeds between the cracks, however, these will allow for drainage after watering. Another flooring option is pea gravel; this will help you to avoid the ground getting muddy and damp.

## HEATING YOUR GREENHOUSE

Finally, remember that you will need to have a heating aspect in your greenhouse for maximized growth. The heat is what separates growing in a greenhouse from trying to grow in the dead of winter. For your heating, you can utilize electric, gas, propane or natural gas heating.

The differences in kinds of heating are going to really be seen in how it has to be set up. You will need to decide if you want to have lines laid down for heating and if you have proper venting for your electricity.

Another factor is what is going to be the easiest and most available in your area. If you live somewhere with a lot of outages, using electric

heating may be the death of your plants.

The cost of heating your greenhouse is going to be very dependent on the size of your greenhouse and the material you have used for your siding. With your siding you want as much light to enter as possible while also being heat-efficient. Generally, your choices will be glass or a plastic such as a fiberglass, polycarbonate, or polyethylene film.

### Polyethylene sides

This option is going to be a quick and inexpensive option for those gardeners or farmers whose primary purpose of their greenhouse is for seed starting. The sheets of polyethylene can be doubled to provide you with better insulation if you need it. This material works well but will not last you as long as the alternatives, as it can last about two to four years.

### PLANTING AND MAINTENANCE

When you are planting your seeds, you're going to want to make sure your seed coverage is good as they need support while growing. If your seed coverage is ample, you will see your microgreens grow thick and healthy. Once the seeds are laid, press them down into your soil softly. Be sure they are wedged into the soil without being buried.

The soil you use is not going to be hugely important in the growing process. You can use any high-quality potting soil, however, many growers have seen increased success using soils that are fortified with natural ingredients. A common ingredient that may aid in the growth of your microgreens is soil fortified with kelp. Keeping in mind the temperature and humidity the microgreens will want to grow in, the process of watering your greens is also critical for growth.

When you first plant, you can lightly sprinkle some water over the top of the soil to give it a little bit of moisture. Top watering is ok until the seeds germinate, at which point it is

important that you switch over to bottom watering. You can do this by putting the tray of soil that you planted in on top of a tray of water.

Leave the tray to soak for about 20 minutes before checking how much the soil was able to absorb and pour the water out. If the soil has absorbed enough water, it should look and feel moist to the touch and also be evenly watered. Ensure there are no dry patches in the soil after watering.

By switching over to bottom watering, you are allowing the roots to soak up what they need and avoid overwatering or damage to the sprouts. If you overwater you also run the risk of causing diseases that can affect the plant due to overly wet conditions.

### SELLING YOUR MICROGREENS

If your primary motivation is to grow microgreens to then package and sell to consumers, it's important to know which are going to be the most profitable and try cutting back on growth costs.

If you are consistently growing microgreens, you are likely to have batches ready for harvest approximately every two weeks. Therefore, a skilled grower who has space and time may be able to produce 20 to 25 crops per year in a normal greenhouse.

However, your outputs can be more than doubled if you stack your trays vertically in your greenhouse.

The more trays you grow, the more you will be able to make off of your microgreens. And with the input cost of trays being low, the profit margin is high. If you use a four-rack system you can produce an average of 30kg of microgreens within a 15m sq growing space, per two-week cycle of growth.

If you sell at a farmer's market or



to people locally, you can bring income every two weeks for your microgreens. Therefore, if you are growing to profit, the best thing you can do is fit as many trays of microgreens into your greenhouse as possible because if you stick to one tray you will likely only produce about 200gms of microgreens per single tray when grown on one single level.

### HARVESTING TIME

As previously mentioned, most of the time your crops will be ready for harvest in about two weeks after you've planted them. A good indicator is that the microgreens have produced a second set of leaves which as referred to as their "true leaves".

For some farmers aiming to make a profit, they will allow certain trays to grow for an additional week. This results in a product called baby greens which are also going to be a profitable and popular product to sell to consumers at farmers' markets. 🌅 JS





# Large-scale solar installation keeps packing facility running



To secure a system that was of the highest quality, with exceptional performance Bella Frutta, a specialised packing facility for apples and pears in Ceres, contracted African Technical Innovations (ATI) for a solar solution.

ATI, recognising the opportunity, rose to the challenge and turned to a solar installation company to provide high calibre inverters and panels. The resulting installation was a resounding success, leading to a subsequent project with African Solar Installations (ASI) that also utilised the same premium products.

Bella Frutta, equipped with a workforce of 620 individuals during peak season and 250 individuals during off season, engages in local operations encompassing short-term bin storage, packing, finished product storage, and load-outs. The company relied on two sizable diesel generators to ensure an uninterrupted electricity supply for their conveyor belts and storage units.

However, escalating power outages and rising diesel costs necessitated an ideal photovoltaic (PV) solution that could seamlessly integrate with the existing diesel generators. To attain operational stability and adhere to the rigorous demands of the European export market, Bella Frutta sought PV modules and inverters renowned for their

exceptional quality, performance, and capacity to provide yield security.

Kobus Engelbrecht, Managing Director of ATI, was responsible for the first solar installation at the premises. "We contacted a reputable company for two main reasons. The first because they are our trusted partners and will not accept anything but the best in terms of product performance and client service. And secondly because they represent world-leading brands locally, and through them, ATI installed excellent Huawei SUN2000-100KTL smart string inverters, combined with the best-in-class PV modules from Hanwha Q Cells, allowing us to offer Bella Frutta the most efficient solution.

Thanks to the performance of the products installed in phase 1, the Bella Frutta executive team could see the benefits of going solar when working with the right team very quickly. So, when the time came to discuss the feasibility of a second solar installation project, they reached out the same trusted partners specifically requesting the same trusted products.

In the second phase, the installation consisted of eight SUN2000-100KTL Huawei inverters and more than 1 MW of Q Cells PV modules - again supplied by SOLARWORLD.

Jean du Plessis, Financial Manager at

Bella Frutta, says they can generate between 20-30% of power needed to run the packhouse. "With our energy crisis, we had to consider other alternatives to address the risk involved at our packhouse. One option was solar and the other was generators as the sun only shines in the daytime and we need electricity 24/7. Generating our own electricity right there on-site means that we're relying less on the National Grid and traditional utility supplier to power our business. In a nutshell, the more energy we produce, the more money we save."

Another attractive aspect of solar panels is the low maintenance costs involved in keeping them. Du Plessis adds: "We manage just fine by cleaning them a couple of times a year at most. Again, since they have no moving parts, there is no wear and tear involved. For those considering solar, once you've covered the initial cost, you can expect very little spending on maintenance and ongoing repair work, leaving you to enjoy the savings."

Green initiatives are also high on Bella Frutta's agenda, and the ability of solar panels to produce energy without greenhouse gases or water pollution made it even more attractive to the team based in Ceres, and soon, hopefully more business will turn to solar to fulfil their large-scale power needs. 🌅



# Exports of African Flowers Increases beyond Comparison



It is reported that the international trade in cut flowers has become an increasingly important global export business for many African countries. The traditional epicentre of the trade, Holland, is wilting, albeit slightly, as a percentage of the flower trade – down from 50% to 48% of global supply in 2019, according to the latest Maersk Briefing on Thursday 15 June. It quoted the findings of the International Association of Horticulture Producers.

This growth in supply by other players outside the Netherlands to meet the demands of international flower imports into the European Union (EU) and the Gulf Cooperation Council (GCC) countries, is seeing an increased

need for capacity for integrated transport and more environmentally friendly alternatives with lower greenhouse gas emissions.

Flower growers in countries like Kenya, Ethiopia, Colombia and Ecuador have increased their presence in the cut flower trade. According to African Business Pages, Kenyan roses represents 40% of the European market presence.

From bloom to bouquet, in recent years the Netherlands has shifted its focus from flower production to flower trading, creating an opportunity for exporters from other parts of the world, including Africa.

According to Logistics Update Africa, "among other African nations like Zimbabwe, Rwanda, and Uganda in flower production and flower exports in Africa, Kenya contributes the lion's share of 62% and Ethiopia at 24% in flower exports." 📌 **Freight News**





# DRAFT REGULATIONS on Labelling and Advertising of Foodstuffs cause concern

Not all are aware of the recent Draft Regulations relating to the labelling and advertising of foodstuffs ("Draft Regulations") which were published for comment on 14 April 2023. These proposed regulations could have a significant impact on industries and businesses that are concerned with, or involved in, the packaging of foodstuffs.

The Draft Regulations prohibit any person from manufacturing, importing, selling, donating, or offering for sale any pre-packaged foodstuff, unless the foodstuff container or the bulk stock, from which it is sold or taken, is labelled according to the regulations as outlined in the draft.

A notable development in the Draft Regulations contain many amendments and could have far reaching implications – among others, the introduction of mandatory warning labels known as 'Front of Pack Labelling' (FOPL). Pre-packaged foodstuffs which contain added saturated fat, added sugar, or added sodium above a certain threshold (the values thereof stipulated in the Draft Regulations) will be required to bear a mandatory black and white warning label on the front of the package.

According to the Draft Regulations, we can expect the mandatory warning labels to be depicted as follows:



Most notably, the mandatory warning labels will be applicable to all pre-packaged foodstuffs containing added artificial sweeteners - in ANY amount whatsoever.



Furthermore, should a pre-packaged foodstuff be required to bear the FOPL, the Draft Regulations are extremely specific regarding where the FOPL is to be placed on the package. They stipulate that the FOPL logos are to be displayed

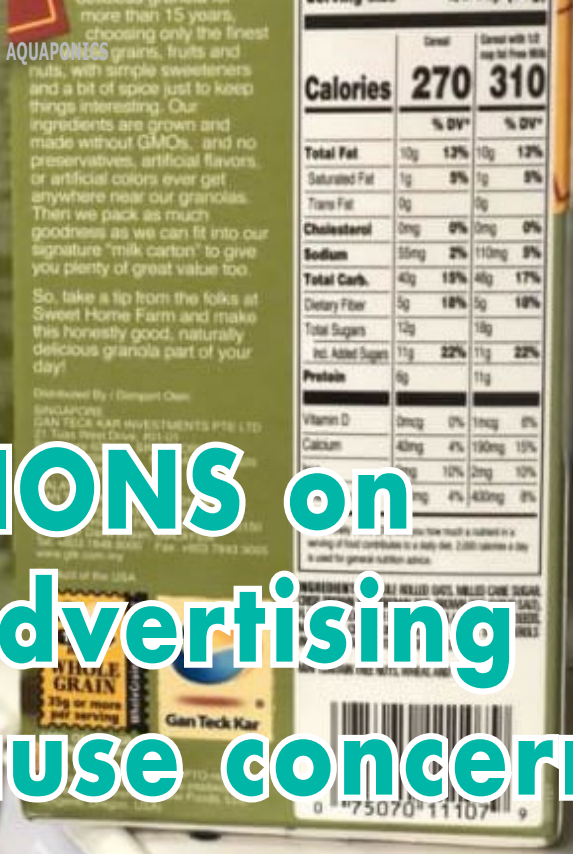
on the front of pack/main panel of the container's label and anchored to the top right-hand corner of the label. They also state that the FOPL

logos must be prominently visible to a consumer when the product is displayed and may not be obscured, removed, or damaged.

The size of the FOPL may vary according to the size of the front of the package and the number of symbols required to be displayed in the FOPL (i.e. High in Salt, High in Sugar).

However, it appears that the FOPL may be required to cover as much as 25% of the front of the package!

If you are wondering what the effect of these mandatory warning labels would be, the reality is that should these Draft Regulations be promulgated in their current form, pre-packaged foodstuffs that are required to bear the mandatory warning label could end up looking something like this:



# BREAKFAST CEREAL



(\*specifications of FOPL have not been calculated)

This may be of concern to those involved in, or related to, the food packaging industry in South Africa. After all, the packaging of a product is engineered to entice consumers, positively, by grabbing their attention whilst also differentiating the product from competing products. The draft regulations will certainly attract attention to products, for other glaring reasons.

It is not only the packaging of pre-packaged foodstuffs that will be affected by the introduction of these mandatory warning labels, but also the adverts too! In terms of the Draft Regulations, any advertising depicting products that carry the FOPL must include the relevant logos of the FOPL as well. These adverts are then required to bear a warning in capital letters, which is at

least one-eighth of the total size or length of the advert, as follows:

continue to be guided by the R146 regulations, which do not currently

**WARNING:**  
**This product is high in [insert key nutrients] / contains artificial sweeteners.**  
**Excessive consumption may be detrimental to your health.**

In addition to this, the Draft Regulations prohibit the package, label or advert of foods carrying the FOPL, from depicting or containing reference to any celebrities, sport stars, cartoon-type characters, puppets, or computer animations.

provide for such mandatory warning labels known as FOPL.

Nevertheless, manufacturers, importers, sellers, donators, or retailers of pre-packaged foodstuffs is encouraged to consider whether their foodstuffs would be required to bear the mandatory warning labels, in terms of the Draft Regulations, so that they are not blindsided by the possible impact, should such Draft Regulations come into force in the near future. 📌

**By: Rachael Lee**

What is important to consider is that the Draft Regulations are just that - a draft which is not yet operational. Accordingly, until such time that the Draft Regulations are promulgated, persons concerned with the labelling and advertising of foodstuffs should



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