



# Undercover farming

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A pair of red over-ear headphones is shown from a top-down perspective. The ear cups are filled with fresh green lettuce leaves. The headband is black with a red outer shell. The background is white with a blue triangle in the top right corner.

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die pols van landbou



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**PROPRIETOR | ADVERTISING**

**CONTACT DETAILS:**

**EDITOR:**

Johan Swiegers  
Cell: 082 882 7023

Email: editors@undercoverfarmingexpo.com

**GENERAL MANAGER:**

Marion Oosthuizen  
Cell: 071 639 9300

Email: marion@undercoverfarmingexpo.com

**DIGITAL MARKETING:**

Tiaan van Straten  
072 067 8046

tiaan@undercoverfarmingexpo.com

Cynthia van Straten  
079 963 3698

cynthia@undercoverfarmingexpo.com

Nicolene Oosthuizen  
082 630 1496

nicolene@undercoverfarmingexpo.com

**DESIGN:**

Yolandé van Zyl  
Cell: 082 775 1002

mandidesigns2018@gmail.com

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**FRONT PAGE: A royal anniversary for SU's HortiDemoCentre as Dutch Queen pays a visit (See page 4 -5)**

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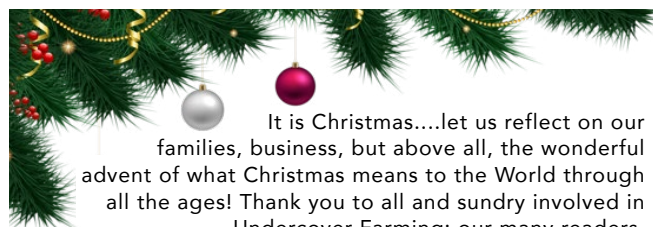
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**A CHRISTMAS BLESSING**

**Isaiah 9:6-7**

For to us a Child is born, to us a Son is given; and the government shall be upon His shoulder, and His name shall be called Wonderful Counselor, Mighty God, Everlasting Father, Prince of Peace.



It is Christmas....let us reflect on our families, business, but above all, the wonderful advent of what Christmas means to the World through all the ages! Thank you to all and sundry involved in Undercover Farming; our many readers, correspondents, advertisers, farmers et al.

From the management and staff: To you and yours; A Blessed Christmas!

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**A**fter a rather hectic start to summer, many farmers in affected areas are busy with the clean-up and repair (even replacement) activities. Hopefully most have reliable and understanding insurers and financiers at hand. With these terrible floods where humans, animals, homes and farming or business infrastructure were lost, hopefully government will understand the plea of farmers who largely contribute to the country's finance and food supplies. Having imports under the circumstances is a given, but our producers who we rely on for so many years, will soon be in a favourable position again to bring food prices under control. It is sad to be in a supermarket queue and watch the affluent with mountainous trollies of foodstuffs, and right behind somebody stands with a bread and two liters of milk in her hands. Producing fresh produce in greenhouses has to expand in South Africa in order to supply markets for locals with quality produce. If there is one matter in which government should look into, it is greenhouse farming. However, without proper training, business mentorship and superb management, greenhouses have been falling by the wayside and we observe skeletons with bits of plastic in the country. Why? Because of poor management, insufficient knowledge and unwilling to attend to the business 24/7. I asked a farmer once what the major change in his lifestyle was when he changed to greenhouse farming; his answer was "I used to take my family away for long-weekends and holidays, now I send them!" That is about it. Unless you have a co-director or manager that you can trust wholeheartedly, to be away for a period of time could cost you. Lastly, the younger set may have negative perceptions over greenhouse farming; but what other agricultural sector offers you a return on investment in under 24 months? To you and yours; have a wonderful Christmas Season! 🍷

*John Swiegers*



Queen Maxima listens attentively to Kholosa Nakani, a post graduate in agronomy how the greenhouse functions.



# Netherlands Queen pays a visit to SU's Horti-DemoCentre

Exactly a year after the opening of Stellenbosch University's (SU) HortiDemoCentre at Welgevallen Experimental Farm, students and staff were delighted to welcome Queen Máxima of the Netherlands to the facility.

The Dutch royal couple spent three days in South Africa last week on a state visit with their ministerial delegation as well as representatives of 25 universities and academic institutions of the Netherlands.

The visit - the second of Dutch monarch since Queen Beatrix visited SA at the invitation of President Nelson Mandela in 1996 - included official talks at the Union Buildings in Pretoria and visits to cultural and historical landmarks in

Pretoria, Johannesburg, and Cape Town.

As a collaborative project showcasing Dutch innovation within a South African context, SU's Horti-DemoCentre was an important final stop on the royals' visit.

A consortium comprising six Dutch companies and a South African company (Greener Solutions), and SU received over 900 000 euros (R16 million in 2022) to get this project off the ground.

Prof Hester Klopper, SU's Deputy Vice-Chancellor: Strategy, Global and Corporate Affairs, Prof Danie Brink, Dean of AgriSciences and Dr Estelle Kempen, lecturer and project manager of the HortiDemoCentre welcomed Queen Máxima and

her delegation to Welgevallen. Klopper acknowledged SU's strong partnerships with "at least 14" academic institutions in the Netherlands.

The Queen spent an hour speaking to SU students and staff about climate control and pest management. MSc student Jancke van Wyk said the centre afforded students an opportunity to learn more about sustainable and climate smart agronomy.

Unlike the Netherlands, where the focus would be on heating technology, the Horti-DemoCentre has been designed to perform under South African conditions that has a Mediterranean climate, she explained. Adaduma Msana, a PGDip student and technical







assistant at the centre, explained to the Queen how the centre re-uses its fertiliser and water and how smart technology is utilised to control the climate inside the greenhouse.

Queen Máxima then donned a protective coat to chat inside greenhouse to students and young farmers about crop health management. Intern Kholosa Nakani, who last year completed a post-graduate diploma in agronomy, explained how the team combines integrated pest management strategies to ensure crop health management.

Her Majesty then met with emerging farmers in the area and representatives of the Farmer Production Support Unit (FPSU). This unit serves as an agricultural training and production hub in the area.

FPSU head, Joe Barends, handed over a proposal to the Queen

outlining the Unit's plans to replicate its model in other districts.

Reflecting on her tour of the site, Queen Máxima said: "It is one thing to hear about these things, but quite another to see it with one's own eyes." 🍷

**Credit: Stefan Els**

**Prof Hester Klopper, Stellenbosch University's (SU) Deputy Vice-Chancellor: Strategy, Global and Corporate Affairs, Prof Danie Brink, Dean of Agriculture and Dr Estelle Kempen, lecturer and project manager of the Horti-DemoCentre, welcomed her Majesty Queen Máxima of the Netherlands at the start of her tour of the greenhouse.**



**The Netherlands Queen, Her Majesty Alexandra and her entourage took a guided tour through the SU's Horti-Demo Centre's greenhouse.**





# Sweet Palermo® Peppers: Nature's Sweet Culinary Treasure

In the realm of vibrant, flavourful peppers, Sweet Palermo® stands tall as a premium brand that epitomizes the perfect fusion of sweetness and gastronomic delight. Originating from the renowned vegetable seed breeding company Rijk Zwaan, Sweet Palermo® peppers have captivated taste buds worldwide with their exceptional taste, vibrant colours, and versatile culinary uses.



## A Taste Beyond Compare

What sets Sweet Palermo® apart is its unique combination of looks and taste. These dulce italiano pointed sweet peppers boast a flavour profile that stands out, marked by exceptional sweetness and an aromatic richness that elevates any dish they grace.

Their brix value, an indicator of sweetness, ranges between an impressive 8 to 9.5, surpassing the usual blocky peppers by a significant margin. Additionally, these peppers are nearly seedless, making meal preparation a breeze and ensuring a consistent, enjoyable eating experience.

## Awards and Accolades

Sweet Palermo® peppers have earned recognition for their excellence. Over the past decade, they've garnered seven prestigious consumer awards, including the esteemed 2022 Taste of the Year award from Spanish consumers. These accolades underscore the peppers' consistent quality and the unanimous approval they receive from those who savour them.

## Quality Assurance and Cultivation

The cultivation of Sweet Palermo® peppers is a meticulous process entrusted to selected growers who form the esteemed Sweet Palermo® Growers Group. These growers adhere to stringent standards set by Rijk Zwaan, ensuring that only the finest produce reaches consumers. Each pepper undergoes a careful selection process, and only those meeting the highest quality standards are hand-selected, hand-picked, and packed into specially marked Sweet Palermo® bags. The mark of Sweet Palermo® signifies authenticity and superior quality.

## Variety and Innovation

Originally introduced in a vibrant red variety, the Sweet Palermo® line has expanded to include an array of colours, including yellow, orange, and the sumptuous chocolate-coloured peppers. These varieties undergo rigorous testing to ensure they possess the necessary resistances, physiological attributes, and yield traits that align with the high standards of the Sweet Palermo® brand.

## Culinary Versatility and Health Benefits

Sweet Palermo® peppers aren't just a treat for the taste buds; they embody the perfect balance between health and indulgence. Loved by health-conscious foodies, gourmards, and children alike, these peppers are ideal for various culinary creations. Whether used in fresh salads, hearty stir-fries, sizzling fajitas, or as colourful toppings, Sweet Palermo® peppers elevate dishes, adding a touch of sweetness and vibrancy.

## Embracing the Sweet Palermo® Lifestyle

Choosing Sweet Palermo® peppers isn't merely selecting a vegetable; it's embracing a lifestyle that harmonizes



health and culinary excellence. Their versatility in the kitchen, coupled with their nutritional value, makes them a favourite among those seeking a flavourful yet health-conscious diet.

## Join the Sweet Palermo® Movement

To experience the Sweet Palermo® difference for yourself, visit their website at [www.sweetpalermo.com](http://www.sweetpalermo.com). There, you can explore the diverse range of flavours, find culinary inspirations, and witness firsthand how these peppers can transform everyday dishes into extraordinary culinary delights.

Sweet Palermo® peppers are not just peppers; they're nature's naturally sweet treasure. Their exceptional taste, vibrant colours, and versatility in the kitchen make them a must-have for anyone seeking to add a burst of flavour and colour to their meals. By choosing Sweet Palermo®, you're choosing excellence, authenticity, and a flavourful journey that transcends ordinary culinary experiences.

Embrace the sweet side of life with Sweet Palermo® peppers and redefine the way you experience the joys of cooking.

## Visit

<https://www.lovemysalad.com/recipes/search?t=sweet+palermo> for mouthwatering recipes.





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**CONTACT:**

Ruan de Bruyn  
Gauteng • Free State  
Cell: 082 616 5441

Tiaan Rautenbach  
Cell: 067 425 0168  
Western Cape

Jandri Venter  
Limpopo  
Cell: 066 475 8662

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# Access to efficient cooling needs effective mechanisms



The average consumer in the developed world, may not be aware that the domestic refrigerator is only the final link in a long continuum that begins on the farm and ends on the table. These two end points are connected by a coordinated series of actions and technologies designed to maintain the temperature of perishable products at the optimal level needed to preserve food for consumption. This 'cold chain,' is the invisible network behind the food system and in Africa, its efficiency has a direct impact on food security.

## Food losses

According to the Rockefeller Foundation, half of the staple food on the African continent is lost in the post-harvest stage or before it reaches the market. The World Resources Institute estimates that in sub-Saharan Africa alone, 37% of food is wasted, which amounts to between 120kg and 170kg per year, per capita. At the root of the problem is a lack of cold storage

infrastructure and cold chain inefficiencies.

Food loss and wastage have far-reaching effects on communities and the economy. These issues can be tied to loss of revenue for farmers and more broadly, the wastage of water, fertilisers, energy and land. Furthermore, given that, as per recent estimates, one in every five Africans faces hunger, solving the cold storage conundrum is a continental imperative.

The answer could lie in servitisation – and more specifically, Cooling-as-a-Service (CaaS), a new approach to cooling efficiency.

## Cooling systems

Up until recently, food producers and manufacturers typically owned, operated and maintained their own

cooling systems. This required a significant capital investment as well as a cost burden that includes repairs, upgrades and utility costs.

For many African stakeholders along the agricultural value chain, the cost of this investment has been largely unaffordable – a reality that has resulted in a heavy reliance on wholly inefficient and inadequate refrigeration technologies. CaaS can address this critical issue, while supporting sustainable development and offering African food producer's unprecedented scalability.

## New business model

It is a relatively new business model in the field of cooling and air conditioning. In essence, it represents a shift away from traditional methods of owning and maintaining cooling systems, towards a pay-per-service system. Instead of purchasing cooling equipment outright, manufacturers 'subscribe' to a service that provides them with refrigeration solutions.

A CaaS partner takes responsibility for owning, operating and maintaining the system, meaning that equipment longevity, reparability, and recyclability falls within the







remit of the service provider. The manufacturer then pays a fixed fee per unit of service.

### Benefits

There is a myriad of benefits to be derived from this service model, including removal of the barriers to cleaner, more efficient cooling technology, providing easy access to cooling for users in the cold chain, while also providing visibility on cooling performance through the measurement, verification and tracking of system efficiencies.

### Sustainability: The regulatory environment

Apart from the material benefits, the model may also address the need for Africa to decarbonise. The two largest contributing factors to harmful greenhouse gas emissions from air-conditioning and refrigeration systems are indirect carbon dioxide emissions as a by-product of operation, and the leakage of hydro chlorofluorocarbons (HFCs) into the atmosphere.

Overall, inefficient cold chain technology can result in excessive energy consumption, increasing its carbon footprint and contributing to environmental degradation. In practice, many users of cooling technology do not have the resources and expertise to diagnose, measure and track inefficiencies and leakages in their heating, ventilation, air-conditioning and refrigeration (HVAC&R) systems. Recognising this, African leaders have; by and large, signalled their readiness to craft policies and frameworks that will facilitate new approaches to cleaner cooling technology in the long term.

### SIEEP launch

For example, the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE), launched the Industrial Efficiency Program (SIEEP) to provide seed funding and training for bankers and project developers to promote market adoption of CaaS.

Twenty-one African countries (South Africa, Burkina Faso, Cameroon, Cabo Verde, Gabon, Gambia, Ghana, Kenya, Lesotho, Malawi, Mauritania, Mauritius, Mozambique, Nigeria, Rwanda, Seychelles, South Sudan, Tanzania, Togo, Uganda, and Zambia) are participating to better prioritise their energy demand planning and infrastructure development so that it speaks to their national determined contributions (NDCs) as well as their self-defined national pledges detailing their contributions towards the global warming threshold of 1.5°C.

### SA: A case in progress

In South Africa, cold storage infrastructure is much further developed than most other sub-Saharan countries, providing 10 cubic metres of cold storage space for every thousand urban residents. This helps to curtail food wastage by approximately 3% to 4% below the continent's average.

A larger cold storage footprint does not necessarily translate into improved efficiency. The Coefficient of Performance (CoP) is a ratio of the heat removed from a cold space divided by the energy required (electricity) to do so. This measure is an indicator of how efficiently a refrigeration system utilises electrical energy to provide cooling.

Without active management, the CoP of most systems degrades over time. Poor maintenance and incorrect control settings contribute to 4% to 5% degradation per year over a system's 15- to 20-year lifespan. Ultimately, this means that by the end of their lifespan, most

systems use 30% to 40% more electricity than they should. The impact of this is colossal when aggregated over South Africa's large cold storage infrastructure.

### SANCP seeks commitment

Although South Africa's National Cooling Plan, a multi-stakeholder effort by national departments, state agencies, industry and academia, recommends servitisation as an agent for change, much still needs to be done to operationalize the recommendations. This highlights the importance of initiatives like SIEEP to harness the collective commitment of sub-Saharan leaders.

For efficient cooling to meet the growing demand in agriculture and food processing, health services and human comfort, a new way of thinking, funding, constructing and delivering energy for Africa and its people will become increasingly important. At scale, CaaS presents promising prospects for Africa's cold chain; and by extension, the future of food security on the continent. 🌅

**By Samuel Jacobs**





# HOT SUMMER EXPECTED: Fit Energy and Shade Screen Systems

**E**nergy/shade screen systems are one of the most common conservation measures to find finance for. With a payback of two to four years, these systems provide a good return on the money invested. They are most common in gutter-connected greenhouses but can also be installed in free-standing greenhouses.

Energy/shade screen systems can provide 30 to 50% savings in heating or cooling costs. Often referred to as energy blankets, they save energy by reducing the heat loss surface area, providing an extra insulation barrier and trapping a layer of dead air on both sides of the screen material.

An energy/shade screen is a mechanical system consisting of a drive motor, support cables, energy/shade material and controls. A gear motor is needed to power the drive system. One motor can handle up to an acre of screen.

## Choosing the Best System

Gutter to gutter or side to side systems require less material but form a larger bundle in the storage position. They are easier to install as work is done at a lower height. With



this system, equipment and plants cannot be supported from the lower truss cord.

Truss to truss systems are more common. They can be configured flat at the lower cord of the truss or formed into a slope-slope or slope-flat-slope shape to follow the roof of the greenhouse. The latter two may allow heating, lighting and watering equipment to remain in place without having to move it. Flat systems reduce the volume of greenhouse that has to be heated.

## Correct Screen Material

The most common materials for energy screens are composite fabrics of alternating strips of clear and aluminized polyester or acrylic held together by a finely woven mesh of threads. Other materials include knitted and woven bonded polyester, metalized high density polyethylene and polypropylene. Look for the warranty life (usually 5 to 10 years), strength and flexibility.

Many screen materials are designed to provide summer shading. For comparison, manufacturers list both the shade factor and the energy savings. Shade levels from 5 to 90% are available with the most common being 40 to 60%.

Screens can also have an open weave or closed weave. The closed weave has a higher energy savings and is used in greenhouses with fan ventilation systems. For natural ventilation, an open weave allows the heat to rise through the screen when it is extended. Some growers install a closed weave to get the high energy savings and then crack the screen open to allow the summer heat to escape up through the vents.

For production, a good choice of screen material is the Tempa 5557 D FB which is made of 4 mm wide aluminium and polyester strips held together with a polyester filament yarn. The aluminium reflects the heat back into the greenhouse at night during the winter and reflects the sun's heat out of the greenhouse





during the summer days. The yarn allows moisture to go through, reducing condensation and dripping.

The Tempa 5557 material has a 45% direct light transmission, 43% diffuse light transmission and 57% energy savings and is used for closed roof greenhouses. For house plants and other shade loving plants a material with more shade should be used. A Tempa 6562 D may be a better choice as it has 65% shade and 62% energy savings.

### Cost

The cost of a screen system depends on the size of the installation, screen material used, number of obstructions that have to be worked around and ease of manoeuvring man-lifts in the greenhouse. Additional cost may result from having to move heating, cooling, lighting or irrigation equipment out of the screen area.

### System control

Deciding when to open and close the screen can be done several ways. The simplest is manual control, basically a switch that turns the gear drive motor on. The disadvantage is that someone has to be around to make the decision on when to activate it. As with other control devices such as heaters or vents, this decision may not always be made at the best time.

These decisions can also be made by controls that are based on time of day, light level, greenhouse temperature, humidity level or all of these. Controllers have been developed that integrate some or all of these functions.

A clock is incorporated to open and close an energy screen base on sunrise and sunset. It is adjusted weekly to account for the lengthening or shortening of the day length. A photo sensor is included to activate the system when the light level inside the greenhouse reaches a pre-set level either too low during the winter or too high during the summer. Temperature and humidity sensors may be included to provide control when pre-set levels are reached. A weather station is needed to provide

outdoor light level, temperature, humidity, wind and rain or ultra-cold conditions.

### Control parameters

Based on the above, the grower is required to enter these parameters into the controller: Start time – when in the morning will the screen system start operation, stop time – when in the afternoon will the screen system stop operation, light level – at what light intensity will the screen be activated either to open or close, maximum/minimum temperature – what are the limits of temperature desired, maximum/minimum humidity – What are the limits of humidity desired.

Also important are gap positions – this sets the per cent open or close position under different conditions such as early on a winter morning to reduce thermal shock or during the summer to provide better shading. The gap steps and speed of movement can be controlled in some systems.

Under changeable weather conditions a time delay avoids frequent opening and closing. Wind speed: to reduce heat loss, the screen can be closed early under high wind speed conditions. Ultra-cold conditions control - this can open the screen and turn on the heat when extra low temperatures is experienced.

The standard system uses nylon monofilament or stainless steel cables to support the screen material. The screen material can either rest on top of the network of cables or be suspended by hooks from the cables. A gear motor powers a drum or rack and pinion that moves the leading edge of the screen material. Control is either with a manual switch or electronic controller.

### Installation and Maintenance

A screen system is easiest to install


if the greenhouse is empty of plants. Man-lifts are frequently used to elevate workers to the truss level and require space to manoeuvre. Heat supply pipes that are above the screen have to be insulated or moved lower. Vent arms, water pipes, light fixtures and electrical wiring may also be in the way. The screen system requires a clear vertical area of at least 30cm.

Closed weave energy screens need to be installed to provide a tight seal all the way around the edges. The most common method is to install a narrow ledge along the sidewall made from polycarbonate sheets or fire resistant screen material. The side edges of the screen slide along the top of this ledge. The back edge is attached to the truss and the leading edge is attached to rigid tubing that seals the screen against the truss.

Regular maintenance is needed to keep proper tension in the cable system. Pulleys and gear motors should be lubricated once or twice a year. Screen materials tend to wear at the rub points or where they are supported by hooks. Repairs may have to be made at these points. 🍎

**Source: Various manufacturers**





# MAINTAINING SUSTAINABLE FOOD PRODUCTION AMID ESCALATING RISKS IN THE AGRI-SECTOR

Risks such as heavy rain, flooding, hail, frost, drought and fire are by no means new to the South African agricultural sector, but due to the effects of climate change, they are increasing in frequency and severity. These risks are also becoming more unpredictable amid changing weather patterns, which complicates risk management efforts for farmers.

The impact of climate change will worsen over time, with forecasts predicting that South Africa will become hotter and that the average temperature is rising. Heat waves will occur more frequently increasing the risk of veld fires and more severe droughts. Managing water resources will become more challenging, making it vital for farmers to improve and conserve soil quality to allow for better water infiltration.

In addition to climate change and severe weather events, infrastructure risks also threaten the productivity of our agricultural sector. The most obvious example is the on-going energy crisis in the form of load shedding, which is severely impacting farmers. Particularly when you consider that 100% of fruit and vegetables and a third of field crops require irrigation, which requires electricity. These mounting challenges put our agricultural outputs at risk.

Agriculture is an export-oriented sector in South Africa with more than half our produce – to the value of \$13 billion – being exported annually.

It's an important contributor to our economy and we cannot afford to let escalating agricultural risks impact our food production outputs.

Crop insurance serves as an integral tool in maintaining sustainable levels of food production by providing a safety net for farmers, ensuring access to financial resources in the event of crop failure and other disasters. It enables farmers to invest in new crops and continue producing food, thus maintaining their operations and securing their livelihoods. Insurers also assist farmers with employing risk mitigating measures to minimize damages.

In addition, agricultural insurance can help reduce the vulnerability of developing farmers who are considered high-risk borrowers. This perceived risk prohibits these farmers from gaining access to much needed credit from lenders. However, insurance reduces the risks that developing farmers face and improves their credit worthiness as it provides a degree of certainty, making it easier for them to access the capital they need to invest in their farms and improve productivity.

Malawi and Kenya have introduced insurance schemes for developing farmers and their food security status has improved year-on-year, according to the 2022 Global Food Security Index Report. Malawi has an overall score of 48.1 and improved by 2.6 points from 2021 to 2022, and Kenya has an overall score of

53 having improved by 10 points over this period. This improvement can be attributed to their robust risk mitigation strategies, particularly in agricultural insurance.

South Africa, with a food security status score of 61.4 ranks the highest in Africa and 59th out of 113 countries, has its own proposed scheme for developing farmers – of which there are approximately 1.3 million in SA. Index Insurance has the potential to be a game-changer in the local insurance landscape.

Index insurance is a type of insurance that pays out if a particular measure, for example, rainfall, is above or below a certain predetermined level. Small-scale farmers could opt for a weather index or a yield index. These products are more flexible and cost-effective because this model of insurance does not require insurance assessors to visit the farm to determine damages. But it will require greater collaboration between insurers and Government to fast-track the development of legislation to make this a reality for smallholder farmers in South Africa.

In conclusion, agriculture insurance is a necessary tool for the sustainability of farmers by ensuring uninterrupted production and assisting with risk management in an escalating risk environment, which is critical for food security, beyond our borders. 🌅

**Source: various farm insurers**







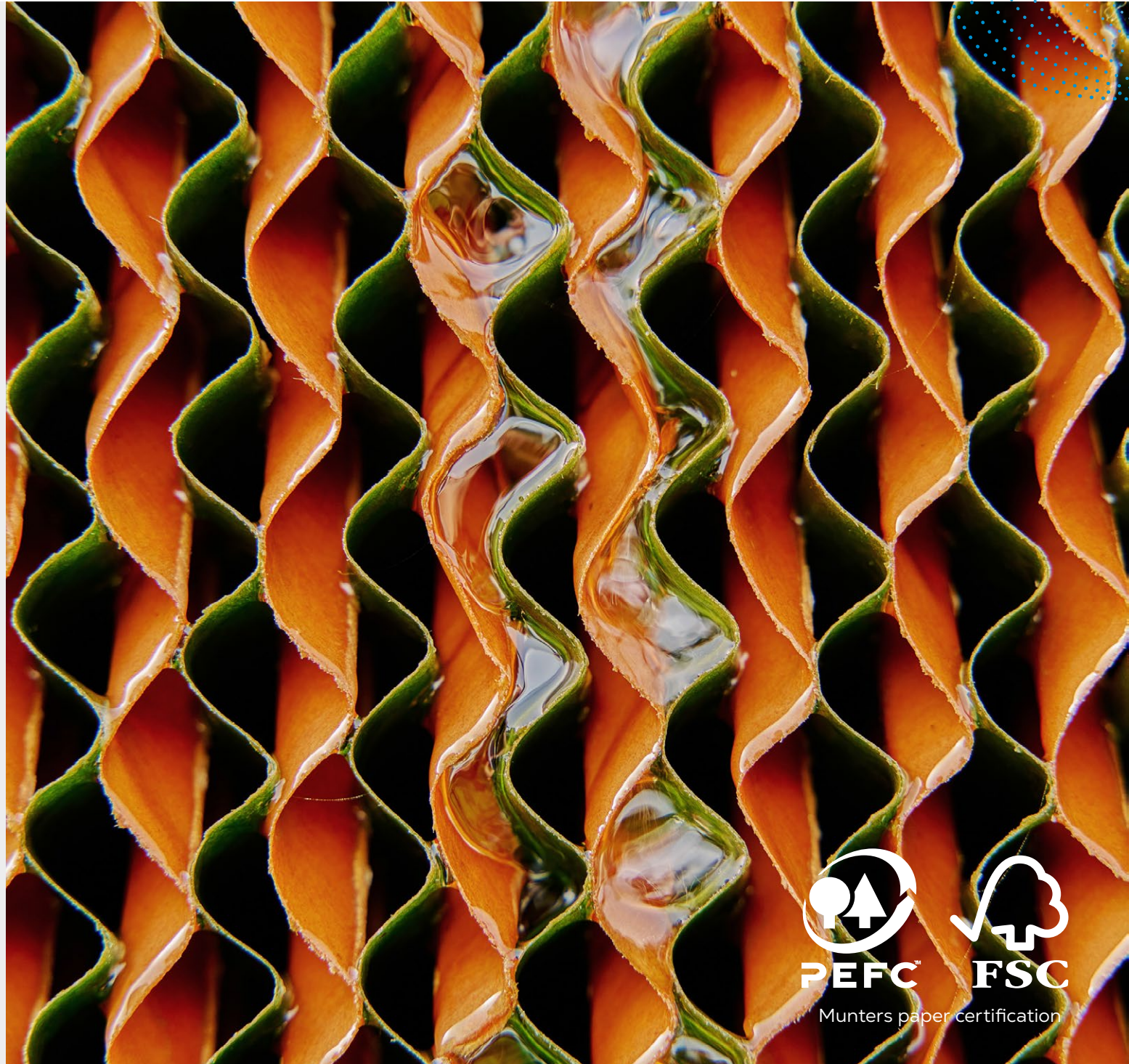
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# BEAUTIFUL, POPULAR GERBERA – THE DO'S AND DONT'S



**G**erbera is one of the most popular flowering plants. Some say it practically sells itself! However, if quality is not there, sales will suffer. For the highest-quality finished product, Gerbera seedsmen says gerbera production requires more attention to detail than most crops.

## Temperature and humidity

It is advised to grow at 100 percent humidity for the first three to four days. Reduce it to 75 percent for the next four to five days. After one week, avoid disease problems by lowering the humidity to 40 to 60 percent. A maximum of 70 percent humidity should be maintained. Good air circulation is very important.

Optimum day length during germination is 16 hours. During periods of low light, use supplemental lighting at 35 to 40 watt m<sup>2</sup> (3500 to 4000 lux), or 400 foot-candles. Gerbera require light during germination so the seed does not need to be covered. If you use vermiculite to maintain a higher humidity, use a very light covering so the seed is still visible after watering the trays.

## Grow media

A porous, well-drained media should be used with an EC of 1.2 to 1.5 and a pH of 5.5 to 5.8. Use a coarse peat to provide better aeration.

Plug Crop Time: In a larger plug,

the crop time is approximately seven weeks from sowing if proper temperature, light and fertility guidelines are followed. The young plants are ready to be potted when they reach the four to five true leaf stages.

## Gerbera fertilizing

It pays off to begin feeding with a complete fertilizer after the first week or once the seedlings are established. Some fertilizers that work well are a 14-4-14 or a 17-5-17 at 50 ppm or even a 20-10-20 at 60 ppm if the light levels are higher. Make sure the plants receive enough feed and the pH remains between 5.5 and 5.8. After 14 days, increase the fertilizer level to 75 ppm.

## Transplanting

Transplant your tiny Gerbera seedlings on time so plants don't become root bound and delay flowering, inhibit development and result in plants that don't size up properly. Make sure they aren't planted too deeply. If the soil covers the crown of the plant, it will inhibit proper growth.

## Gerbera Growing Media

Use a fully fertilized, porous, well-drained soil. EC should be 1.5-2.0 with a pH of 5.5-5.8. A coarse peat with 20 percent perlite provides good aeration.

## Right Temperature

The temperature within the

greenhouse for Gerbera flower initiation is found to be around 23°C and for unfolding of the leaves is around 25-27°C. The temperature should never go below 12°C and above 35°C. To maintain healthy plants, the optimum humidity within the greenhouse should be around 70-75%.

## Moist

Alternate between moisture levels of wet and medium and allow media to approach medium before saturating to wet. Do not allow plants to wilt, which can cause root injury.

## Greenhouse Lighting

It is advised for supplemental lighting which is beneficial during winter months. In the finishing stages, avoid a day length greater than 16 hours. When plants are getting established after transplanting, a 14-hour day length works well, and then after seven to 10 days, reduce it to 11-13 hours..

## Application of Fertilizer

Constant feeding with a 17-5-17 fertilizer at 150-200 ppm is needed to maintain an EC in the soil of 1.75 to 2.0. Under high light conditions, a 20-10-20 fertilizer can be used. Supply 8-12 ppm phosphorous and 1.5 ppm iron. The use of a calcium-based fertilizer is recommended during the winter months but may need to be supplemented with an ammonium-type fertilizer.







# POTATO SEED SUPPLY SYSTEMS IN ETHIOPIA – PLANT DEVELOPMENT IN GREENHOUSES



**Mini tuber production at Desse tissue culture center, Ethiopia.**

In Ethiopia the potato is the largest arable crop cultivated on some 181,000 ha of land annually. Only 1.3% of the total seed potato is sold / transacted as certified seed fulfilling the Ethiopia Agricultural Authority's standard.

With the seed rate of 2 tons/ha per ha, 362,000 tonnes of certified seeds would be needed to meet demand.

Several production problems are the cause for low yield nationally, besides lacking quality seed.

Potato cultivation dominates in the highlands where there is a lack of irrigation watering schemes and farm size is small, usually less than 2 hectares per family.

The unavailability of certified seed, suboptimal agronomic practices, along with a heavy late blight pressure summarize the major constraints limiting tuber yields in Ethiopia.

Public and private partners are involved in addressing the sustainable production of seed in quantity with quality.

An international NGO, SNV Netherlands Development Organization is working in more than 35 countries in Africa, Asia and Latin America. It has worked in Ethiopia since 1974.

Horti-LIFE is an SNV project funded by the Dutch Embassy that focuses on improving the access of smallholders to high-quality inputs and to knowledge and skills.

At the core of the program are Farmers' Field Schools (FFSs) in which smallholders learn how to make optimal use of improved seeds and other inputs.

This is complemented by strengthening input suppliers, seed systems, nurseries and banks. One specific objective of SNV is

to improve the seed potato supply chain. Because of the intensity of the problem, SNV brought different partners on board to improve the seed potato shortage in Ethiopia.

Those partners include: Ministry of Agriculture of Ethiopia (MoA) is our main national partner together with the Ethiopia Agricultural Authority. In general, the project is implemented with the Development Agent (DA) hired by the MoA found in villages where the project is operating.

The Irish Potato Research and Development Association (APReDA) is an umbrella organization under which all the activities related to potatoes are conducted.

It influences the policymakers and the members to create an enabling environment for the potato sector. 📌  
**Source: Potato Congress (Contents and pic: Fresh Plaza**

## ► GERBERA from page 14

Watch your pH closely. The optimal pH is between 5.5-5.8. Gerberas favor a lower pH and will show signs of iron and manganese deficiencies when the pH reaches 6.5. At this point, the leaves will have a mottle to the foliage.

### **Growth Regulators**

For smaller containers like 4-inch pots, apply B-Nine (daminozide) at

2,500 ppm seven to 10 days after potting. Do not apply B-Nine once buds are visible, because this will cause shortened flower stems. When pea-sized buds are visible, the plants will flower in approximately three weeks.

### **Diseases**

Preventive fungicides may be applied for Rhizoctonia, Pythium

and Phytophthora. It is up to the Gerbera producer to teach his staff on scouting plants for underwatering and possible diseases.

Early detection and suitable action will pay off in terms of abundant crops! 📌

**By JS and several sources**



# PREPARE FOR STORM DAMAGE TO YOUR GREENHOUSES

Climate, the elements, and weather patterns of all kinds can have their negative impacts on greenhouses—but none is more dreaded and destructive than wind damage.

Wind damage can take many forms. From the sheer force of frontline winds to unforeseen debris carried from a storm, wind can weaken your structures, damage coverings, and set production and profits weeks and weeks behind.

One thing's for sure: greenhouse growers should be aware of the risks that wind poses, while protecting and preventing against them as much as they can. But how? While you can't stop storms and wind from happening, here are some of the best ways that greenhouse growers ready themselves against the inevitable while protecting their greatest growing asset of all.

## Replace and repair regularly

The longevity of any greenhouse is dependent on maintenance. On top of building your greenhouse only with the highest quality materials, owners ought to keep a sharp eye on any components that may need replacing from wear and tear over time.

Steel supports, wood, hoops, foundation fastenings, and coverings fall under this category. Small holes or gaps in coverings, even under

moderate wind pressure, can be worn out, widened, and eventually completely removed by winds—sometimes very abruptly when it's too late. Of course, wind can weaken and topple structural supports, too. Be sure to have some sort of building maintenance or yearly inspection planned. This is the only way to have a completely preventative safeguard for your greenhouse's structural integrity.

## Be strategic

This can have all manner of impacts on your greenhouse's safety against wind. For example: some building sites are more vulnerable to wind than others. High altitude sites are undesirable, while it's preferable to favour lower, more wind-protected sites instead. If you must build in a high place, set structures on south- or east-facing slopes (if you must build on or near a slope).

Greenhouses on north- or west-facing slopes, on the other hand, are at the greatest mercy of the most unpredictable and damaging winds.

Last but not least: build far away from trees or wooded areas, which can be a source of damaging debris in the event of a storm, tornado, hurricane, or other wind-related occurrence. That said, building wind breaks at strategic places and at the right distances is highly recommended.

## Keep coverings tight

While this step can be tied into general maintenance and repair, checking and tightening coverings is advisable for a much more frequent basis. In fact, it should practically be routine. It's ideal even to daily—and

if not daily, then weekly—check fastenings for tightness as much as possible.

Besides wear and tear, loose coverings and side vents can quickly and easily compromise the strength of a hoop house, high tunnel, or other plastic greenhouse against winds. Plastic covered greenhouses especially should, when one can, be kept tightened and taut to the ground and frames whenever they become loose—which can be more frequent than one would expect. This can especially happen unsuspected after new plastic coverings are solarized, right after being implemented or replaced.

## Batten down the hatches

The most proactive method of preventing wind damage is anticipating it! Check weather forecasts and wind speeds often. Install a weather app and activate alarm notifications on your phone for when surprise wind events could be headed your way: such as tornadoes, hurricane winds, or even just strong storms.

This way, you can plan for high winds days ahead of time—or, right in the nick of time. On expected windy days, plastic coverings can be tightened or reinforced, or glass ventilation systems and ducts shut until wind speeds are calmer. When you receive weather warnings, you can also tighten coverings and close vents quickly before winds hit.

This is why sophisticated greenhouse growers may opt for smart phone technology.







# HOW TO ATTACH PLASTIC SHEETING TO A GREENHOUSE

Choose a day with low wind speeds if at all possible. It is best to unroll the greenhouse plastic in the early morning in order to avoid having the wind work against you during this process. This is one of the steps of building a greenhouse kit in which it is best to have extra hands available. Particularly if you will have to be dealing with wind issues, think through the process before you begin.

Plan where you will need people standing ahead of time to secure the corners. Have the tools you will need at hand: Ladders, it is best to have at least 2 available.

For taller hoop house you will want to rent a scissor lift. Bolt cutters or a hacksaw for cutting spring wire to length, Push brooms, for easing the plastic over the hoops, tennis balls which can be placed on pole ends to protect plastic when guiding it over the structure. They can also be tied into a corner of the plastic with rope to be used in pulling it over the length of your structure.

One also needs rope, a box cutter or similar tool for trimming plastic, safety gear like gloves, goggles, etc. Do not forget greenhouse repair tape (accidents happen!).

It is often heard that everything speeds up in the build when you

begin attaching the plastic: because the wind may be blowing it around, because many people will be looking to you to tell them where to be, because you are almost finished with your build.

## WHAT SIZE OF GREENHOUSE PLASTIC

The size of your greenhouse film can be determined by measuring the length and width of the growing structure that you wish to cover. Account for the total length of the pipes you will use to complete the hoops and the end walls. Roll-up sides will require an extra 1,2m of plastic. If you are measuring plastic

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### ▶ STORM DAMAGE from page 16

This technology allows you to work the functions of your greenhouse remotely through an app, monitoring or activating greenhouse vents, doors, or other components at the touch of a button— even when you're not near your greenhouse at all.

In the case of windy days or weather warnings, this can make battening down the hatches against wind incredibly quick, easy, and in the most proficient way for complete protection of your greenhouse.

### When you can't protect from wind...

The reality that all greenhouse growers must face: there is no way to predict, protect, or prevent wind damage to your greenhouse 100%. Wind events can and will happen, and they may damage your structure no matter what you do— and it happens to even the most prepared and experienced of greenhouse growers out there! Advise for the best protection possible for a greenhouse against wind? Greenhouse

insurance! Even if you do all you can to stop the worst that winds bring, a greenhouse-specific insurance policy assures that you recoup all that's lost from wind damage: whether it's complete loss of a building, or partial damage that put your growing business or hobby behind.

With all these safeguards together, you can have the most protected greenhouse in the industry when it comes to wind damage. There's no better set of ways to prevent it! 🌅

By D Guida, NIP





► GREENHOUSE PLASTIC from page 17

for the double layer, you will only need enough plastic to cover from hip board to hip board as the second layer will only need to cover the top of the structure.

### INSTALLING THE PLASTIC

To attach greenhouse plastic, begin by unrolling your plastic film lengthwise along the structure. Unroll the film so that the label is visible from inside the structure you are covering when you attach the greenhouse plastic. Most plastic is folded in such a way as to facilitate it unfolding properly as you pull the corners.

After rolling out the plastic, have two people grab a corner of the film on the ends and begin lifting over the hoops of a hoop house greenhouse. As you begin lifting the plastic over the hoops work with the wind when unfolding otherwise the plastic will be pushed on the ribs making the job much more difficult. This is where having soft bristled brooms or poles with tennis balls on the end is extremely useful.

### CAREFUL!

Take care not to get hung up on corners, boards or hardware to avoid rips.

In case of mishaps, it is a good idea to have a roll of greenhouse repair tape on hand to fix any small tears that occur. Having helpers near the end walls to help unroll and unfold allowing the pullers more slack can make this process more seamless. When fully rolled out, the plastic film should have at least 2 extra feet all around the structure on the ground.



### SECURE PLASTIC WITH SPRING WIRE AND LOCK CHANNEL

Lock channel and spring wire is the industry standard for properly securing greenhouse plastic. Installing lock channel and spring wire is a simple and economical way of installing greenhouse plastic and other coverings, including poly plastic and shade cloth, to a structure.

The PVC coated spring wire used to secure greenhouse coverings into a lock channel is sometimes referred to as wiggled wire because you will need to "wiggle" it up and down during installation. Spring wire, used in conjunction with the lock channel, forms a tight and secure attachment of your greenhouse covering.

In order to install the spring wire, pull the plastic tight and wiggle the wire back and forth into the channel. Each section of wire is 1,9m feet long so there will be places that you will need to cut the wire to fit. You can use bolt cutters or a metal saw to easily size the sections that you need.

We prefer the method of using spring wire and lock channel over the often used staples and batten board method because it gives the grower the ability to remove and reinstall the plastic without causing damage.

### INSTALLING SPRING WIRE AND LOCK CHANNEL FOR

### GREENHOUSE PLASTIC

To finish securing the film to a greenhouse frame, begin at the top of an endwall and work down one side to the ground and repeat the process top to bottom on the other side. Move your ladder and your crew to the opposite endwall. With help, pull the plastic as tight as you can toward you and begin securing the film into the channel top to bottom and side to side.

Next, move to one of the long sides and begin securing the film into the lock channel with spring wire at the hip board. Once the plastic is secure along the length of one side wall, move to the opposite long side. While pulling down as tight as you can, secure the plastic with spring wire. After completion, you will be able to see where you can retighten the plastic by removing a section of spring wire and pulling from the bottom.

### A NOTE ABOUT INSECT NETTING:

If you plan to install insect netting to protect the roll-up sides on your hoop house; it will need to be placed in the lock channel with a separate set of spring wire before you install the plastic.

Remember when you place your order to add enough extra spring wire to run the length of your hoop house times four. To read more on insect netting and how to install it check out the Insect Netting for

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Organic Pest Control for a Hoop House article on our blog.

### HOW DO YOU INSTALL PLASTIC WITH ROLLUP SIDES?

To install roll up sides you will wrap at least 1' of greenhouse film rolled and attached around ¾ EMT down the length of the greenhouse. Specially designed greenhouse snapclamps make this process relatively painless.

Feel free to cut off any excess from the bottom past 12". Once the greenhouse plastic is secured to the hand crank end, you may find that hand-rolling the non-crank end as you roll the sides up and down assists in alignment.

Once you are satisfied with that, roll the side walls down to the baseboard to begin trimming for the end wall.

If you will be using roll up sides it is particularly important to plan for controlling weeds around the edges of the structure. Landscape fabric is one of the best ways to do this.

### INSTALLING PLASTIC ON THE END WALLS

For end wall plastic remember that you will be inserting spring wire into some lock channels as the first layer or as the second layer.

The lock channel around the baseboards, door, door frame, optional vent frames, and all

uprights will have the end wall plastic as the first layer inserted. For the end wall hoop you will be installing on top of the plastic any wire you already have in place.

The more places you can secure the plastic on the ends the better. This is because the end walls are vertical and bear more wind load than the curved length of the hoop house or greenhouse roof. Begin by securing the plastic across the baseboards including horizontal door and door frame pieces at the bottom.

Then secure the plastic to the top with a second layer of wiggle wire in the end wall hoop lock channels that you first secured the plastic in when you began installing the plastic.

When working the wrinkles out, think in terms of working from a central point and out diagonally.

Next work your way up the door, door frame, and uprights to the top of the hoop. It works best if you work from the bottom to the top from the middle out on one side and then the other. Securing these

individual pieces after the perimeter makes the end wall skin very tight and that is exactly what you want. Lastly cut between the door and the door frame between lock channels to allow the doors to open. 🌞

**Further reading on the right plastic (polypropylene) will be published in our forthcoming edition. Source: Various reputable greenhouse constructors**

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**MORE INFORMATION CONTACT: MARION OOSTHUIZEN**

Cell: 071 6399 300 or email: [marion@undercoverfarmingexpo.com](mailto:marion@undercoverfarmingexpo.com)  
For more detail visit [www.undercoverfarmingexpo.com](http://www.undercoverfarmingexpo.com)