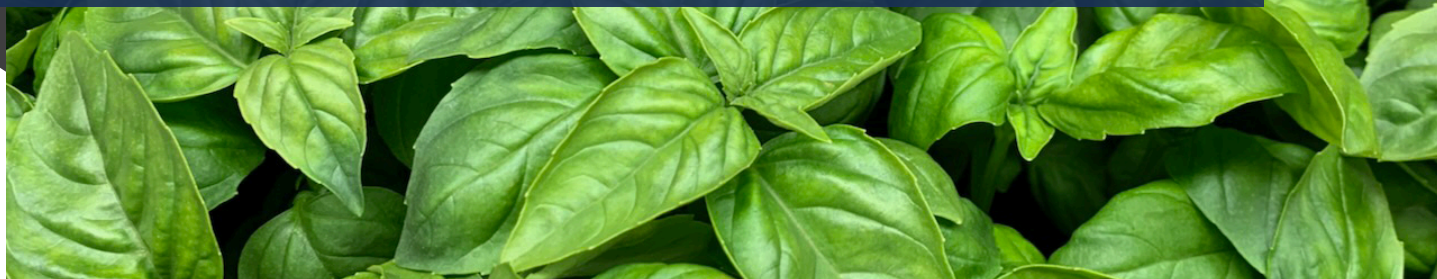




RHASS Presidents' Initiative for 2023

The RHASS Presidents' Initiative for 2023 will raise awareness of the critical role science plays in our food and drink sector.

CASE STUDY: Aberdeenshire farm grows upwards to fill fallow time of year



Case Study Partner

IGS is a Scottish-based agricultural infrastructure provider. Founded in 2013, the company brought together decades of farming and engineering experience to create an agritech business with a vision to revolutionise the indoor growing market. Its commitment to innovation has continued apace to develop 25 granted patents for its unique vertical farming technology. IGS launched its Crop Research Centre in Invergowrie, Dundee, in August 2018. Currently, more than 200 crops can be successfully produced using a growth tower for customers across four continents.



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—
Graeme Warren

Overview

The 300-acre Waterside Farm in Aberdeenshire grows barley, oats, rye for distilling and hemp for the environment and health.

With a short growing season from April to September, owner Martin Dickie, Managing Director of Brewdog, and Manager Graeme Warren were looking for alternative ways to produce from the farm during the six months of the year when there are no crops in the ground.

With his background in food and drink, Martin recognised the demand from the restaurant trade for fresh, quality produce low in food miles and environmental impact.

In 2021, he invested in a vertical farming tower built by Scotland's Intelligent Growth Solutions (IGS) to diversify into producing different crops throughout the year and provide the farming business with year-round income.

Graeme Warren, Director of the vertical farm enterprise, Vertegrow, and the farm manager, said:

“The tower is like a very good piece of farm machinery. It’s a tool that helps us to grow quality crops efficiently and effectively. Although it’s a substantial initial investment, it gives us greater control over the returns, maximising yields and growing higher value crops that we’d never be able to grow otherwise in the North-East of Scotland.

It complements the field-scale enterprises on the farm. We’re really excited as we experiment with what we can grow and the role this could have in future food production, how we farm and the potential to shorten supply chains and reduce reliance on imports.”

“It’s anticipated that by 2030, 30% of food will be grown in vertical farms.”



Reaching new heights

The first vertical tower was installed on the farm in November 2022, after two years of experimentation in shipping containers. The core focus so far has been leafy and microgreens and herbs, but with the greater space and zoning available with the tower, and plans to install a second, trials now include tree saplings to fulfil the extraordinary levels of recent forestry planting and bringing on strawberry

plants for berry growers to extend their season.

“Growing in towers takes away the risk of disease and weather variables, and through a combination of IGS’ and our own research, we are creating the optimum growing conditions, tweaking them in real time to guarantee the best possible outcome,” explains Graeme.

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The tower is nine metres high and each of the 52 growing trays is the size of a snooker table, all moved and managed automatically through a Cloud-based software system. The conditions - airflow, light, humidity, and water – have been carefully researched by IGS crop scientists to create the ideal ‘recipe’ for different crops.

“It means we can provide high quality fresh, local produce for food service and retailers, outside seasonality, but it also helps us address some of the key challenges for farming today: extreme weather, available labour, changes in subsidy, Brexit challenges, the salad shortages we saw earlier in the year when we couldn’t get it from Europe.”

A perfect ‘Tuscan’ start can be created in this ‘farm in a box’ for tomatoes to accelerate new plants before hardening them off to suit the local environment. Tree saplings can be grown in 90 days rather than the 18 months they take to reach the same stage outdoors, and without the cost of chemical pesticides.

IGS estimates that if 3% of the UK’s 216,00 farms had a single tower, that shortage could have been filled. A 12-metre tower is equivalent to a hectare of arable land. As customers increasingly look at the environmental impact of their food, producing food this way also has huge credibility, adds Graeme:

These conditions can be iterated in real time to optimise the output based on the characteristics most desired by the end consumer, for example, to slow growth to stop plants getting too “leggy” or using different combinations of light to maximise flavour or enhance nutrition.

“We harvest and recycle water, minimise fuel and energy use, there are no emissions or chemical pesticides and by growing closer to home, the produce is fresher and has longer shelf life so there’s less food waste.”

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This case study is one in a series, highlighting where farmers, across a range of different sectors, have benefited from scientific advancements.



Fruitful growth

With a worldwide shortage of vanilla, usually grown in hot regions such as Madagascar and India, the latest development for Vertegrow is experimenting to see if it can create 3-4 flowerings in the controlled environment of vertical towers, rather than the 1-2 annual flowerings expected in their origin country.

Other experimentation includes chillies, flowers and 'ripen at home' products. A future focus is flavour and nutrient profile: Vertegrow is working with the James Hutton Institute and the Rowett Institute and a major retailer to look at how vitamin and protein content could be increased in certain plant-based

foods for the healthy consumer market.

More towers are planned for Vertegrow which will be co-located with renewable energy sources.

The business employs a further five people to run the vertical farm, who have all been trained in machinery operation to support the arable enterprise at busy times of year. Graeme, who was previously a property lawyer for SSE, says this type of farming attracts a different kind of person into the business which has also brought different perspectives as it develops.

Supporting field-scale agriculture

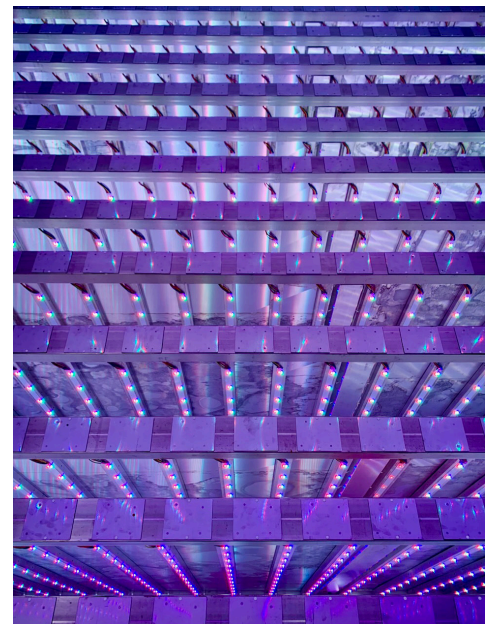
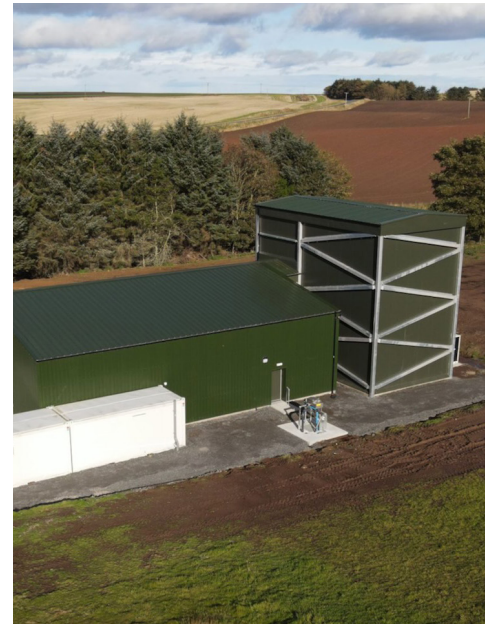
A shared ambition for both Vertegrow and IGS is to see a network of local food growing hubs to supply the UK with a broad range of food crops, shortening supply chains and serving customers in more remote places such as the Highlands and Islands. This could potentially be through collectives of farmers or a franchise model. Up to 20 IGS towers can be managed remotely by one operative.

The return on investment for a grower depends on the crop and market, which could be pharmaceuticals or perfume as well as food, but can often sit around 3-7 years, which is rapid for agritech, says IGS CEO, David Farquhar. He adds that vertical farming should not be perceived as a scary futuristic science or

a point of threat for traditional agriculture but as co-beneficial to field-scale growing in Scotland:

"This advancement in technology is exciting and we are very keen to get more farmers involved. We see this very much as collaboration, not competition and are already seeing it as a vision that farmers are taking on."

"It decreases reliance on complex food chains and labour, re-localises food sources for longer shelf life and lower food miles and gives growers greater control over cost and production. At IGS, we have an open door and always relish conversations with growers about what they need and how we can support them to achieve it."



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