

# Growing Underground: Sustainable Urban Farming [C1]

La popolazione mondiale cresce sempre di più e, di conseguenza, aumenta anche la domanda di cibo. E se la risposta migliore fosse un'agricoltura più sostenibile, sottoterra e nelle grandi città?

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As the world's population grows rapidly, so does its demand for food. Can it be grown sustainably? Is it possible to farm in an urban environment? Deep beneath the streets of southwest London, a futuristic business is finding solutions. As an urban agricultural pioneer and co-founder of Growing Underground, Richard Ballard believes passionately in sustainable and environmentally-friendly urban food production. His business limits waste from the three biggest CO2 contributors: buildings (and the energy required to power them), agriculture and transport. Ballard and his partner, Steven Dring, aren't farmers or scientists, but they've been inspired by the ideas of two US thinkers: Professor Dickson Despommier, who was a pioneer of vertical farming; and economist Jeremy Rifkin, who's known for his creative ideas. Ballard goes into more detail about these ideas. **Richard Ballard (English accent):** The first is a guy called Jeremy Rifkin, who is an economist by trade. He's written about twenty books. And he came up with this concept called the Third Industrial Revolution, which is about buildings producing their own energy, feeding that to smart grids and using that very efficiently. It's about using an abundance of cheap renewable energy and feeding that into cities and powering them. His idea has been adopted in cities around Europe. Also, China have adopted the Third Industrial Revolution principles. They've invested 84 billion pounds about five years ago into that. This really interested me and this made me think that the future with an abundance, cheap renewable energy could power things like this. As well as that, I was looking at another guy called Dickson Despommier who came up with the concept of a vertical farm in the early noughties, at Columbia University with his class. And they looked at the fact that agriculture is responsible for 30 per cent of carbon emissions on the planet and how could they reduce that? And they looked at ways of bringing food production closer to the point of consumption, as well as using waste

streams in cities like excess CO2 and heat from industry to [power](#) potential growing plants. This was in the early days, before LEDs were invented and they were looking at using mirrors to reflect light into vertical [stacks](#) or [disused](#) buildings. This idea really inspired a generation of architectural students, who started doing the [drawings](#) for vertical farms, futuristic ones. And that really sort of inspired a generation of urban agricultural entrepreneurs, like myself and Steve. Other people are doing this in [warehouses](#) above ground or on the top of buildings, [feeding](#) into restaurants and supermarkets below.

## **BUILDING BUSINESS**

As Ballard explains, a successful [trial](#) led to bigger-scale testing, attracting investors and crowdfunding support that helped them build their business.

**Richard Ballard:** We did a basic [trial](#) and got some good results and built up a larger test area, where we did [seed density](#) in [yield trials](#), see what we could grow. That space was big enough to probably try and attract some investments. We started bringing some investors down to get involved and we ended up doing a crowdfunding campaign, which enabled us to [raise](#) about a million pounds over a two-year period. We brought in other investors and that enabled us to build the site we've got today, start supplying and building the operational side of the business.

## **ADVANTAGES**

Farming thirty-three metres below London's busy streets has certain advantages, as Ballard explains. **Richard Ballard:** We have a consistent temperature year round, whether it's -5° outside or 35°. As well as producing light, the LEDs we use produce some heat. Using that heat and ventilation we [draw](#) into the tunnel from outside, as well as moving of air inside, as well as the humidification, we can create the perfect environment for temperature, humidity, CO2 and an [airflow](#). And this enables us to grow in the same conditions, year-round, 365 days a year.

## RIGHT LIGHT

Plants do not need white light to grow, and they reflect green light. Ballard explained how an underground farm finds the right level and type of lighting, and the impact it has on a plant's growth and flavour. **Richard Ballard:** Blue and red is much more energy-efficient than the [broader](#) spectrum that we use. But, we did a lot of [trials](#) and we find the flavour was much better with a broad light spectrum. And you can actually work in that environment. The blue and red is quite a difficult environment to work in; everything appears black, so it's difficult to [spot](#) if there's any problems with [crops](#) and that sort of thing.

## THE TASTE TEST

In fact, Ballard and his team are convinced that the [crops](#) grown in their tunnels in artificial light taste better than plants grown using traditional methods. **Richard Ballard:** It's an excellent taste, you can do the taste test and try our products with anything that's growing in greenhouses or outside, and it tastes very similar. You can change spectrums to alter the shape or [elongate](#) a plant or make it [bushier](#), which in turn can change sugars and [starches](#). So you can probably affect flavours by doing that.

## SPACE TRAVEL

Tunnels filled with plants growing in a hydroponic system under pink LED lighting sounds and looks like something from a science fiction film. We asked Ballard if it has any uses in other environments, such as in space or on other planets. **Richard Ballard:** There is a lot of talk of this at the moment. Probably hydroponics wouldn't be used. There are other technologies now like aeroponics, which uses a lot less water and uses [misting](#) to [spray roots](#) — probably something like that would be used I would've thought in space or if that was possible and on other planets.

## CHALLENGING TRADITION

Back on earth, farming is known for being a conservative and traditional industry. We asked Ballard what response their pioneering ideas and technology had from farmers and their representatives. **Richard Ballard:** We've done a lot of tours of the NFU [National Farmers Union] and their members, and general farmers, and the feedback's very positive. And to be honest, it's to the point where a lot of people have spaces on their lands, maybe [disused barns](#) or buildings that they're now thinking about looking at to do something like this in the future, and I think that's definitely another direction that farmers can go in. [www.zerocarbonfarms.co.uk](http://www.zerocarbonfarms.co.uk)

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# Glossary

- **stacks** = scaffali
- **warehouses** = magazzini
- **trial** = prova, test
- **seed density** = densità di semina
- **draw** = attirare, attingere
- **crops** = colture
- **spray** = spruzzare
- **barns** = fienili
- **waste** = rifiuti, scarti
- **feeding** = alimentare
- **power** = fornire energia
- **early noughties** = primi anni Duemila
- **broader** = più ampio
- **spot** = individuare, rilevare
- **yield** = resa
- **raise** = raccogliere fondi
- **economist by trade** = economista di professione
- **came up with** = ideare, proporre
- **smart grids** = reti intelligenti
- **waste streams** = flussi di rifiuti
- **starches** = amidi
- **roots** = radici
- **airflow** = flusso d'aria
- **elongate** = allungare
- **bushier** = più folta
- **misting** = nebulizzazione
- **disused** = inutilizzati