



Where I work Lucas van der Zee

Photographed for *Nature*
by Francesco Rucci and
Francesco Marinelli.

Farming today is unsustainable, with its greenhouse-gas emissions and its destruction of wildlife habitats. Agriculture now takes up half of Earth's hospitable land surface, at the expense of these habitats.

Developing sustainable food production will require multiple approaches. My PhD research at Wageningen University in the Netherlands is inspired by alternative, indoor methods of food production, such as farming leafy green vegetables vertically and growing meat in a laboratory. I wondered – if you can grow meat without an animal, can you grow fruit without a plant?

This could be done inside, which might help us to return some agricultural land to nature.

During my master's programme in agricultural engineering, I discussed indoor fruit production with my professor. He invited me to write a master's thesis on the subject of growing fruits without the plant. Now, we're testing this idea.

The main task of my PhD is to collect immature fruit or flowers from tomato plants, and try to grow them into healthy,

high-quality tomatoes in the lab. Ultimately, we want to produce fruit from tomato meristem cells – undifferentiated cells from which new plant organs can grow – and skip using a plant entirely.

The jars in this photo contain some of the early results of my research, when I was testing different growing conditions at different stages of tomato development. The lighting is an energy-efficiency measure; we use blue and red LEDs, the best colours for photosynthesis.

Some people get excited about the possibilities of my work, but most are hesitant, which I understand. In the past, people have rushed into using food technologies, such as cage-grown chickens and the extensive use of synthetic fertilizer, without considering the potential downsides. An important part of my PhD programme will be to assess the sustainability of my method.

Lucas van der Zee is a horticulture and product physiologist at Wageningen University, the Netherlands. **Interview by James Mitchell Crow.**

Correction

This article erroneously stated that Lucas van der Zee is trying to grow stems into high-quality tomatoes. In fact, he wants to grow tomatoes from immature fruit and flowers.