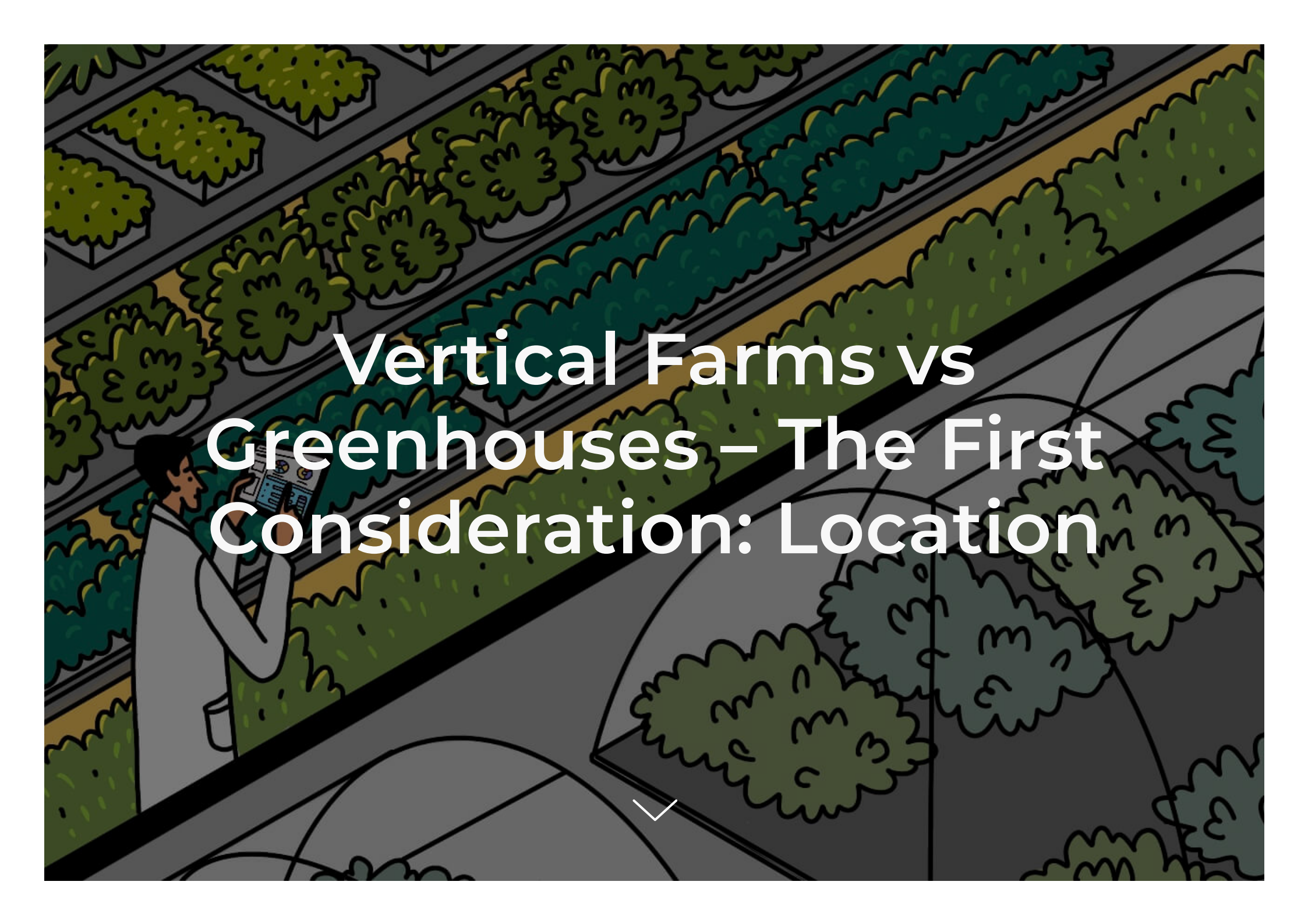


A stylized illustration of a city street scene. In the foreground, a person wearing a white lab coat is standing on a sidewalk, looking at a tablet device. The street is lined with various green plants and trees, some in planters. A greenhouse is visible in the lower right corner. The background shows more greenery and a road. The overall style is a mix of illustration and photography.

Vertical Farms vs Greenhouses – The First Consideration: Location

In just the past decade or so, sustainable farming has seen a high-tech makeover in the form of Controlled Environment Agriculture, or CEA, which consists of two main technologies: Vertical farms and greenhouses.

When it comes to feeding the world, it's not a choice between vertical farms or greenhouses. We'll need both to feed our growing global population with healthy, sustainable food, and we need to understand the ideal situation for each.

But as a business decision, it often is a choice between the two – and that's what we hope to explain in this five-part series of articles: When and where to use a vertical farm versus a greenhouse, and what factors – both economic and environmental – make the difference.

In this first post, we'll cover the basic differences between vertical farms and greenhouses, and **why location matters so much when deciding between the two**. Then stay tuned because in the next articles, we'll dive deeper into energy and lighting costs, automation and other expenses, environmental and crop considerations, and finally, the future of farming.

Vertical Farms vs Greenhouses: The Basics

The two technologies are often confused, but there are significant differences between them in resource use, cost, output and, perhaps most importantly, the ideal locations for each.

Greenhouses are the more traditional technology that you're probably familiar with: A single layer of crops, planted inside an enclosed space with walls and a ceiling made of glass or plastic to allow natural light in. They're semi-controlled environments.

Vertical farms, on the other hand, are a much more recent invention using trays of usually hydroponic plants, stacked in floor-to-ceiling towers, with LED lights illuminating each layer, and climate control constantly adjusting the temperature, humidity and more.

In the upcoming articles in this series, we'll dive into each part of these differences in more detail. But for now, let's start with the first question entrepreneurs always need answered: The price tag.

Henry Gordon-Smith is the CEO of Agritecture, an independent consultancy and **software** creator that helps clients decide between the two technologies. As he puts it, "Vertical farming represents the most expensive, most controlled form of agriculture."

At first blush, vertical farms are, in fact, shockingly more expensive than greenhouses – six to 10 times as costly. Gordon-Smith says vertical farming costs 2,200 to 2,600 Euro per square meter of cultivation bed space, while high-tech greenhouses cost 250 to 350 Euro per square meter of cultivation space.

Both offer a year-around source of fresh, pesticide-free, locally-grown produce, which provides better nutrition than the same foods that arrive from far away.

But what else do farmers, entrepreneurs and investors get for all the added expense of vertical farming?

The answer is pretty simple: A more compact farm with more production per square meter, **less water use**, and more control over both quantity and quality. (With iFarm, this predictability is part of the package, in the form of a guaranteed yield within a precise time frame.)

For some entrepreneurs or municipalities, the cachet of implementing a high-tech farming technique that's only been in use for less than a decade is also a factor in favour of vertical farming. But most often, the choice comes down to location.

The Ideal Location for a Vertical Farm versus a Greenhouse

The first step in determining the feasibility of building a vertical farm or greenhouse is to look at the drivers and constraints – many of which are simply location-based.

Places with limited space, such as dense urban areas, and limited access to fresh water are ideal for vertical farms. Doubly so if they have access to low-cost, renewable energy, and if they're near a market with high demand for the crops vertical farms excel at producing: Leafy-greens, micro-greens, herbs and berries grown locally, without pesticides.

But in areas with unlimited space, lots of natural sunlight, and high-cost and/or high-carbon electricity, greenhouses may be the better option and the extra expenses of vertical farming might not make sense.

How these considerations apply in broad regions of the world is illustrated below:

GLOBAL MARKET DRIVERS FOR CEA

DRIVERS	USA (CALIFORNIA)	USA (NORTH EAST)	CENTRAL EUROPE	NORTHERN EUROPE	GCC*	UNITED KINGDOM	INDIA	AUSTRALIA
WATER SECURITY	✓	○	○	○	✓	✓	✓	✓
FOOD SAFETY	✓	✓	○	✓	✓	✓	✓	✓
LIMITED ARABLE LAND	○	✓	✓	○	✓	✓	✓	✓
UNFAVORABLE WEATHER	○	✓	✓	✓	✓	✓	○	✓
DEMAND FOR PREMIUM & LOCAL	○	✓	○	✓	✓	✓	○	✓
DEMAND FOR INNOVATION LEADERSHIP	✓	○	✓	○	✓	○	○	○
DEMAND FOR AGRICULTURE INDEPENDENCE	○	✓	○	✓	✓	✓	✓	✓

*Gulf Cooperation Council

Next, in [Part 2](#), we'll address the most common concern related to all kinds of indoor farming: Energy use and its associated carbon footprint. (And we'll explain why, in the long term, it's not as big of a factor as people often think.)

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