

Farms of the Future

Earth's population is increasing (less than 4 billion in 1970, 7.9 billion now, and expected to be 9.7 billion by 2050¹).

It is thought that food production will need to increase by around 70% by 2050² to meet this extra demand.

All of these people have essential needs, such as:

- Water
- Homes
- Schools
- Hospitals
- Roads
- Other infrastructure

Food security happens when: everyone can access enough safe and nutritious food to be healthy, and this can be sustained for the future

Plus food and more. All of this takes space, as more and more facilities need to be built.

But where will they be built? If towns and cities expand outwards, more buildings will have to be created in the countryside.

And this means building on farmland, which leaves less space for farms, but the farms need to be able to produce more food, because there will be more people.

How can we solve this problem?

¹United Nations, 2019: <https://www.un.org/development/desa/en/news/population/world-population-prospects-2019.html>

²United Nations, 2013. <https://news.un.org/en/story/2013/12/456912>



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Solution: Space-saving farms



Vertical farming is a method that grows crops in vertical layers, where the layers are stacked one above the other, instead of spread out across the ground. In the image on the left, lettuce plants are being grown in vertically stacked layers, without soil. This is called **hydroponics**.

Image: Valcenteu, [CC BY-SA 3.0](#), via Wikimedia Commons

Some farms have even been set up underground, for example in old mining tunnels. These are known as ‘deep farms’ and are naturally warm as they are underground, so crop production is largely unaffected by climatic or seasonal factors. But they do require lighting to enable photosynthesis. These farms could even be created under cities to reduce transportation costs and CO₂ emissions.

People can also grow food in very small spaces, such as on **windowsills** or on **rooftops**.

What can you think of?

How else could we produce food whilst saving space in future?
Does it have to be on land? What about up in trees, or out at sea?



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Minecraft Challenge

Can you build **your own space-saving farm in Minecraft**?

Remember that it needs to be able to **produce food**, whilst taking up as **little space** on land as possible. Where could it be? **How could it be structured?** What about **light and water**?

You could use:

- some of the building techniques we have covered
- your own ideas.

If you do not have access to Minecraft you could:

- draw your design
- build your own using simple materials.



Image: Science Hunters.

You can find out more about a **real-life ‘farming futurist’** here: <https://www.thisisengineering.org.uk/meet-the-engineers/ben/>

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