

Food Security

What does 'food security' mean?

Food security means that everyone has enough safe and nutritious food to be healthy, both now and in the future.

This video from the Biotechnology and Biological Sciences Research Council explains more:

<https://www.youtube.com/watch?v=0emw7IkFdK8>

The Sustainable Development Goals

The 17 Sustainable Development Goals (SDGs) were adopted by the United Nations in 2015 as a call to “end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity”.

You can find out more here:

<https://www.undp.org/sustainable-development-goals>

Food security and the Sustainable Development Goals

Food security is a key part of **SDG 2**. This is **Zero Hunger**: End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

It can also be linked to **SDG 3**. This is **Good Health and Well-being**: Ensure healthy lives and promote well-being for all at all ages.

What's the challenge?

Earth's population is increasing and is expected to be 9.7 billion by 2050¹.

All those people will need safe, healthy food. This means that food production will need to increase by around 70% to meet this extra demand².

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>

As well as more food, our population will also need more of other things that we need to survive and be healthy.

This includes:

- Shelter – homes to live in
- Infrastructure – things like roads, schools and hospitals
- Safe drinking water
- Can you think of anything else?

All of these things take up space on the ground!

If we expand towns and cities out into the countryside, we leave less space for farms...

We can't increase the size of the Earth, so to support our future societies, we have to find ways to produce more food without taking up lots more space.

Possible solutions

What have people tried so far?

- **Underground farming:** These ‘**deep farms**’ can use places like tunnels that already exist.
 - These farms are naturally **warm** as they are underground
 - Being underground avoids being very affected by **seasons and climate**
 - Because plants need **light** for photosynthesis, underground farms need to be lit

Could they be built under cities? What might be the benefits of doing this?

- **Home growing:** People find ways to grow their own crops. This could include using some very small spaces that aren’t being used for other things, such as **rooftops** and **windowsills**.



Image: [rybson4891](#) from [Pixabay](#)

Can you think of any others?

- **Vertical farming:** growing crops in columns, instead of spread out across the ground.
 - **‘Hydroponics’** (giving plants nutrients in liquids) can be used to do this without soil!



Image: **BrightAgrotech** from **Pixabay**

What else can you think of?

How else could we save space?

Do farms have to be on land?

Where else could they go?

The solutions above are all for growing plants. What do you think the future might hold for farms with animals?

How can engineers help?

Engineers can help find ways to farm in the future to support food security. For example, this video from This is Engineering shows how robots can help feed the world:

https://youtu.be/fFoTD_UQIaw

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

Minecraft Challenge



Starter: Plant some seeds in Minecraft. **What is essential for them to grow?** Is this the same in Minecraft and the real world?

Medium: Conduct an experiment. Choose a type of seed to plant from the inventory. Plant the seeds in two groups. Give fertiliser (bone meal) and water to one of the groups. **Which grows faster? Why?** How does this compare to the real world?

Advanced: As the world's population grows, there will be more people needing food and less space to produce it in. **Design a space-saving farm** to solve the problem. It could be on land, at sea, in trees...

You could use:

- some of the engineering 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.

Not an official Minecraft resource. This project was supported by the Royal Academy of Engineering under the *Ingenious Awards* scheme. For educational use only. Contact: sciencehunters@uwe.ac.uk.