



# greenhouses & polytunnels



## what are they?

Greenhouses and polytunnels are permanent or semi-permanent structures made of transparent material such as glass or plastic that protect plants from the cold and wind. They allow through the whole spectrum of sunlight, but trap the (infra-red) radiation that is reflected from the earth or plants (plus the warmed air is prevented from mixing with cooler air from above), which causes temperatures to rise. Carbon dioxide also allows sunlight through, but traps reflected infra-red radiation from the earth - which is why it's called a 'greenhouse gas'.

Greenhouses tend to be smaller but more permanent structures made of more durable (and expensive) materials than polytunnels (e.g. glass rather than plastic sheet). They range in size from a cloche or a cold frame to the Eden Project - the world's largest greenhouse.

The cultivation of plants under controlled conditions within structures has been practiced since Roman times, but greenhouses proper arrived in Europe after the Renaissance and massively increased in number in the UK in the 19th century. They are now much more affordable. In rural or suburban areas, domestic greenhouses around 2-3 metres long are common in gardens. Polytunnels are cheaper per cubic metre than greenhouses, and therefore tend to be used for larger-scale growing.

Greenhouses can be of traditional wood and glass (the more environmentally-friendly but more expensive option) or of polycarbonate sheet and aluminium frame. They can also be made of unusual materials like recycled plastic bottles or lego. They can be free-standing, pop-up or lean-to (against the house or a wall). Polytunnels are free-standing, and usually made of polyethylene sheet stretched over a semi-circular frame of steel or aluminium tubes.



*Greenhouses are a common sight in UK gardens.*



*No tomatoes you can buy will beat the taste of home-grown tomatoes from your greenhouse.*

High-tech, experimental greenhouses have been developed, for example the AgriPOD. These can involve technologies such as: soap-bubble shading/reflecting (to capture warmth in winter and reflect excess heat in summer); trapping surplus daytime heat in heat-stores for slow release at night; internal recycling of water to reduce usage; hydroponics / aeroponics / aquaponics to maximise yields and minimise use of water, energy, time and space.

## what are the benefits?

- Longer growing season, so higher yields.
- Larger range of plants can be grown.
- Reduced food miles - you can grow fruit or veg that would otherwise be imported.
- More efficient use of resources like water and compost, due to controlled and confined space; you can also harvest rainwater from the roof.
- Easier to control pests and weeds - wind-blown weed seeds for example.
- Protection for plants from extreme weather conditions, birds etc.
- You don't get wet in the garden if it's raining

## what can I do?

Start small: it's cheap and easy to build your own small structure to get started, and it can be fun to make something from scratch (from recycled materials). A few poles (old tent-poles will do, or bamboo poles tied together to make an A-frame) and some plastic sheeting is all you need for a miniature polytunnel. You can also get cheap kits from garden centres. You'll need to water regularly, as the plants won't be getting any rain, and that may involve lifting the structure off - but, if you find that your yields increase, you could up-scale to larger structures in subsequent seasons.

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Make a cold frame - an old window on a brick or timber base. Cold frames are for 'hardening off' plants germinated in trays in the house or greenhouse - a halfway stage from propagation in trays in a warm environment to planting outside. Leave the top open a little bit more each day, until the plants are ready to transplant to the garden.

There are numerous suppliers of greenhouses, polytunnels and the materials required to make them. You'll find thousands online, or visit your local garden centre. Greenhouses are usually cheaper at the end of the season, in the autumn. Look on Freecycle or other freebie websites, or in the classified section of the local press - but they're usually snapped up quickly, and you'd probably have to dismantle and transport it.

Large structures (e.g. the larger polytunnels) often need planning permission – check with your local planning office if you are in doubt about your local regulations.

See [permaculture.co.uk/readers-solutions/how-build-£30-diy-greenhouse](http://permaculture.co.uk/readers-solutions/how-build-£30-diy-greenhouse) for how to build a £30 DIY greenhouse. Think about tethering it to the ground to prevent damage by strong winds, and incorporating ventilation, and ease of access with a wheelbarrow, into the DIY design.

In the northern hemisphere, it's best to have the largest side of the greenhouse or polytunnel facing south, for maximum unobstructed sunlight. A lean-to greenhouse might be a good idea, because you don't actually need the glass on the north side, and if it's next to your house, it will receive a little bit of warmth and protection, and provide more insulation for your house.



*Polytunnel on a smallholding in Wales.*

Staging can add height and tiers so that you can grow more food in the same space. You'll need ventilation (pests can proliferate in still air) and in summer it may get too hot. A greenhouse can have roof windows, and polytunnels flaps that open at the ends. We wouldn't recommend heating, as the environmental benefits of using the structure would be wiped out. If a crop needs a heated greenhouse, grow something else.

With a greenhouse, you can have fresh green leaves like mizuna, rocket and lettuce all through the winter. It's impossible to buy anything that tastes like freshly-picked green salads, and is one of the best arguments for having a greenhouse. In early spring you can germinate plants such as French beans in the greenhouse earlier than you would outdoors (plant them outdoors later in the season). You can follow this with tomatoes, aubergines, peppers and cucumbers. Sow French beans in pots in August, then bring the pots inside to have beans in October and November. The strawberry season can be hugely increased, and you can plant a grapevine at the north end (so that it doesn't cast a shadow over other crops).

Of course your greenhouse will need regular watering, as it isn't getting any rain. Watering can or hose is the easiest solution, but it's labour intensive. There are several kinds of automated systems, such as drip irrigation (on top of the soil), seep hoses (under the soil) or water timers between your tap and your hose. The bigger your greenhouse, the more useful an automated system will be. It's best to irrigate in the evening, so that the water has time to soak into the soil without evaporating.

## resources

- see [lowimpact.org/greenhouses](http://lowimpact.org/greenhouses) for more info, courses and books, inc:
- Gatter & McKee, *the Polytunnel Handbook*
- Jonathan Edwards, *Greenhouse Gardening*
- Roger Marshall, *How to Build your own Greenhouse*
- [greenhousegrowing.co.uk](http://greenhousegrowing.co.uk) - great resource, with tips on growing, maintenance, cleaning and tasks at different times of the year
- [morningchores.com/greenhouse-plans](http://morningchores.com/greenhouse-plans) - 122 free DIY greenhouse plans
- [bit.ly/3jlwEGC](http://bit.ly/3jlwEGC) - factsheet on growing crops in a polytunnel

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