

GCSE  
FACT FILES

## Glass Houses and Polytunnels

For first teaching from September 2013

For first award in Summer 2014

## Soils, Crops and Habitats



agri  
culture  
and  
land use

## Glasshouses and Polytunnels



### Learning Outcomes

#### Students should be able to:

Demonstrate knowledge and understanding of protected cultivation, e.g. glasshouses and polytunnels, its economic importance and how it is used to satisfy market demand.

### What is protected cultivation?

Protected cultivation can be described as using technology to grow plants and crops in a favourable environment to obtain a yield that is as close to maximum as possible.

This usually means growing plants in **glasshouses** and **polytunnels**.



iStockphoto / Thinkstock.com

**Glasshouse**



iStockphoto / Thinkstock.com

**Polytunnel**

#### Why is protected cultivation of economic importance?

The world population currently stands at 7 billion and is expected to rise to 9 billion by 2050. This, along with climate change, puts tremendous pressure on global food supplies and could lead to starvation in many countries.

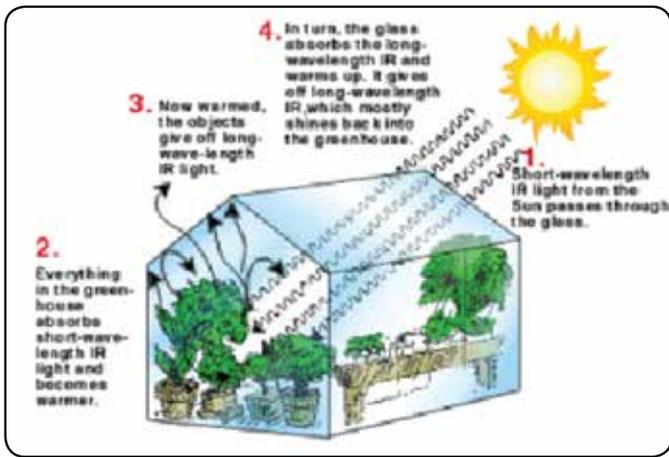
Research shows that protected cultivation may significantly increase food production as it allows crops to grow without the impact of negative weather conditions and in places where they would not normally grow. In short, protected cultivation makes much more use of the same land, it increases productivity.

The technology required is easily adapted to the requirements of the farmer and the chosen crop. For example, a farmer in India will have enough light and heat to grow crops but water will be a problem. Growing his crop in polytunnels means he can supply the water efficiently without wastage. Meanwhile a farmer in Britain may use artificial light and heat in a glasshouse to extend the growing season.

Endangered plant species can also be saved from extinction if their habitat has been destroyed by human activity or climate change as their unique growing conditions may be replicated in a protected environment.

#### Advantages of protected cultivation.

- Environmental conditions can be controlled e.g. lighting, temperature, humidity.
- Plants can be grown in places where plants cannot normally grow.
- Plants can be grown out of season or allows a longer growing season.
- Less impact on the surrounding environment through efficient land and resource utilisation.
- Crops can be grown at greater densities leading to higher yields.
- Harvesting does not depend on weather.
- Control of crop disease may be more effective as infection may be restricted to a single glasshouse/polytunnel.



from <http://www.thedygreenhouse.com/how-do-greenhouses-work/>

### Disadvantages of protected cultivation

- Is expensive to set up, e.g. purchase and installation costs.
- Is expensive to run, e.g. increased lighting and heating costs.
- Some crop diseases (e.g. fungal infections) are more likely in the crowded growing conditions.
- Diseases may spread very rapidly in the glasshouse/polytunnel.
- Some people may consider the conditions unnatural.
- Is resource intensive - requires regular monitoring.
- Some people may consider large numbers of polytunnels/glasshouses aesthetically (visually) unattractive.

### How protected cultivation can satisfy market demands.

Protected cultivation allows farmers including those having small farms to produce more crops each year from their land, particularly during the off-season, when prices are higher.

High value plants and vegetables which are in seasonal demand by the consumer such as salad crops in summer or soup ingredients in winter can be grown locally without the need for high transport costs.

There is a big demand by consumers for locally grown fruit and vegetables which supports the local economy by keeping money in the area and creating local jobs, as well as the national economy by reducing unemployment and the amount of expensive imports of fruit and vegetables.

### Example of protected cultivation – photo-degradable plastic and maize

Transparent photo-degradable plastic can be used to provide protection for young maize seedlings and plants. The plastic covering increases air and soil temperatures in the immediate environment surrounding the maize plants.

In the Northern Ireland climate this provides protection from frost, increases growth rates and provides higher yields.

Although the maturing maize plants can grow through the plastic cover, its photo-degradable nature helps it break down after being exposed to sunlight for a period of time.



## Learning Activities

1. Name the two structures most frequently used in protected cultivation?
2. Working in groups discuss the impact of an increase in world population on global food supplies.
3. Research two salad ingredients typically grown in Northern Ireland glasshouses to explain how environmental conditions can be altered to extend the growing season.
4. Make a poster showing three ways protected cultivation can help reduce pressure on global food supplies.
5. Hoverflies are a good means of biological control of greenfly. Discuss and explain why they are more effective in a glasshouse compared to field.
6. Visit your local supermarket and find three examples of fruit or vegetables which are grown in another country but could be grown locally in a glasshouse.

## Key Terms

Protected cultivation  
Glasshouse  
Polytunnel  
Global food demand  
Climate control



## Web Resources/Links

<http://www.gardenorganic.org.uk/pdfs/Polytunnel-Factsheet.pdf>

<http://www.calu.bangor.ac.uk/Technical%20leaflets/021201tunnel%20veg.pdf>

<http://www.thedygreenhouse.com/how-do-greenhouses-work/>

<http://www.maizetech.ie/Film5.html>

[www.dardni.gov.uk/ruralni/index/bussys/organic.../polytunnel.htm](http://www.dardni.gov.uk/ruralni/index/bussys/organic.../polytunnel.htm)