

Climate change

The concentration of carbon dioxide and other greenhouse gases in the atmosphere has risen significantly over the past century causing global temperatures to increase and our climate to change

Climate change is occurring as a result of human activity. Scientists predict that in the UK we will experience higher temperatures, changes in rainfall pattern and more severe weather events such as storms and flooding.

Greenhouse gases are being emitted into the atmosphere, primarily from the burning of fossil fuels such as coal, oil or gas, to meet the needs of our modern lifestyles.

Everyday things we take for granted like the heating and lighting in our homes and our transportation all release carbon dioxide into the atmosphere. All the products we buy; from clothes to computers all produce emissions during their production or transportation.

The sun warms the earth but some of its heat is reflected



CO₂ and other gases trap heat, keeping the earth warm

The Greenhouse Effect

The earth is surrounded by a layer of gases which act like the glass walls of a greenhouse; they let the sun's rays enter but stop much of the heat from leaving. This is a natural process and it is this layer of 'greenhouse gases' that keeps the planet warm enough for people and animals to live.

However as humans emit more greenhouse gases into the atmosphere the greenhouse effect becomes stronger. More heat is trapped and the earth's climate begins to change unnaturally. Since the industrial revolution, which began in the 18th century, the amount of carbon dioxide (CO₂) in the atmosphere has increased by 40%. In fact, the concentration of CO₂ is now higher than at any point in the past 650,000 years.

The role of trees

Trees and woodlands play a crucial role in regulating our climate. They remove carbon dioxide from the atmosphere storing it as carbon through the process of photosynthesis

Photosynthesis is the biochemical process which happens in the leaves of all green plants. It is the first step towards making food not just for plants but ultimately for every animal on the planet as well.

During this process sunlight, carbon dioxide (CO₂) and water are 'captured' by the green plants and converted into glucose (sugar) and oxygen (O₂). The plants store the carbon from CO₂ gas and use it to make solid material such as wood.

Because they are such large organisms, trees are capable of absorbing and storing large amounts of carbon through this process. The carbon is held in the trunk, branches, leaves and roots of each tree and even in the forest soil.

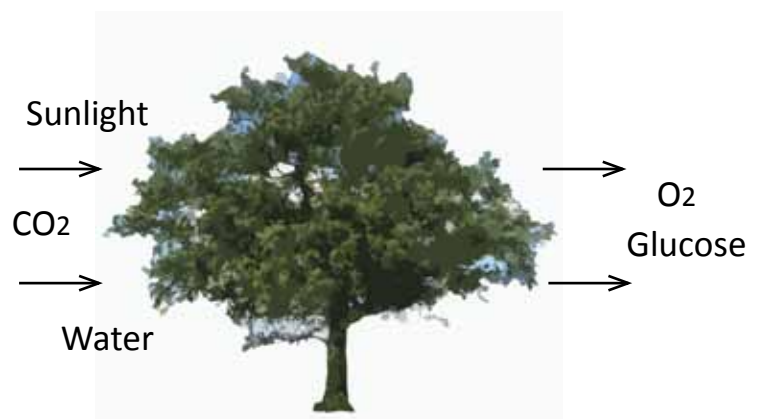
It is the natural process of photosynthesis that is responsible for helping to regulate the amount of CO₂ we have in our atmosphere as green plants all over the world help to absorb carbon.

The burning of fossil fuels releases over 20 billion tonnes of CO₂ into the atmosphere each year but the planet's natural processes (including the absorption of CO₂ by trees and forests) can only absorb around half of that amount.

This means there is an increase of CO₂ going into the atmosphere of 10 billion tonnes a year.

Carbon is held in the tree for its whole lifetime until its wood decays or dies. Even when a tree is chopped down the wood still holds onto the carbon. Anything made of wood can store carbon for hundreds of years.

A single tree can hold up to 4 tonnes of carbon!



Managing trees for climate change

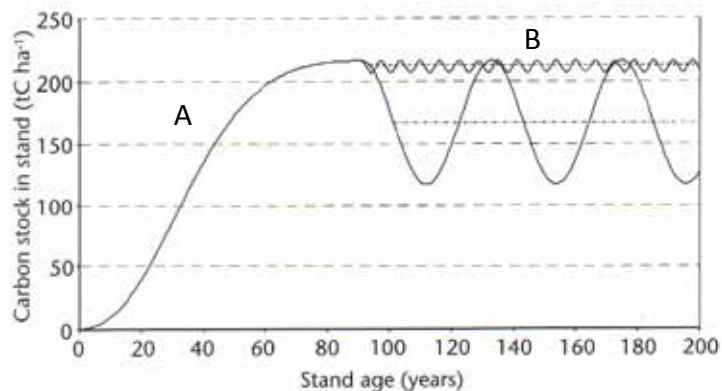
If we have fewer trees then more carbon dioxide will build up in the atmosphere. We need to protect the trees and woodland we already have and plant new woodland to replace those we have lost

Because so much carbon is absorbed and stored in trees the world's forests are very important areas for helping prevent climate change.

Many of the world's forests are being destroyed. This not only means that we have less trees to absorb the carbon we produce but it also leads to the release of all the carbon stored in them.

Consequently deforestation is responsible for the release of almost 6 billion tonnes of CO₂ emissions every year.

Because of the vital role of trees and woodland in absorbing carbon we must manage our woodlands carefully and maximise their ability to store carbon effectively.



During early establishment and when trees are young (A) they soak up carbon very quickly. As trees get older and mature (B) carbon absorption slows down until it reaches a steady state. Carbon stocks neither increase or decrease because absorption of carbon in growing trees is balanced by losses in decaying trees.

At this point a forest does not absorb any more carbon but it has become a vast carbon reservoir.

Good management of our forests means cutting down some trees to maintain a range of different tree ages. This maximises the absorption capacity of the whole woodland.

We need to manage the woods we have to maximise their ability to absorb carbon effectively.

Sustainable woodland

Numerous scientists and studies confirm that actively managed sustainable forests absorb more carbon more quickly and efficiently than unmanaged forests

But good management is not just about carbon storage it also needs to consider other valuable environmental services such as flood mitigation and soil conservation. It needs to consider our wildlife and the value of woodland as a home and habitat for many of our native animals, birds and insects.

It must also account for public use of woodlands for recreation and wellbeing and allow for the use of wood as a natural renewable, economic resource that we can use to replace damaging fossil fuels.

If woodland is managed with all these considerations in mind then it is sustainably managed woodland. This is because it balances environmental, social and economic needs.

Woodland that is managed in a sustainable way is able to provide many benefits:

- Environmental benefits such as storing carbon
- Vital habitat for wildlife
- A renewable supply of wood for building & fuel
- Safe places for public recreation and well-being



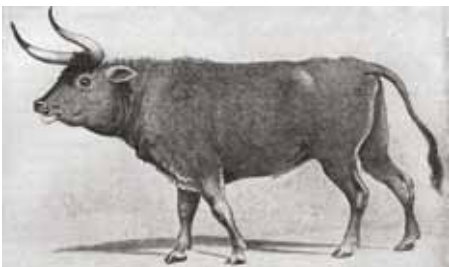
Sustainable woodland management means that we manage our woodlands in a balanced way by ensuring their vitality and health now and in the future.

Early woodland management

Managing woodland for wildlife in Britain is based largely upon traditional woodland practices

Long before man came along our ancient woodlands of the past would have been self regulating and governed by many natural processes.

The browsing and trampling of large herbivores such as Aurochs (wild cattle) would have created openings or glades in the forest allowing light to the woodland floor and benefiting many plant



species. The rooting of wild boar disturbed soil which mixed soil nutrients, created seed beds for trees, increased the diversity of plant species and exposed food for birds. Much of our native British wildlife became adapted to these conditions.

When early, traditional woodland management began it included techniques such as coppicing (harvesting young trees to encourage re-growth), pollarding (removing branches for timber and wood fuel) and thinning (selective felling to create straight and tall trees for building).

The advantage of these early techniques was that they mimicked many of the natural processes that used to take place in woodland long before man's intervention so our native wildlife was able to survive.

Coppicing and regular tree removal through the process of 'thinning' both increase light to the woodland floor and disturb the soil in much the same way as our ancient mammals once did.



Taking care of wildlife

The loss of our ancient woodland mammals means that many examples of British wildlife now depend on managed woodland for their continued existence

The Industrial revolution was fuelled by coal, oil and gas (all fossil fuels) as alternatives to wood which led to less woodland management. Forests were cleared to make way for industry and the large towns which sprung up.

Woodland was neglected because it was no longer economically viable. Many native species suffered as a result including the Nightingale and Dormouse.



Images © Forestry Commission

Many of our woodlands are now coming back into management which will help the survival of species such as the Fritillary butterflies.

Selective felling or thinning of trees prevents woodland from becoming too overcrowded. This gives trees more space to grow and allows light to get to the woodland floor helping many species of plant such as Wood anemone, Dog violet, Wild strawberry and Sanicle.

Many species of orchid also benefit from management including the Early-purple orchid, Common Twayblade, Fly orchid and the Greater and Lesser Butterfly-orchids all of which are adapted to traditional methods of coppice activity.

Woodland rides, which would once have been made by large migrating cattle, are usually created and maintained in well-managed woods. These open areas are a magnet for insects and act as highways for night-time predators such as bats and owls and help them hunt for their prey.



Greater butterfly orchid © Jim Asher

Wood for fuel

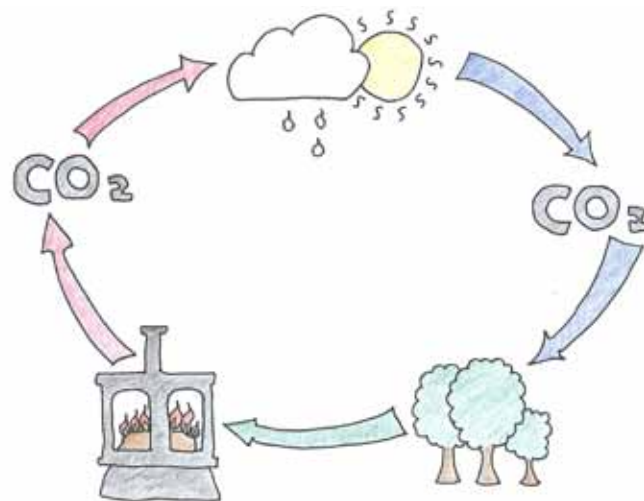
In a time before modern materials such as steel, concrete and plastic, our ancestors lived in a world mostly made from wood

Wood is now enjoying a revival! It is a renewable energy source we can use to replace fossil fuels and the emissions they produce.

Our ancestors used this natural renewable resource to build their homes, their transport and tools. Importantly, wood was also an essential fuel to keep our forefathers warm and was also used for cooking.

Climate change means we have to look for alternative sources of energy and those produced by natural methods are the best to use. You may have heard about green energy like wind and solar power but burning wood is also a clean renewable energy source providing the wood comes from sustainably managed woodland and is burned close to where it was grown to reduce transportation.

Extracting firewood and other wood from woodland is one way to ensure that woodlands are managed rather than neglected (because there are economic benefits in doing so). It also benefits the rural economy by providing local jobs and diversification opportunities for farmers and land owners.



As long as trees are left to grow over a wide area for a long time and what is grown is more than what is used as fuel there will be a balance between the absorption and emission of carbon dioxide in the atmosphere.

Wood for building

Wood has the lowest energy consumption of any commonly used building material. Replacing one cubic metre of concrete or red brick with the same volume of timber would save 1 tonne of carbon dioxide

Everything we do affects the environment around us. It is impossible to construct a building without having some impact on the environment.

Many countries are now working toward 'greener buildings' and making choices that reduce energy use, reduce the use of non-renewable materials and reduce the pollution caused by the manufacture of materials. In this way they are able to minimise the impact or "environmental footprint" of a building.



Upper image © Wood for good

There is only one building material that uses the sun's energy to renew itself in a continuous sustainable cycle; wood.

Wood is the only major building material that is renewable. It uses less energy and produces less air and water pollution than the energy intensive manufacture of steel and concrete.

Not only this but anything made from wood will continue to store carbon for hundreds of years!

We can all make a significant contribution to climate change by choosing to buy or use wood in place of energy intensive materials such as steel or concrete.

Wood is the ultimate building material. Once we have used it we can just grow more. It grows naturally and lasts a lifetime. No other material has the character or warmth of wood, it helps make a home a healthier place. Wood is at the heart of sustainable living.



Lower images © Forestry Commission

Sustainable sources

How do we know if a wood or paper product has come from sustainably managed woodland?

Look for the Forest Stewardship Council (FSC) stamp on any wood or paper product. The FSC is an independent, non-governmental, not for profit organisation established to promote the responsible sustainable management of the world's forests.

If you work for an organisation that makes use of wood or paper products you may also encounter a certification scheme called PEFC; an international, non-governmental, not for profit organisation dedicated to promoting Sustainable Forest Management.

Forests are often converted to other land uses which may provide higher economic returns but lack many of the rich social and environmental benefits.

Upper image © FSC

A global increase in the use of wood products will lead to the planting of new forests, improve the management of existing ones and help reduce the amount of carbon dioxide in the atmosphere.

So what action can you take today to help?



Action points

- **Support your local woodland and its management**
- **Only buy sustainable sources of wood carrying the FSC or PEFC mark**
- **Use wood for energy instead of burning fossil fuels**
- **Make, build and buy things made from wood instead of using high carbon materials such as concrete, steel and plastic**
- **Buy recycled or sustainable sources of paper**
- **Buy local or British to reduce your carbon footprint by reducing transportation**

Lower image © Juraj Vysoky