

12. Improving the Carbon Footprint of Your Burial Ground



This sheet explains how churchyards and cemeteries are currently storing carbon in their trees, plants and soils, and how you can maximise this process. It gives ideas to help manage burial grounds in ways that reduce the carbon being released into the atmosphere, whilst increasing that stored within plants and soil. Both of these will reduce your burial ground carbon footprint.

Burial grounds can be a good store of carbon. The majority contain soils which have been storing carbon for decades, centuries or even millennia. They also contain trees, native shrubs and sometimes an area of woodland.

The Carbon Cycle and Fossil Fuels

Many of us are striving to reduce our **Carbon Footprint** as a response to climate change. The Anglican Churches of England and Wales have a target of 2030 to reach net zero carbon whilst other denominations and local authorities have similar targets in place. Carbon dioxide is a key greenhouse gas which needs to be reduced in the atmosphere, but it is also crucial to life. Life revolves around the carbon cycle which, when undisturbed, is storing, releasing and using both carbon dioxide and oxygen in a balanced way.

When we think about capturing carbon, most of us think of tree planting but actually this is not always the best thing to do. Trees, shrubs, grassland and soil all store carbon. A tree in the wrong place can damage precious habitats and trigger a release of carbon so care is needed.

Trees, shrubs and woodland

Trees and shrubs store carbon in wood, within their trunk, branches and roots. Trees store more carbon than other plants owing to their size and long lifespan; a veteran tree has been storing carbon within its wood for a great many years. Hedges can be ancient too and also store carbon. Due to this, trees and hedges are often seen as the pinnacle of carbon sequestration (which is another way of saying storage!), and planting schemes are promoted as a way to combat climate change.



Grassland

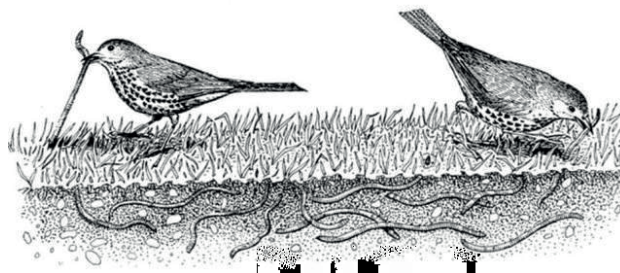
Grasslands are often overlooked as an important store of carbon as they don't contain large visible plants like trees or shrubs. Grasslands do store carbon within the leaves, stems and roots of their plants though, and can hold a great deal of carbon within the soil. It is estimated that up to 30% of the earth's carbon is stored in grasslands as soil carbon.



Soil carbon

Soil carbon is the carbon that enters the soil through decomposing plant matter.

When plants or parts of plants die, they are broken down and used as food by invertebrates such as insects and worms, by fungi and by bacteria and other microbes. Whilst some carbon dioxide is released through this process a great deal of the plant matter is incorporated into the soil. This plant matter is made primarily of carbon and oxygen.



The more mature soil is, the better for carbon storage. A mature, complex, undisturbed soil has a wide range of invertebrates, fungal mycorrhizae, bacteria and other microbes all of which contain carbon. Burial ground grassland tends to be full of different grasses, flowering plants, fungi and lichens. This richness above ground leads to a corresponding richness below.

So, which is the best?

It is not easy to directly compare the carbon within a veteran tree, a group of shrubs and an area of grassland: there are so many variables such as tree size, age and type, number of species within the grassland, soil depth, underlying rock, management and rainfall.

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Rather than doing a direct comparison it is more useful to know that individual trees, grasslands and areas of woodland are all excellent carbon stores. With trees, shrubs and woodlands most of the carbon is above ground and visible, with grasslands it is mainly invisible - within the soil.

As a general rule, peat bogs and fens store the most carbon, mature semi-natural woodland next, followed by species-rich grasslands including those with scattered trees such as parkland or orchard. We are currently working with partners to gain more knowledge of the specific importance of churchyards for carbon storage.

Reducing the Carbon Footprint of a burial ground

When planning how to reduce your churchyard, chapel yard or cemetery carbon footprint there are two aspects to consider:

1. How can you manage a burial ground to allow the most carbon storage.
2. How can you reduce the release of carbon dioxide or other greenhouse gases by reducing the oil, petrol and chemicals you use in churchyard and burial ground management.

Capturing carbon in burial ground trees, plants, and soils

Trees (see Action Pack sheets A4, A5, A6 and A7)

Whether intentionally planted or self-seeded, burial ground trees are storing carbon so try to avoid cutting down or pruning trees unless this is necessary for safety reasons or potential damage to buildings or monuments.

Existing Trees and Shrubs:

- Prolong the life of trees and native shrubs like hazel by coppicing (pruning stems at their base) or pollarding (pruning part way up the trunk).
- Consider allowing branches of veteran and ancient yews to touch the ground and take root, this is rejuvenating and keeps the tree living for longer.
- Deadwood contains carbon and decomposes slowly. Think of deadwood as an asset to be stored, either in a deadwood pile or if possible and safe, leaving it within the tree where it will also provide holes, nooks and crannies for wildlife too.
- Wood is also a useful product and by making something long-lasting you will be storing



carbon for the lifetime of the object you make. If a tree needs to be felled can the wood be used for floorboards, furniture or even a bowl or two?

- Do you have hedges? Increasing the area of a hedge leads to a direct increase in carbon storage. Could it be left to grow taller and wider and any gaps planted up?
- Do you need to rake up dead leaves in autumn or can they be left beneath trees? If left, they will be pulled into the soil by worms and will increase soil carbon. Raking leaf litter up to put into a compost heap helps too and is the best option if they can't be left. (N.B. you may need to rake leaves from flowery grassland to maintain the wildflowers, both thick leaf litter and grass cuttings will gradually reduce the floristic diversity).



Planting new trees and shrubs

- There is sometimes a place for new planting in burial grounds. You may be replacing a tree that came down in a storm, or planting in an area of grassland which does not contain much diversity. Try doing the simple survey in our Burial Ground Botanical Companion (on our website – caringforgodsacre.org.uk) to see if the chosen location for a new tree is already full of species in which case a different place would be better. N.B. if planning to plant trees please check with your diocese, local authority etc to see if permission is needed.
- Could you plant a hedge if you need a new boundary, perhaps to delineate a churchyard extension? The young, vigorous hedge plants will store carbon particularly rapidly in their first years of quick growth.
- If you have flowerbeds, can you plant some shrubs within them?

Grassland (see Action Pack sheets A2, A3 and A8).

Burial ground grasslands are likely to be excellent for carbon storage as they tend to contain a rich array of plant species. Their carbon storage can be increased by managing them in a less intensive way.

The higher the number of different plants growing in the grassland, the greater the amount of stored carbon. This is because an assemblage of species growing together will use the available resources (light, water, minerals) effectively as different species have different needs. In other words, more species result in a more efficient use of available resources, which increases productivity, thus increasing the carbon being

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removed from the atmosphere and used for plant growth.

More plants also mean more plant debris going into the soil and supporting a wider range of animals including soil invertebrates,

many of which may be specific to particular plants. By having a range of meadow flowers as well as grasses there is more carbon stored within plant roots, as the meadow flowers tend to have longer roots than grass species.

A taller sward means that more carbon is used in producing the stems and leaves of plants, it also means that roots go deeper to support the larger plants. Deeper rooting leads to more soil activity which in turn leads to more soil carbon storage.

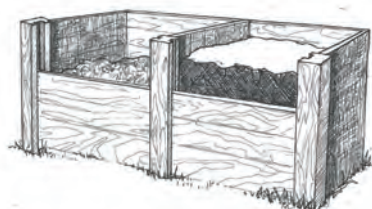
Short grass will store carbon but does not store as much as long grass.

Grassland with a few species will store carbon but does not store as much as grassland full of different grasses, wildflowers and a rich association of invertebrates.

N.B. grasslands do not continue to store more and more carbon over centuries, they reach a point of saturation. It is important to keep that carbon locked away within the grassland. This is the same for other natural habitats such as peat bogs or mature forests.

Consider:

- Increasing the amount of taller, meadow grass within your burial ground (see A2 & A3).
- Managing short grass areas a little differently – how about having medium length grass which is cut monthly with the cutting bar at its highest setting? (see A2). This small difference will increase carbon storage both above and below ground whilst remaining manageable and neat.
- Keeping a record of the plants within your grassland; many burial grounds have a wide variety of grassland plants but for those that don't, you might consider enhancing the sward with seed or plug planting (see B10, the Botanical Companion and our website for information on using iNaturalist).



Soil Carbon

Burial grounds tend to have mature, undisturbed soils. When soil is bare it erodes which leads to the carbon within the soil being released back in the atmosphere. When plant debris within soil is exposed, it quickly decomposes, releasing carbon. Burial ground soils rarely erode as they are not broken up by ploughing or excavation. Apart from grave digging, these soils have been gradually deepening, with a complex network of invertebrates, fungi and microbes forming. Grave digging, whilst it disturbs the soil, leaves soil open to the air for a short time following which the soil is replaced and turves laid back on top.

Consider:

- Following the steps above for grassland, this affects the soil and the carbon stored within it.
- Avoiding unnecessary digging. Burial grounds contain biodiverse, mature habitats so no need to try and 'enhance' by putting in a pond or making extra flower beds.
- Keeping soil covered with vegetation helps to prevent carbon-loss so include ground cover plants within flower beds.



Taller vegetation such as a meadow rather than short lawn creates a deeper zone of active soil associated with deeper plant roots. Active soil contains more stored carbon as it is full of life.

Reducing the oil, petrol and chemicals that you use (see Action Pack sheet D6)

The management tasks that you and other churchyard volunteers do may use fossil fuels, but usage can be reduced or even eliminated. Here are some principles in carbon reduction to consider and try to follow.

Consider:

Reducing the use of power tools. Most power tools (including grass mowers) are petrol driven and less use means less release of carbon dioxide. Do you need a leaf blower or hedge trimmer or will a rake and clippers do? When you need to buy new tools maybe choose electric ones and consider an electricity supplier that uses renewable energy.

Mowing less often. Rather than short grass which is cut fortnightly, how about a combination of medium grass which is cut monthly and long grass which is left uncut for 3 to 4 months – far less mowing needed and far more flowers! (See Action Pack sheets A2 & A3)

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Using what you have near at hand. Moving things in vehicles involves fossil fuels so try to use or buy local. Do you decorate the church with flowers grown locally or even from the churchyard, or are they imported?

Saving water by collecting and using rain for watering flowers. Treating and moving water takes time, chemicals and fossil fuels. Why not install water butts on the church downpipes?

Avoiding chemicals such as herbicides and pesticides. We have seen that more diversity means more carbon storage and producing these chemicals can be a carbon heavy process.

Composting green waste or letting it decompose in situ, in a deadwood pile or as leaf litter within wooded areas. N.B. always rake up and move leaves and grass cuttings away from your grassland areas, do not leave them to rot on the sward or you'll gradually lose your wildflowers!

Avoiding the burning of leaves or deadwood. How about creating a deadwood pile and putting leaves into the compost. Burning releases carbon immediately unlike slow decomposition.

Try and take a step on this journey

It's key that you do this gradually, change takes time, and it is important to keep managing your site whilst you change systems. Try and bring volunteers and the local community along with you as you make these changes, there may be ideas that would work in your gardens or public green spaces too. Start with something small, such as moving from fortnightly to monthly mowing of short grass areas and then follow this up with another change that is achievable, water butts perhaps. Every step on the journey helps and it's good to focus on what you can achieve rather than what you can't easily change.

Useful contacts

Church in Wales environment page
www.churchinwales.org.uk/en/about-us/our-campaigns/environment/

Church of England environment page
www.churchofengland.org/environment

Treeconomics www.treeconomics.co.uk

Woodland Trust
www.woodlandtrust.org.uk

Useful Reading

CfGA Action Pack sheets referred to above:

A2 Caring for grassland

A3 Cutting long grass and dealing with grass cuttings

A4 Inspecting and caring for trees

A5 Yews and other veteran trees

A6 Practical management of trees and shrubs

A7 Caring for hedgerows

A8 Creating wildflower meadow and helping wildlife

B10 Surveying for plants and animals

D6 Sustainability

BBC Bitesize helps to explain the carbon cycle, carbon footprint and global warming in a simple way
www.bbc.co.uk/bitesize



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