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The 10 golden rules of tree planting in order to gain maximum climate change and biodiversity benefits.

This briefing provides the most up-to-date information for those local authorities which are considering large scale tree planting as a way of ameliorating the effects of climate change reducing or mitigating carbon emissions as well as increasing opportunities for biodiversity.

The briefing will be of particular interest to those officers responsible for parks and open spaces, improving and protecting biodiversity and implementing climate change actions.

Key Issues:

- The large-scale planting of trees has been seen as a potential solution to absorbing the carbon emissions created by human activity and causing climate change.
- This solution is being implemented globally as nations work towards preventing catastrophic rises in global temperatures.
- However, before such schemes can be implemented there needs to be a close consideration of sites and tree types to ensure their sustainability and gain maximum benefits from the tree planting.
- Hurried and poorly prepared schemes can actually reduce carbon absorption and severely damage local biodiversity and livelihoods.
- The Royal Botanical Gardens Kew, have prepared a paper outlining 10 golden rules to ensure the viability of tree planting schemes and existing forest regeneration to ensure tree planting is a success.
- This briefing note provides a summary of the wider tree planting considerations and a summary of the 10 golden rules.

Background

In October 2020 APSE held a seminar on Trees and woodlands **https://www.apse.org.uk/apse/index.cfm/events/previous-seminars/2020-seminars/trees-and-woodlands-seminar/** which discussed a number of tree and

woodland related issues , including; England's National Tree Strategy, the economic value of trees, tree strategies and the health and well-being values of woodlands.
Running throughout the seminar was an emphasis on the practical need to ensure that when large scale tree planting programmes were being developed, that the right trees where being planted in the right places in order to ensure future tree sustainability and health as well as gaining maximum climate change, biodiversity and wider environmental benefits.

Background

With the global need to address climate change, some studies indicated that trees had enormous potential to soak up and store carbon, and as a consequence of this research many countries established tree planting campaigns as a key element of their plans to tackle climate change.

In the UK, all of the main political parties have promised to plant increasing numbers of trees to address climate change. However, care needs to be taken as to where and which trees are planted. If the new planting rate is achieved, it would lead to something like 17% of the UK becoming forested, as opposed to 13% now. At the moment, the UK's forests pull in about 10 million tonnes of carbon dioxide a year but the hope is to more than double that. Concerns have been raised as to whether there is currently enough trained staff in Britain to support the government's plans for a huge increase in planting.

What other problems could there be?

Trees grow very slowly so there needs to be long-term management plans.

This is particularly important as in their early years, saplings are extremely vulnerable to a long list of threats: droughts, storms, pests and diseases with potentially a quarter of a newly-planted forests and woodlands will not succeed

It is only when trees grow to an age of 20-30 years will they start to absorb large amounts of carbon dioxide and at this point, the forest will only continue to grow if a proportion of trees are thinned out to allow more room for others to develop.

This ongoing management is important for if trees are not cared for they will die and rot and any carbon they have absorbed previously can be released, although most of the carbon in the dead trees will be subject to natural decomposition returning much of the carbon back into the soil as humus. Therefore, it is not enough to simply plant large number of trees the resources must continue to be in place to manage them if we are to avoid diseased and unsustainable landscapes.

As such guidance, via a paper produced by The Royal Botanical Gardens Kew, has developed 10 golden rules as to how large-scale tree planting schemes should be approached

Dr Kate Hardwick, conservation partnership coordinator at RBG Kew and a lead author of the paper said: "Tree planting now dominates political and popular agendas and is often

presented as an easy answer to the climate crisis, as well as a way for corporate companies to mitigate their carbon emissions, but sadly, it isn't as simple as that. When people plant the wrong trees in the wrong place, it can cause considerably more damage than benefits, failing to help people or nature.

The Ten Golden Rules for reforestation to optimise carbon sequestration, biodiversity recovery and livelihood benefits

The rules were published as a response to the damage some large-scale tree planting schemes are seen to be inflicting on the environment and to provide nature-based solutions to protect and restore global forests.

The list highlights how forests can be restored with the simultaneous triple benefit of maximising carbon capture to mitigate global warming, recovering ecosystems, and helping people's livelihoods.

The paper doesn't set out to say that tree planting is wrong as a solution to tackle global warming and protect biodiversity, when done correctly and effectively it has significant benefits. However, the 10 golden rules challenge the way some large-scale tree planting schemes are implemented and gives other suggestions in order to maximise impact and avoid the mistakes of some existing large scale planting schemes which have actually reduced carbon capture and had long-term negative impacts on biodiversity, landscapes and livelihoods.

One such example is in South Africa, when the non-native Australian acacias were introduced for dune stabilisation and timber during the 19th and 20th centuries. The acacias became invasive, spreading widely across vast areas of land, taking over the natural heathlands and grasslands and lowering the water table. It now costs the country the equivalent of millions of pounds to clear them every year.

Therefore the 10 golden rules aim to ensure that new and restored areas of forest become effective, long-term carbon sinks, stop the loss of forest biodiversity and support the livelihoods of local people. The rules cover all stages of the reforestation process, from selecting the right site and the right species, through to using the forest to generate a sustainable income for local people. They emphasize the importance of protecting existing forests and working collaboratively.

The 10 golden rules are:

Protect existing forests first

Keeping forests in their original state is always preferable; undamaged old forests soak up carbon better and are more resilient to fire, storm and droughts. Whenever there's a choice, halting deforestation and protecting remaining forests must be a priority

Put local people at the heart of tree-planting projects

Studies show that getting local communities on board is key to the success of tree-planting projects. It is often local people who have most to gain from looking after the forest in the future.

Maximise biodiversity recovery to meet multiple goals

Reforestation should be about several goals, including guarding against climate change, improving conservation and providing economic and cultural benefits.

Select the right area for reforestation

Plant trees in areas that were historically forested but have become degraded, rather than using other natural habitats such as grasslands or wetlands.

Use natural forest regrowth wherever possible

Letting trees grow back naturally can be cheaper and more efficient than planting trees.

Select the right tree species that can maximise biodiversity

Where tree planting is needed, picking the right trees is crucial. Scientists advise a mixture of tree species naturally found in the local area, including some rare species and trees of economic importance, but avoiding trees that might become invasive.

Make sure the trees are resilient to adapt to a changing climate

Use tree seeds that are suitable for the local climate and how that might change in the future.

Plan ahead

Plan how to source seeds or trees, working with local people.

Learn by doing

Combine scientific knowledge with local knowledge. Ideally, small-scale trials should take place before planting large numbers of trees.

Make it pay

The sustainability of tree re-planting rests on a source of income for all stakeholders, including the poorest.

Conclusion

Although these rules may not all apply to UK large scale tree planting, the sentiments and practical advice are worthy of note, certainly natural regeneration and planting mixed species can reduce the time lag between planting new saplings and when they are their most effective at soaking up carbon emissions which can be as much as 50 years or more.

The mixed species rule allows greater protection against disease than planting mono-cultural stands of trees, which occurred in the 1960s and 1970s, when the UK government-encouraged a rash of planting resulting in regimented rows of the same species of conifers making them susceptible to the same pests and diseases.

These 10 rules highlight that planting trees is highly complex. There is no universal, easy solution to a successful reforestation initiative given the extraordinary diversity of trees, forest types and the unique cultural and economic environments each forest is in. However, there are successful examples that we can learn from and develop further to build on current public and private interest in the topic.

Further details on the paper: Ten golden rules for reforestation to optimise carbon sequestration, biodiversity recovery and livelihood benefits can be found at the link: https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.15498

APSE Comment

In 2018, UK net emissions of carbon dioxide were provisionally estimated to be 364.1 million tonnes (a drop of just over 2% on the previous year).

However, although the removal of carbon dioxide by current tree stocks could be argued to be relatively low, when coupled with wider national carbon reduction programmes and the aforementioned planned doubling of absorption rates from trees, this contribution will only grow. It must also be remembered of the additional benefits trees bring such as increasing biodiversity,

The reforestation initiatives currently underway, the upcoming UN Decade on Ecological Restoration https://www.decadeonrestoration.org/about-un-decade and aspirations for a post-COVID green recovery, have generated unparalleled hope and optimism that forest restoration really can improve global ecology while uplifting local livelihoods. However, it will only do so if it is based on sound science, guided by indigenous knowledge and local communities, supported by fair governance, and incentivized by long-term funding mechanisms.

From a more practical perspective, and large-scale planting schemes will not only require considerable pre-planning (suitable sites, tree species, identification of benefits, stakeholder and community engagement, etc.) most importantly, it will also require long term commitments from all those who have given their pledge to not only plant more trees but also commit to their long-term management if they are to benefit both current and future generations.

One last consideration is that when deciding to create new woodlands and forests, we have a duty to protect them, such natural features are not simply products for us to use as we see fit, in this case to clean up the mess current and past generations have made , for as Peter Wohlleben in his book 'The Hidden Life of Trees 'points out trees are like families: tree parents live together with their children, communicate with them, support them as they grow, share nutrients with those who are sick or struggling, and even warn each other of impending dangers.

Therefore, we have much in common with our trees and woodlands and as such it is our responsibility to not only nurture and support such organisms, but also to learn to share our space, and where necessary, create more in order to continue the ancient symbiotic relationship we have with our trees and woodlands.

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