FLOOD FORESTS

APRIL 2020

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Published by: PARLIAMENT STREET

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HOW PLANTING NEW FORESTS CAN HELP PREVENT WINTER FLOODING IN THE UK

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How planting new forests can help prevent winter flooding in the UK

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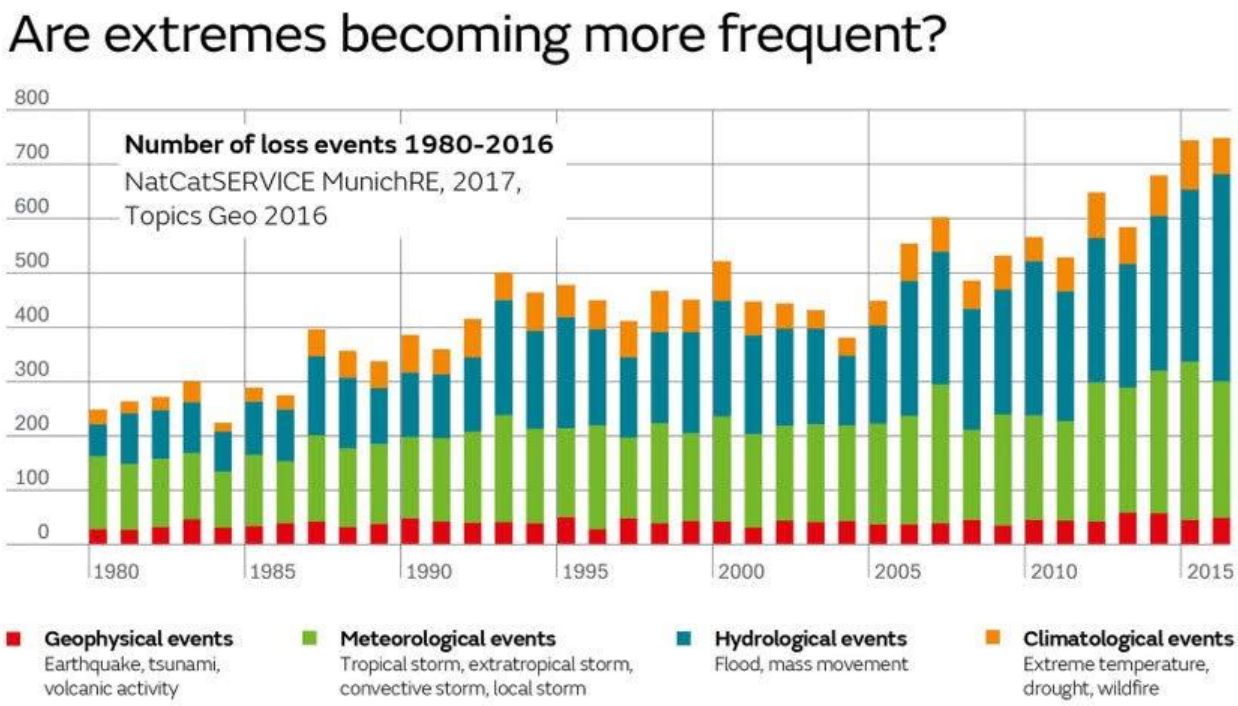
Abstract

Between October 2019 and February 2020, the UK received above-average rainfall and was impacted by a number of major storms. Soils were wetter than average for this time of year and mean river flows were higher as rain fell on already saturated ground. In the spring Storms Ciara and Dennis wreaked havoc across the UK causing significant flooding due to the swollen rivers and overwhelmed local flood defences. Vast areas of the UK were affected causing billions of pounds of damage to homes and businesses. This paper advocates the planting of 'flood forests' across the UK's uplands and flood plains to slow the flow of rainwater and retain and store rainwater. These forests would also absorb and capture significant amounts of carbon dioxide, helping in the fight against climate change, and also improve air quality.

Devastating flooding – no longer once in a thousand years

As climate changes continues the UK will witness an increase in the number of warm spells, a decrease in cold spells, but also an increase in heavy rainfall *(Met Office, 2020)*. This is best demonstrated in the time series below which clearly shows that extremes of weather are increasing across the world.



Source: Met Office (2020)

We can, therefore, say that such flooding events are no longer 'once in a thousand-year events' but sadly going to be increasingly common for communities across the UK.

What can be done? - Flood forests

Although not a new idea this paper advocates a major national works project – the planting of 'flood forest' in UK uplands and on water plains. An increasing body of research suggests that tree planting can reduce the height of flooding rivers simply by 20% by planting trees over 25 – 40% of a catchment area (the area where rainwater feeds into a river) *(BBC, 2016).* Further research is currently being carried out on the River Aire where tree planting is being combined with other nature techniques to slow the flow of rainwater, e.g. creating leaky barrier, woody dams and stabilizing riverbanks *(Gov.uk, 2019).*

Planting trees helps reduce flooding by intercepting rainwater as it falls (this can reduce the amount of rainfall reaching the ground by 45% for some forests) *(Forestry Research, 2020a).* Soils in forests tend to have a more open structure from greater amounts of organic matter and the action of tree roots – this results in the ground acting as a better

store of water *(ibid, 2020a).* The tree itself will absorb large amounts of water to grow, and trees planted near to rivers can also help physically reduce the flow of water.

Some of the many suitable types of tree include:

- Dogwood
- Guelder rose
- Downy birch
- Alder,
- Willow
- Hawthorn
- Blackthorn
- Hazel.

Of course, some species will absorb more water than others, and it's important to be sensitive to the local area.

Planting trees has the additional benefit of absorbing and storing significant amounts of carbon dioxide, a major contributor to climate change. Again, this varies by age, but a hardwood tree can absorb as much as 22 kg of carbon dioxide per year and in return release oxygen *(European Environment Agency, 2012).* Finally, planting trees can dramatically improve air quality by absorbing zone (O_3), oxides of nitrogen (NO_x), ammonia (NH_3), and sulphur dioxide (SO_2) from the air *(Forest Research, 2020b).* Credible research demonstrates that tree planting can lead to a reduction in air pollution-linked deaths and hospital admissions *(Tiwary et al, 2009).*

Conclusion

Operationalising flood forests across the UK will require a regulation framework which supports poor-quality farmland being planted with millions of trees. This could be done through the new subsidy framework will replace the Common Agricultural Policy in 2021. The cost of tree saplings could equality be met by government, charities, and/or landowners – most probably a combination of the three. What is most important is that although the spring is now here the problem of flooding is here to stay and requires a strategic response.

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