



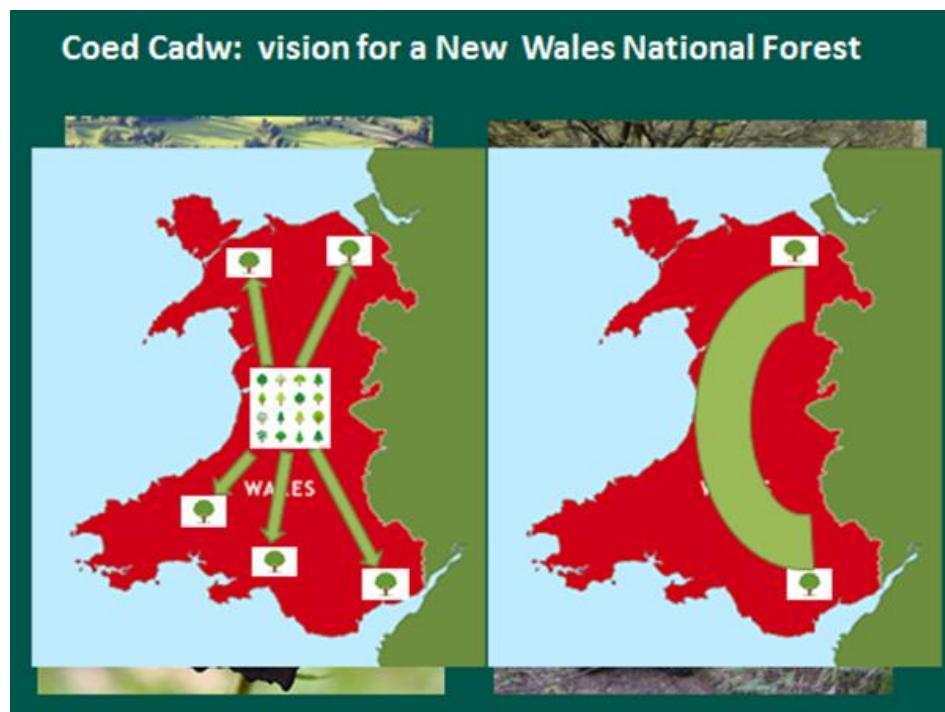
Wales National Forest

Comments to Climate Change, Environment and Rural Affairs Committee.

Inquiry on NDF 13th November 2019

A New Wales National Forest

1. We believe the First Minister's intention is for something inclusive and inspirational and think it is important that this political leadership is maintained. It is important that this new initiative does not just become a utilitarian delivery plan for the woodland expansion targets or a rebranding of the existing public forest estate.
2. We see a new "fforest" as a well wooded landscape which provides an attractive and healthy environment in which many things can happen, including housing and development.
3. We see the programme operating on a national scale, connected from north to south and across both urban and rural locations. We see a truly national and distinctive Welsh brand, flexible to local circumstances.
4. We think it essential that public and stakeholder engagement is at the heart of developing activity. Throughout the NDF document there is frequent reference to communities but the process of community engagement or co-design is barely discussed.



Views on the policy on establishing a national forest (policy 9). In particular: Whether the draft NDF gives sufficient detail on this issue. Your involvement in developing this proposed policy

- We are involved in current discussions through the Woodland Strategy Advisory Panel and are also making representations direct to WG
- The idea is still at the development stage, and we think it is important not to close down on details too early, in order to ensure the project is sufficiently ambitious and inclusive. We have proposed a substantial stakeholder engagement and scoping exercise which we hope the WG will fund.
- This engagement process needs to take place over an extended period of time. There is value in the early announcement of one or two demonstration sites provided these launch a process which invites far wider participation
- We believe the First Minister's intention is for something inclusive and inspirational and think it is important that this political leadership is maintained. It is important that this new initiative does not just become a utilitarian delivery plan for the woodland expansion targets or a rebranding of the existing public forest estate.
- A Wales National Forest can start a new and different conversation around woodland that does not repeat the mistakes of the forest expansion of the 1950s when a top down and divisive process destroyed public support for forestry.
- We see a new “fforest” as a well wooded landscape which provides an attractive and healthy environment in which many things can happen, including housing and development.
- We see the programme operating on a national scale, connected from north to south and across both urban and rural locations. We see a truly national and distinctive Welsh brand, flexible to local circumstances.
- We think it essential that public and stakeholder engagement is at the heart of developing activity. Throughout the NDF document there is frequent reference to communities but the process of community engagement or co-design is barely discussed.

Briefing Note

Agroforestry can help mitigate flooding

Planting trees improves the infiltration of rain and surface water into the soil. Tree roots open up the soil structure and create a larger network of large pores in the surrounding soil.

Research carried out at Pontbren¹ in Montgomeryshire has demonstrated the value of planting hedges and strips of woodland both across slopes and to protect stream edges. These are agroforestry actions which particularly applicable to livestock farming in Wales. In addition to helping with flood mitigation they deliver many other benefits for livestock welfare and productivity, biodiversity and landscape and carbon storage.

Widespread adoption of such measures, supported by a new sustainable farming scheme, would help to reduce and hold back peaks flows, especially if combined with other “slow the flow” measures and natural flood management approaches.



(Photo: Pontbren)

Suitably located and designed tree belts can help reduce flash flooding and soil erosion by slowing down surface water flow and sending it deeper into the soil.

Research results² clearly showed shelterbelts across slopes captured surface run-off and allowed it to percolate into the soil. Within woodland the overland flows were greatly reduced.

Through reducing overland flows and increasing infiltration, peak stream flows were also reduced. These effects were apparent within just two years of planting. The benefits will be greater with deeper rooting tree species, including most native broadleaves. Coniferous species including spruces and pines tend to be shallower rooting.

A second valuable agroforestry measure is the fencing and planting in riparian protection zones. This can also slow down water run-off into streams and has a very significant role in

¹ Woodland Trust (2013) The Pontbren Project: A farmer lead approach to sustainable land management in the uplands. C. Keenleyside 33 pp bilingual

<https://www.woodlandtrust.org.uk/publications/2013/02/pontbren-project-sustainable-uplands-management/>

² Bird SB Emmett BA Sinclair FL Stevens PA Reynolds B Nicholson S & Jones T 2003. Pontbren: Effects of tree planting on agricultural soils and their functions. Report to CCW, NAW and FC.

intercepting sediment and nutrients and protecting stream banks from trampling and erosion.

As a result vegetation has recovered and stream morphology has returned to a more natural profile with riffles and pools, which are used by trout and supporting other wildlife.

Soil erosion is a loss to the farm, but also has a damaging effect of biological processes in the stream.

(photo: Pontbren. M Townsend)



The Evidence

Evidence of the impact on flooding of providing cross slope and riparian belts of trees has been recently summarised by the Centre for Ecology and Hydrology as part of their evidence work for the Welsh Government to inform the new Sustainable Farming scheme.³

They concluded that:-

On average, compared to the grazed pasture, runoff volumes were reduced by 48% in ungrazed pasture and by 78% in the woodland, and five years after tree planting soil infiltration rates were 67 times greater in the woodland than in the grazed pasture. Further work is needed to understand the full impact of trees as they reach maturity, and whether the ability of soil below trees to store water could be further improved through tree species selection (Marshall et al., 2014)⁴. A modelling study using the observed Pontbren data predicted an average 5% reduction of a severe flood event as a result of creating woodland strips across 7% of this 12km² catchment (McIntyre et al., 2012)⁵.

On riparian woodland they note that the co-benefits on stream quality and habitat are substantial but there is currently a lack of direct observational evidence on the impact of

³ Keenleyside, C.B.1 & Old, G.H. (2019) Environment and Rural Affairs Monitoring & Modelling Programme (ERAMMP). Sustainable Farming Scheme Evidence Review. Technical Annex 9: Flood Mitigation. Report for Welsh Government 26pp. <https://erammp.wales/en/resources>

⁴ Marshall, M.R. et al(2014). The impact of rural land management changes on soil hydraulic properties and runoff processes: results from experimental plots. *Hydrological Processes*, 28, 2617-2629.

⁵ McIntyre, N. et al (2012). The potential for reducing flood risk through changes to rural land management: outcomes from the Flood Risk Management Research Consortium. Presentation to British Hydrological Society's 11th National Symposium, *Hydrology for a Changing World* (Dundee, 2012).

riparian woodland on flood flows at catchment scale. They note that modelled data does provide some evidence.



For example, Dixon et al. (2016)⁶ modelled riparian forest restoration in the New Forest and found that desynchronisation of flood waves resulted in a significant reduction in peak flows at the catchment scale (~100km²).

Photo: fencing for riparian planting in the bleak Doethe Fawr catchment in the Cambrian Mountains

Another review of the benefits of agroforestry reported evidence from European experience on the possible impact of agroforestry interventions on flooding⁷

“Wheater et al. (2012)⁸ have also predicted the effect of tree planting on water flows from a 400ha sub-catchment. Relative to a baseline scenario, removing all trees increased the median flood peak by 20%, adding tree shelterbelts reduced the peak by 20%, whilst full afforestation reduced the peak by 60%. Whilst Wheater et al. (2012) note that these changes were reduced for more extreme flood events, the results highlight that tree planting can reduce runoff and flooding for ‘median’ events.”

Also:-

“In South West France agroforestry is also being promoted at a larger scale to improve flood management and reduce soil erosion as part of the Agr-eau project in the Adour-Garonne watershed (Balaguer, 2016)⁹, an approach that it would be good to replicate in the UK.”

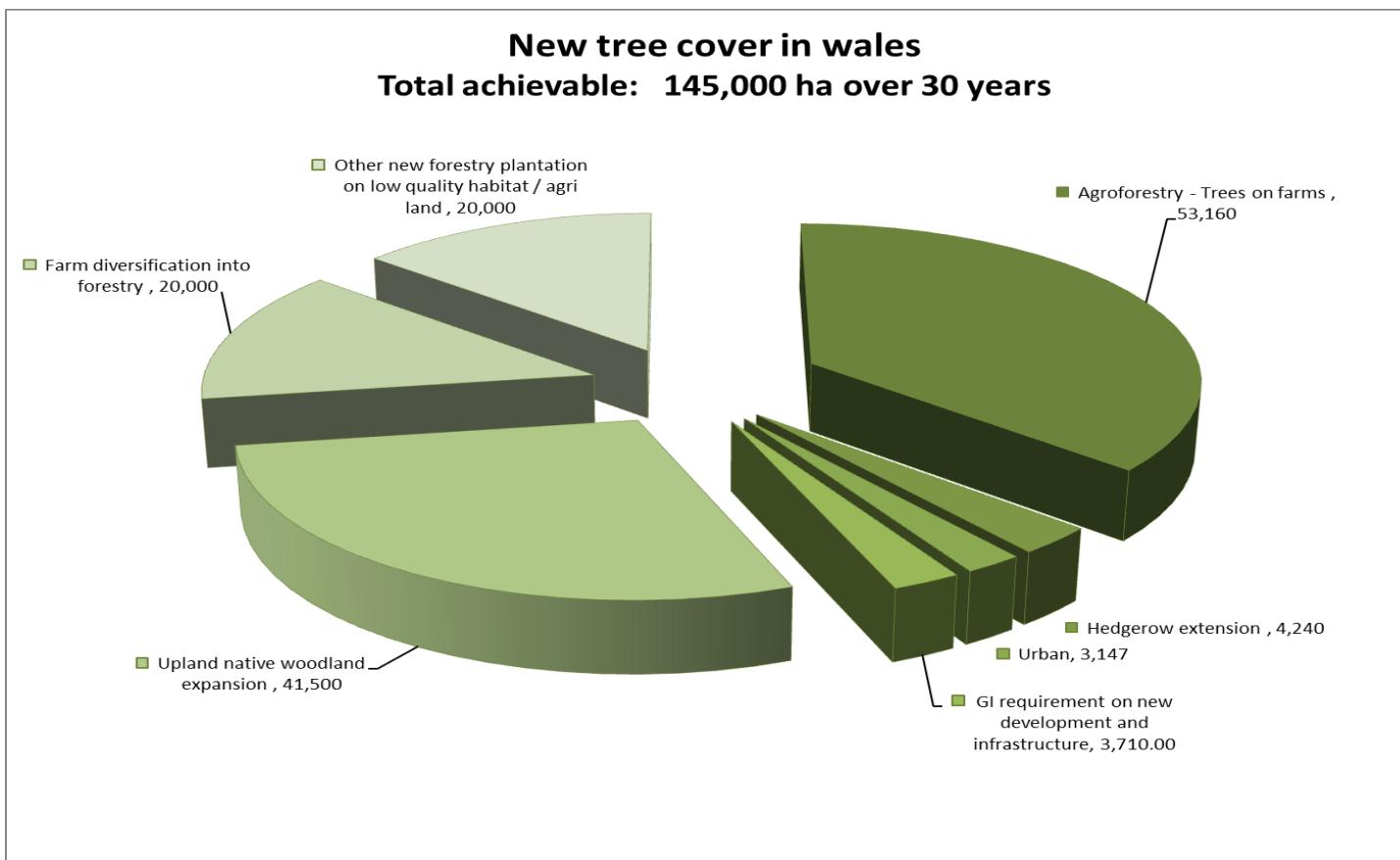
⁶ Dixon, S. J., et al. (2016). The effects of river restoration on catchment scale flood risk and flood hydrology. *Earth Surface Processes and Landforms* 41(7): 997-1008.

⁷ Burgess P (2017) Agroforestry in the UK Q Journal of Forestry April 2017 vol 111 No 2 pp111-116

⁸ Wheater, H.S. et al (2012) Chapter 22. Modelling Environmental Change: Quantification of Impacts of Land Use and Land Management Change on UK Flood Risk In: System Identification, Environmental Modelling, and Control System Design (Eds: L. Wang & H. Garnier) Springer-Verlag London Limited.

⁹ Balaguer, F. (2015) Ag'reau: Developing a Resource-Efficient, Ecofriendly, Climate-Smart Agriculture across the Adour-Garonne Watershed (South- West France). Presentation at the Agroforestry Event at EXPO 2015, Milan, Italy. 12 September 2015. <https://www.agforward.eu/index.php/en/news-reader/id-12-september-2015.html>

Provisional analysis of possible contribution to targets of different forms of new woodland creation



Subject to further analysis