



Woodland Creation through Natural Colonisation: Social Dimensions

Olivia FitzGerald, Katy Spencer, Mike Dunn, Bianca Ambrose-Oji

Background

Tree cover in England is set to increase by 34,000 hectares by 2028, raising total tree cover from 14.5% to 14.76% (Defra, 2023). Alongside tree planting, policy envisages woodland expansion through natural processes contributing to meeting this target (Defra, 2023). The England Woodland Creation Offer provides grant support for natural colonisation establishment, with a requirement of 100 tree stems per hectare after 10 years (Forestry Commission, 2021). Natural colonisation occurs when tree seed reaches a site and establishes where woodland has not recently existed. This differs from natural regeneration where new trees establish within existing woodland or where woodland has recently been located (see Figure 1).

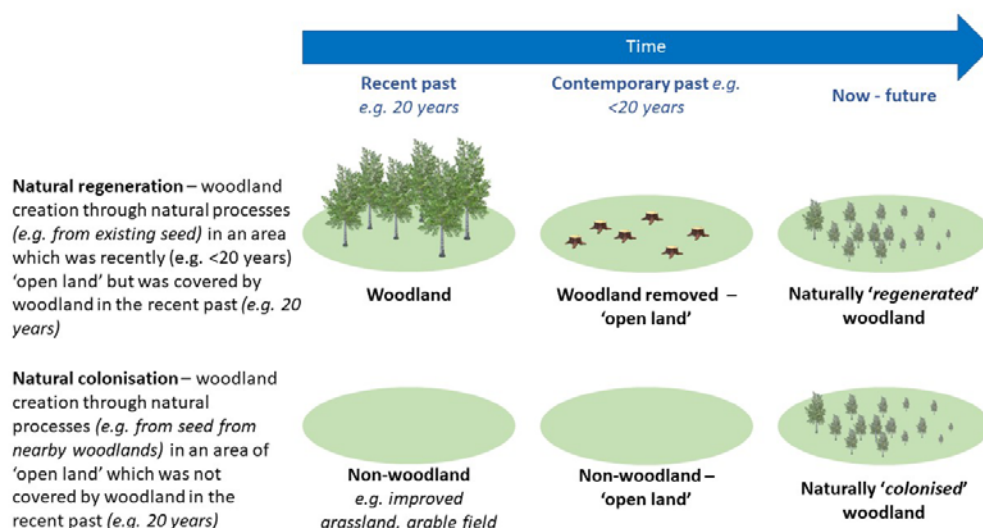


Figure 1. Defining natural colonisation and natural regeneration (created by Kevin Watts, 2021)

Trees established through natural colonisation may offer important advantages, including improved adaptation to climate change, resilience to pests and diseases, and a reduction for the need to use plastic tree guards (Defra, 2021).

Despite policy ambitions towards natural colonisation, these aims will only be achieved if land managers choose to follow this approach.

This paper reports on a scoping study, undertaken between August 2021 and March 2022 that sought to answer questions on where different types of land managers – from the public, private and third sectors – see potential for expanding tree cover through natural colonisation, and the benefits they may expect to gain in doing so. The research also sought to understand in what scenarios land managers regard natural colonisation as an inappropriate strategy, the risks or disadvantages associated with it, and key knowledge gaps which may be acting as a barrier to adoption.

Forty land managers were interviewed, comprising representatives from the public (n=10), third (n=6) and private sectors (n=24); including 18 farmers primarily from lowland South-East England. The indicative sampling grid is included as Appendix 1.

A summary of key findings and conclusions are presented below.

Where natural colonisation is perceived as suitable

The following section outlines scenarios in which land managers thought natural colonisation would be appropriate and feasible, and the likely benefits they recognised.

Scenarios

It should be almost the first thought: can natural regeneration, natural colonisation take place rather than go straight into tree planting? (Third sector, conservation-focused NGO)

The scenario that the majority of land managers from all sectors identified as most appropriate for natural colonisation was when trying to restore natural processes and create habitat for wildlife. The objective of such a scenario was not focused on creating woodland with a prescribed stocking density to meet grant requirements, suggesting that natural colonisation is best promoted more as a nature-friendly land use than a method of creating woodland. It was notable that third sector conservation NGOs described organisational shifts in approach, moving towards favouring natural colonisation as a preferred method of woodland creation where possible. Farmers were keen to stress that the land they would set aside for natural colonisation – and any type of woodland creation – would be marginal agricultural land or awkward field corners of low agricultural value. They often stressed the need

for adequate long-term funding to compensate for the loss of agricultural outputs and therefore make natural colonisation something that they would consider more seriously. Other land managers also reported assessing which part of their landholdings were appropriate for natural colonisation, recognising different objectives and site conditions for different areas of their holdings. Many types of land manager shared the belief that natural colonisation is an appropriate approach when expanding existing woodland, as this would provide the seed source proximity required to assist successful colonisation.

Benefits

I have loads of lovely trees that I've had to do nothing at all to. It's been effortless. (Private sector, livestock farmer)

The ability to create habitat through structural diversity and scrub was regarded by public and third sector land managers with an interest in landscape conservation as natural colonisation's greatest appeal. Wildlife and biodiversity benefits were valued by land managers knowledgeable of natural processes and willing to accommodate the stages preceding full canopy cover and woodland establishment. Across the sectors, there was a strong sense that 'nature knows best', with naturally colonising trees perceived as more resilient to threats such as climate change and pests and diseases, through greater genetic diversity and better site adaptation than planted trees. However, some land managers with forestry or ecology backgrounds expressed doubt that natural adaptation through processes such as natural colonisation could match the rate of climate change, compared with selectively importing and planting trees of more southerly provenance. Land managers had greater consensus in the view that natural colonisation offers the benefit of reducing the risk of pests and diseases by not relying on the movement of planting material. Some farmers were attracted to natural colonisation, believing that it could be a cost-effective option due to no planting stock or labour costs. Conservation NGOs in particular valued the ability to grow trees without the use of plastic tree guards.

Where natural colonisation is perceived as unsuitable

The following section outlines the scenarios in which land managers thought natural colonisation was not appropriate or feasible, and the disbenefits they recognised.

Scenarios

I think the perception of 'leave and walk away' is extremely bad in land management terms. It takes us back to set aside, which was an extraordinarily poor chapter I think for farmers, in the concept of being paid for doing nothing (Private sector, mixed arable/ livestock farmer)

There was consensus across land manager types that natural colonisation is unsuitable for meeting timber production objectives. Farmers thought that any tree expansion strategy, including natural colonisation, was not suited to good quality agricultural land (grades 1-2) which should instead continue to be prioritised for food production. The data revealed a tension between farmers and other land managers about the suitability of particular types of land for natural colonisation. For example, upland moors and peatland are seen as suitable by farmers because of their marginality in terms of agricultural value. This is in stark contrast to conservation NGOs that view these sensitive habitats as inappropriate for tree cover because of the assemblage of important and threatened species currently existing there.

Financial costs and the potential loss of farming payments were a concern, particularly to tenant farmers. Collectively farmers tended to associate natural colonisation with rewilding, perceived to threaten their role as food producers, and reflected strongly held farming values and beliefs that they should not be paid for 'doing nothing'. Third sector organisations dependent on donations and volunteers were similarly keen to be seen to be 'doing something' and involving their members in actions for trees. That meant that in some circumstances active tree planting could be a more socially acceptable approach than natural colonisation.

Disbenefits and risks

Natural regen [sic] carries a bit more risk for the landowner and the people giving the grants, I suppose (Third sector, forestry-focused NGO)

Perceived disbenefits and risks of natural colonisation varied between land manager types. Farmers frequently discussed the food security risks associated with taking land out of agricultural production for any type of woodland creation. For many, the lack of control over the ecological progression towards woodland presented by natural colonisation, which often passes through a period of scrubby habitat, contradicts traditional farming practice and the aesthetics of managing a 'tidy' farm.

Public and third sector organisations were also concerned about public perceptions of 'untidy' scrub, although they recognised that this might be overcome through education, particularly as many members of the public prefer a more 'naturalistic' appearance to woodland compared to rows of planted trees. For these types of land managers, key risks associated with natural colonisation processes included: the unpredictability of woodland creation compared with tree planting; 'undesirable' species such as non-native conifers or 'weed' trees making up the woodland; or domination of one species reducing the desired structural and biological diversity of new woodland, and making it more susceptible to disease (e.g. ash dominated woodland). Some land managers, particularly those in northern England and managing upland contexts, believed that natural colonisation simply would not happen. However, there was awareness among a small number of land managers

with professional forestry knowledge that some of these risks and issues are a temporary phase as woodlands establish and move to canopy closure over time. The long timescale for woodland establishment was a disadvantage mentioned by many; for those using incentives to fund natural colonisation this meant an additional risk of not meeting required stocking densities within specific agreement periods.

The suitability of a 'blended' approach

It's worth thinking about a mixed approach between the two because often what comes up naturally is obviously valuable and useful, but it may not be everything that you want. – (Private sector, forest/woodland advisor)

Amid discussions comparing natural colonisation with tree planting, just under half the sample described what, in our analysis, we have termed a 'blended' approach. This is an approach to woodland expansion that combines natural colonisation with some planting. Land managers described taking such an approach: when a woodland seed source is lacking, and where planting is used to 'kickstart' natural processes¹; or when natural colonisation has failed to establish the required density of trees within a specific time period. Farmers in particular saw value in supplementary planting. For them, this represented one way of encouraging desired species to establish and spread through natural colonisation. Land managers of all types described how planting could mitigate the risk of single species stands, and be used to add diversity where natural colonisation had resulted in a monoculture. The 'blended' approach was also considered by some as another way of increasing resilience in the face of climate change and emerging pests and diseases, by maintaining some control over the species mix and introducing species and provenances considered to be more resilient.

Knowledge gaps and information needs

Our research highlighted key knowledge gaps and identified ways in which information and guidance can shape decision-making around the use of natural colonisation.

Influence of information and knowledge

So actually training farmers in what to expect and what to observe while it happens...we do need tree experts to reassure people that what they're doing is right (Private sector, arable farmer)

Land manager decisions are often influenced by advisors. The research revealed that forestry sector advisors have traditionally not considered natural colonisation as a

¹ In ecological terms this is 'applied nucleation'. Small groups of trees, or nuclei, are planted to attract seed dispersers, supply propagules and speed up the natural colonisation process (Hughes et al., 2023).

viable approach to woodland expansion so have a variable range of knowledge on the process. Ecologists and land managers themselves with experience of trying natural colonisation were shown to be an important source of information. The knowledge and skills offered by advisors, whether professional or peer group, will have an important impact on land manager perceptions/values and their confidence to use natural colonisation as an approach.

Knowledge gaps

Because tree planting has for many decades been the single most common strategy for woodland expansion, including the strategy supported by incentives, it is perceived as the 'default' method. Participants in this study demonstrated confusion around terminology, often conflating the term 'natural colonisation' with the more familiar 'natural regeneration'. This was true across land manager types, but less so amongst professional managers of forestry and woodlands. Natural colonisation and natural regeneration are different processes with different outcomes, so there may be a need for clarification around the terms and why this is important to land managers.

Natural colonisation was therefore shown to be a new proposition to land managers and advisors alike, resulting in a general lack of knowledge and experience of this approach. The key knowledge gaps mentioned included:

- the ecological processes involved in natural colonisation
- the operational processes involved, e.g. ground preparation, the need for deer fencing, onward management
- estimated timescales to reaching establishment
- indicators of successful establishment
- what approach to natural colonisation works best in which kind of ecological and physical conditions and locations.

Some third sector organisations with an advisory role felt they lacked the necessary knowledge to explain natural colonisation processes to land managers, and several participants had learnt about natural colonisation through their own 'trial and error' experience because of a reported lack of existing evidence and information. Forestry professionals and owners tended to be more confident in their understanding of the processes and outcomes of natural colonisation. One public sector land manager highlighted a need for greater knowledge sharing and dissemination between forestry, conservation and farming sectors, in order to pool expertise and share best practice.

Demand for tools and guidance

It's not necessarily having guidance notes or anything, it's seeing real-life

examples of what works, I think, is probably the most useful (Third sector, conservation-focused NGO)

It is clear from this research that land managers require information about natural colonisation presented to them in different ways depending on their objectives. Information is needed in multiple formats to suit learning styles and audience preferences, supplied in multiple ways as land managers move along a pathway of learning, knowledge development and decision making about woodland creation approaches.

In terms of the required content suggested by different kinds of land managers:

- Farmers were interested in tools to calculate values of natural colonisation grant scheme or carbon benefits, and information on the timeframes and composition of expected succession stages of natural colonisation
- Forestry-focused advisors and NGOs felt that case studies of natural colonisation, including photos, would be useful, alongside decision-making tools such as cost-benefit analysis, opportunity maps and flowcharts to support site suitability assessments. They, alongside public sector organisations, were more likely than farmers to use technical guides produced by the forestry sector.

In terms of the preferred communication and delivery methods suggested by land managers:

- All land managers stated a preference for interactive information sources, such as videos and webinars, and in-person knowledge sharing
- Professional forestry and woodland managers and third sector organisations found Forestry Commission (FC) site visits useful
- Farmers tended to associate the FC with large scale commercial forestry operations and bureaucratic procedures, so stated a preference for visits from farm advisory groups. Knowledge transfer events, such as agricultural shows or targeted forestry events and knowledge sharing forums, were also mentioned as useful
- All types of land managers, but farmers in particular, emphasised interactions with peers, e.g. demonstration farms/woodlands, as likely to be a very effective method, even more so than receiving information from organisations and advisors that may have little direct experience or knowledge of natural colonisation themselves.

Conclusions

Our research has demonstrated that among a wide range of land managers, the greatest strength of natural colonisation as an approach to woodland expansion is

perceived to be the provision of rich and diverse habitats. This includes changes through time, and habitats, such as scrub, that are valued for important biodiversity benefits by some land managers. The other benefits of woodland creation (e.g. carbon sequestration, timber production and recreational values) are not the primary focus. The risks associated with timescales and uncertain woodland outcomes that natural colonisation presents remain a barrier to some land managers.

Therefore, it may be most appropriate for policy makers and others to frame natural colonisation as a nature-friendly approach to land management, rather than as a method of woodland creation *per se*. Not only could this help to situate natural colonisation within land manager objectives, but it also aligns with policy initiatives supporting nature and landscape recovery.

Land managers and their advisors require tools and guidance to support the selection of suitable sites for natural colonisation and the assessment of likely outcomes. There is a clear preference for in-person and peer-to-peer knowledge sharing. Education for both land managers and the public may help to address concerns about untidiness and impressions that land is not being properly managed. A 'blended' approach appears to be a logical way of spreading risk and ensuring that desired objectives are achieved, while harnessing the benefits of both natural colonisation and tree planting. Further evidence is needed to verify assumptions that trees grown through natural colonisation demonstrate greater resilience to climate change and pests and diseases. The advantages and disadvantages of the blended approach to woodland expansion have not been explored in detail from a socio-ecological perspective and warrant further research.

Future research

We hope to develop and strengthen the first phase (2021-2022) of research in the following ways:

1. Extend the sample across different land manager types and across nations to explore differences and assure veracity of results

Our sampling strategy this year was tailored to our resource. However, our sampling frame aims to capture many more land managers than we achieved. Our sampling grid (Appendix 1) highlights specific and important gaps that may elicit different land manager perspectives, including upland contexts, marginal farming systems, and large land-based businesses. In addition, this report has focused on England but initial work in Scotland (8 interviews to date) shows some differences, and as of yet we have not undertaken any work in Wales.

2. Create a policy-relevant typology of land managers likely to engage in natural colonisation along a risk perception/management objective continuum

3. Use the typology to create a tool useful to policy and other stakeholders, that identifies messaging approaches that might engage different kinds of land managers in natural colonisation
4. Further exploration of knowledge needs and identified gaps and how these might be addressed for different kinds of land managers
5. Identify knowledge exchange opportunities to present and discuss this social science work and that of other science groups across Forest Research working on natural colonisation. This might include stakeholder workshops, conferences and a journal paper.

References

Defra (2023) Environmental Improvement Plan 2023: First revision of the 25 Year Environment Plan. Available online: [Environmental Improvement Plan \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1171227/2023-03-28-25-year-environment-plan-2023-2027-1st-revision.pdf) (Accessed 28 March 2023).

Defra. (2021). The England Trees Action Plan 2021-2024. Available online: [The England Trees Action Plan \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1001227/2021-03-25-england-trees-action-plan-2021-2024.pdf) (Accessed 25 March 2022).

Forestry Commission (2021) Appendix 5: Natural colonisation guide. England Woodland Creation Offer grant manual. Available online: [EWCO Grant Manual - Appendix 5 - Natural colonisation guide v1.0 June2021.pdf \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1001227/2021-03-25-england-trees-action-plan-2021-2024.pdf) (Accessed 25 March 2022).

Hughes, S, Kunin, W, Watts, K & Ziv, G 2023 New woodlands created adjacent to existing woodlands grow faster, taller and have higher structural diversity than isolated counterparts. *Restoration Ecology* 31 e13889.

Acknowledgements

This work was funded by Defra's England Tree Planting Programme and Nature for Climate Fund, as well as Forest Research's Sustainable Forest Management Programme. It was undertaken by the Social and Economic Research Group at Forest Research.

We would like to thank those who gave their time to participate in the research, and the Farming and Wildlife Advisory Group (FWAG) South East and Northumberland National Park Authority for playing an integral role supporting land manager recruitment. We also extend our gratitude to Forest Research colleagues in the Land Use and Ecosystem Services research group, for supporting collaborative research design and participant recruitment, and providing ecological insights during the analysis process.

Appendix 1. Sampling grid illustrating spread of land manager types engaged in research

KEY				REGION/NC CONTEXT						
* target				NORTH			SOUTH			
achieved				With NC	Without NC	Both	With NC	Without NC	Both	
NC= Natural Colonisation				incentivised	non-incentivised	either	incentivised	non-incentivised	either	
LAND MANAGER										
SECTOR	TYPE	ECOLOGY	ENTERPRISE							
Private	Farmers	Acid grassland	Livestock/poultry	*	*	*	*	*	*	
			Mixed/estate	*	*	*	*	*	*	
		Improved grassland	Livestock/poultry	*	*	*	*	*	*	
			Mixed/estate	*	*	*	*	*	*	
		Arable	Arable only	*	*	*	*	*	*	
			Mixed/estate	*	*	*	*	*	*	
	Forest/woodlan	Acid "forest soils"	Commercial timber	*	*	*	*	*	*	
			Conservation	*	*	*	*	*	*	
			Multiple/estate	*	*	*	*	*	*	*
		Non-forest soil	Commercial timber	*	*	*	*	*	*	
			Conservation	*	*	*	*	*	*	
			Multiple/estate	*	*	*	*	*	*	
Public/Third	Land owning organisations	Mixed - multiple sites	Utility companies				*			*
			Crown Estate				*			*
			Church				*			*
			Env trusts (e.g. NT, WT)				*			*
			Highways				*			*
			Network Rail				*			*
			MOD				*			*
			Local Authorities			*				*
			AONB/National Park			*				*
			Forestry England			*				*