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WOODLANDS FOR WALES: MEETING AFFORESTATION TARGETS SET FOR 2050

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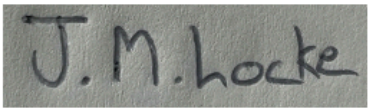
Signed: 

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ABSTRACT

Most countries are developing their own decarbonisation pathways, phasing out fossil fuels and developing climate change mitigation and adaptation policies to achieve negative emissions. Natural carbon sinks, specifically forests, present a great opportunity to reduce greenhouse gas emissions by sequestering carbon during photosynthesis and storing carbon in forest biomass and harvested wood products. Therefore, countries are utilising approaches that involve the maintenance, enhancement, and introduction of healthy and resilient woodland ecosystems within their decarbonisation pathways. The Woodlands for Wales Strategy is the Welsh Government's 50-year-action plan for Welsh woodlands and afforestation, aiming at improving the social, economic, and ecological benefits of the nation's woodland ecosystems. It sets national targets to expand woodland cover by at least 2,000 hectares per annum, to reach the expansion goal of 43,000 hectares by 2030 and 180,000 hectares by 2050.

However, actual rates of planting have fallen short in comparison to government targets, with just 290 hectares of new planting in 2020. This dissertation aims to investigate how policy has evolved to meet the afforestation targets set by the government, and whether current afforestation policy and funding schemes can satisfy these targets. The research makes use of a documentary analysis and semi-structured interviews with stakeholders possessing relevant expertise and experience. The findings show that policy has evolved to address barriers to woodland expansion progress and increase its scope to meet the targets set by the government by 2050, but this is dependent on the success of policy yet to be introduced. However, the findings raised concerns around whether the call to deliver these targets quickly will result in inappropriate planting that doesn't thoroughly consider the effects that poorly designed afforestation can have on communities, and ecosystem functions and services.

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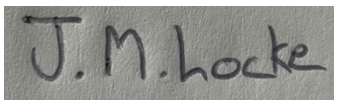
SIGNED:  DATE: ……16/09/2022…….

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1. INTRODUCTION

1.1 Background

December 12th, 2015, saw the United Nations (UN) deliver The Paris Agreement, a universal, legally binding climate change deal that set a pathway for countries to reduce their emissions, in a global effort to limit the increase in global temperature ideally to well below 2 degrees Celsius (C) above pre-industrial levels, with increased efforts to limit this to 1.5C (Carbon Brief, 2015a). As part of the deal, countries will be required to make Nationally Determined Contributions (NDCs) (Keith, Vardon, Obst, Young, Houghton and Mackey, 2021) with the aims of achieving their climate pledges (Carbon Brief, 2015b). The Intergovernmental Panel on Climate Change (IPCC) argues that the world is already in the middle of climate change and that strong climate action may have been delayed for too long, meaning the window to avoid dangerous or catastrophic climate impacts may be closed (Teske, 2022, Engelbrecht and Monteiro, 2021). As such, there is a probability of greater than 50% that the 1.5C threshold will be surpassed as soon as 2030, even in the best mitigation scenarios (Engelbrecht and Monteiro, 2021). These stark scientific realities have incited a growing commitment from countries, corporations, and sub-national entities to set net-zero carbon dioxide (CO_2) targets (Keith et al., 2021).

Global mitigation efforts to achieve the Paris Agreement are being translated into decarbonisation pathways that can act as a framework for mitigation decision making (Teske, Niklas, Nagrath, Talwar, Atherton, Guerrero, 2020). For instance, the IPCC's One Earth Climate Model (OECM) identifies that adhering to a global carbon budget of 400 gigatonnes (Gt) of CO_2 can restrict global warming to 1.5C by 2050, with a 67% likelihood (Teske et al., 2020). To remain within the carbon budget, "the global economy must decarbonise the energy system entirely within the next 30 years" (Teske and Pregger, 2022, p. 12). To decarbonize the global energy supply, fossil fuels must be phased out and replaced with a renewable energy, but with the limited availability of sustainable bioenergy, it will be impossible for some industry sectors to become fully electrified (Teske and Guerrero, 2022). Thus, to achieve negative emissions while compensating for emissions that are currently unavoidable (Teske et al., 2020), it is widely established that Green House Gas

(GHG) emissions reductions should be supplemented with Nature Based Solutions (NBS) and carbon removal from natural sinks (Giebenk, Domke, Fisher, Heilman, Moore, DeRose and Evans, 2022).

NBS that involve the maintenance, enhancement, and introduction of resilient and healthy ecosystems have great climate change mitigation potential, through the sequestration and storage of carbon, therefore, ecosystem approaches are being utilised in decarbonisation pathways globally (Nagrath, Dooley and Teske, 2022). The key pathway for mitigating climate change impacts associated with land use change is reforestation, where related activities have been simulated to sequester 93 Gt of carbon by 2100 (Teske, Nagrath, and Niklas, 2022). This is because forests sequester atmospheric carbon into forest biomass and harvested wood products, or it can be used as a renewable energy alternative to fossil fuels (Kangas and Ollikainen, 2022). To become carbon neutral by 2050, net carbon sinks from forests should increase from 360 megatonnes of CO_2 per year ($MtCO_{2eq}yr^{-1}$) to 450 $MtCO_{2eq}yr^{-1}$ (Pilli, Alkama, Cescatti, Kurz, and Grassi, 2022). Therefore, nature-based solutions through reforestation can help limit surface warming within the wider context of net-zero targets, while simultaneously producing other ecosystem benefits (Teske et al., 2022).

1.2 Research Objectives

The focus of this research is on the Welsh Government's (WG) policy to significantly increase the countries woodland cover. The research will utilise a documentary analysis of relevant public body sources, supplemented with semi-structured interviews with relevant stakeholders. This shall be to investigate how policy has evolved to meet the afforestation targets set by the government, and whether this can satisfy the countries net zero targets. This shall allow me to address the following research aims:

1. To analyse secondary data on current woodland creation frameworks in Wales to assess how efforts have evolved to meet the targets set for future Welsh woodlands.
2. To investigate whether existing woodland creation policies and funding mechanisms can satisfy current and future afforestation targets in Wales.

3. To explore the views of key stakeholders on the Woodlands for Wales strategy and its progress, and if there are any barriers to woodland creation and management. In addition, to explore their perspectives on what can be done to support their involvement in reaching these targets.

1.3 Dissertation Structure

To achieve the research objectives, initially, this study will conduct a literature review to provide context on the current state of Welsh woodlands, the benefits of afforestation in Wales, and the current afforestation policy, targets, and progress. It shall then discuss existing literature around barriers preventing the implementation of woodland creation in the context of current political frameworks. The following section will detail the methods used to collect data. Next, the findings section shall present the key themes that arose through the desk-based policy documentary analysis and the semi-structured interviews. The final section shall discuss and interpret the results against the issues highlighted in the literature review.

2. LITERATURE REVIEW

2.1 The Characteristics of Welsh Woodlands

The most recent data estimates that the woodland cover in Wales is currently 309,000 hectares (ha) (WG, 2019, Forest Research, 2020), nearly half (47%) of which is known to be managed according to the requirements of the UK Forestry Standard (UKFS) (Beauchamp and Jenkins, 2020). The UKFS provides a basis for sustainable forest management for woodland owners, adhering to international principles and agreements of the global forestry sector (Raum, 2017). 117,000ha of the woodland managed according to the UKFS is encompassed by the Welsh Government's Woodland Estate (WGWE), the remaining 29,000ha of certified woodland is privately owned (Beauchamp and Jenkins, 2020). Around 62% of the woodlands in Wales is privately owned (Forest Research 2020), 35.4% of which is under personal ownership and 11.9% is under business ownership, with 2.2% of business ownership relating to the forestry and timber business (Beauchamp and Jenkins, 2020). The

remaining woodland is under charity ownership, or it is either common land or unidentified land (Beauchamp and Jenkins, 2020).

152,000ha of Welsh woodland is conifer woodland, the remaining 158,000ha are broadleaved woodland (Forest Research, 2020). Sitka spruce dominates conifer woodlands in Wales, accounting for over 60% of the species distribution, followed by larches which account for around 15% (Forest Research, 2020). Species distribution is far more diverse amongst broadleaved woodlands, with the top three dominant species being oak (18.9%), ash (13.9%), and hazel (10.2%) (Forest Research, 2020). There is an additional 92,000ha of tree cover in the form of small woodlands, groups, and lone trees, totalling 402,000ha of woodland and tree cover in Wales (Beauchamp and Jenkins, 2020). Of which, 90% of woodland and tree cover is in rural areas (Beauchamp and Jenkins, 2020). Overall, woodlands in Wales cover 15% of the total land area, with the additional tree cover equating this to 19.4%, making it one of the least wooded countries in Europe, compared to the European average of 38% woodland cover (WG, 2018, Beauchamp and Jenkins, 2020).

The characteristics of Welsh woodlands have been influenced by historic land usages and previous government policy, resulting in most of the woodland in Wales being predominately made up of non-native species (WG, 2018). The remaining ancient woodlands, most of which are now ancient semi-natural woodlands, and native woodlands are small and fragmented (WG, 2010). Moreover, recently non-native planting has also occurred in ancient and native woodlands for afforestation purposes (Warren-Thomas and Henderson, 2017). Overall, the total area of Welsh woodland has remained consistent in the last 30 years (WG, 2018). However, planting rates have considerably changed between 1976 and the present day, with a large decrease in the amount of new planting and an increase in the amount of forestry restocking occurring between 1976 and 2016 (Warren-Thomas and Henderson, 2017). For instance, planting rates decreased by 82% between 1988-89 and 2009-10 (Climate Change, Environment and Rural Affairs Committee (CCERAC), 2017). On average, 100ha or so are planted each year in Wales, with just 290ha being planted in 2020 (Nation Cymru, 2022), which barely balances the area of woodland removed during habitat restoration and development activities (WG, 2018).

2.2 The Benefits of Afforestation

Woodland creation and afforestation has become an increasing priority in recent years due to the opportunities of emission reduction and carbon sequestration (Wynne-Jones, 2013). As of 2017-18, the current sequestration of carbon from Welsh woodlands was estimated to be 1,840,000 tonnes annually (WG, 2019). Moreover, timber can act as a renewable energy source and construction material, reducing the need of fossil fuels (WG, 2018). As such, wood, as a natural and renewable material, has huge advantages for sustainability and a pathway towards a circular economy within Wales (NRW, 2021a). For instance, biomass materials, such as plants and wood, are the second largest source of renewable energy in the UK, accounting for 12% of the UK's electricity supply (Green Industries Wales, 2021). Currently, a range of biomass projects in Wales have the capacity to meet the heat demands of 108,000 homes in the nation (Green Industries Wales, 2021). Moreover, governments are increasingly incentivised to increase national biomass energy usages as a way of ensuring energy security and the reduced reliance on expensive fossil fuels, especially surrounding the current insecurity in UK homes around rising electricity bill prices (Department for Business, Energy & Industrial Strategy, 2022).

Furthermore, the current Welsh market for timber products contributes an estimated £528.6 million to the national economy, providing jobs for between 8,500 and 11,300 people (WG, 2018). Thus, a more sustainable management of forests and an increase in home grown timber would contribute to the added-value and resilience of the forestry sector and Welsh economy (WG, 2018). In addition, the ecosystem services provided by woodlands has a range of benefits that would enhance Welsh land management and habitat resilience (Osmond and Upton, 2012). For instance, tree cover can support more productive farming by providing shade and shelter for animals, improving hedgerows, and the efficiency of water use for crops (Osmond and Upton, 2012, National Forest Union (NFU) Cymru, 2021). Furthermore, woodlands play crucial roles in soil and water management – which alongside forestry are the world's largest natural carbon sinks (ClientEarth Communications, 2020) – by diffusing pollution, reducing nutrient runoff, improving water and soil quality, reducing flood risk, and by maintaining water flows during dry spells (Warren-Thomas and Henderson, 2017). In addition, tree cover and diverse woodlands are

extremely useful in reversing the decline of biodiversity by playing a crucial role in habitat creation and conservation (Beauchamp and Jenkins, 2020). Finally, the importance of woodland access in supporting and maintaining people's well-being was especially highlighted during the Covid-19 pandemic, with the benefits woodlands can have in alleviating depression and anxiety being widely recognised (News Medical Life Sciences, 2021).

2.3 The Woodlands for Wales Action Plan

"Woodlands for Wales (WfW) is the WG's fifty-year strategy for woodlands and trees in Wales" (WG, 2016, p. 4). The WG's regularly update WfW Action Plan (2016, p. 4) outlines the long-term vision for the future of Welsh woodlands through afforestation: "Wales will be known for its high-quality woodlands that enhance the landscape, are appropriate to local conditions, and have a diverse mixture of species and habitats." Due to the benefits afforestation can have socially, economically, and ecologically, the WG views woodland creation as an important asset in achieving their national priorities for driving green growth, resilience and safety, and tackling poverty (WG, 2016). This approach is being developed in adherence to the Well-being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016. These pieces of legislation aim to provide social, economic, and ecological benefits for Wales by utilising and enhancing the nations natural assets, to better adapt to climate change and ensure a safer and resilient future for future generations through net-zero pathways by 2050 (NRW, 2020a, Future Generation Commissioner for Wales, n.d., Wales Council for Voluntary Action (WCVA), n.d.). To meet these goals, the Environment (Wales) Act put in place the legislation needed to achieve the Sustainable Management of Natural Resources (SMNR), which sets out the aims for Wales to have healthy, well-functioning, and resilient social, economic, and eco-systems (NRW, 2020a). To achieve this, Section 6 of the Environment (Wales) Act requires that public authorities, within their function, must seek to maintain and enhance biodiversity and promote the resilience of Welsh ecosystems (WCVA, n.d.). Thus, public authorities are required to prioritise the delivery of NBS and follow SMNR principles, considering biodiversity and ecosystems into their planning, projects, and day-to-day activities (WCVA, n.d.).

Thus, building upon Government priorities and the legal obligations of the Environment (Wales) Act, the aim of the WfW strategy is to increase the countries canopy cover and achieve the SMNR within woodlands (Future Generation Commissioner for Wales, n.d., WG, 2018). Therefore, the WfW strategy sets a target to create 43,000ha of new woodland by 2030, rising to 180,000ha by 2050 (WG, 2018, Green Industries Wales, 2021, Nation Cymru, 2022). Moreover, NRW aims to expand the land area covered by the WGWE to ensure the sustainable management of new woodlands and uncertified existing woodlands (NRW, 2018). To meet the nation's afforestation targets, at least 2000ha of woodland should be planted per annum by 2030, rising upwards to 4000ha by 2050 (WG, 2018). However, between 2010 and 2015, only 3,203ha of new planting took place, meaning that in 2022, over 31,800ha of new planting needs to take place for the country to be on track to meet WG targets (CCERAC, 2017). Moreover, as aforementioned, just 290ha were planted in 2020 (Nation Cymru, 2022).

According to Beauchamp and Jenkins (2020), the potential for woodland creation is highly dependent on landownership and availability. 80% of land in Wales is agricultural land managed by farmers, therefore, farmland presents the greatest opportunity for woodland creation to meet the WG's targets (NFU Cymru, 2021). For instance, to meet the targets of 180,000ha by 2050, 3,750 farms in Wales would require complete afforestation (NFU Cymru, 2021). Even if just 3.42% of Wales' existing agricultural land was used for tree planting, a total of 60,000ha could be planted (NFU Cymru, 2021). Through various schemes and grants, supportive measures have been put in place to encourage woodland creation on farmland in Wales (Emmett and the Glastir Monitoring & Evaluation Programme (GMEP) team, 2017). For instance, grants have been available for farmers who use their land to provide ecosystem goods and services as part of Wales' Rural Development Plan, through the Glastir scheme, however, uptake of the scheme and tree cover contributions within its introduction have fallen short (Emmett and the GMEP team, 2017). The Sustainable Farming Scheme in 2025 attempts to address this by introducing a universal action for farmers to share 10% of their agricultural land to support tree planting by 2050 (WG, 2022a). However, for these "hugely ambitious" afforestation targets to be met, there is a need to understand the barriers towards the uptake of existing woodland creation projects and previous schemes and incentives (NFU Cymru, 2021, p. 5). Therefore, the following paragraphs shall

explore existing literature on the barriers preventing stakeholder engagement in woodland creation.

2.4 Barriers preventing woodland creation

2.4.1 Grant Scheme Design

According to the Royal Forestry Society (RFS) (2020), landowners are unlikely to convert land to woodland without a financial incentive. As such, 51% of stakeholders that took part in The RFS (2020) woodland creation survey, said that a grant is vital toward their involvement in woodland creation and 61.7% believe that grants should cover more than 80% of the costs involved in tree planting. However, as Beauchamp and Jenkins (2020) stress, current Welsh grant schemes require too much paperwork and landowners often require external assistance to complete them. Respondents from the RFS (2020) survey describe woodland creation grants as complex and that the application process is enough to deter landowners from considering woodland creation. For instance, the newest grant scheme, the Woodland Creation Planning Scheme (WCPS), requires applicants to utilise the Woodland Opportunity Map (WOM) web-map browser and interrogate shapefile data into their own Geographical Information Systems (GIS) software, to be able to understand the constraints associated with the area they have received funding to plant on (WG, 2021a, WG, 2022b, WG, 2022c).

2.4.2 Economic Barriers

The financial benefits of agriculture are embedded in rural communities, thus there is a deep concern that policy driving the conversion of agricultural land to tree planting land, may have the potential to damage rural communities (NFU Cymru, 2021). Moreover, “some farmers cannot wait 40 years for a crop of timber to grow” (NRW, 2021b), nor can the many businesses in communities dependent on farmers for their livelihood (NFU Cymru, 2021). Thus, farmers are unlikely to invest into a woodland creation system, if it is not integrated well into a farming system to allow for them to derive income from agricultural commodities (NFU Cymru, 2021).

This economic rationale against tree planting is further exacerbated by the fact that payments for providing ecosystem services are based on the costs-incurred and income forgone calculations, and for many, the payment rates are being outpaced by the costs incurred (NFU Cymru, 2021). Moreover, it is important for land managers and farmers to be able to sustain their livelihoods and invest towards the future, so many farmers are concerned about the permanency of woodland creation and timber production (Beauchamp and Jenkins, 2020, NFU Cymru, 2021). For instance, farmers may be reluctant to free up productive farming land for tree planting as opposed to adapting and building a resilient productive farm for future generations (NFU Cymru, 2021). Moreover, it should be noted that 30% of agricultural land in Wales is currently under tenancy agreement (NRW 2021b). In most of these cases, tenant farmers are under restrictive clauses and unable to plant trees (NFU Cymru, 2021), which excludes a huge area of land from increasing national tree cover (NRW, 2021b).

2.4.3 Risks

On top of the risk of economic uncertainty for landowners, there is also a large risk involved with tree health and the risks associated with climate change related extreme weather conditions (Beauchamp and Jenkins, 2020, NRW 2021b, NFU Cymru, 2021). Phytophthora ramorum is a pathogen that has caused great economic, social, and environmental impacts to trees across Wales, leading to an estimated 12,285ha of potentially infected woodland that may need to be destroyed (WG, 2019). Moreover, a fungal disease that is causing ash dieback in Wales is recorded in nearly every 10km^2 area in Wales (WG, 2019). Thus the prevalence of disease and the costs of removing diseased trees can prove a great economic and rationale risk to landowners (NRW, 2021b). In addition, with an expected increase in drier spells and heatwaves across the UK (Carbon Brief, 2022), there is an increased risk of wildfires, with most of Wales under a Fire Severity Index of very high in the most recent heatwave of August 2022 (Duggan, 2022). Tree planting coupled with drier weather can increase fuels and risk of wildfires, as seen in Chile and Portugal, where dense, extensive, monospecific tree plantations have promoted megafires within the nation, which may act as a rationale deterrent for farmers (Sills, 2022).

2.4.4 Social Factors, Attitudes, and Historical Practices

To be able to better influence stakeholder decision-making in line with environmental policy goals, there is substantial academic literature focussed on understanding the stakeholder perspective, and their social and cultural factors (Beauchamp and Jenkins, 2020). For instance, Iversen, Velden Naomi, Convery, Mansfield, and Holt's (2022) research suggests that the choice to not plant trees on agricultural land is guided by intrinsic values and a cultural belief of what land ought to be used for. As expressed in supporting literature, the self-identity of a farmer is not in line with a forester, rather some see agriculture and forestry as divorced from each other (Ambrose-Oji, Goodenough, Urquhart, Hall and Karlsdottir, 2022). As such, to some farmers trees are generally not seen or engaged with and attention is centred towards arable land and commercial crops, or instead, trees are not seen as relevant to a successful farming identity which is related to tidy land management (Ambrose-Oji et al., 2022).

Moreover, literature shows that there is a concern amongst farmers that woodland creation not only symbolises a change in land usage, but also a change of their way of life and culture (Iversen et al., 2022). For instance, Holmes, Clemoes, Marriot and Wynne-Jones (2022) stress that within rural landscapes in Wales there has been a rebalancing of landscape preference, where traditional livestock monocultures and their associated landscapes are less preferred. Rather, landscapes based on sensitive production which allow for nature to flourish is now preferred (Holmes et al., 2022). It is argued that some rural identities, cultures, and economies have taken this as an external threat to their farming heritage that values practices like traditional sheep farming (Holmes et al., 2022). The result of this is that "farmers… see themselves as marginalised by the conservation agenda which is aligned to government and urban elites" (Holmes et al., 2022, p. 162). As such, it is claimed that opposition to land use changes within rural areas is rooted within how these changes will disrupt local and community relationships toward the natural environment (Holmes et al., 2022). As such, within Holmes' et al. (2022) study, it was found that a rejection of overly powerful outsiders imposing their interests on the landscape was widespread in rural communities, thus effecting political mobilisation and resulting in insider vs. outsider conflicts in rural landscape preferences.

Literature suggests that different stakeholders are having difficulty in finding a consensus to facilitate woodland creation (Iversen et al., 2022). Within Iversen's et al. (2022) study, it was found that within the consultation processes, landowners expressed a need to feel like they are being listened to and included, and for there to a be a clear pragmatic focus on economic incentives. Moreover, reflecting Holmes' et al. (2022) study, farmers have expressed a greater trust in organisations that have an agricultural remit, like NFU Cymru, compared to private contractors and public and government bodies (Ambrose-Oji et al., 2022). Farmers largely agree that expert advice is essential, however, there has been a call for more active guidance, through face-to-face consultation with consideration of the stakeholder's expressed needs (Ambrose-Oji et al., 2022). However, the decision to favour online information and applications, coupled with inconsistent information from multiple agencies and advisors, has left many stakeholders feeling cut off and over-saturated (Beauchamp and Jenkins, 2020, Lawrence and Marzano, 2014, and The Royal Forestry Society, 2020).

3. Methodology

3.1 Qualitative Approach

According to Leeman and Novak (2017), the overarching goal of collecting and examining qualitative data is to gain insight and an understanding of the meanings held by participants. In many cases, before researchers inquire into participant insight, there is already a wider context of information in existence, thus inquiry into participants of interest can take place around the context that is of interest to the researcher (Leeman and Novak, 2017). In the case of this research, this qualitative study uses both primary and secondary research, to gain first-hand insight from relevant experts and stakeholders to comprehensively explore the evolution and capacity of afforestation policy in Wales to meet its targets. This was achieved through semi-structured interviews with key stakeholders and relevant documentary analysis. Methodological triangulation was used, through the combination of interviews and documentary analysis, to gain the most complete and detailed data possible on the object of enquiry (Morris, 2017).

3.2 Data Collection

3.2.1 Secondary Research – Documentary Analysis

Desktop research was utilised to gather a range of documents and government policy reports to be used for documentary analysis. To ensure a good understanding of the context and a comprehensive coverage of documents, a range of publicly available sources were used, such as white papers, progress reports, acts of parliament, strategic plans, manuals and handbooks, and consultation reports.

3.2.2 Primary Research – Semi-Structured Interviews

Primary research was gathered through semi-structured interviews with a relevant stakeholder within the forestry sector and a stakeholder involved in cross-sectoral activities with the forestry sector. An inductive approach was initially taken to primary research, where secondary data analysis highlighted key topics of conversation and inquiry which were used to inform interview questions and discussion points (Denscombe, 2010). As such, in this study, interviews are not relied upon entirely for information but rather are utilised through quotes as a source of further insight into themes raised in academic literature and publicly available sources. The interview topics were designed around achieving the research objectives and therefore included topics like developments in the SMNR in the context of forestry and policy impeding factors to woodland creation on privately-owned land. Whilst conducting the interviews, many factors and topics of interest arose that were previously not considered, which directed further desktop research and the usage of an iterative approach in secondary data collection (Descombe, 2010).

Due to the participant's roles within woodland creation being different, questions were not standardised to encourage new topics to arise and the interviewee to elaborate on their own experience. However, the researcher made usage of questions centred around the research objectives and findings from the documentary analysis, making sure to use mapping questions that retained the focus and direction of the interview (Ritchie and Lewis, 2003). Open-ended questions encouraged more detailed and informative responses, coupled with content mining question which were used to gain a further detailed understanding of participant insight (Ritchie and Lewis, 2003). As such, the style of interviewing largely encompassed what Seale, Gobo, Gubrium and Silverman (2004)

describe as mundane interactional cooperative interviewing. This involved introducing initial topics of discussion and allowing the interviewee to talk and unpack key terms, then following up with follow-up questions and talk about personal ideas based on research where appropriate (Seale et al., 2004). The use of affirmative probes, like saying 'uh-huh', smiling, and nodding, were used to reassure the collaborative nature of the interview and engagement of the interviewer, encouraging the interviewee to expand on their ideas (Bernard, 2013).

3.3 Sample Design

The sampling design of this study was based on a purposive sampling approach, were from the outset of the research it was established what sample was required to allow the research question to be answered (Bryman, 2016). Therefore, it was established that it was important to speak to people who are actively involved in the forestry and or, are knowledgeable in current forestry activities and relevant debates. Interviews were secured with an individual working within the environmental departments of a local council (Respondent A), and an individual working on-ground within forests for a governmental organisation (Respondent B). These participants were identified through a desktop search and were contacted by email. Each participant had extensive knowledge of the topic and experience in collaboration with a variety of organisations of focus, such as the WG, NRW, NFU Cymru, the RFS, etc. The interviews lasted around 45 minutes each and took place until many of the topics, concerns, and suggestions that arose during interviews were covered and repeated (Ritchie and Lewis, 2003). Thus, it was determined that increasing the sample size was not necessary, instead this study focussed on ensuring that good purposive sampling had taken place (Ritchie and Lewis, 2003).

3.4 Ethical Considerations

Before data collection could take place, adherence to The University of Bristol's guidelines about sound ethical practice had to be approved by the School of Geographical Sciences Research Ethics Committee (ethics monitoring form can be found in appendix 1) (Bryman, 2016). Once interest in participation was shown, informed and written consent from

participants was obtained prior to the interview taking place (Bryman, 2016). Thus, participants were provided initially with a participant information sheet which informed participants on the purpose and aims of the research, the privacy of their data, and how their data will be collected and managed. Additionally, harm to participants was considered, as this study benefitted from recorded data which can cause unwanted stress and anxiety in some (Bryman, 2016). Participants were informed of their right to withdraw at any point if they felt their wellbeing was at harm. Participants were encouraged to make usage of the information provided to them in the participant information sheet before signing the consent form.

Remote desktop interviews were preferred for this study due to the ease and speed of recruiting participants, as well as the convenience for interviews to take place without consultation of location (Engward, Goldspink, Iancu, Kersey and Wood, 2022). All interviews took place on Microsoft Teams and were transcribed using the live transcription tool provided within the streaming service. Participants were reminded of their right to withdraw at any time and their anonymity at the start of each interview, and consent was gained before beginning audio recording.

3.5 Data Analysis

Thematic analysis was used in the analysis and interpretation of both primary and secondary data collection to identify themes within both data sets and to identify patterns occurring within each (Hawkins, 2017). Through the investigation of data, themes were built to identify important findings that aligned with the aims and objectives of the research project (Hawkins, 2017). Coding is the starting point for most forms of qualitative data analysis (Bryman, 2016), in this case coding was used to identify cohesive categories within data to uncover themes and ideas in relation to the research question (Sun, 2017). The codes identified during data collection and analysis have been organised into themes and sub-themes consistently found across primary and secondary data collection.

3.6 Limitations

This study has several limitations. Firstly, this study struggled to acquire the desired representative sample, reaching out to many governmental bodies and officials with no successful responses. This is most likely due to busy scheduling and time restraints but as Cameron (2021) explains, acquiring research participation from civil servants is difficult. In hindsight, the researcher should have identified his sample as a hard-to-reach sample and allocated more time and resources to networking within pre-defined subgroups (Shaghaghi, Bhopal and Sheikh, 2011). Whilst the study did not elicit viewpoints from government officials, it secured interviews with stakeholders with expert knowledge and experience that provided sound conceptual insights (Murray and Hughes, 2018). However, there was a potential risk that interview participants therefore had biases towards their own organisation and its activities. The chance of this bias occurring is hoped to have been reduced by reassuring participants that their responses and involvement will remain completely anonymous. Moreover, issues with sample size may have been addressed by utilising a mixed-methods approach, such as the use of online surveys with open-ended questions, as the general convenience associated with online surveys may have increased response rate (Bryman, 2016). However, it is argued that the use of good purposive sampling means the research remains sound on a conceptual level (Murray and Hughes, 2008).

Moreover, whilst the interviewer followed a framework considered to be good interviewer practice, they acknowledge their inexperience (Ritchie and Lewis, 2003, Seale et al., 2004, Bernard, 2013). Upon review of recordings and transcripts, some tropes of bad interviewer practice were identified, such as, asking questions with a lack of clarity, not probing topics with the potential of providing salient research findings, and steering the interview in line with research assumptions (Gesch-Karamanlidis, 2015). As such, the informal conversational approach taken to the semi-structured interviews of this study may have required a more experienced interviewer (Brayda and Boyce, 2014). Therefore, this study may have benefited from the usage of well-planned standardised open-ended interview questions to retain good interviewer practice (Brayda and Boyce, 2014). Overall, the researcher acknowledges the limitation of their study and how their methodology may influence the interpretation of data and will indicate the insecure nature of any claims and conclusions.

4. Findings

4.1 Practical Limitations of Policy

4.1.1 Sustainable Forest Management

According to the WG (2018), the capacity for organisations to deliver the economic and public goods objectives set out within WfW strategy is highly dependent on Welsh woodland being actively and sustainably managed. As such, respondent B reflects on the developments in sustainable woodland management they have observed in relation to their role:

> *"Before [NRW was established in 2013], there was a sort of 'don't worry about the environment, just get the timber out' [consensus]."*

Following the Environment (Wales) Act making it a requirement for NRW to pursue SMNR (Welsh Government 2021c), the sustainable management of woodlands in Wales is improving, with the percentage of privately-owned woodlands certified by the UKFS increasing from 14% to 20% between 2001 and 2019 (NRW, 2021c). As such there is an assessment of high confidence that there is scope to maintain and enhance the resilience of ecosystems and the ecosystem services woodlands provide (NRW, 2020b, Welsh Government, 2021b), which respondent B touches upon:

> *"Reducing the carbon footprint of what we do is massive. We [adhere to these] principles referred to as SMNR […] that's the main core of what we are doing […] pushing that into every civils design."*

However, NRW (2021c) states that there is a mixed picture for the successful sustainable management of woodlands in the next 30 years, as respondent A articulates:

> *"Forestry operations are a great thing, we should grow more timber [for] more construction [and for] more firewood instead of coal […] but very large plantations*

> *[are all] about timber production, with large areas of clear fell and high proportions of Sitka spruce which isn't great for biodiversity."*

Section 6 of the Environment (Wales) Act 2016 requires public authorities to meet their duty to enhance and maintain biodiversity and ecosystem resilience. NRW (2021c) stress that the challenges for the sustainable management of woodlands is to improve planned management, resilience, and the flow of ecosystem services. For instance, Welsh non-native woodlands score low to medium in terms of diversity, being vastly dominated by Sitka Spruce (Forestry Research, 2019, NRW, 2021c). Respondent A goes onto to further critique the usage of SMNR principles in woodland management in Wales, further exacerbating that:

> *"If you're clear felling an area you need to mitigate for issues [towards biodiversity and water quality for example] which doesn't always happen on large plantations […] [The SMNR] includes biodiversity as well, not just carbon neutral."*

4.1.2 Target Setting for Tree Planting

The State of Natural Resources Report (SoNaRR) assessment of the achievement of SMNR of woodlands (NRW, 2021c) shows that woodland creation falls well short of targets. "Rates of new woodland creation remain insufficient to meet decarbonisation priorities" (NRW, 2021c, p. 16) and it is doubtful that woodland ecosystems will be able to cope with the challenges of climate change in the future (NRW, 2020c). As such, it expected that the resilience of woodlands will deteriorate in the next 30 years in the face of increased climate change impacts and increased risks to pests and diseases (NRW, 2021c). Therefore, there is an urgent need to change the scale and pace of action (NRW, 2020c), however, respondent A and B remain cautious the urgent need to deliver on targets quickly can result in the creation of woodlands that lack resilience:

> *"I think that's the problem, we've got targets in black and white that ultimately if we don't hit [we're] going to fail."* [Respondent B]

> *"There are always dangers when you set targets […] [An opinion within NRW] is that its lovely to plant nice trees. But we [must] do this at a scale and pace to meet carbon targets and that means planting Sitka spruce"* [Respondent A]

4.1.3 Right Tree, Right Place

Plantlife (2012) argues that the WG's ambitions for woodland creation is a well-intentioned aim but it is too simplistic of an approach, rather we need better woodland as currently only 7% of Welsh woodland is in a good condition (NRW, 2021c). It is feared that tree planting targets will result in major land use changes that will result in inappropriate planting sites and the increased use of invasive, or potentially invasive non-native species in woodland creation (Plantlife, 2012).

> *"Yes, we need more tree planting, but we need to be really careful about how and where that happens […] there are an awful lot of habitats that are really special that have nothing to do with trees and they need looking after too." [Respondent A].*

For instance, Respondent A expressed a fear that the proposed Sustainable Farming Scheme universal action of farmers having at least 10% tree cover on their farms (Green Industries Wales, 2021, WG, 2022a):

> *"When you announce a target of 10% […] that is where I get nervous […] because there [is not just] a nature emergency in woodland ecosystems, but grassland ecosystems, peatland ecosystems, and wetland ecosystems."*

As Plantlife (2012) express, the farming community is yet to fully embrace the idea of woodland creation, so a requirement to share 10% of their land for tree planting will result in a stronger tendency for less productive farmland to be targeted for planting, placing pressures on marginal and upland habitats that are valuable for wildlife.

> *"How does this look on ground? [A farmer] is not going to choose [to plant on 10%] of their most lovely deep productive soil […] [they will choose to plant on the*

uninteresting area] that is a bit wet and boggy, but that's [an area with high biodiversity value]." [Respondent A]

Whilst there are strong policy presumption against the permanent removal of trees, the WfW strategy does advocate for existing non-native woodlands to be restored to priority open habitats, such as peatland and heathland, where there are clear ecosystem service benefits (Forestry Commission Wales, n.d.). As such, respondent B explains that it is understood that planting or restocking is not always appropriate:

"One thing that maybe the stats don't show, [is that there are a large number of areas] that once we've harvested […] we're putting them back to peatland […] and there's potential with a good peatland to store significantly more carbon."

4.1.4 Commercial Planting

The NFU Cymru (2021) calls for greater consideration towards safeguarding rural communities in decarbonisation pathways, as it highlights that policies setting targets to drive tree planting are leading to increasing pressures on land use changes in Wales (NFU Cymru, 2021). For instance, there are an increasing number of cases of farms being bought up by external investors and government bodies for the purpose of afforestation. These have the potential to harm rural communities:

"Large companies [are] buying entire farms and covering it with planted trees as they have a target to plant trees to sequester carbon […] This drives up farmland, and prices out local people, but also, it takes a large chunk of land out of farming, in areas where the farming culture is deeply grained into society." [Respondent A]

Unlike NRW, private landowners and commercial foresters are not required to pursue SMNR principles (WG, 2021c), so there are concerns that increased profit-orientated planting will not be implemented in a way to enhance and maintain the resilience of Welsh woodlands.

"[The farm] has been purchased by Tilhill to be planted, all the land has been planted up […] Tilhill are private and they're only in it to make money." [Respondent B]

> *"[A commercial company] were going to buy up […] ex-sheep grazing land and plant it with 70% Sitka spruce, within half a mile of national park, where the grassland did happen to have [..] threatened species […] which you would've lost."* [Respondent A]

4.2 Private Sector Involvement

4.2.1 Payment Incentives

According to NRW (2021c), achieving the government's future targets is highly dependent on future support mechanisms and grant funding. According to the GMEP, the WG's current sustainable land management scheme (Glastir) since its introduction has seen little tree planting (3,923ha) and a varying uptake (Emmett and the GMEP team, 2017, Welsh Parliament, 2021). The report suggests that low uptake may be attributed to the fact that environmental payments to farms in Wales average between <1 and 10% of total farm outputs, compared to the Basic Payment Scheme (BPS) which account for between 6 and 23% (Emmett and the GMEP team, 2017). Under the BPS scheme, farmers must be 'active' farmers to be eligible for payments and payments are issued for each hectare of eligible agricultural land (WG, 2021c).

> *"A farmer once told me that [his] most productive day of work, [is the day he submits his] BPS claim, as that's how he makes most of his money […] Ultimately, a farmer [...] needs to have a viable business and to make [money]. As we are today, we are operating in a framework which pays for production not [environmental] quality. So, there are no incentives to address environmental issues"* [Respondent A]

Moreover, Farmer Practice Survey's, structured interviews, and focus groups show that the application process is a significant barrier to Glastir uptake, with a call to simplify the process (Emmett and the GMEP team, 2017). Respondent B recalls the difficulty a farmer they had worked alongside expressed:

> *"I know that they looked into it, came back, and said […] the rewards not worth the hassle […] Maybe it needs to be aimed at a target audience"* [Respondent B].

The BPS scheme will continue until the end of 2023, Welsh Parliament then plans to introduce The Agriculture (Wales) Bill, which will introduce the Sustainable Farming Scheme underpinning all future farm support to produce food in a sustainable manner (WG, 2021d, WG, 2022a). The scheme hopes to improve on shortcoming of previous payment incentive frameworks, and it hopes to deliver beneficial outcomes on a farm level as well as a public goods level (WG, 2022a).

> *"Hopefully the new sustainable farming scheme, which will replace BPS, will begin to address this […] so that farmers are not paid for production but for public goods"* [Respondent A]

According to Llais y Goedwig (2020), to produce the public goods associated with woodland creation, new plantations must be supported into adulthood. Therefore, it is crucial that stakeholders remain committed and involved in woodland creation and management (Woodland Carbon Code, 2018, NFU Cymru, 2021). Henceforth, the Sustainable Farming Scheme should provide continued financial support for management planning and woodland maintenance, which was lacking in previous grants available to landowners that focussed entirely on woodland creation (Llais y Goedwig, 2020).

> *"What happens when 20 years from now [when there are issues of biomass debris] […] who is going to pay for that? It's those sort of questions that are a blocker […] So, it's easier for those land managers to say no [to tree planting] so they then don't have a maintenance budget, its risk aversion."* [Respondent A]

4.2.2 Lack of collaboration and organisation

According to NRW (2020c, p. 39), "Wales has much of the regulatory and policy frameworks in place [to increase ecosystem resilience]." However, a theme that was prevalent in semi-structured interviews but not so much in documentary analysis, was a lack of organisation and collaboration within the regulatory framework of Wales' environmental sector. As respondent A expresses:

> *"There is a lack of organisation between all organisations in the sector, including government. It's not particularly clear exactly who is responsible [and] who does what."*

The OECM argues that for global industry to implement the 1.5C target of the Paris Agreement, the global carbon budget requires a holistic estimate based upon the interconnection of all sectors (Teske et al., 2020). As such, within each sector, supported collaboration between sector bodies could contribute to meeting multiple government priorities, such as woodland creation and biodiversity (Welsh Government, 2022d).

> *"We need a lot more join up between all sectors, because yes we need more timber and more trees to sequester carbon but as part of that, if it's done well, we can build in biodiversity, water quality, flood resistance, and things like that […] but to do that you have to do cross sector"* [Respondent A]

There is a scheme to support collaboration between Welsh public sector organisations through the Assets Collaboration Programme (WG, 2022d). This provides funding for collaborative projects with at least two public sector bodies that contribute to multiple government priorities, such as decarbonisation, biodiversity, sustainability etc. (WG, 2022d). However, according to respondent A:

> *"[Collaborative] funding which is available is often competitive, people don't have a right lot of time to collaborate, so people go on their own and secure [their own] money through funding. The current funding landscape doesn't encourage collaboration."*

Moreover, interviewees described experiences of a lack of collaboration between public bodies. Respondent A, recalls a scenario where a farmer converted their farm woodland to sheep grazing land without informing anyone:

> *"They should've applied for screening for an EIA assessment […] with the Welsh Government, but they didn't. They polluted a water course in doing so [and] a special*

> *area of conservation [which is then a] pollution control issue [with] NRW. They probably should have applied for a felling license so that's another branch of NRW, but [that branch of the NRW doesn't] talk to the water quality side. So, there were multiple departments within the same organisation and multiple organisations who were all involved in multiple breaches of legislation around one site, so there's not a lot of coordination"*

According to the RFS (2020), the greatest deterrence to woodland creation for landowners was dealing with multiple government agencies to secure grant approvals. As respondent A and B express, this is cause of frustration and conflict for landowners, especially farmers:

> *"I have heard of stories of a particular farmer being visited by a dozen different organisations all in the same year for him to help deliver [different] projects they've just got funding for […] The farmer just gets switched off."* [Respondent A]

> *"I think one of the issues that we have got with the way that [NRW is] set up, [is that] we've got [separate departments for] water quality, grassland enforcement, etc. Ultimately, all these people that will turn up at a farmyard are in a NRW van… so I think there is quite a dislike from some agricultural areas to NRW."* [Respondent B]

NRW (2020c) calls for the delivery of environmental objectives at a much faster pace and acknowledges that this pace could be increased by bringing together a wider set of skills and knowledge from different sectors, institutions, and geographical areas. To facilitate this, Respondent A calls for 'honest brokers' to facilitate collaboration:

> *"There are lot of people doing good stuff in their spheres, they need to be able to see each other so that they can see how each other's projects may benefit each other. What you need is someone with the capacity to act as a broker of collaboration, you need someone who [is neutral] to facilitate collaboration."*

For instance, with the policy headline of 10% of agricultural land being shared for tree planting, an honest neutral broker of collaboration may help provide greater ecosystem service outcomes, as respondent A stresses:

> *"There is a need for people to step away [from] that target for good reasons and that's where that honest broker of collaboration comes in. Someone needs to look at it and go okay, 10% of tree cover is a good idea but this specific farm has lovely species-rich meadows, [so] lets retain the species rich meadows [instead]."*

5. DISCUSSION

The ambitious targets set by the WG for the expansion of woodlands and the enhancement of the nation's natural assets (Welsh Parliament, 2019, NRW 2020a), has led to positive developments to improve the capacity and scope of policy to maintain and enhance the resilience of ecosystems and the ecosystem services woodlands provide (NRW 2020b). For instance, new planting in Wales favours broadleaved woodlands and species, compared to the typically monospecific and dense conifer woodlands currently present in Wales, with 86% of new planting using broadleaved species to promote diverse and resilient woodlands (Warren-Thomas and Henderson, 2017, Forest Research, 2020). In addition, the climate change mitigation potential from producing more resilient and healthy ecosystems is being coupled with low carbon energy transitions within the forestry sector and agricultural sector (Green Industries Wales, 2021).

With increasing fuel prices and pressures from SMNR principles, it is hoped that projects like HyNet North Wales will be successful in producing and distributing hydrogen energy to industries to reduce related CO_2 emissions in transport, infrastructure, and construction activities (Green Industries Wales, 2021). Moreover, the Sustainable Farming Scheme that will replace the BPS will pay for ecosystem goods and services, not production, achieving a reduction in waste and farm emissions, and enhancing the resilient and sustainably productive nature of farm ecosystems (Welsh Government, 2022a). Overall, despite tree planting progress falling short of current targets to meet 43,000ha worth of expansion by 2030 (WG 2018, Green Industries Wales, 2021), it appears that Wales has developed the

scope of much of the regulatory and policy frameworks in place to potentially be able to satisfy these targets (NRW, 2021c). This will likely be dependent on the success of future policy and decision-making frameworks, like the Sustainable Farming Scheme. Furthermore, whilst expansion targets for 180,000ha by 2050 is described as “highly ambitious” (NFU Cymru, 2021, it is not unheard of, Scotland expanded their area of farm woodland by 129,000ha between 2010 and 2019 (Forest Research, 2020).

However, the call to increase the speed of delivery and the extent of tree planting targets is leading to concerns about whether tree planting will be delivered in the right way (Plantlife, 2012, NRW, 2020c, NFU Cymru, 2021, p. 5). In the current state of woodlands in Wales, less than 5% are in favourable conditions and the ecosystem function of most woodlands are threatened by pollution, invasive species, and a lack of diversity associated with a lack of quality management (Forest Research, 2020, NRW, 2021c). As respondent A stressed more woodland is a well-intentioned aim, but more poorly managed woodland will lead to more woodlands in poor conditions, threatening woodland ecosystems and the life dependent on them (Plantlife, 2012). Consequentially, producing woodland with low resilience and diversity will reduce the potential ecosystem benefits they could produce, increasing tree health issues and the costs associated with them (NRW, 2021c). Overall, whilst policy has evolved with the scope to increase the resilience and extent of woodlands, it may not be producing the benefits it intended and what we may need is better woodland in Wales (Plantlife, 2012, Woodland Trust, 2021).

Despite NRW claiming that it adheres to the ‘right tree, right place’ incentive, both respondent A and B recall the knowledge of public body and commercial tree planting projects that have lacked thorough consideration of the side effects planting project may have on the wider environment and ecosystem functions and services biodiversity. Therefore, a call to increase the speed of delivery and extent of tree planting is raising concerns that more inappropriate planting sites will be chosen and limited to monocultures of non-native species to meet looming deadlines (Planlife, 2012, NRW, 2021c, Tolgyesi, Buisson, Helm, Temperton and Torok, 2022). Moreover, respondent A expressed concern that the popular nature of tree planting as a NBS as a pathway for decarbonisation overlooks the needs to improve the resilience of other ecosystems.

According to Tolgyesi et al. (2022), there appears to be a general undervaluation of the diverse ecosystem services of habitats like grasslands, heathlands, and peatlands, etc. Moreover, there seems to be a lack of recognition globally and amongst pro-afforestation groups that tree planting may have limited climate mitigation effects and may increase biodiversity loss, creating conflicts to conservation, habitat restoration, and climate targets (Tolgyesi et al., 2022). As such, tree planting tends to be the slogan of global climate action, for instance, the EU Biodiversity Strategy for 2030 sets to plant 3 billion trees across Europe, however it proposes no counterbalance for its effects on other habitat restorations (Tolgyesi et al., 2022). Habitats like grasslands lack obvious above-ground carbon sinks but due to the length of time it takes for woodlands to grow, research shows that there is no significant difference in the amount of carbon stored by lands that were either planted or left to natural succession over a 50-year period (Thibault, Thiffault, Bergeron, Ouimet and Tremblay, 2022, Tolgyesi et al., 2022).

Afforestation is likely to remain the key nature-based pathway for mitigating the negative effects of climate change and despite current Welsh planting rates falling short of set targets, policy appears to be evolving to facilitate the capacity for woodland expansion (NRW, 2021c). For example, as respondent A stresses, it is hoped that the introduction of the Sustainable Farming Scheme in 2025 will address barriers facing woodland creation, with the universal action of 10% of farming land usage for forestry rewarding farmers for ecosystem services (Welsh Government, 2022a). However, with such targets, it should be increasingly important to safeguard rural communities in the face of external pressures for land use changes (NFU Cymru, 2021). As such, there is a risk that rural communities may be burdened by tree planting projects, where they may be priced out of local land and the financial benefits shift away from rural communities, diminishing opportunities for future generations to access farming and local housing (NFU Cymru, 2021).

Thus, it is argued there is potential for a land grab in rural communities in Wales (NRW, 2021b). This type of land use change reflects displacement of tribes in the global south, where afforestation has acted as an alibi for legalised land grabbing, resulting in forcible plantation on tribal lands, reducing their access to land resources and the relocation of

settlements (Saxena, 2019). Therefore, to facilitate collaboration, Welsh tree planting projects and decision making-frameworks must avoid exacerbating the already present outsider vs. insider conflict for rural land use preferences (Holmes et al., 2022). The Sustainable Farming Scheme and following policy must deliver a balanced approach where the economic livelihoods and well-being of rural communities is safeguarded for tree planting to not encompass rural land grabbing (NFU Cymru, 2021).

This is where respondent A's call for an 'honest broker of collaboration' in tree planting decision making-frameworks would be useful. For instance, having a neutral individual or organisation that isn't influenced by targets, economics, or land use preferences, to encourage collaboration in the decision-making process may have the potential to highlight or provide advise on how to reduce the potential harm a woodland creation project can pose to communities, ecosystem functions, and ecosystem services. Therefore, they may advice and or prohibit tree planting where it may harm the economic livelihood or well-being of certain communities, or the better maintenance of existing ecosystems, woodlands included, or restoration of other types of ecosystems may be more beneficial.

6. CONCLUSION

The WfW strategy represents a highly ambitious target to expand the nation's woodland cover as part of the nation's NDC to the transition towards a decarbonisation pathway to satisfy the Paris Agreement. Built upon the back of, the Well-being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016, increasing Wales' woodland cover hopes to provide social, economic, and ecological benefits for Wales. By utilising and adhering to SMNR aims and principles, the WfW strategy aims to enhance the nations natural assets, ensuring a safer and resilient future for generations to come. Actual tree planting progress up to date has fallen short of the 2,000ha per annum target set to increase woodland cover by 43,000ha by 2030. A literature review revealed that barriers to woodland creation are mainly centred around the agricultural sector, farmers present the greatest opportunity to facilitate woodland creation, but poor grant scheme design, economic risks, and social and cultural impeding factors have affected the mobilisation of afforestation policies. However, it would be difficult to suggest that 2030's afforestation

target and the target for 180,000ha to be planted by 2050 is not achievable because this will likely be dependent on the future success of new legislation, like the Agriculture (Wales) Bill, and grant schemes, like the Sustainable Farming Scheme. The introduction of policies and universal actions that require agricultural land to support tree planting shows that policy is evolving to improve the countries scope to meet the targets set by the government by 2050. The success of which will likely rely on the capacity for future policies and grant schemes to safeguard rural communities, providing viable economic outputs for landowners from public goods alongside sustainable food production. This research aimed to investigate how Welsh forestry policy has evolved and whether it has evolved to meet the afforestation targets set by the government, by methods of documentary analysis and semi-structured interviews. However, insights from stakeholders and findings from the documentary analysis led the researcher to question whether the aim of the study should have been to investigate whether Wales needs the woodland coverage it has set targets for. Ultimately, this research through primary and secondary data collection finds that there may need to be a greater focus on expanding a variety of ecosystems in Wales, and a greater need to improve the quality of existing and new woodlands rather than increasing the quantity of poor-quality woodlands.

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Appendices

Appendix 1 – Approved Research Ethics Application

University of BRISTOL

University of Bristol Research Ethics Application

Investigator information

Application Submitter Details

Title

Mr

First Name

Jonathan

Surname

Locke

Faculty

Faculty of Science

Department

School of Geographical Sciences

School

School of Geographical Sciences

Telephone

Email

mb21349@bristol.ac.uk

Preferred Name or Also Known As

15 September 2022

Reference #: 2022-11297-12025

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Faculty

Science

School / Department / Centre

School of Geographical Sciences

Please select the Research Ethics Committee (REC) to review your research ethics application:

School of Geographical Sciences Research Ethics Committee

Is this a student project? (I.e. Is the ethics application submitted as part of your student qualification?)

Yes

Please declare your level of study

Taught Masters

Supervisor Contact Details

Title

Dr

First Name

Sue

Surname

Rodway-Dyer

Department

Human Geography

Faculty

Faculty of Science

Email

sue.rodway-dyer@bristol.ac.uk

Supervisor Details (if external to the University of Bristol)

Please provide their name, organisation details, email address and telephone number.

Please provide details of any other researchers/collaborators involved in the study.

To proceed to the next page select 'Next' in the Actions tiles.

To save your application for completion and submission at a later date please select 'Save' in the Actions tiles.

Brief study outline

Brief Project Outline (up to approximately 300 words)

Wales is one of the least wooded countries in Europe, with woodland covering only 15% of the land area, compared to the EU average of 38%. As a result, the Welsh Government (WG) has set many afforestation targets. Implemented in 2001, but revised in 2009, Woodlands for Wales is the WG's 50-year strategy for the future of Welsh woodlands. Due to a strong shared consensus for the benefits of greater tree cover, this governmental strategy aspires to create 100,000ha of new woodland between 2010 and 2030. To reach their targets, 2000ha of woodland must be planted annually from 2020 to 2030, increasing up to 5000 between 2030 and 2050, where Wales should reach net-zero emissions. However, the progress to date does not reflect the government's ambitions, just 3,203ha of woodland has been created between 2010 and 2015.

The aims of this project are:
1. To analyse secondary data on current and previous woodland creation frameworks in Wales, to assess how efforts have evolved to meet the targets set for future Welsh woodlands.
2. To investigate whether existing woodland creation policies and funding mechanisms can satisfy current and future afforestation targets in Wales.
3. To explore the views of key stakeholders on the Woodlands for Wales strategy and its progress, and if there are any barriers to woodland creation and management. In addition, to explore their perspectives on what can be done to support their involvement in reaching these targets.

This project shall utilise statistical and analytical data from a range of governmental and academic secondary data sources, such as research briefings, reports, and papers. The use of past and current data will be used as part of an analysis of policy, to assess how policy has evolved and how it could change in the future. The project shall also make use of interviews with key stakeholders to gain an insight into their views, perspectives, and hopes for the future.

To proceed to the next page select 'Next' in the Actions tiles.

To save your application for completion and submission at a later date please select 'Save' in the Actions tiles.

Checklist Questions Does your research involve any of the following? Tick all that apply

The following list is the standard University Checklist of common areas of ethical concern. If your research involves any of these issues you must ensure that you expand upon them in the sections that follow and if you are an inexperienced researcher (undergraduate/ taught masters) you are unlikely to receive a favourable ethical opinion.

☐ Participants who are particularly vulnerable or unable to give informed consent

* Examples of vulnerable participants are children, people with learning difficulties, patients, people experiencing emotional distress or mental illness, people living in care or nursing homes, and people recruited through self-help groups, participants in a dependent or unequal relationship with the researcher(s) or research supervisor.

☐ Participants to take part without their knowledge and consent at the time

* Examples include the covert observation of people or incidental recording of others.

☐ Actively deceiving participants

* Examples include deliberately falsely informing participants, withholding information from participants or misleading participants in such a way that they are likely to object or show unease when debriefed about the study.

☐ Discussion or collection of information on sensitive topics or considered special category status under GDPR

* Special Category Status under GDPR include:

- personal data revealing racial or ethnic origin;
- personal data revealing political opinions;
- personal data revealing religious or philosophical beliefs;
- personal data revealing trade union membership;
- genetic data;
- biometric data (where used for identification purposes);
- data concerning health;
- data concerning a person's sex life;
- and data concerning a person's sexual orientation.

If the research is in relation to any of the sensitive topics listed then the legal issue requiring such scrutiny in such cases that 'explicit consent' must be obtained and the consenting process reviewed by the ethics committee

☐ Invasive procedures

* Invasive procedures may include:

- Administration of drugs placebos:
- Other substances (e.g., drinks, foods, food or drink constituents, dietary supplements) to study participants;
- Biological samples from participants be obtained;
- Pain or more than mild discomfort likely to result from the study.

☐ Scans (e.g. MR, CT, PET) or x-rays of research participants

☐ Photographs, videoing, recording or similar of research participants without their consent

☐ Financial inducement (other than reasonable expenses and compensation for time)

☐ The use or storage of information about living people whose personal identity could be discovered from that information

☐ Funds received from politically or culturally sensitive funding sources

*Examples include the defence sector, projects with potential environmental effects and other internationally regulated or protected industries. For more information, please follow the link to the 'Research Governance and Integrity Policy'

☑ None of the above

To proceed to the next page select 'Next' in the Actions tiles.

To save your application for completion and submission at a later date please select 'Save' in the Actions tiles.

Study design and background

Geographical Sciences Ethics Application Form

All dissertation projects require a completed, reviewed and approved ethics application. In order for your research ethics application to be reviewed by your supervisor and Geography's Ethics Committee, you must complete all elements of the form and ensure that all relevant documentation has been uploaded.

Is this a multi-stage ethics application? (eg Are you seeking ethics approval for an initial stage of your project and will seek further approvals when required.)

- ☐ Yes
- ☑ No

Please confirm if this application is submitted as part of either a taught or research masters program:

- ☑ Taught Masters
- ☐ Research Masters
- ☐ Unsure

Methods - Tick any of the methods you are proposing to carry out. Tick all that apply.

- ☑ Methods that involve human participants
- ☑ Archival methods and/or qualitative secondary data e.g. text or images
- ☑ Analysis of quantitative secondary data
- ☐ Numerical modelling
- ☐ Field and/or laboratory work

Please select the method of data collection relevant to your research. Tick all that apply

- ☐ Questionnaire / Survey method
- ☑ Interviews method
- ☐ Focus group discussion
- ☐ Other (Please specify)

Who will be recruited to participate in the interview?

Key stakeholders involved in the process of woodland creation in Wales. For instance, employees of the Welsh Government, Nature Resource Wales, as well as landowners, farmers, etc.

How many participants will be recruited to take part in an interview? Provide justification for the sample size.

2-10 participants. Due to a wide range of secondary data suitable to conduct the project, interviews will just be used to support the analysis of secondary qualitative and quantitative data.

How will the participants be identified and recruited to take part in the interviews?

Stakeholders will be identified through the usage of the Better Woodlands for Wales Case Boundary map, which publicly provides the key details of stakeholders, like farmers and land owners, who receive funding as part of the Woodlands for Wales scheme. I hope to recruit some memebers of governance involved in the scheme via email through the corresponding websites, there is also online access to the details of private woodland planners involved in the scheme. All participants will be contacted by email with recruitment material attached.

How will you ensure that your participants invited to interview are neither vulnerable nor under the age of 18?

The study does not anticipate or foresee any significant harm to participants in the study, however if a participant feels they are vulnerable to a risk toward their wellbeing or safety, they will be informed of their right to withdraw themselves and their data at any time during the interview without reasoning. Participants will be informed of their right to withdraw data after completion of an interview, they have a 7-day cut off period once they have agreed their transcript to withdraw their data. If during the course of the research I become aware of any vulnerability, I will redirect the trajectory of the conversation away from the topic. The study does not foresee the use of participants under the age of 18, however, if there is doubt then there will be a DOB check before the study begins.

How will you conduct your interview(s)?

Online

Online - Please provide details of the online platform and if any research permissions are required:

Microsoft Teams will be used and I will request permission from each participant to record the interview in order to transcribe it. I will use the Transcription service provided by Teams for this.

Copy and paste the text of all your interview recruitment material here:

Dear Stakeholder,

I hope this email finds you well. My name is Jonathan Locke, I am a student at The University of Bristol from Pembrokeshire, Wales, currently studying MSc Environmental Policy and Management, and I would like to invite you to take part in my MSc dissertation research project.

The focus of this project will be on the Woodlands for Wales 50-year strategy for the future of Welsh woodlands. The project aims to assess how policy efforts have evolved to meet the targets set for future Welsh woodlands and if they currently can satisfy contemporary and future afforestation targets, through an analysis of policy.

I reach out to you as I seek key stakeholders who play a role in the effective, sustainable management and creation of woodlands in Wales. I invite you to take part in a short interview, no longer than 30 minutes, on your views on the Woodlands for Wales strategy and its progress, and if there are barriers to woodland creation and management. In addition, it could be a good opportunity for you to explore your perspectives and voice your opinions on what can be done to support your involvement in reaching these targets.

If you would like to take part in an interview, please contact me at (mb21349@bristol.ac.uk). I shall then send you the relevant documentation, such as a participant information sheet and a consent form.

I look forward to hearing from you,
Jonathan Locke

Please provide any recruitment material used to recruit potential participants to take part in your interview.

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Recruitment	Recruitment Material	Recruitment Material.docx	29/06/2022		166.1 KB

Copy and paste the Participant Information Sheet (PIS) wording for your interviews here:

PARTICIPANT INFORMATION SHEET
I would like to invite you to take part in my MSc dissertation research project. Before deciding to participate, please read this information sheet, to understand the purpose of this research and what is involved with participation. After you have had 48 hours to read this information sheet, I will send you the consent form. Please feel comfortable to contact Jonathan Locke (mb21349@bristol.ac.uk) if you have any questions and would like more information or if you are unclear about aspects of the process.
WHO AM I AND WHAT IS THE PURPOSE OF THIS PROJECT?
This research project will be conducted as part of Jonathan Locke's MSc Environmental Policy and Management dissertation project and is supervised by Dr Sue Rodway-Dyer (sue.rodway-dyer@bristol.ac.uk), lecturer at the University of Bristol's School of Geographical Sciences.
Woodlands and trees are vital in sustaining the wider environment and our wellbeing. They provide shelter, shade, the oxygen we breath, they draw in carbon and filter pollution, improve biodiversity, and reduce flood risk. Between 1905 and 1998, the coverage of woodland in Wales almost tripled from 88,000 hectares (ha) to 299,000ha. However, the rate of new planting has declined in recent decades and, in comparison to the European standard, Wales is one of the least wooded countries with only 15% of the land area coverage, compared to the EU average of 38%. As a result, the Welsh Government (WG) has set many afforestation targets. Implemented in 2001, but revised in 2009, Woodlands for Wales is the WG's 50-year strategy for the future of Welsh woodlands. Due to a strong shared consensus for the benefits of greater tree cover, this governmental strategy aspires to create 100,000ha of new woodland between 2010 and 2030. To reach their targets, 2000ha of woodland must be planted annually from 2020 to 2030, increasing up to 5000ha between 2030 and 2050, where Wales should reach net-zero emissions. The targets for the afforestation of Wales policy are built around four strategic themes, responding to climate change, creating woodlands for the people of Wales, creating a competitive and integrated forest sector, and improving the country's environmental quality. The purpose of the project is to investigate whether current woodland creation frameworks can satisfy the government's future afforestation targets.
The aims of this project are:
1. To analyze secondary data on current and previous woodland creation frameworks in Wales and to assess how efforts have evolved to meet the targets set for future Welsh woodlands.
2. To investigate whether existing woodland creation policies and funding mechanisms can satisfy current and future afforestation targets in Wales.
3. To explore the views of key stakeholders on the Woodlands for Wales strategy and its progress, and if there are any barriers to woodland creation and management. In addition, to explore their perspectives on what can be done to support their involvement in reaching these targets.
WHY HAVE YOU BEEN SELECTED TO TAKE PART?
As a key stakeholder involved in the process of woodland creation and management in Wales, you have been approached as you

play an important role in the effective, sustainable management and creation of woodlands. This means that upon completing an interview, I hope to get a clearer understanding of whether or not the Woodlands for Wales strategy can satisfy governmental targets for woodland creation, from the perspective of key stakeholders. In addition, I hope to understand any potential issues you may have with current proceedings and what you may like to see change.
DO YOU HAVE TO TAKE PART?
You do not have to take part in this research. It is up to you to decide whether you want to be involved. If you do decide to take part, please save a copy of this information sheet to keep. Please also read and sign the consent form before completing the interview. It is important to note that you can withdraw from the interview at any time once you have started, without needing to give reason.
WHAT WILL TAKING PART INVOLVE?
As an individual with insight into woodland creation in Wales, if you agree to take part you will be invited to conduct an interview which shall involve a range of open-ended questions. These will be designed to encourage a conversation and discussion on your views, thoughts, perspective, and any changes you would like to see to woodland creation proceedings and incentives in the future. I am looking to gain a clearer insight of your experience, rather than directing you to a specific response, to support my analysis of secondary data.
HOW WILL THE INTERVIEWS BE RECORDED?
I will ask for your explicit consent to record the audio of the interview for the purpose of writing a transcript of the interview. Quotes from the interview will be analysed in my project to present perspectives on stakeholder's views on woodland creation in Wales.
WILL I HAVE AN OPPORTUNITY TO VIEW THE TRANSCRIPTS?
I will email you a copy of the transcript within a week of completing the interview. Upon email of the transcript, you will have the opportunity to think about your agreed involvement in the study and to check for any factual or transcription errors. If you wish to make a modification to a quote, a record of this will be made in the appendix of the dissertation. Once we have reached a transcript agreement, I shall delete the audio recordings. If you wish to withdraw your data after the transcript agreement, I have set a 7-day cut off period for the withdrawal of results, after this point I shall delete your contact details and the data will be unable to be withdrawn.
HOW IS CONFIDENTIALITY MAINTAINED?
Names will be anonymized and any details that might identify participants, such as job titles will not be included in the project, to avoid identifying details of participants. The transcripts will refer to participants using an anonymised code. The key for this code will be secured as a hard copy in a separate location from the data to enhance security.
WHAT HAPPENS AT THE END OF THE PROJECT?
You can request to see a summary of project results once an external exam board has met and agreed on the project mark, hopefully by November 2022. If you would like to do so, feel free to contact me once the project has been submitted and marked.
WHAT ARE BENEFITS OF TAKING PART?
While there are no immediate benefits or rewards for participation, your insight and personal experience provides an opportunity for others to learn more about the topic.
WHAT ARE THE RISKS OF TAKING PART?
We do not foresee or anticipate any significant risk to you or your data in taking part in this study. If, however, you feel that taking part in the research will affect your wellbeing or cause you unwanted stress, we would like to remind you that you do not have to take part in the study and if you do take part, your data is fully anonymous and can be withdrawn up until a 7-day cut off period after reaching a transcript agreement. Please contact Jonathan Locke (mb21349@bristol.ac.uk) if undertaking the research has affected your wellbeing and we can direct you to the appropriate wellbeing services. If you wish to make a complaint or raise any concern about the ethics of this research project, please contact me or the Chair of the School of Geographical Sciences Ethics Committee (r.flecker@bristol.ac.uk or franklin.ginn@bristol.ac.uk).
Thank you very much for your time.

Upload copies of all Participant Information Sheets (PIS) for your interviews

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Information Sheet	Participant Sheet	Participant Sheet.docx	29/06/2022		180.3 KB

Clearly outline how informed consent will be obtained from all participants prior to individuals taking part in your interviews?

Participants will be given an information sheet to read at least 48 hours before being asked to sign a consent form and they will have an opportunity to ask any questions, and they will be made aware that they can withdraw their person and/or their data at any time during the interview, up until a 7-day cut off period after transcript agreement. Participants will then be sent a consent form for them to sign via email.

Copy and paste the consent form wording for your interviews here:

Title of the research project: Woodlands for Wales Strategy: Can No Net Loss be achieved by 2050?
Nature/level of the project: Msc Environmental Policy and Management dissertation research project
Institution: University of Bristol (Bristol, United Kingdom)
Researcher's name: Jonathan Locke
Researcher's email: mb21349@bristol.ac.uk
CONSENT FORM
Please select Y or N to indicate your consent
1. I confirm that I have read the information sheet for the investigation. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. Yes No
2. I understand that my participation is voluntary and that I am free to withdraw from the interview process at any time without giving any reason and that all material will be destroyed/deleted. Yes No
3. I agree to the interview being audio-recorded. Yes No
4. I understand that information I provide will be treated confidentially. Yes No
5. I understand that I will have the opportunity to check the transcript for any factual or transcription errors. I understand that if I wish to qualify the transcript that this will be recorded in an appendix to the Dissertation. Yes No
6. I agree to take part in this research project. Yes No
7. I understand that there is a 7-day cut off period for me to withdraw my data from the study once a transcript agreement has been made. Yes No

Name of Participant Date Signature

Name of Person Date Signature
taking consent

Upload copies the blank consent forms you will use for your interviews

Documents

Type	Document Name	File Name	Version Date	Version	Size
Consent Form	Consent form	Consent form .docx			175.9 KB

What is the copyright status of the information/image/data you will use?

Use of one or more of the datasets/images is covered by an online copyright statement

Specify the data that you will be using and include the URL in the text box below.

I will be using a range of parliamentary and governmental information documents, where the text can be reproduced free of charge in any format or medium providing that it is reproduced accurately and not used in a misleading or derogatory context.

Data from The Woodlands for Wales Case Boundaries Map is encouraged to be used under the Open Government Licence for Public Sector Information. https://lle.gov.wales/catalogue/item/BetterWoodlandsForWalesCaseBoundaries/?lang=en

Copy and paste the relevant section of the copyright statement that pertains to your usage of this data here along with the URL for this copyright statement.

You are encouraged to use and re-use the Information that is available under this licence freely and flexibly, with only a few conditions.

Using Information under this licence
Use of copyright and database right material expressly made available under this licence (the 'Information') indicates your acceptance of the terms and conditions below.

The Licensor grants you a worldwide, royalty-free, perpetual, non-exclusive licence to use the Information subject to the conditions below.

This licence does not affect your freedom under fair dealing or fair use or any other copyright or database right exceptions and limitations.

You are free to:
copy, publish, distribute and transmit the Information;
adapt the Information;
exploit the Information commercially and non-commercially for example, by combining it with other Information, or by including it in your own product or application.

http://nationalarchives.gov.uk/doc/open-government-licence/version/2/

What is the copyright status of the information/image/data you will use?

Use of one or more of the datasets/images is covered by an online copyright statement

Specify the data that you will be using and include the URL in the text box below.

I will be using a range of parliamentary and governmental information documents, where the text can be reproduced free of charge in any format or medium providing that it is reproduced accurately and not used in a misleading or derogatory context.

Data from the Welsh Government's Woodlands for Wales Strategy document is encouraged to be used under the Open Government Licence for Public Sector Information. https://gov.wales/woodlands-wales-strategy

Copy and paste the relevant section of the copyright statement that pertains to your usage of this data here along with the URL for this copyright statement.

You are encouraged to use and re-use the Information that is available under this licence freely and flexibly, with only a few conditions.

Using Information under this licence
Use of copyright and database right material expressly made available under this licence (the 'Information') indicates your acceptance of the terms and conditions below.

The Licensor grants you a worldwide, royalty-free, perpetual, non-exclusive licence to use the Information subject to the conditions below.

This licence does not affect your freedom under fair dealing or fair use or any other copyright or database right exceptions and limitations.

You are free to:
copy, publish, distribute and transmit the Information;
adapt the Information;
exploit the Information commercially and non-commercially for example, by combining it with other Information, or by including it in your own product or application.

http://nationalarchives.gov.uk/doc/open-government-licence/version/2/

Is the dataset you are using about people e.g. census datasets?

No

Is this research funded?

No

Do you or your supervisor(s) have any actual or potential conflict of interest in this study?

No

Participant and Researcher Safety

Describe potential risks to **research participants** (physical, psychological, legal, social) arising from the research:

I identify that some participants may be potentially at risk from psychological distress or physical discomfort. If during the study distress or discomfort is expressed, I shall draw the interview to a close and sensitively direct the participant to the appropriate wellbeing services. I have also considered the risk toward our participants wellbeing, which may include mild stress. I have addressed this by reassuring participants that their personal data will be fully anonymous and by offering them the right to withdraw at any time during the interviews, up until a 7-day cut off period upon transcript agreement. Participants will also be provided with signposting to relevant wellbeing services, such as Mind and Samaritans, in the PIS, my contact details are provided as well if they feel their wellbeing is at risk from the research, so that I can act accordingly

Describe potential risks to the **researcher** (physical, psychological, legal, social) arising from the research:

I do not foresee any potential risk to myself during the study. However, in the potential scenario that the research is confronted with an aggressive participant, the research will withhold a high standard of research integrity and remain calm and empathetic to the participant. If I feel that a topic of conversation could illicit an adverse emotional reaction, I shall direct the topic of conversation away from that topic, at the cost of compromising overall research goals. As the interview will be conducted online, I also have the option to terminate the interview at any time.

Data management and information security

Will your participants be anonymised?

Yes

What arrangements have been put in place to ensure confidentiality and security of data gathered in the study? Will the data be stored in hard copy or electronically, and where will it be held? Will the codes to anonymity be held in a separate location from the data?

Names will be anonymized and any details that might identify participants, such as job titles will not be included in the project, to avoid identifying details of participants. The transcripts will refer to participants using an anonymised code. The key for this code will be secured electronically in a separate location from the data to enhance security. Transcripts will be stored electronically on OneDrive to eliminate the need for USB and hard drives. When the transcripts are to be shared with participants it will be done so in a safe, secure fashion through a password protected, secure email.

Research outputs

How will you offer participants the opportunity to be informed about the outcome of this study?

Contact details will be deleted after the transcript agreement and the withdrawal period for data has passed, but participants will be provided with my contact details and can request a summary of project results by contacting me once the project has been submitted and marked.

How will the results of your study be disseminated?

The dissertation project will be added to the virtual dissertation library for other students to view.

Please outline how you will undertake this research with good research integrity principles in place.

To ensure that this research has good principles in place I will adhere to the high standards of research integrity of The University of Bristol. Henceforth, I shall be committed to upholding the highest standards of rigour and integrity in all aspects of research. I shall be committed to ensuring that research is conducted according to appropriate ethical, legal and professional frameworks, obligations and standards.

Supporting Information

Supporting information Please provide any additional information in relation to your study that you think may be relevant.

Any other information Please upload any other documents that you think may be relevant to your research. There is no limit to the number of documents you can upload.

To proceed to the next page select 'Next' in the Actions tiles.

To save your application for completion and submission at a later date please select 'Save' in the Actions tiles.

Signatures

Submission Declaration

- ☑ I confirm that my responses are complete and accurate.
- ☑ I understand that any errors or omissions may cause a delay in the processing of my application.

Supervisor Signature

Once you have completed your ethics form and uploaded all related documents ask your supervisor to review your ethics application by clicking this button.

Signed: This form was signed by Dr Sue Rodway-Dyer (sue.rodway-dyer@bristol.ac.uk) on 29/06/2022 18:24