

Research Report

Evaluating the accessibility and inclusivity of voluntary carbon markets for rural enterprises in the UK

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NICRE Research Report No 24: February 2025

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Non-technical abstract

Voluntary carbon markets play a critical role in achieving net zero goals by enabling the trade of carbon credits. However, UK rural enterprises such as farms, small businesses, and local producer groups, face significant barriers to participation. These include limited access to reliable information, minimal community input in key decisions, and unequal distribution of economic benefits. This project investigated these challenges by examining the Woodland Carbon Code and Peatland Code, identifying areas where they fall short in supporting fair and sustainable carbon trading.

Our findings point to the need for clearer ethical guidelines, stronger partnerships with rural communities, and better support for diverse land ownership models. To help address these issues, we developed accessible resources, including an animated guide offering ten practical tips for entering the carbon market and an infographic explaining key principles for navigating these opportunities.

By equipping rural communities with the tools and knowledge needed to engage, this project aims to create a more inclusive, fair, and sustainable rural economy while advancing progress toward national net zero targets

Acknowledgements and funding

This research was funded by the National Innovation Centre for Rural Enterprise – Open Research and Innovation Fund (Round 2). The authors would like to extend their gratitude to the two research assistants from the Countryside and Community Research Institute for their support in facilitating the online workshop. Additional funding was provided by the Bournemouth University Early Careers Research Network Networking Grant, which co-funded the in-person workshop with the southwest farming cluster. The authors also wish to acknowledge the Public Involvement in Education and Research (PIER) Partnership for their invaluable assistance in facilitating engagement in the workshop, drawing on their expertise in working with individuals with lived experience.

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Non-technical executive summary

This study investigates the alignment of the Woodland Carbon Code (WCC) and the Peatland Code (PC) with the Interim Principles for Responsible Investment in Natural Capital (IPRINC), focussing on their role in involving rural enterprises in the UK's voluntary carbon markets (VCMs). It evaluates how these frameworks engage key actors such as farm businesses, small and medium-sized enterprises (SMEs), land agents, and local producer associations, to determine the effectiveness of current policies and practices in ensuring equitable participation and access to carbon trading initiatives.

Background

As the world increasingly strives to meet net zero targets, VCMs (VCMs) have emerged as a critical strategy for mitigating carbon emissions. These markets allow businesses and organisations to invest in projects that sequester carbon, effectively offsetting their own emissions. However, rural enterprises, often pivotal in these efforts, face significant barriers to accessing VCMs. Limited awareness and understanding of carbon markets, insufficient community involvement in decision-making processes, and concerns about the ethical implications of carbon trading practices contribute to these challenges.

The current governance frameworks in the UK, namely the WCC and PC, are intended to provide standards for carbon offsetting projects. Still, their effectiveness in promoting inclusivity and addressing the unique needs of rural enterprises remains uncertain. Many rural businesses express frustration over their exclusion from the decision-making processes, feeling that their voices are not adequately represented in carbon market initiatives. This exclusion not only undermines the potential benefits of carbon trading for rural communities but also poses risks of 'greenwashing', where organisations may claim environmental benefits without making meaningful contributions to carbon reduction.

Range of investigation

This investigation encompasses a thorough analysis of the WCC and PC, employing qualitative research methods. The study examines the principles and criteria established by these codes and evaluates their alignment with the IPRINC framework, which advocates for responsible investment practices that prioritise community engagement, transparency, and ethical considerations.

The research also explores the experiences of rural enterprises participating in VCMs through participatory workshops, where farmers, landowners, and other local partners share their insights and concerns. By combining desk analysis with community engagement, the study aims to provide a holistic view of the barriers and opportunities within the UK's VCM landscape.

Methods of analysis

The research employs a qualitative approach, integrating desk analysis of existing literature and frameworks with insights gathered from participatory workshops. The desk analysis focuses on evaluating the principles of the WCC and PC, including their guidelines for community engagement, carbon accounting, and environmental integrity. This analysis also incorporates a review of relevant literature on responsible investment practices and the challenges faced by rural enterprises in accessing VCMs.

Two participatory workshops were conducted with key actors in the UK VCM landscape, including eight farmers (four dairy and four arable crop farmers), four land agents, and seven representatives from local producer associations. These workshops utilised a power-interest model to categorise participants based on their influence and interest within the carbon market ecosystem. By mapping the relationships and dynamics among various groups, the research sheds light on the decision-making processes that govern carbon trading initiatives. This approach helps identify the power dynamics at play and highlights the need for tailored policy interventions to support equitable participation in VCMs.

Findings

The study identifies critical barriers and opportunities influencing rural enterprises' engagement in VCM under the WCC and PC. The findings identify systemic gaps and propose actionable reforms to ensure VCMs align with incidence of equity, inclusivity, and environmental integrity:

- 1. Limited community engagement:**
Both the WCC and PC encourage collaboration but fail to enable meaningful and transparent community involvement in project design and implementation. Rural enterprises and local communities, particularly tenant farmers and crofters, reported feeling excluded from decision-making processes, which undermines trust and participation. Participants highlighted inconsistencies in consultation practices and insufficient mechanisms to involve local voices.
- 2. Knowledge gaps and accessibility:**
Rural partners face significant challenges in understanding and navigating VCM frameworks. Participants noted a lack of accessible educational resources and technical support, leaving smaller actors, such as tenant farmers, vulnerable to exploitation by more knowledgeable intermediaries. Farmers specifically expressed confusion about baseline requirements and the financial implications of participation.
- 3. Power imbalances:**
The influence of larger corporate entities and public institutions disproportionately shapes decision-making, leaving smaller actors with limited agency. Tenant farmers and crofters, in particular, reported low representation in governance structures, contributing to inequitable outcomes and missed opportunities for inclusive project design.
- 4. Deficits in ethical standards and transparency:**
Neither the WCC nor the PC explicitly integrates ethical guidelines to safeguard transparency and fairness in carbon trading. Participants raised concerns about the lack of mechanisms to verify the credibility of buyers, carbon credits, and benefit sharing agreements, which erodes trust and confidence in these markets.
- 5. Insufficient support for diverse land ownership:**
Both codes lack clear strategies to promote equitable land ownership or tenancy arrangements, despite the importance of the structures for sustainable natural capital management. Participants emphasised the need for collaborative partnerships and cooperative models to empower smallholder farmers and community groups.
- 6. Missed opportunities for broader benefits:**
While the WCC and PC focus primarily on carbon management, participants

identified opportunities to align these frameworks with broader socio-economic and environmental goals, such as biodiversity conservation, rural job creation, and community wealth building. Existing projects demonstrate the potential for integrated outcomes, but these successes remain isolated and unscaled.

Conclusion

This study provides valuable insights into how rural enterprises can better understand, navigate, and capitalise on opportunities within the UK's VCMs. By identifying and addressing gaps such as insufficient community engagement, inadequate ethical standards, and limited support for diverse land ownership structures, there is significant potential for the WCC and PC to promote more sustainable, socially equitable investments in natural capital. Enhanced transparency and meaningful community involvement will not only protect local interests but also strengthen the frameworks' contributions to climate action and biodiversity conservation.

As these frameworks continue to evolve, it is crucial that they align with responsible investment principles. Such alignment will facilitate a Just Transition to a low-carbon economy that benefits all members of society. The findings of this research lay a strong foundation for future studies and policymaking, highlighting the importance of inclusivity, ethical considerations, and community empowerment in the ongoing development of VCMs.

Recommendations

To address the identified gaps and to enhance the engagement of rural enterprises VCMs, the following strategies are proposed:

1. Strengthen community engagement:

Community engagement must go beyond aspirational statements to become a core operational principle. Building on current initiatives such as the British Standards Institution's (BSI) standards for high integrity nature markets and the Taskforce on Nature-related Financial Disclosures (TNFD), the following actions are recommended:

- a. *Embed collaborative governance models:* Formalise advisory panels or farmer-led steering committees to directly inform project planning and implementation under the WCC and PC frameworks.
- b. *Ensure early engagement:* Require project developers to announce planned activities through local councils, agricultural associations, and cooperatives, allowing community involvement from the outset.
- c. *Integrate existing platforms:* Incorporate community engagement guidelines into established frameworks like the [BASIS standards](#) to streamline participation.

2. Expand education and knowledge sharing:

Addressing the knowledge gap among rural enterprises is essential. Specific steps include:

- a. *Develop targeted training programmes:* Partner with local agricultural colleges, farm advisory services, and organisations like the National Farmers' Union (NFU) to deliver workshops on carbon market participation, covering topics such as baseline assessments, credit validation, and financial implications.

Introduction and background

Carbon trading markets, including VCMs, are increasingly recognised as critical tools in global and national strategies to mitigate greenhouse gas (GHG) emissions and achieve carbon neutrality. VCMs facilitate the trading of carbon credits, representing a specific quantity of carbon dioxide reduction, allowing entities to offset their emissions while supporting carbon sequestration and reduction initiatives (UNDP Global Climate Promise, 2022). In the UK, VCMs play a pivotal role in advancing the country’s net zero commitment by 2050, as outlined in the 2015 Paris Agreement and the 2005 Kyoto Protocol (HM Government, 2021b). By complementing regulated markets, VCMs offer opportunities for entities not covered by mandatory emission reduction frameworks, such as rural enterprises, to contribute to climate action through innovative carbon management approaches (Climate Change Committee, 2022a; Forkes-Rees, 2023).

While VCMs are governed by voluntary standards set by organisations like [Verra](#) and [Gold Standard](#), the UK has developed its own frameworks to ensure credibility and environmental integrity. Among these, the WCC and PC serve as leading examples of VCM frameworks, offering methodologies for quantifying, validating, and verifying carbon sequestration through woodland creation and peatland restoration, respectively. These codes are specifically designed to address the challenges of carbon offsetting within the UK, offering tailored solutions to ensure rigorous GHG accounting and alignment with national climate objectives (WCC, 2022; National Trust Scotland, 2023).

The WCC, established by the UK Forestry Commission in 2011 and now overseen by Scottish Forestry, provides a robust framework for carbon sequestration through woodland creation. By offering independent validation and verification of carbon credits, the WCC ensures that projects need high environmental standards and contribute to net zero goals.

The PC, introduced to promote peatland restoration in the UK, aims to attract private investment to address the degradation of over 80% of UK peatlands. Through a structured quantification of climate benefits, the PC supports transparency, credibility, and scalability in VCMs while aligning with the UK’s broader sustainability targets. These codes exemplify the distinctions between regulated and VCMs. Unlike regulated markets, such as the [UK Emissions Trading Scheme](#), which operate under legally mandated frameworks, VCMs are characterised by flexibility and decentralisation. Table 1 outlines these key differences, highlighting the unique opportunities and challenges of VCMs in enabling rural enterprises to engage in carbon management initiatives.

Table 1: Key differences between regulated and voluntary carbon markets

Adapted from Forkes-Rees (2023) and Mansanet-Bataller & Pardo (2008).

ATTRIBUTE	REGULATED CARBON MARKETS	VOLUNTARY CARBON MARKETS
PURPOSE	Mandated by government regulations to achieve specific emission reduction targets.	Driven by voluntary commitments from businesses, organisations, and individuals to offset emissions.
COMPLIANCE STANDARDS	Governed by legal frameworks and compliance standards established by regulatory authorities, such as the UK ETS.	Follow voluntary standards, e.g., WCC, PC, Verra, and Gold Standard.

MARKET MECHANISM	Operates through cap-and-trade systems or carbon taxes, where entities are required to meet legally binding emission caps.	Primarily based on over-the-counter transactions, certifications, and private agreements, offering flexibility in approaches.
ENFORCEMENT	Enforced by government agencies, with penalties for non-compliance.	Relies on credibility and voluntary commitments, with limited legal consequences for non-compliance.
TARGET AUDIENCE	Heavily focused on large emitters, such as industrial and energy sectors.	Includes diverse actors, such as rural enterprises, individuals, and non-regulated entities.
ENVIRONMENTAL INTEGRITY	Monitored and verified through stringent government defined protocols.	Verified through independent certification bodies using voluntary frameworks, such as the WCC and PC.
ROLE IN CARBON MARKETS	Aimed at meeting national and international climate obligations, including the Paris Agreement.	Compliments regulated markets, enabling broader participation in carbon reduction initiatives.
KEY BENEFITS	Provides a clear legal structure and guarantees compliance with emission targets.	Encourages innovation, inclusivity, and localised solutions through bottom-up engagement and flexible project approaches.

Despite their potential, rural enterprises face significant barriers to participation in VCMs, including limited access to market information, insufficient representation in decision-making processes, and disparities in economic gains. These challenges highlight the need for frameworks that promote inclusivity, equity, and sustainability. Addressing these gaps is essential to ensure that VCMs serve as effective tools for climate action and community resilience (Chunga et al., 2023; Fraser et al., 2006; Reed, 2008; Reed et al., 2018; Stringer et al., 2006).

The Interim Principles for Responsible Investment in Natural Capital (IPRINC)

The IPRINC, introduced by the Scottish Government in 2022, provides a framework for promoting equitable and sustainable natural capital investments, including carbon offset projects. Developed in response to the growing need for frameworks that balance environmental goals with social economic equity, the IPRINC aims to address challenges such as inequitable benefit distribution, lack of community engagement, and limited governance standards in natural capital markets. By aligning investments with environmental, social, and governance (ESG) considerations, the IPRINC serves as a roadmap for integrating green governance into VCMs.

The IPRINC emphasises on the following principles:

- 1. Integrated Land Use:** Investments must consider natural, social, economic, and human capital to promote balanced land use that benefits local communities and natural ecosystems.
- 2. Public, Private, and Community Benefits:** The equitability of investments is essential. Benefits from natural capital investments should be shared across public, private, and community interests, ensuring rural communities receive long-term gains.
- 3. Engagement and Collaboration:** Investors should actively engage with local communities in decision-making processes, ensuring that collaborative approaches to land use deliver mutual benefits.

4. **Ethical and Values-Led Investment:** Investments should adhere to UN PRI principles and align with local and national policies, ensuring that projects contribute to Just Transitions, Fair Work, and other social goals.
5. **High Environmental Integrity:** Investment projects must deliver measurable and verifiable benefits, aligning with frameworks like the WCC and the PC while meeting standards set by the Paris Agreement.
6. **Diverse and Productive Land Ownership:** Investors should prioritise partnerships and management agreements with communities to ensure land ownership and use are diverse, productive, and contribute to long-term social and environmental benefits.

This study contributes to a broader understanding of how diverse forms of environmental knowledge - including scientific, practical, and local knowledge - can inform decision-making practices and policy frameworks within carbon markets. By drawing on desk-based reviews and insights from interactive workshops with key actors in the rural economy, this study provides actionable recommendations for improving the accessibility and equity of VCMs for rural enterprises. Specifically, it identifies strategies to strengthen the alignment of VCM frameworks with responsible investment principles, promoting inclusive participation and supporting a Just Transition to a low-carbon economy. The findings offer critical insights for carbon credit sellers, carbon credit buyers, land agents, and other actors seeking to create an enabling environment for rural enterprises in VCMs, emphasising the importance of equitable community involvement in decision-making processes to ensure environmental justice and long-term sustainability.

Research design and methodology

Sample Characteristics and Participation

This study involved two distinct phases of data collection, each targeting different groups through separate workshops designed to capture a comprehensive range of perspectives within the VCM ecosystem.

The first workshop, conducted online in January 2024, focused on senior leaders in the VCM sector, including land agents, academics, and representatives from third-party organisations. The second workshop, held in-person in July 2024, engaged farmers from the southwest farming cluster in England to gather localised, on-the-ground knowledge.

In total, the online workshop for senior leaders included 11 participants, representing a range of sectors: land agents (n=4), organisations focussed on environmental advocacy and public policy (n=2), agriculture and land management (n=2), conservation and natural resource management (n=1), and academics (n=2). These individuals were selected for their experience in carbon market engagement and their role in facilitating broader participation in VCMs.

The in-person workshop involved eight farmers, comprising four dairy farmers and four arable crop farmers. Participants were recruited through an online advertisement and regional agricultural networks, ensuring that the study captured insights from those actively engaged or interested in VCMs. By focusing on participants from the southwest farming cluster, the study was able to gather region-specific insights into the challenges and opportunities faced by rural enterprises.

Recruitment

For the online workshop with senior leaders, recruitment was conducted using a purposive sampling approach (Creswell & Clark, 2017; Urban & van Eeden-Moorefield, 2018), aimed at selecting individuals who could provide expert insights into the structure and functioning of VCMs. Senior leaders in VCM-related roles distributed flyers to potential participants between November 2023 and January 2024, acting as intermediaries. This recruitment strategy ensured a diversity of perspectives while focusing on individuals with significant experience in carbon market policies and practices.

The in-person workshop with farmers employed a regionally-focused recruitment strategy, leveraging agricultural networks within the southwest farming cluster. An online advertisement campaign ran from May to July 2024, targeting farmers who were already or potentially interested in engaging with VCMs. This recruitment method sought to foster community-based participation and capture locally grounded insights relevant to VCMs and carbon codes, aligning with the study's objective of incorporating practical, local knowledge to inform policy.

Data Collection

The research consisted of two phases of data collection:

- 1. Phase 1: Desk Review and Theoretical Mapping**

The first phase involved a desk review and mapping exercise to systematically

assess the alignment of the WCC, PC, and the IPRINC. Conducted from October to December 2023, this phase provided foundational insights into the synergies and gaps between the codes and the IPRINC framework, laying the groundwork for the policy-relevant themes explored in subsequent phases.

2. **Phase 2: Participatory Workshops**

A. **Online Workshop with Senior Leaders (January 2024)**

The online workshop aimed to capture insights from senior leaders across England and Scotland, thus representing a range of regional and sectoral perspectives (Orngreen & Levinsen, 2017). Prior to the workshop, the authors convened over a two-month period to plan and finalise the activities. A three-part structure, as defined by Shamsuddin et al. (2021), was designed to identify both barriers and potential policy interventions for enhancing VCMs. The workshop consisted of:

- **Plenary Session:** This introductory presentation contextualised VCMs within broader climate and policy goals, setting the stage for discussions on equity, access, and governance.
- **Power-Interest (P-I) Model Analysis:** Participants applied a co-designed Power-Interest model to analyse the roles of affected groups, facilitating an exploration of decision-making dynamics and power influence within the VCM ecosystem. Potential biases were mitigated through a structured process that included a diverse range of participants (de Vente et al., 2016; Prell et al., 2008).

The Power-Interest model analysis was a key component of the online workshop. Prior to the workshop, an initial list of key actors was compiled based on a review of relevant literature (e.g., Chen *et al.* 2021) and reports on voluntary carbon codes in the UK. This list included broad categories such as 'Project developers' and 'Project funders', which were further refined into subcategories through the desk review. During the workshop, participants were introduced to the P-I framework, where 'power' was defined as the ability to influence decision-making processes within VCMs, and 'interest' was conceptualised as the investment a group has in the outcomes of VCMs. These definitions were adapted from Guðlaugsson et al. (2020).

Participants engaged in a co-design process to categorise actors based on these dimensions. They worked in breakout groups to assess and place actors on a two-dimensional matrix, with discussions facilitated to resolve disagreements. A virtual tool was used to visualise the placements in real time. Potential biases were mitigated through a structured process that included a diverse range of participants (de Vente et al., 2016; Prell et al., 2008).

Revisions to categories, such as splitting 'Project developers' into more specific groups (e.g., Crofters and Tenant farmers), were made based on the consensus reached during this exercise. The final matrix (Figure 4) represents an aggregated view, ensuring it reflects diverse regional and sectoral perspectives.

- **Evaluation of WCC and PC Alignment with IPRINC:** A participatory mapping exercise evaluated the practical alignment of WCC and PC with the IPRINC framework. Group activities on a digital collaboration platform

allowed participants to assess how well these codes address equitable community engagement, transparency, and sustainable investment.

- **Co-design of Top Ten Tips for Animation:** In addition to the evaluations, participants collaboratively developed a set of top ten tips for an animation aimed at assisting landowners, farmers, and land agents in navigating the UK VCM. These tips were generated from discussions on best practices and insights gleaned from the workshop, focusing on practical strategies for engagement with VCMs.

B. In-Person Workshop with Farmers (July 2024)

The in-person workshop was structured to capture the practical, on-the-ground challenges of VCM engagement among farmers. The workshop included:

- **Plenary Session:** Farmers received a foundational understanding of VCMs and their relevance to farming, facilitating informed participation.
- **Participatory Rural Appraisal (PRA):** Following the plenary, participants engaged in a 'Participatory Rural Appraisal' (PRA) exercise. The process enabled farmers to use visual tools to document and discuss current engagement practices, challenges, and opportunities in VCMs. The PRA process, designed to integrate rural community knowledge into decision-making (Vaughn and Jacquez, 2020a), provided a platform for farmers to collaboratively explore actionable solutions to improve engagement in VCMs.

The PRA discussion focussed on three main areas:

- A. **Current engagement practices:** Participants were tasked with identifying their existing practices regarding VCM engagement, including how they currently navigate carbon markets, use the carbon codes, interact with intermediaries (e.g., land agents and carbon buyers), and manage carbon sequestration projects on their farms. This activity allowed farmers to articulate their level of involvement and reflect on their firsthand experiences with the practical aspects of engaging in carbon markets. The PRA methodology enabled farmers to visualise these practices, fostering shared learning and highlighting common practices across different farming contexts.
- B. **Challenges faced:** The groups then focused on identifying and discussing the primary challenges that hinder their effective participation in VCMs. This included concerns over resource allocation, knowledge gaps, trust in market stability, and institutional barriers. Participants shared personal experiences and collectively highlighted the structural and operational challenges that limit their engagement with VCMs. The PRA methodology encouraged collective problem identification, which led to a more nuanced understanding of challenges faced by different types of farmers and how these challenges intersected with broader systemic barriers.
- C. **Opportunities for improvement:** Lastly, the participants were encouraged to consider potential opportunities for improving their involvement in VCMs and identify the support required. The discussed strategies for enhancing transparency, building stronger

community ties, and improving access to reliable market information. Participants also reflected on the role of policy frameworks and emerging technologies in fostering a more accessible and equitable carbon market. PRA helped facilitate this discussion by enabling participants to collaboratively explore possible solutions that could work within their local contexts, thus fostering a sense of ownership over the proposed improvements.

Data Analysis

Data from both workshops were analysed through a comparative approach, focusing on extracting policy-relevant themes that inform equitable participation in VCMs.

For the online workshop, data from the Power-Interest Model and mapping activities were compared with findings from the desk review. The analysis identified themes such as market accessibility, power dynamics, and governance gaps, which are crucial for policy recommendations.

For the in-person workshop, farmer feedback was transcribed and thematically analysed, following a structured process adapted from Burgess et al. (2021). The analysis focused on local knowledge and practices, with themes such as resource constraints, knowledge gaps, and market trust emerging as central to farmers' experiences with VCMs.

- A. **Transcription and Data Collation:** Following the workshop, the data were digitised. Each group's contributions were transcribed and categorised according to the three discussion areas: (i) current engagement practices, (ii) challenges faced, and (iii) opportunities for improving engagement. The notes were carefully reviewed and organised to capture the full range of ideas and perspectives shared by the participants.
- B. **Initial Coding:** Using QSR NVivo, a qualitative data analysis software, the authors applied an initial coding phase to identify recurring concepts and patterns across the collected data. Each discussion point was coded based on its content, focusing on key themes such as market accessibility, resource constraints, trust, and technological needs.
- C. **Thematic Development:** The initial codes were then grouped into broader themes derived from the shared experiences and challenges discussed by the participants. Thematic areas included knowledge gaps, barriers to market entry, trust in market stability, opportunities for collaboration, and resource allocation for carbon sequestration.
- D. **Comparison Across Groups:** A comparative analysis was conducted between the two mixed groups to identify any divergences or similarities in perspectives, helping to understand the diversity of experiences between the dairy and arable crop farmers.
- E. **Synthesis of Findings:** Finally, the themes identified were synthesised to provide a coherent narrative of the findings. Key insights regarding the barriers to engaging with VCMs and potential strategies for improving participation were highlighted. These findings were contextualised within the broader UK VCM landscape and served as a basis for the study's recommendations.

The data from this workshop provided context-specific insights into the challenges farmers face in engaging with VCMs. The analysis of these findings was integrated with the results of the online workshop to offer a comprehensive understanding of how both groups view the alignment of the WCC and PC with the IPRINC framework. Discrepancies between the two groups' perspectives were resolved through discussions among the authors until consensus was reached.

Ethics Approval

This study obtained ethical approval from the relevant institutional ethics committee affiliated with the corresponding author's institution during the study period and participant recruitment phase. Prior to participation, all individuals provided written informed consent.

Limitations and Considerations

This study acknowledges certain considerations in interpreting the data collected, particularly from the in-person workshop with farmers. The participant group was drawn exclusively from the southwest farming cluster of England, which may introduce a regional focus that could limit the broader applicability of the findings to other areas of the UK, including devolved nations. Additionally, the recruitment process relied on voluntary participation, which may mean that farmers who are already engaged or interested in VCMs are more represented in the sample. As a result, perspectives from those who may be less engaged or more cautious about VCM participation may not be fully captured. Furthermore, the study primarily reflects the experiences of dairy and arable crop farmers, and while these represent significant agricultural systems, the unique challenges faced by other types of farming, such as horticulture, may require further exploration. These factors provide important context for interpreting the findings and suggest areas for further research to enhance generalisability.

Findings

This section presents the findings of the study through three key levels of analysis: (1) characterisation of the WCC and the PC through desk analysis, (2) analysis using the power-interest model derived from participatory workshops, and (3) the alignment of these codes with the IPRINC, incorporating insights from desk analysis and workshop discussions. This holistic evaluation of the codes highlights gaps and opportunities to strengthen responsible investment and equitable engagement in carbon offsetting initiatives.

Overview of the Woodland and PCs

Carbon offsetting represents a prominent strategy in mitigating carbon emissions and advancing towards net-zero objectives (Jones et al., 2024). Integral to the credibility and efficacy of carbon offsetting efforts is the certification of these projects. The UK WCC and Peatland Carbon Code have emerged as pivotal components within carbon markets, quantifying and validating carbon sequestration from land use changes. These governance frameworks empower landholders to generate certified carbon credits, contributing to climate change mitigation while upholding stringent environmental standards and fostering community engagement (Manning & Nayak, 2024).

A. WCC

The WCC, launched in 2011, is a voluntary scheme that establishes robust design and management requirements for UK-based projects sequestering carbon through woodland creation (Koronka et al., 2022). While the WCC provides a standardised framework for verifying carbon sequestration, it does not account for carbon stored in forest-derived products or reductions achieved by substituting wood products for higher-carbon alternatives (Koronka et al., 2022; Valatin, 2022).

The WCC's objectives include maintaining high sustainable forest management standards, ensuring best practices in woodland carbon accounting, implementing rigorous protocols for measuring carbon uptake, enforcing regular validation and verification, and promoting transparency in project registration and carbon unit retirement. By September 2024, a total of 2,099 projects had been registered on the Land Carbon Registry, collectively spanning 83,888 hectares across the UK (Braby, 2024). Although the WCC enables organisations to offset their carbon emissions, criticisms have emerged regarding the lack of a clear community engagement mandate, leading to concerns about equitable benefit distribution and potential 'greenwashing' (Bayon et al., 2012; Cong et al., 2022).

Workshop discussions revealed that while the WCC fosters partnerships between carbon sellers and buyers, the extent of local community engagement varies widely among projects. Farmers expressed frustration over the lack of consultation regarding carbon credit calculations and the prioritisation of carbon buyers' interests over their own. This indicates a significant gap in ensuring equitable participation in the carbon market.

Figure 1: The lifecycle of the WCCWCCWCCWCC

Source: Forkes-Rees, 2023



B. PC

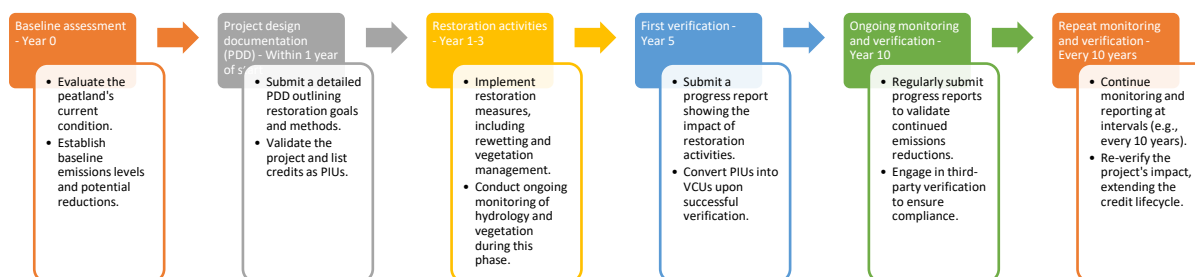
The PC is a voluntary framework designed to promote peatland restoration in the UK, responding to the degradation of peatlands that now emit greenhouse gases due to historical management practices (Bain et al., 2011). It aims to attract private investment to bridge a funding gap estimated at £500 million for peatland restoration over the next decade (Economics for the Environment, 2018; Moxey et al., 2021).

The PC provides a structured approach to marketing climate benefits through independent validation and verification processes. However, significant barriers remain, including limited awareness among land managers about the PC and a shortage of skilled professionals for complex restoration projects (Brown, 2020; Moxey et al., 2021). Additionally, financial viability concerns arise from the disparity between carbon prices in voluntary versus compliance-based markets (Price, 2023). Figure 2 illustrates the key steps in the PC lifecycle, highlighting the structured approach to achieving climate benefits through independent validation and verification. While a timeline can be added to these steps based on similar initiatives, it is important to note that these may vary depending on individual projects due to differences in scope, scale, and specific restoration requirements.

The workshop highlighted that while the PC prescribes community engagement, a distrust of external investors hampers effective participation. This underscores the necessity for robust knowledge mobilisation efforts and community education to foster wider engagement in peatland restoration.

Figure 2: Lifecycle of carbon credits under the PC

Adapted from National Trust Scotland (2023)



Power-Interest Model

The initial compilation of pertinent groups interested in and affected by the UK VCM, as derived from Chen et al. (2021) (Figure 3), underwent revisions following input from workshop participants and a comprehensive review of reports pertaining to voluntary carbon codes in the UK. Primarily, it was determined to enhance the specificity of the “Project Developer” category by subdividing it into distinct entities such as Crofters, Tenant Farmers, and Community Supported Farms. Similarly, the “Project Owner” category was refined to include Landowners, Estate Owners, and National Park Authorities. “Project Funders” underwent a segmentation into Banks and Private Investors. The designation “Validators and Verifiers” was rephrased as Non-Statutory Certifiers and Governance Bodies. Furthermore, the categories of “Brokers” and “Traders” were amalgamated into a singular group. Lastly, the category “Standards Organisations” saw a division into National Government, Statutory Organisations, and Regulators.

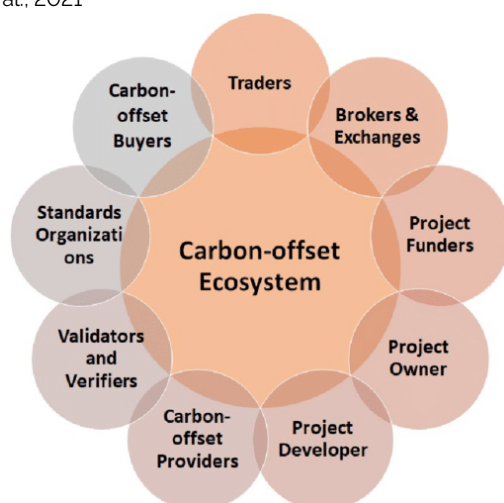
Table 2: Definitions of identified relevant groups to the UK VCM

Relevant groups	Definition
Crofters, Tenant Farmers, Community Supported Farmers	Are those who develop carbon reduction projects. Their role is primarily to scope out the projects, find documents to get the registered and certified, physically create a project, and eventually sell them/share benefits with the project owners.
Landowners, Estate Owners, National Park Authorities	Are those who operate and/or own the land where the project takes place.
Non-Statutory Certifiers, Governance Bodies	Are those who validate a project's baseline and is projected and achieved emission reductions. Some certifiers also have processes to conduct validation and verification activities.
Brokers and Traders	Are those who broker trade between carbon sellers and carbon buyers by arranging transactions for non-standardised products and trades. They act as the intermediary organisation.
National Government, Statutory Organisations, Regulators, Community Councils	Are those who define a set of rules and criteria for voluntary emission reduction

Relevant groups	Definition
Taxpayers	credits. Often, they are also responsible for maintaining carbon registries.
Advisory boards	Private households that pay local and national tax.
Buyers	Are those who act as a sounding board for the carbon sellers.
Third-party (industry lobbyists, project funders)	Energy-intensive organisations that buy carbon credits.
	Are those with an active interest in the VCM but may not be directly engaging with carbon buying or selling.

Figure 3: Key parties involved in VCM

Source: Chen et al., 2021



Following a method akin to that employed by Guðlaugsson et al. (2020), groups were classified into four conventional clusters based on their positioning within the two-dimensional matrix (Figure 4). These clusters encompass Players (demonstrating significant influence), Subjects and Context Setters (exhibiting moderate influence), and Crowd (characterised by relatively low influence) (see Table 3).

The P-I matrix (Figure 4) was developed based on structured analysis conducted during the online workshop. Participants categorised actors according to their perceived power and interest in the UK VCM. This iterative and participatory process ensured that the matrix reflects a broad range of perspectives (Vaughn and Jacquez, 2020b) and accurately captures the dynamics of influence and engagement within the sector.

Figure 4: Two-dimensional power and interest matrix identifying key parties of the UK's VCM and the role they play

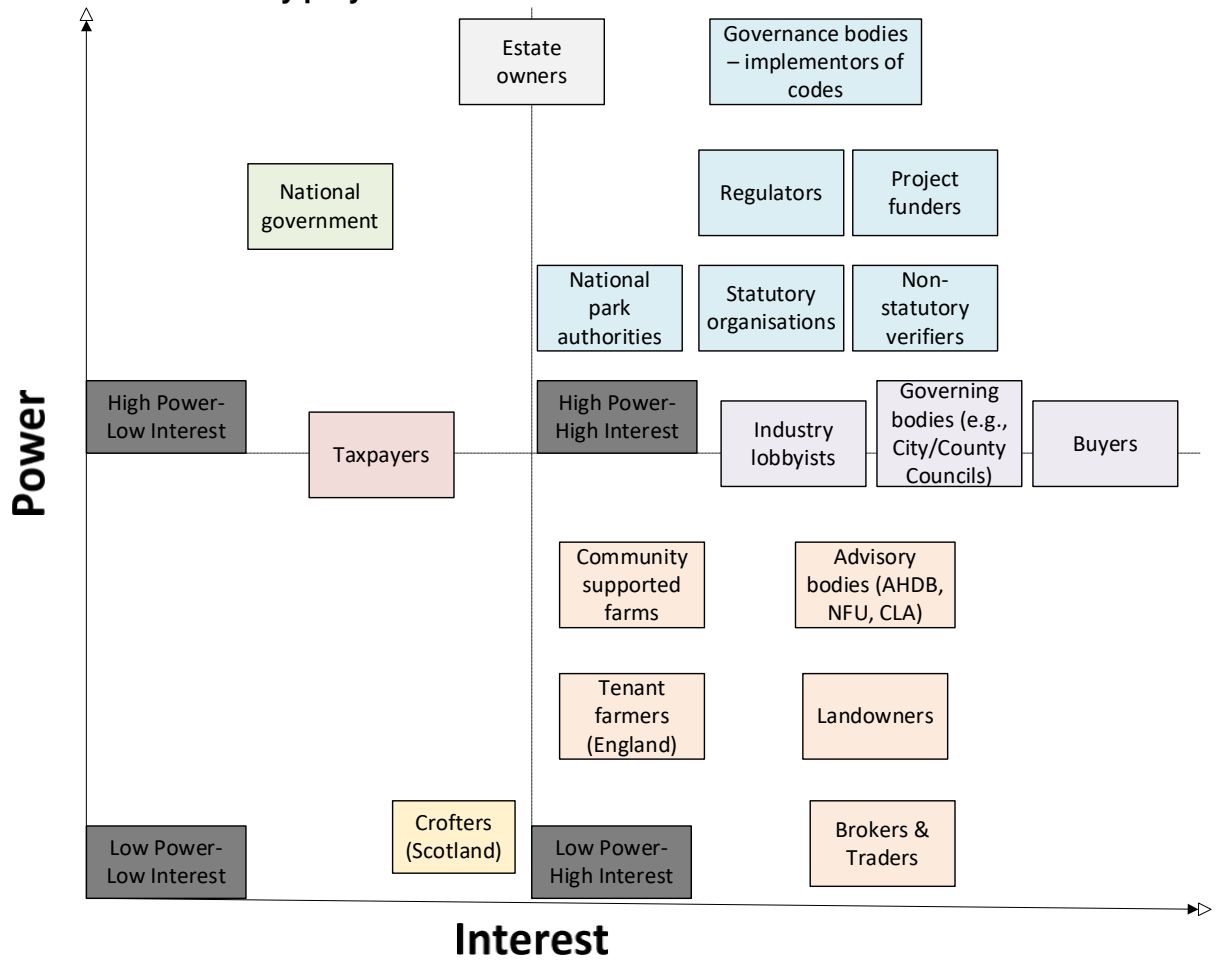


Table 3: Characterisation of relevant groups based on salience

Relevant group	Salience level	Cluster characteristic
Crofters	Low	Crowd
Tenant farmers	Medium	Subjects
Community supported farmers	Medium	Subjects
Brokers & Traders	Medium	Subjects
Landowners	Medium	Subjects
Advisory bodies	Medium	Subjects
National Park authorities	High	Players
Statutory organisations	High	Players
Non-statutory organisations	High	Players
Regulators	High	Players
Third-party	Medium/High	Context-setters
Governance bodies	Medium/High	Context-setters
Buyers	Medium	Context-setters
Taxpayers	Medium	Context-setters
National government	Medium	Context-setters
Estate owners	Medium	Context-setters/Players

- A. Players:** The primary decision-makers, encompassing the regulatory and oversight bodies of the UK VCM, as well as two additional groups (estate owners and national park authorities), are acknowledged as possessing the highest level of salience in the decision-making process. Consequently, they are classified as key players with the greatest influence on decisions impacting the UK VCM.
- B. Context Setters:** Third-party organisations, carbon credit buyers, taxpayers, and the national government are designated as Context Setters due to their medium-high levels of power, interest, and salience. This group comprises groups who participate in the decision-making process through direct or indirect monitoring and evaluation of the status and development of the UK VCM.
- C. Subjects:** Tenant farmers, community-supported farmers, brokers and traders, landowners, and advisory bodies are identified as having high interest but low power. Consequently, they can only passively influence the decision-making process. This group holds a medium level of salience and is therefore characterised as Subjects.
- D. Crowd:** Crofters exhibit low interest and power, resulting in a limited level of salience in influencing decisions related to VCMs in the UK. Consequently, this group is characterised as Crowd, holding a lower level of salience. Notably, while the Crofters group is classified as a low influence group in Scotland, the Tenant Farmers group is deemed influential in decision-making within VCMs in England.

Mapping the Alignment of the Woodland and PCs with IPRINC

The findings from the mapping exercises illustrate how the WCC and PC align with the IPRINC framework, providing insights into the efficacy of these codes in promoting responsible investment and equitable engagement.

A. Engagement and Collaboration

The IPRINC principles emphasise the significance of inclusive engagement and collaboration in natural capital investments, especially when land use changes are at stake. While both the WCC and PC demonstrate a dedication to fostering collaboration by requiring partner involvement across various stages of project development, the actual implementation of these processes often falls short in terms of effectiveness and inclusivity, as highlighted by insights from the desk review and workshops.

- *Collaboration with landowners and public bodies*

The IPRINC emphasises the necessity for investors and land managers to engage transparently with landowners and public bodies to establish a cohesive strategy for achieving environmental and social benefits. However, the desk review revealed that while the WCC and PC reference collaboration, it is not a primary focus within either framework. For example, the WCC highlights that collaborative group projects can reduce validation and verification costs, but this reference is procedural rather than an encouragement for meaningful, ongoing collaboration. Similarly, the PC includes a requirement for project developers and landowners to provide contact information for

feedback, yet this provision falls short of ensuring inclusive collaborative planning or the active involvement of all stakeholders in critical decision-making processes.

The participatory rural appraisal with farmers revealed shortcomings in the meaningfulness and inclusivity of collaboration efforts. Farmers and landowners expressed that project developers' engagement efforts were often superficial, focusing primarily on information dissemination rather than fostering inclusive and transparent decision-making processes:

"An issue that landowners commonly face we are told, is that they are hardly ever consulted on when it comes to deciding how carbon credits will be calculated, whether the baseline is the same for everyone, and what they are committing to...they hardly are aware of what they are signing up for...in many cases they might be tenant landowners, such as tenant farmers, who have been asked to sign on by another organisation..." – Participant 4

This underscores the gap between the theoretical commitments to collaboration outlined in the codes and the realities experienced by rural landowners. Farmers voiced frustration over the superficial nature of engagement, which often led to a misalignment between the objectives of VCM projects and the practical needs of local communities. The lack of meaningful involvement fostered confusion and mistrust among landowners, particularly in cases involving land use changes. Significant barriers, including limited access to information, knowledge gaps, and inadequate communication about VCM processes, further weakened the capacity of rural communities to meaningfully influence projects impacting their land.

- *Early engagement with relevant local communities*

The IPRINC framework places significant emphasis on early engagement with local communities, mandating that investors proactively involve these communities during the initial planning stages to identify opportunities for shared benefits (Scottish Government, 2022). The desk review revealed that the PC aligns with this principle by establishing clear requirements for early engagement. Project developers are required to initiate outreach to local communities, neighbouring properties, and potentially marginalised groups from the outset of project planning. The PC encourages the use of diverse communication channels, including local newspapers, social media platforms, and community council notifications, to ensure comprehensive outreach. Furthermore, it underscores the importance of safeguarding historic assets by consulting relevant specialists and mandates that all engagement and consultation processes be documented transparently and made publicly accessible.

In contrast, the WCC lacks a formal mandate for early community engagement. While it encourages collaboration, it does not include explicit requirements for proactive outreach during the initial stages of project development. This omission highlights a misalignment between the WCC and the IPRINC's emphasis on transparent and proactive community involvement, exposing a potential shortcoming in its adherence to the principles of responsible investment in natural capital.

Moreover, findings from the participatory rural appraisal sessions and workshop discussions revealed that, despite the PC's stipulations for early community engagement, its implementation often failed to foster trust or establish transparent communication channels with local communities. Participants frequently expressed distrust towards external investors and described engagement processes as lacking in transparency, further compounding the challenges of meaningful collaboration:

"The WCC encourages collaboration with local communities. However, when it comes to farming communities, there is a poor understanding of local farming clusters as most agencies tend to look at regions within the devolved nations...however, it is quite challenging with the PC. Carbon sellers often don't know who is investing in their land as a lot of the trading and contracting work is done through agents with a lot less transparency [than investing in carbon credits]..." – Participant 2

Participants expressed significant concerns regarding the PC's implementation of its early engagement requirements. Although the framework stipulates early community involvement, farmers reported a notable level of distrust towards external investors and project developers. This distrust, compounded by a perceived lack of transparency, emerged as a major barrier to effective engagement, fostering widespread scepticism among farmers about VCMs. Participants described these markets as immature, pointing to an absence of robust governance frameworks and clear policy structures to ensure fair and equitable participation.

This scepticism also extended to economic considerations, with farmers raising concerns about the financial viability of participating in VCMs. Specific issues included price volatility, uncertainty around long-term commitments, and limited clarity regarding tax implications, such as income tax on carbon credit trades and inheritance tax obligations. These concerns were viewed as significant barriers to early and meaningful engagement, further undermining the potential of VCMs to deliver on promises of community well-being and environmental sustainability.

- *Engagement with local communities during the decision-making process*

The IPRINC framework emphasises the importance of proactive and ongoing engagement with local communities throughout the decision-making process to ensure that their perspectives and needs are integral to project design and implementation. The desk review revealed that both the WCC and PC include feedback mechanisms to gather input from local communities after the initial scoping phase and prior to project commencement. However, these provisions are vague and lack specificity in key areas, such as strategies to ensure the inclusion of marginalised groups and structured methods for conflict resolution. This gap highlights the need for clearer guidelines to foster more inclusive and transparent engagement practices within these frameworks.

Workshop findings underscored several practical challenges in effectively applying engagement guidelines. For the WCC, participants noted that wildlife trusts and other conservation organisations often play a constrained role, functioning primarily as consultees rather than active decision-makers. This limited the extent to which community voices could meaningfully influence project outcomes. For the PC,

participants highlighted notable regional disparities in community engagement practices, with Scotland generally viewed as having more robust and consistent efforts compared to other devolved nations, particularly England. These regional inconsistencies further underscored the need for a more standardised and inclusive approach to community engagement across the UK.

"Scotland has historically always had better community engagement practices than any of the other devolved nations, especially England. This makes it easier for there to be effective and successful partnerships between all parties interested in, and those that could be affected by, various initiatives, such as VCMs..." – Participant 6

Farmers emphasised the importance of continuous involvement rather than sporadic, one-off consultations. They expressed that the lack of consistent engagement diminished their ability to influence project decisions that directly impacted their livelihoods. Effective community engagement, they suggested, should be based on sustained and iterative collaboration, ensuring that communities remain actively involved throughout the entire project lifecycle. This approach was viewed as essential for building trust, fostering transparency, and aligning project outcomes with the practical needs of local actors.

B. Ensuring environmental integrity

Maintaining environmental integrity is fundamental for investments in natural capital, particularly to achieve authentic emissions reductions aligned with the Paris Agreement. A key requirement is that offsetting efforts should complement, rather than substitute, direct emissions reductions. In the context of the WCC and PC, environmental integrity is upheld through the implementation of quantifiable and verifiable processes. These processes adhere to established standards and are supported by rigorous monitoring and reporting practices, ensuring that carbon sequestration activities meet both environmental and accountability objective.

- *Measurable and Verifiable Investments*

The IPRINC framework mandates that carbon management investments be measurable and verifiable, ideally operating within government-supported frameworks to ensure credibility. Both the WCC and the PC align with this requirement by necessitating independent validation and verification conducted through accredited bodies. These measures play a critical role in maintaining environmental integrity and fostering trust in carbon management projects.

The desk review revealed that the WCC mandates the submission of all project documentation, along with supporting evidence, for validation within three years of registration. Validation procedures are milestone-based, focusing on critical activities such as tree planting and the implementation of control measures. Similarly, the PC requires detailed monitoring plans that link monitoring activities to risk assessments and land management strategies, while also specifying reporting procedures to ensure accountability and adherence to environmental goals.

Workshop findings highlighted several practical challenges associated with these rigorous requirements. For the WCC, participants observed that monitoring activities posed significant logistical and financial challenges, often creating barriers for smaller landowners and community-led projects. Regarding the PC, participants emphasised that land managers responsible for generating carbon credits should also account for their own emissions to ensure comprehensive carbon accounting. Additional concerns were raised about the high costs of obtaining professional advice and transaction expenses, which further strained project budgets. The non-binding nature of such advice was also identified as a limitation, reducing its overall effectiveness in guiding land managers toward successful implementation:

“There are quite a lot of challenges when trying to ensure [environmental integrity]. For example, landowners do not really understand how environmental integrity is measured. Although they would like to contribute and share information, there is no system in place currently that allows them to contribute information in real-time...” – Participant 11

These insights illustrate the practical challenges in achieving measurable and verifiable environmental integrity under both Codes, highlighting issues related to cost, complexity, and comprehension.

These insights underscore the significant financial and logistical constraints faced by landowners, which pose considerable challenges to achieving the measurable and verifiable environmental integrity required under both the WCC and the PC. These barriers limit the ability of landowners to fully adhere to the rigorous standards of carbon accounting and monitoring, thereby affecting the overall effectiveness and credibility of these frameworks.

- *Offsetting and plans for reduction*

The IPRINC prioritises emissions reduction, emphasising alignment with offsetting strategies and broader reduction plans to advance carbon neutrality. Desk review findings reveal that the PC mandates restoration efforts through a combination of re-vegetation and re-wetting, offering explicit guidance to minimize methane emissions by avoiding extensive standing water areas and employing careful water management strategies. In contrast, while the WCC aligns with the UK's Net Zero 2050 commitment, it provides more general guidance on emissions reduction without prescribing a similarly explicit pathway for achieving these goals.

Workshop findings revealed concerns among farmers about the "land-bound" nature of WCC agreements, which focus narrowly on emissions within the immediate project scope, neglecting broader emissions considerations. Additionally, farmers voiced apprehension about allocating excessive land to VCM initiatives, fearing potential negative impacts on agricultural productivity and food security, which are critical to sustaining rural livelihoods:

“Why are there so many approaches across the UK? I just found out that Scotland requires baseline assessments. However, with such a system missing in England, it puts certain landowners at a disadvantage, simply

because they might not have a certain type of soil, or because they did not subscribe for a certain certification scheme..." – Participant 5

During the participatory rural appraisal farmers expressed comparable concerns regarding inconsistent baseline establishment in VCMs, highlighting local variations in soil, climate, and farming practices. These inconsistencies were perceived as contributing to regional disparities, with some farms facing disadvantages in comparison to others. The recurring theme among participants was the pressing need for standardisation and fairness to ensure equitable treatment across diverse agricultural contexts.

- *Transparency and the UK Carbon Land Registry*

The IPRINC underscores the importance of transparency in the transfer of carbon rights and project documentation. Both the WCC and PC mandate the use of the UK Land Carbon Registry, a centralised platform for recording project details, including ownership changes, carbon unit transactions, and Pending Issuance Units (PIUs). This registry serves to ensure transparency and accountability across woodland and peatland carbon projects (WCC, 2019).

Desk review findings indicate that both the WCC and PC include robust provisions for transparency, requiring documentation and reporting of carbon unit transactions and any changes in ownership or tenancy. These measures provide actors with access to project details and help maintain trust in the carbon market system. However, workshop discussions did not delve deeply into the practical implementation of these transparency requirements, highlighting it as an area needing further exploration to understand how effectively they are being applied in real-world scenarios. Workshop and participatory rural appraisal findings did not elaborate on the impact of transparency and the UK Land Carbon Registry of VCMs on UK's rural economy.

- *Use of established Codes and reputable brokers*

The IPRINC recommends adhering to established codes such as the WCC and PC, alongside reputable brokers to ensure integrity, transparency, and standardisation in carbon trading. Desk review findings highlight that both the WCC and PC require brokers to provide accurate project statements and ensure buyers are educated on their guidelines. This requirement helps enhance credibility and build investor confidence.

However, workshop findings did not specifically address the role of brokers in maintaining environmental integrity. This gap suggests that this aspect was either not prominently considered by participants or its practical relevance has yet to be fully understood or experienced by farmers and landowners engaging with VCMs. Further exploration of brokers' roles in facilitating adherence to these codes could provide valuable insights into their effectiveness in ensuring compliance and trust within the market.

- *Consideration of current and future carbon management needs*

The IPRINC highlights the importance of landowners evaluating their current and future carbon management needs before trading carbon credits to ensure alignment with broader sustainability and climate goals. However, desk review findings indicate that neither the WCC nor the PC explicitly encourage this proactive consideration. This omission creates a potential gap in their alignment with long-term carbon management strategies, limiting their ability to support forward-looking decision-making.

Workshop participants reinforced these concerns, citing uncertainties surrounding future carbon accounting requirements under both the WCC and PC. Farmers emphasised the necessity of aligning carbon management initiatives with government sustainability goals but pointed out the significant institutional barriers that hinder their ability to effectively engage with VCM schemes. These challenges highlight the need for clearer guidance and support mechanisms to enable landowners to navigate VCMs while planning for their long-term carbon and sustainability commitments:

“...also, there is so much uncertainty and mixed messaging regarding investing in these markets. Often, companies advise their tenants [on lands such as farms] to not invest in VCMs as currently, there is no clear understanding of what pressures net zero requirements would bring...” – Participant 6

During the participatory rural appraisal, farmers highlighted potential risks of exploitation, particularly for tenant farmers, who may face challenges as landowners and external organisations prioritise short-term offsetting goals over long-term sustainability objectives. This dynamic further complicates tenant farmers' involvement in carbon management projects, raising concerns about fairness, equity, and the prioritisation of agricultural and community resilience in VCM initiatives.

C. Integrated land use

Integrated land use within sustainable land management seeks to harmonise multiple objectives by incorporating environmental, social, economic, and regulatory considerations. This approach aims to optimise land use while mitigating adverse impacts on ecosystems, biodiversity, local communities, and cultural heritage (Ziadat et al., 2017). To be effective, land use strategies must balance benefits and challenges across natural, social, economic, and human capital. This alignment with responsible investment principles and the IPRINC framework ensures that land use practices contribute to sustainable development while supporting inclusive and equitable outcomes.

- *Consideration of positive and negative impacts*

The IPRINC highlights the importance of evaluating the impacts of carbon management initiatives across four forms of capital: natural, social, economic, and human. It stresses the need to assess both synergies and trade-offs in the implementation of these initiatives. Carbon sequestration projects are expected to deliver ecological benefits while simultaneously considering social outcomes, fostering community well-being, and addressing the broader economic and human capital implications of their activities. Desk review findings revealed that both the WCC and PC mandate baseline GHG emission assessments to establish a reference point for measuring emissions reductions.

The PC takes a comprehensive approach by requiring detailed baseline assessments, risk identification, and remediation measures for restoration projects that fail to achieve their projected outcomes within five years. This aligns with the IPRINC's emphasis on evaluating both positive and negative impacts, fostering an integrated decision-making approach that incorporates environmental and economic considerations. Similarly, the WCC requires initial documentation and validation; however, its focus is more oriented towards achieving specific milestones tied to woodland projects.

Workshop findings identified the practical trade-offs encountered by farmers in implementing carbon management practices. Participants noted that while practices such as reducing tillage can enhance soil carbon storage, they often lead to increased herbicide use and water management challenges, thereby undermining other environmental objectives. These insights underscore the critical need to evaluate the broader impacts of carbon sequestration strategies to ensure they do not inadvertently compromise the overall sustainability of agricultural systems.

Additionally, during the participatory rural appraisal, farmers expressed concerns regarding the implications of land burdened with carbon liabilities under the WCC. Specifically, they highlighted the challenges associated with selling land encumbered by these liabilities, as well as the limited economic opportunities tied to non-commercial woodland projects. While such projects deliver significant biodiversity benefits, participants pointed out that they often lead to increased timber imports, reflecting a negative externality that should be carefully assessed within an integrated land use framework. These findings reinforce the importance of adopting a holistic approach that balances environmental gains with economic and social sustainability:

"The WCC focuses on non-commercial woodlands, but this has unintended economic consequences. We end of importing more timber because we aren't utilising our own resources to their full potential..." – Participant 8

- *Delivery of wider outcomes*

The IPRINC highlights the importance of delivering outcomes that extend beyond carbon management, emphasising improvements in biodiversity, resilience against food supply chain disruptions, and advancements in natural flood management. These broader objectives align with the core principles of sustainability and resilience, serving as a cornerstone for natural capital investments that aim to generate long-term environmental, social, and economic benefits. By prioritising these outcomes, the IPRINC reinforces the need for holistic approaches to carbon management that integrate ecological integrity with community and systemic resilience.

Desk review findings highlight that while both the WCC and PC advocate for the inclusion of broader environmental and social benefits, the degree to which these objectives are operationalised differs significantly. The WCC emphasises potential biodiversity gains through woodland creation, whereas the PC prioritises ecosystem resilience and GHG emission reductions via peatland restoration. However, neither code provides explicit guidelines on how to systematically integrate these broader outcomes across all projects. This lack of clarity introduces variability in implementation and risks vagueness in delivering consistent and measurable broader impacts.

Workshop insights highlight the potential for achieving wider outcomes through community-driven initiatives under the WCC. Participants highlighted examples from the Community Woodland Association in Scotland, where community-led efforts in responsible land management and planting activities have demonstrated dual benefits. These initiatives not only generate environmental advantages but also foster significant social impacts by cultivating a sense of community ownership and enhancing well-being through the stewardship of underutilised land. Participants noted the positive social and economic contributions of such projects, including local job creation, strengthened community ties, and the enhancement of natural capital. These outcomes illustrate the untapped potential of community-driven approaches in aligning carbon management with broader sustainability goals:

“Community projects like the ones in Scotland are great examples of what can be achieved when local people are involved directly. Not only do they help the environment, but they also bring economic benefits and build community connections...” – Participant 7

However, these initiatives are not without challenges, particularly when addressing economic and regulatory complexities. Participants raised concerns about issues such as capital gains, inheritance tax, and the influence of regulatory lobbying, which pose significant obstacles to integrating broader objectives into existing frameworks. Additionally, the emerging nature market was perceived as being in its infancy, with participants highlighting its lack of robust infrastructure necessary to ensure long-term sustainability.

While participants acknowledged the potential of both the WCC and PC to deliver outcomes beyond carbon offsetting, they emphasised the need for a stronger focus on explicitly incorporating social and economic dimensions into project planning. This alignment would be critical to fully integrate the principles for responsible investment and maximise the impact of these frameworks in achieving broader sustainability objectives.

D. Benefits: Public, Private, and the Community

The IPRINC highlights that investments in natural capital must extend beyond generating economic gains for private entities, aiming instead to deliver broader benefits that contribute to public and community wellbeing. This principle resonates with the International Labour Organization's (2015) concept of 'Just Transitions', which advocates for equity and inclusivity in the transition to a low-carbon economy. By integrating public, private, and community interests, natural capital investments can promote sustainable development, fostering long-term prosperity, social resilience, and environmental sustainability.

- *Creation of shared benefits for a Just Transition*

The principle of creating shared benefits is central to the concept of 'Just Transitions,' emphasising the importance of ensuring that investments do not disproportionately favour a single interest group or sector. Instead, it calls for a balance between public interests (such as environmental conservation and public health), private interests (such

as profitability and market viability), and community interests (such as local welfare, equitable participation, and social inclusion) (Barton & Mates, 2011; Feichtner, 2007; Thaldar, 2022). This approach ensures that natural capital investments align with the broader goals of sustainability, equity, and resilience.

Desk review findings reveal that neither the WCC nor the PC explicitly addresses the concept of shared benefits or provides guidance on achieving equitable distribution. While the WCC suggests potential co-benefits of projects, such as improvements in public health, local job creation, and contributions to local supply chains, these benefits are neither explicitly mandated nor operationalised within its framework. Similarly, the PC lacks direct mechanisms or provisions to ensure that benefits are equitably distributed among all actors, leaving room for variability and potential disparities in how benefits are realised across different projects.

Workshop findings highlight the gaps in both codes regarding the operationalisation of shared benefits. Participants specifically highlighted the WCC's lack of clarity in effectively communicating the broader co-benefits of woodland carbon projects. For instance, while participants acknowledged opportunities to enhance public understanding of how these projects could contribute to job creation and other social outcomes, they noted that such co-benefits are often treated as "secondary". As a result, these potential benefits are not prioritised during the design or implementation phases, diminishing their overall impact on community well-being and economic development:

"An ongoing challenge is that the [Woodland Carbon] code does not help communities and other key players of the rural economy understand additional benefits investing in such markets would have. There is the potential for, and existing examples that show its positive impact on local job creation, overall public health and wellbeing, and equal access to other opportunities..." – Participant 10

Farmers highlighted significant confusion in navigating VCMs and understanding how to derive tangible benefits, citing a lack of clear, accessible guidance on the steps needed to ensure compliance and achieve meaningful outcomes. Regarding the PC, participants noted that the potential for creating shared benefits often depended on whether projects were spearheaded by public or private entities. Concerns were raised that mandating shared benefits could deter private sector involvement, underscoring the need for well-defined guidelines and incentives to effectively balance public, private, and community priorities in project implementation.

- *Creation of benefits for local communities and support for community wealth building*

The IPRINC highlights the importance of directing investments towards practices that enhance land value and ecosystem services, ensuring long-term benefits for local communities. This principle aligns with the concept of community wealth building, which focuses on fostering local economic prosperity by strengthening community assets, supporting local businesses, and empowering residents to actively participate in and benefit from economic activities (Dubb, 2016).

The desk review findings highlighted that while the WCC briefly references opportunities for community engagement such as staff volunteering, education, and development initiatives funded through profits from woodland carbon projects, it falls short of providing specific guidelines for the practical implementation of these benefits. Similarly, the PC does not explicitly address community wealth building or include mechanisms to promote local economic benefits, demonstrating limited alignment with the IPRINC's emphasis on fostering inclusive and sustainable economic development.

Workshop findings further highlighted the importance of prioritising community-driven benefits. Participants advocating for the WCC stressed the need to empower local regions to identify and address their unique priorities. For instance, local regions, such as boroughs and counties in the UK, could establish tailored frameworks for carbon management that align with specific community needs. However, participants also warned that this decentralised approach risks inconsistencies in delivering outcomes unless supported by a standardised framework that ensures alignment across regions.

In the case of the PC, workshop participants offered limited insights on community benefits, suggesting that its structure may place insufficient emphasis on supporting local economies. Farmers highlighted that projects under both codes frequently failed to incorporate mechanisms for reinvesting wealth into local communities, which undermines their potential to contribute to long-term prosperity and resilience. Participants stressed the need for standardising community-focused investment practices to guarantee broader and more equitable benefits across all projects, ensuring that carbon initiatives foster sustainable development at both local and national levels.

E. Support for diverse and productive land ownership

Investments in natural capital should aim to support diverse ownership structures that balance private, public, and community interests. The IPRINC, aligning with the UN Principles for Responsible Investment, underscores the importance of avoiding a singular focus on outright land ownership. Instead, it advocates for alternatives such as management agreements and community partnerships to deliver broad social and economic benefits. These principles emphasise the need for inclusive and sustainable land-use practices, particularly in contexts involving agricultural tenancies or crofting tenure, to ensure long-term ecological and community resilience.

Diverse and productive land ownership models are essential for fostering inclusive decision-making, equitable benefit distribution, and sustainable land management. A diversified approach ensures that the interests of multiple actors are represented, supporting the principles of responsible investment (United Nations, 2006). However, desk review findings reveal that neither the WCC nor the PC provide explicit guidance or mechanisms to actively promote diverse land ownership structures. This gap highlights an area for potential enhancement to align more closely with the principles outlined in the IPRINC.

- *Identification and engagement with relevant parties early in the decision-making process*

The IPRINC emphasises the importance of identifying and engaging key actors, such as landowners, tenant farmers, and local communities, early in the decision-making process. Proactive engagement fosters collaboration, builds trust, and ensures that the perspectives of those with existing rights or vested interests in the land are incorporated into project outcomes. This approach aims to maximise mutual benefits, including improved land stewardship, capacity building, and economic opportunities for both investors and local communities.

Desk review findings highlighted that the PC includes provisions requiring project developers to demonstrate legal ownership or tenure for the duration of the project. For land under tenancy, developers must secure written consent from landowners, who assume responsibility if the tenancy ends prematurely. These requirements align with the IPRINC's emphasis on early and transparent engagement with all relevant partners. In contrast, the WCC lacks explicit guidelines on early engagement, particularly for projects involving alternative land tenure arrangements.

Workshop findings highlighted practical challenges in implementing early engagement. Participants observed that public bodies were generally more effective at facilitating early engagement compared to private entities. Farmers reported difficulties in determining the optimal timing for joining VCM schemes, often due to barriers such as complex data collection and measurement requirements. Additionally, for the PC, participants noted that financial returns for smaller projects were often insufficient to attract individual landowners, leaving larger estates better positioned to navigate the process due to greater access to infrastructure and resources:

“...when trying to work within VCMs, it is often the larger estates that can comply with the complexities of the system. Tenant farmers and smaller landowners lack the resources and infrastructure needed to engage effectively...” – Participant 3

- *Management agreements and collaboration/partnership with communities*

The IPRINC advocates for flexible approaches to natural capital investments, emphasising alternatives to direct land ownership, such as management agreements and partnerships with communities. These approaches leverage local knowledge and resources, enabling opportunities for shared economic and environmental benefits while reducing potential conflicts associated with outright ownership.

Desk review findings revealed that neither the WCC nor the PC explicitly includes collaborative partnerships or management agreements as central elements of their frameworks. This omission limits the ability of these codes to promote inclusive and participatory land-use practices. For example, while the WCC acknowledges the potential for group projects to reduce costs, it does not mandate partnerships that foster shared responsibilities or equitable benefit distribution among actors.

Workshop findings further emphasise this gap, with participants highlighting the absence of robust mechanisms to ensure community involvement in decision-making. For both the WCC and PC, community voices were often excluded from land-use planning and management discussions. Participants suggested that collaborations with

entities such as the National Trust or local government bodies could facilitate community-driven initiatives, including tree planting and peatland restoration, which align with both environmental and social objectives. However, several challenges were identified, such as the declining number of tenant farmers and the financial complexities associated with commission-based arrangements. These barriers highlight the need for clearer frameworks to encourage equitable partnerships and community inclusion in natural capital investments:

"There needs to be a more structured framework to ensure that communities are part of these projects. Otherwise, these carbon schemes will continue to feel like they benefit investors and large estates rather than the local communities who live and work on the land..." – Participant 8

For the PC, participants highlighted that smaller landowners and tenant farmers often encountered significant structural barriers to participation, particularly in large-scale projects spearheaded by private entities. These barriers included financial constraints that limited their ability to invest in restoration activities, a lack of technical expertise needed to navigate the complexities of carbon markets, and restricted access to support networks that could facilitate their involvement. These challenges underscore the need for targeted interventions to level the playing field and ensure inclusive participation across diverse landholding groups.

- *Promoting land ownership structures*

The IPRINC underscores the importance of community and cooperative land ownership in promoting sustainable and equitable land management practices. These structures enable the distribution of decision-making power, bolster local resilience, and ensure more inclusive access to the benefits of natural capital investments.

Desk review findings revealed that neither the WCC nor the PC explicitly incorporate mechanisms to support cooperative or community-led land management initiatives. This gap limits the potential of these codes to align with the IPRINC's principles of fostering diverse and productive land ownership structures.

Workshop findings reinforced these concerns, with participants emphasising the value of community-led projects in promoting equity and inclusivity. For instance, participants proposed introducing legislation mandating that a percentage of land be publicly owned or managed collaboratively. Such an approach could empower all relevant partners, ensuring that decision-making authority is distributed more equitably. However, participants also acknowledged that the practical implementation of such initiatives would require clear guidelines, standardised frameworks, and robust support systems to maintain consistency and efficacy across regions:

"The way land is currently managed through these schemes doesn't reflect the needs of smaller farmers or communities...there is a huge potential for projects that are community-led, but there is no real support to make that happen." – Participant 5

Participants also highlighted the potential role of cooperatives in bridging the gap between small landowners and larger investors. Cooperatives, they suggested, could enable smaller partners to pool resources, share responsibilities, and collectively engage in carbon markets. This collaborative approach would enhance their capacity to participate effectively in natural capital investments, ensuring they can benefit equitably from these initiatives while addressing structural barriers such as financial constraints and lack of technical expertise.

F. Ethical and values-led: Adhering to the UN Principles for Responsible Investment

The Principles for Responsible Investment (PRI) emphasise the integration of environmental, social, and governance (ESG) considerations into organisational strategies, promoting transparency, fostering collaboration, and aligning investments with societal and environmental goals. The IPRINC builds on this foundation by extending these principles specifically to natural capital investments, advocating for ethical, values-driven approaches that prioritise inclusivity and ecological sustainability.

Despite these frameworks, desk review findings revealed that neither the WCC nor the PC explicitly integrates the PRI or similar ethical standards into their structures. This omission creates a misalignment with internationally recognised benchmarks for responsible investment, raising concerns about the transparency, accountability, and integrity of projects governed by these codes. Without embedding formal ethical guidelines, the WCC and PC may inadvertently undermine investor confidence and erode trust among local communities—both of which are essential for fostering sustained engagement and support for natural capital initiatives. This gap underscores the need to strengthen the ethical foundations of these codes to enhance their credibility and alignment with global standards.

- *Lack of ethical frameworks*

The desk review identified a significant gap in the WCC and PC frameworks, as neither explicitly incorporates provisions to align with established ethical benchmarks or the broader values of responsible investment. While both codes demonstrate adherence to robust carbon accounting standards and validation processes, they fall short of embedding ethical principles into their operational or decision-making frameworks. For example, the WCC prioritises UK-based offsets and promotes responsible forestry management but does not mandate explicit adherence to ethical standards. Similarly, the PC lacks a structured framework for addressing ethical concerns, relying instead on the practices and discretion of individual project developers and investors.

Workshop participants highlighted the potential benefits of integrating a formal set of ethical principles within the WCC to guide investments and promote transparency. While the WCC's existing focus on the integrity of buyers was recognised as a strength, participants emphasised the need for codified ethical guidelines to ensure consistency, accountability, and trust across all projects. Such measures could enhance both investor confidence and community support, aligning these codes more closely with the PRI and other global benchmarks for responsible investment:

“Although the WCC ensures UK-based offsets, there is no formal guidance on ethical principles or responsible investment. Adopting a set of guidelines would give everyone greater confidence in the process and help maintain its reputation...” – Participant 7

The findings further revealed a reliance on project assessors to evaluate buyers' reputations through informal methods, without formal mechanisms to address potential ethical concerns. This lack of structured processes creates vulnerabilities within the WCC framework, leading to inconsistencies in how ethical considerations are applied. Such gaps pose challenges in maintaining the WCC's alignment with responsible investment principles, potentially undermining the credibility and accountability of projects under its purview. Establishing clear, codified ethical guidelines could address these inconsistencies, ensuring a more robust and transparent approach to upholding the values of responsible investment.

- *Transparency challenges in the PC*

Transparency emerged as a critical challenge in aligning the PC with ethical principles. Workshop participants expressed concerns regarding inconsistencies in claims made by buying organisations, as well as the presence of multiple, and at times conflicting, requirements within the code. These inconsistencies were viewed as significant barriers to fostering ethical investment practices. Participants underscored the need for clearer, standardised, and more transparent processes to validate claims and rigorously assess the integrity of buyers. Addressing these gaps could strengthen the Code's ability to uphold ethical standards and enhance trust among actors:

“There is significant uncertainty around claims made by some organisations involved in peatland projects. Without a clear ethical framework or standardisation, it becomes very difficult to build trust in the system and ensure transparency in the investments being made...” – Participant 4

This highlights the PC's lack of harmonised ethical standards, and the resulting complications in its ability to attract responsible investments.

- *Perceptions of ethical standards in VCMs*

Workshop participants raised broader concerns about ethical practices within VCMs, particularly in the context of the WCC and PC. They emphasised the critical need for transparency in project implementation and decision-making processes. Farmers specifically highlighted the importance of clearer communication regarding the ethical standards applied to projects, noting that the absence of such standards often resulted in uncertainty and distrust:

“...there is so much uncertainty and mixed messaging regarding investing in these [voluntary carbon] markets. Often, companies advise their tenants [on lands such as farms] to not invest in VCMs as currently, there is no clear understanding of what pressures net zero requirements would bring...” – Participant 6

The lack of formalised ethical standards within both the WCC and PC was viewed as a missed opportunity to align more closely with the PRI and to enhance their overall credibility within the VCM ecosystem. Participants suggested that embedding structured ethical frameworks could help build trust among stakeholders and strengthen the integrity of the codes.

Key conclusions and implications

This study evaluates the alignment of the WCC and the PC with the IPRINC, with a focus on fostering Just Transitions, environmental integrity, and social equity within VCMs. It identifies key challenges, opportunities, and actionable recommendations for creating equitable and sustainable carbon market frameworks. This section contextualises the findings within the broader landscape of Just Transitions, the evolving role of VCMs, and policy relevance, while drawing attention to the interconnected nature of these themes.

Both codes significantly contribute to GHG accounting, monitoring, and verification practices within the UK's VCMs, thereby supporting national climate targets. However, the findings underscore the need for better alignment of the codes with the principles of responsible investment to ensure that VCMs deliver environmental, social, and economic benefits consistent with a Just Transitions. While the codes include mechanisms to uphold environmental integrity, persistent challenges such as fostering meaningful collaboration, addressing socio-economic inequalities, and supporting diverse land ownership structures, highlight areas for improvement. These insights underscore the importance of implementing actionable strategies to enhance the inclusivity, transparency, and sustainability of VCMs, ensuring their alignment with both national and global green development goals.

Just Transitions in the context of VCMs: The findings indicate that Just Transitions are critical for ensuring that VCMs advance environmental sustainability while also fostering social equity and economic resilience. Tackling disparities in benefit-sharing, power dynamics, and engagement processes is crucial to aligning frameworks like the WCC and PC with Just Transitions principles. Given the profound impacts of land use changes on rural economies, equitable involvement of local communities, farmers, and tenant landowners is essential. By incorporating participatory governance, fair benefit-sharing mechanisms, and inclusive decision-making into carbon codes, VCMs can support sustainable rural development while contributing meaningfully to broader green development objectives.

- Key challenges

One of the major challenges to achieving a Just Transition in VCMs is the unequal distribution of economic benefits. Revenue generated through carbon offsetting initiatives tends to be concentrated among larger entities, often corporate buyers, while smaller actors, including farmers, tenant landowners, and local communities who provide the carbon credits, receive comparatively little financial gain. Workshop participants emphasised that the lack of well-defined benefit-sharing mechanisms within the WCC and PC contributes to a sense of exclusion among these smaller actors. This prioritisation of corporate interests undermines trust and deters many rural actors from engaging with VCMs.

Beyond economic disparities, power imbalances also impede progress. Decisions concerning VCM projects are frequently dominated by influential institutions such as public agencies and private investors, leaving smaller actors with minimal influence. This unequal dynamic erodes the agency of local communities, disconnecting them from projects that directly affect their land and livelihoods. The absence of standardised frameworks to ensure inclusive participation by marginalised groups exacerbates this imbalance, contributing to exclusionary practices that undermine the codes' commitment to equity.

Additionally, practical barriers add to the complexity. Rural communities and small-scale landholders often find it challenging to access reliable, transparent information about how VCMs operate. The administrative and compliance requirements can be overwhelming, particularly for those lacking institutional support or technical expertise. These obstacles disproportionately burden smaller actors, further entrenching existing inequalities and limiting the potential of VCMs to deliver socially equitable outcomes.

- Opportunities for embedding Just Transitions

The findings identify numerous opportunities to integrate Just Transitions principles into the frameworks of VCMs through targeted improvements to the WCC and PC. One key area is the introduction of explicit benefit-sharing mechanisms to ensure that financial gains are fairly distributed across all actors. This might involve prioritising local job creation, encouraging community-driven economic growth, and channelling revenues back into rural economies. Incorporating these practices into the existing codes could help strengthen rural resilience and social well-being, paving the way for long-term sustainability.

Advancing inclusive decision-making processes also offers a clear path toward embedding Just Transitions in VCMs. The study highlights the importance of participatory governance frameworks that allow smaller actors to have a meaningful role in shaping project outcomes. Instituting clear mandates for their representation in planning and oversight can help address existing power imbalances and ensure a broader range of perspectives. Furthermore, creating ongoing platforms for dialogue among VCM participants could build trust and foster stronger collaboration, which are key components for successful and equitable project implementation.

Community empowerment stands out as another essential dimension of Just Transitions. To overcome structural and informational barriers, it is crucial to offer transparent, accessible resources on carbon markets and to co-design capacity-building programs that give rural actors the knowledge and tools they need to participate effectively. Additionally, developing user-friendly technological solutions for real-time data monitoring and market engagement could significantly enhance accessibility and inclusivity.

Beyond the existing codes, emerging frameworks like the Soil Carbon Code and Hedgerow Code provide additional opportunities to embed Just Transitions principles. Integrating equity, inclusivity, and sustainability into these new standards could bolster the credibility and effectiveness of VCMs. Such an approach ensures that low-carbon

practices benefit all segments of society, laying the groundwork for a fairer and more sustainable future.

- Recommendations for advancing Just Transitions

The recommendations provided demonstrate a clear pathway to advancing Just Transitions within the context of VCMs, reflecting principles of equity, inclusivity, and sustainability while aligning with green innovation and governance goals.

A. Strengthening participatory governance frameworks

Embedding explicit requirements for local community co-creation and shared accountability would shift both the WCC and PC beyond simple consultations to true collaborative partnerships. These frameworks should formalise mechanisms such as inclusive public forums, transparent grievance redress systems, and active representation of marginalised groups such as tenant farmers and crofters, to counteract existing power imbalances. In doing so, local communities can become co-leaders in shaping projects that directly impact their livelihoods.

B. Standardised methodologies for equitable distribution and long-term monitoring

By adopting measurable socio-economic and environmental indicators such as biodiversity enhancements, community well-being, and rural economic resilience, the WCC and PC can ensure more equitable benefit-sharing. Long-term monitoring frameworks, led by independent bodies and supported by community-driven oversight committees, will track these metrics over time, ensuring fairness while fostering rural resilience and progress toward carbon neutrality.

C. Encouraging public-private partnerships (PPP) to support community-led initiatives

The WCC and PC should champion partnerships that align private sector expertise with public sustainability goals. These collaborations could fund technical training for local farmers, promote cooperative ownership of land management projects, and improve financial access for smallholders. By structuring these partnerships through legally binding agreements, communities retain control over outcomes, ensuring equitable benefit-sharing while driving both rural and green development.

D. Embedding Just Transitions metrics into certification standards

To institutionalise equity and inclusivity, the codes should include specific metrics such as participatory decision-making and social equity, directly within their certification requirements. For example, integrating frameworks like the 'Just Transitions Score' (Htitich, Krylová and Harmáček, 2024) provides a clear, measurable standard for responsible project approval. Periodic reviews of these metrics would allow the codes to adapt to emerging challenges, ensuring that the transition to low-carbon practices continues to align with evolving green innovation and governance objectives.

By adopting these targeted strategies, the WCC and PC can better serve as models for equitable, inclusive, and sustainable carbon markets, contributing to a more just and resilient future.

Implication for VCMs: The findings of this study underline the urgent need to enhance key aspects of VCMs in the UK. Refining approaches to GHG accounting, embedding social equity considerations, and fully integrating local knowledge into decision-making processes are paramount. These improvements will be critical in positioning VCMs not only as credible and effective tools for climate mitigation, but also as mechanisms for addressing wider socio-economic inequalities and fostering community resilience.

- Strengthening GHG accounting standards

Comprehensive and transparent GHG accounting standards are crucial for ensuring the environmental credibility and operational transparency of VCMs. While both the WCC and PC offer robust validation and verification processes, these frameworks are often inaccessible to smaller actors. The complexities of current accounting requirements such as demanding significant technical expertise and financial resources, create a structural disadvantage for marginalised groups, hindering their participation and influence in decision-making processes.

The findings underscore the entrenched inequalities within rural economies, as smaller actors frequently lack the resources to navigate technical frameworks. Farmers voiced frustrations over the opacity in establishing carbon baselines and monitoring protocols, leading to mistrust and a sense of exclusion. These challenges indicate a pressing need for adaptable, locally informed GHG accounting frameworks that lower barriers to entry and foster inclusivity.

Reforms that simplify accounting processes such as the introduction of farmer-friendly tools and community-led capacity-building initiatives, could help equalise opportunities and encourage broader participation. Embedding equity metrics into validation and monitoring processes would further align VCM frameworks with the principles of Just Transitions. Equity-focused indicators like tracking the distribution of financial benefits and assessing the engagement of underrepresented groups, would ensure that carbon offset projects yield both environmental and socio-economic benefits.

Incorporating regional context and local knowledge into baseline development and monitoring can enhance the alignment of GHG accounting standards with local realities. Collaborative governance structures, which place rural communities at the centre of decision-making, could support fairer and more effective carbon management. By aligning GHG accounting practices with equity and inclusivity, VCMs can serve as a tool not only for reducing emissions but also for promoting long-term socio-economic resilience and sustainable development.

- Integrating local knowledge

The findings highlight the critical role of integrating local knowledge into VCM frameworks to address systemic challenges and foster more equitable outcomes. Entrenched power imbalances and the exclusion of tenant farmers, crofters, and other

marginalised groups from meaningful decision-making processes erode trust and diminish the impact of rural actors. Embedding local knowledge within governance structures ensures these actors have both a voice and meaningful influence, aligning VCM projects more closely with the lived realities and needs of the communities they affect.

Incorporating local knowledge goes beyond rectifying inequities. It presents an opportunity to enhance the effectiveness and inclusivity of VCMs by reflecting localised environmental and socio-economic conditions. Co-developing baseline assessments and monitoring frameworks in collaboration with local communities can foster trust and long-term engagement. By shifting from top-down approaches to more participatory and co-created governance models, policymakers can build stronger, more resilient relationships with rural actors.

However, practical barriers remain. Workshop participants identified structural obstacles, including a lack of accessible tools, resources, and farmer-friendly data platforms, which currently hinder smaller actors from contributing their knowledge. Addressing these issues requires the introduction of standardised, user-centric digital tools and community-led training initiatives that empower rural actors. Such measures would not only enhance participation and representation but also help close the governance gaps highlighted earlier in the report.

By integrating local knowledge as a cornerstone of VCM governance, the codes can more effectively align environmental objectives with social equity. Inclusive governance strengthens the credibility of carbon management projects, ensuring fairness in benefit-sharing and contributing to a Just Transition. This approach supports both environmental integrity and social sustainability, in line with the principles of responsible investment outlined in the IPRINC and the PRI. By systematically embedding local expertise into decision-making processes, VCMs can deliver tangible socio-economic and environmental benefits, positioning them as valuable tools for equitable and sustainable development.

- Alignment of the WCC and PC with the IPRINC

The alignment of the Codes with the IPRINC underscores key insights into how these frameworks contribute to responsible investment in VCMs. The analysis reveals key strengths, including the codes' adherence to rigorous environmental standards. However, it also exposes critical gaps, such as the lack of robust mechanisms for equitable benefit-sharing and insufficient structures for proactive community engagement. Table 4 illustrates the points of alignment with the IPRINC principles while clearly identifying areas that require further refinement. This visual overview highlights opportunities for development, reinforcing the need for a more just and inclusive approach to low-carbon land management practices

Table 4: Comparison of the WCC and PC against the IPRINC: Key alignments and areas for improvement

Source: Nayak et al. (under review)

IPRINC Principle	Alignment with WCC and PC	Support for Just Transitions	Areas for improvement
Engagement and collaboration	WCC and PC include provisions for community engagement but lack comprehensive, participatory practices.	Some collaborations occur through consultations, but these often remain superficial and fail to include smaller, vulnerable actors such as tenant farmers and crofters.	Implement more participatory and inclusive engagement practices. Address power imbalances by ensuring representation of smaller actors in decision-making processes. Develop long term engagement mechanisms.
Environmental integrity	Both codes require robust GHG accounting and monitoring systems to maintain environmental integrity.	Effective at ensuring environmental goals, but these standards often impose financial and logistical burdens on small-scale actors, limiting inclusivity.	Simplify and standardise validation and monitoring processes. Balance environmental objectives with the socio-economic realities of local communities to ensure equitable participation.
Integrated land use	Both codes encourage sustainable land use but often prioritise large scale projects.	Aligns with ecological goals but overlooks local land use complexities and the potential conflicts with agricultural productivity and cultural practices.	Develop guidance for balancing ecological resilience and economic stability. Include flexible frameworks to integrate local land use knowledge and diverse farming systems.
Public, private, and community benefits	The WCC briefly mentions co-benefits (e.g., public health and local job creation), while the PC lacks clear guidelines for benefit sharing.	Aligns with broader sustainability goals but fails to institutionalise mechanisms for equitable benefit-sharing between public, private, and community entities.	Establish frameworks for equitable benefit-sharing. Create mechanisms to track and ensure that economic benefits from VCMs are reinvested into local communities.

IPRINC Principle	Alignment with WCC and PC	Support for Just Transitions	Areas for improvement
Diverse and productive land ownership	Neither code explicitly promotes diverse land ownership structures, and tenant farmers are often excluded from benefits.	Limited alignment, as the codes do not support alternative ownership models or recognise the challenges faced by tenant farmers and crofters.	Introduce policies supporting diverse land ownership and collaborative management models (e.g., cooperatives). Provide targeted support for tenant farmers and marginalised land users.
Ethical and value-led investments	Both codes lack explicit ethical guidelines aligning with the UN Principles for Responsible Investment (PRI).	Ethical considerations are not formally embedded, creating gaps in transparency, accountability, and investor responsibility in fostering inclusive economic development.	Embed ethical standards aligned with UN PRI into the WCC and PC frameworks. Mandate transparent reporting of ethical compliance by investors. Ensure all investments prioritise social equity.

Relevance to policy and practice: The findings highlight several lessons for national policymakers, including the UK Department for Environment, Food & Rural Affairs (Defra), devolved administrations, and regulatory bodies like the Scottish Government, Natural England, and Natural Resources Wales. By aligning carbon codes with Just Transitions principles and embedding social equity into VCM frameworks, these actors can enhance the relevance and effectiveness of VCMs, both in meeting the UK’s net zero targets and in shaping international green development strategies.

- Embedding social equity in policy frameworks

One of the key findings from this study is that social equity considerations are insufficiently addressed within the current frameworks of the WCC and PC. Government bodies such as Defra, Natural England, and Natural Resources Wales should focus on revising these codes to include explicit provisions for equitable benefit-sharing, participatory governance, and better representation of the socio-economic needs of tenant farmers and crofters. In turn, project developers, investors, and other practitioners can implement these revised policies by co-designing projects with local communities, fostering inclusive decision-making processes, and ensuring transparent and fair distribution of financial and non-financial benefits.

- Aligning carbon codes with Just Transitions principles

Integrating Just Transitions principles into the WCC and PC requires a comprehensive shift that goes beyond technical carbon accounting. Government bodies, regional development agencies, local authorities, and environmental regulatory bodies should

embed metrics into certification standards that evaluate projects' contributions to social equity, local economic resilience, and community capacity-building. Entities such as the British Standards Institution (BSI) could play a role in establishing guidelines, and parliamentary committees focussed on environmental affairs could influence how Just Transitions principles are embedded into VCMs. Meanwhile, project developers and investors can use these metrics to enhance trust, legitimacy, and social acceptability among local communities. By incorporating Just Transitions metrics, VCMs can serve as a global benchmark for sustainable innovation, positioning the UK at the forefront of green development leadership.

- Leveraging VCMs to support the UK's net zero and sustainability goals

VCMs serve as a crucial instrument in meeting the UK's net zero targets, provided they effectively balance environmental aims with socio-economic outcomes. National and devolved governments, regional environmental agencies, and entities such as the Defra should integrate carbon codes into a broader sustainability framework. This framework would not only address biodiversity enhancement and community-led land management but also build economic resilience in rural areas. Doing so aligns these markets with established national sustainability objectives and strengthens their credibility on the global stage. Practitioners ranging from landowners to conservation organisations, should focus on implementing projects that adhere to strict environmental standards while actively addressing local socio-economic needs. This approach would illustrate the potential of VCMs to advance community-led innovation, fostering both environmental and social progress.

- Developing policy synergies across governance levels

The study identifies notable disparities in the execution of engagement, governance, and benefit-sharing principles across the UK's regions, particularly between England and Scotland. To address these discrepancies, national and devolved governments, along with regional environmental agencies, should work together to develop a consistent, UK-wide approach to implementing Just Transitions principles. By establishing unified guidelines that encompass community engagement, equitable land management, and shared benefits, policymakers can ensure fair and balanced participation in VCMs regardless of location. For practitioners including project developers, conservation groups, and local authorities, such standardised frameworks would reduce uncertainty, simplify compliance requirements, and foster smoother cross-regional collaboration, thereby strengthening the overall governance and inclusivity of VCM initiatives.

- Informing emerging sustainability practices

The findings offer valuable guidance for shaping the UK's evolving sustainability policies, including biodiversity net gain requirements and nature-based solutions outlined in recent strategies (Wentworth, 2024). National policymakers and government advisory bodies can use these insights to develop policies with clear, enforceable mechanisms for equitable community engagement, transparent benefit-sharing, and enhanced accountability. For practitioners such as land managers, environmental consultancies, and project developers, implementing these approaches not only strengthens their

leadership role in sustainable land management but also drives innovation in green governance. This dual focus can provide a competitive edge as the sector continues to evolve rapidly, creating opportunities for practitioners to contribute meaningfully to a sustainable future.

In summary, the report highlights the importance of aligning VCM frameworks with principles of social equity and environmental sustainability. By examining the WCC and the PC through the lens of the IPRINC, it highlights both their contributions and the critical gaps that need addressing.

Key findings reveal that while the WCC and PC establish robust environmental standards, they fall short in areas such as equitable benefit-sharing, consistent community engagement, and transparent decision-making processes. The absence of clear mechanisms for integrating local knowledge and the lack of meaningful representation for tenant farmers, crofters, and other marginalised groups hinder the potential of these codes to foster inclusive participation and long-term sustainability.

To strengthen these frameworks, targeted reforms are recommended. Enhancing participatory governance structures, embedding ethical guidelines, and developing equitable benefit-sharing mechanisms are essential steps. Incorporating local expertise and ensuring that community members have a voice in decision-making can improve trust, transparency, and the overall integrity of VCMs. Furthermore, clear guidance on fair land tenure arrangements and strategies to promote diverse ownership models would help ensure that benefits from carbon projects are distributed more equitably.

These recommendations not only address existing challenges but also position the WCC and PC to more effectively contribute to the UK's net zero commitments. By prioritising inclusivity and equity, these codes can serve as models for responsible investment in natural capital, supporting a Just Transition that benefits all stakeholders.

Future directions: Building on this research, future investigations should delve deeper into the mechanisms that promote equitable benefit-sharing, transparent governance, and participatory decision-making within VCM frameworks. Evaluating the long-term socio-economic impacts of VCM projects, particularly on marginalised groups such as tenant farmers and crofters, will be essential for understanding how to achieve a fairer distribution of both financial and non-financial gains. Furthermore, exploring the scalability of community-led carbon management initiatives, as well as assessing their effectiveness in different regional contexts, can help identify best practices and inform the development of new frameworks.

Emerging frameworks, such as the Soil Carbon Code and the Hedgerow Code, present valuable opportunities to implement lessons learned from the WCC and PC. Future research should examine how these new codes incorporate responsible investment principles and whether they succeed in addressing known gaps in community engagement, ethical standards, and diverse land ownership structures. By providing clear metrics for inclusivity, transparency, and equitable governance, these evolving frameworks can set a precedent for more socially and environmentally sustainable carbon markets.

Finally, leveraging technological advancements and innovative data management tools can improve the transparency, accountability, and accessibility of VCMs. Future studies could explore how digital platforms, real-time monitoring technologies, and mobile-friendly carbon calculators enhance participation and trust among smaller landholders. By focusing on these areas, research will not only advance the understanding of responsible investment in natural capital but also ensure that VCMs contribute meaningfully to global sustainable development and climate goals.

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