PERENNIAL BIOMASS CROPS
PBC4GGR
GREENHOUSE GAS REMOVAL

Rethinking perennial biomass crops implementation in farmed landscapes: designing opportunities for integration into the farming system

Deliverable 4: Synthesis Report on potential PBC integration strategies and support mechanisms

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1. Introduction

1.1 Background

There is growing recognition that perennial biomass crops (PBC) could complement, rather than compete with, other land uses through multifunctional land strategies. Integrating PBC into farming systems, in ways that are profitable, resilient, and locally appropriate will require new business models and markets, including private and public ecosystem service payments. Combining these with PBC feedstock payments allows diversification of revenue streams in a challenging post-transit transition environment, at an individual farm business or landscape scale.

1.2 About this project

This project aimed to rethink how PBC - specifically Miscanthus and Short Rotation Coppice (SRC) willow - can be more effectively integrated into existing farming systems.

Objectives

1. Identify opportunities for integrating PBC into farming systems at farm and landscape level
2. Scope out the public and private sector mechanisms to support farmers and land managers in integrating PBC into their farming systems at farm and landscape level
3. Co-design strategies and prototypes for PBC integration

A key focus of this project was on identifying strategies that were profitable, resilient and practicable both at a farm and landscape scale. This included identifying past and current support mechanisms and revenue streams as well as exploring experiences of PBC growers. This project synthesises data collected as part of the PBC4GGR project Phase 2, with new data collected as part of this Flexibility Fund project. The analysis largely relates to the English context.

2. Methods

2.1 Research design

Three tasks were conducted each addressing one of the three objectives. These served as a framework for both data collection and analysis. The tasks comprised: i) analysis of previous interview transcripts and workshop reports from Phase 2 of the Perennial Biomass Crops 4 Greenhouse Gas Removal (PBC4GGR) project[1]; ii) semi-structured in-

[1] PBC4GGR Phase 2 aimed to capture wider non-grower (farmer) and stakeholder views in four regions in England and Wales: North-East, mid-Wales, Yorks and Humber and Midlands selected to represent different biophysical regions, farming systems and market opportunities, with 16-18 interviews in each region. This was followed by a participatory modelling workshop in each region. Stakeholders included representatives of the farming and agricultural community, biomass crops industry, renewables and carbon removal sector, forestry commission, conservation and catchment management agencies.

depth interviews with 23 stakeholders; and iii) a participatory workshop with 10 stakeholders. Figure 1 shows the research design and the associated reports. The stakeholders who participated are those concerned with growing, supplying and supporting PBC, as well as those active in land use decision making more generally. These included growers, advisers, researchers, supply chain, natural capital and policy representatives. They were consulted at each stage of identifying strategies and support mechanisms and their experiences and suggestions incorporated in an iterative way.

This report summaries and synthesises the findings from the analysis undertaken in the three tasks.

2.2 Reporting

Findings from each task are reported in the following reports, with this report (D4) providing a synthesis:

- Deliverable 1: Report on potential PBC integration strategies
- Deliverable 2: Report on support mechanisms for integrating PBC into farming systems
- Deliverable 3: Report on stakeholder participatory workshop: PBC integration strategies and support mechanisms

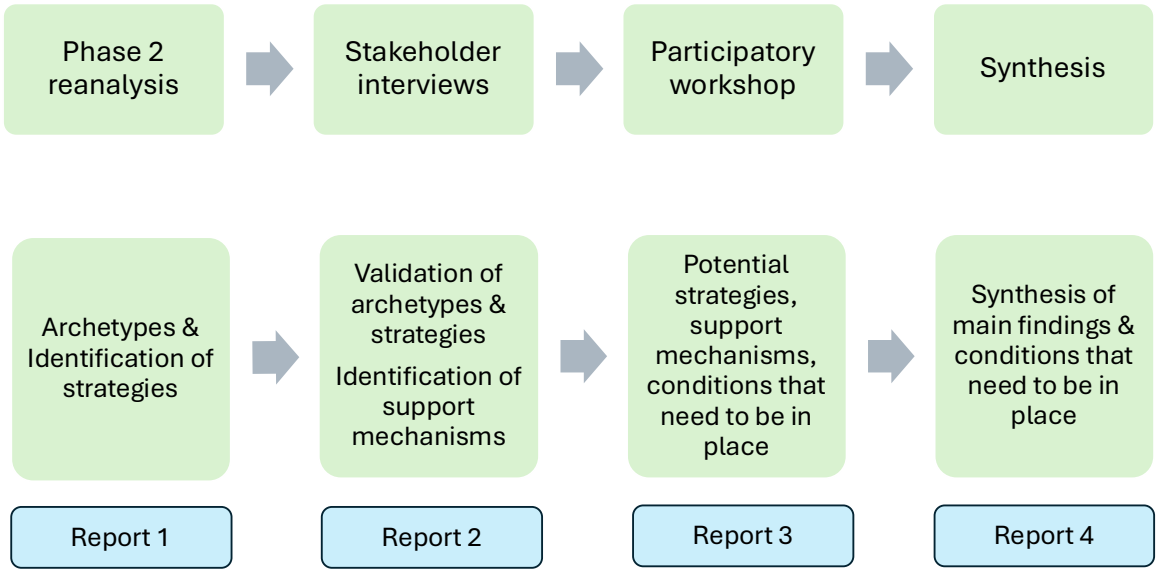

Figure 1: Research design and reports

3. Main Findings

The following sections summarise findings from the three main tasks.

3.1 Potential strategies for integrating PBC into farming systems at farm and landscape level

This task identified potential strategies for integrating PBC into farming systems at farm and landscape level; these have been identified and 'co-designed' with participants. It combined findings from the PPC4GGR project with in-depth interviews with 23 stakeholders. Analysis was used to identify four overlapping PBC grower archetypes and an opportunity scenario which were validated and evaluated in interviews:

- Archetype A: Stepping Back (low maintenance farming)
- Archetype B: Optimiser
- Archetype C: Resilient (de-risking)
- Archetype D: Green Values
- Opportunity scenario: Synergistic Farmer

Building on the interviews, the following potential PBC integration strategies were identified and explored:

- On-farm business resilience, including circular approaches
- On-farm ecological resilience in terms of land management
- Develop existing and new products
- Develop ecosystem services

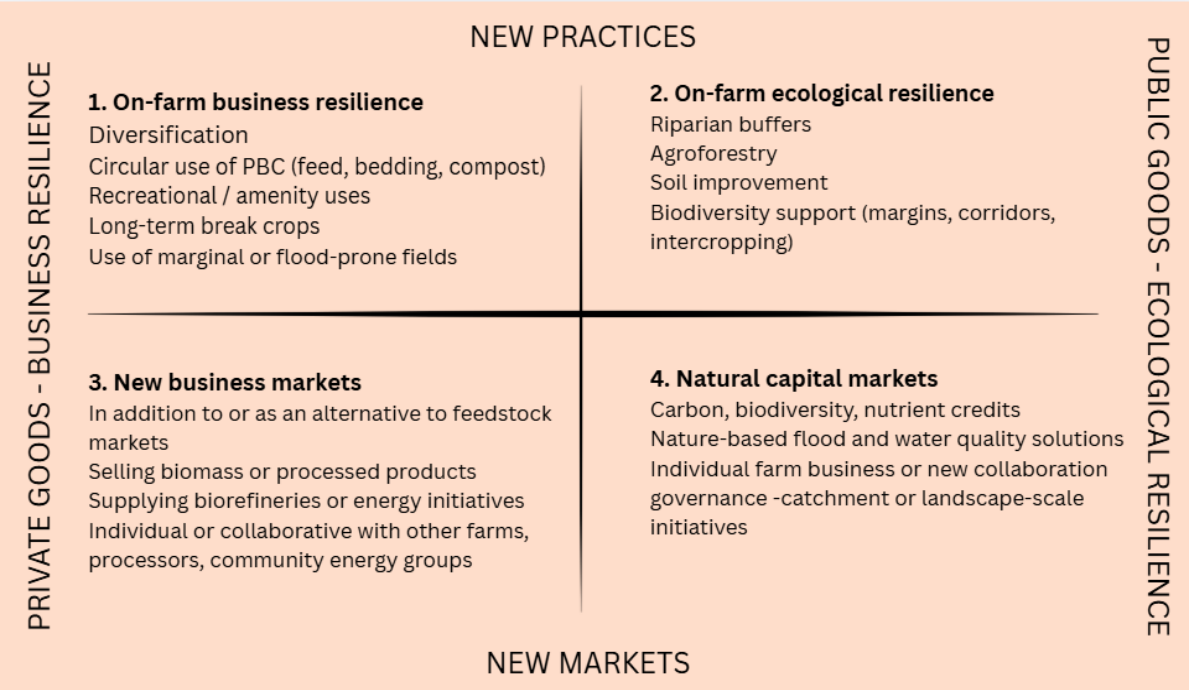

Figure 2: Matrix showing PBC potential integration strategies drawn from archetypes and participants' insights

These are shown in the four quadrats in the matrix in Figure 2 where one axis represents business to ecological resilience, and one axis represents new products to new services.

Participants expressed varying levels of optimism about these strategies. Whilst they recognised potential opportunities for diversifying income, they were also aware of the associated risks. This task provided the foundations for the next stage of analysis which identified support mechanisms (including markets) that might enable farmers to implement these strategies.

3.2 Support mechanisms for integrating PBC into farming systems

This task scoped out and examined public and private sector mechanisms (including markets) to support farmers and land managers in implementing these integration strategies at farm and landscape level. A desk study and analysis of interviews with 23 stakeholders was structured around four support categories:

1. Public policy support
2. Growing commercial markets
3. Nascent nature markets
4. Stacking and blended finance opportunities

The following key points emerged in stakeholder discussions about these mechanisms:

- There is currently no dedicated **public support** for growing PBC as feedstock or for the co-benefits they deliver. Stakeholders regard PBC as 'forgotten' and not being able to compete on a level playing field with other supported crops or practices. PBC supporters advocate a small incentive to encourage planting combined with recognition of PBC co-benefits. SFI and CS (and SFS in Wales) are regarded more as a competitor for PBC than an incentive and the relaunched SFI has removed actions used previously by PBC growers.
- With respect to conventional feedstock **markets**, in the absence of any planting grants, private finance (loans) integrated into feedstock supply contracts play an important role. Newly emerging markets for biomass products, as part of the transition to low-carbon energy and materials, herald revenue opportunities for growers, and there is some optimism. These are still largely in development and not yet operating at sufficient scale. Farmers' attitude to risk and their entrepreneurial skills will also determine how they progress.
- **Nature markets** potentially offer income for PBC co-benefits with voluntary carbon markets (VCM) highlighted, although farmers are cautious and awaiting improved VCM governance. Opportunities for rewarding PBC water-related co-benefits (nutrient and flood mitigation) were also identified. Payments and support from water companies, catchment projects, local authorities and

insurance companies (or partnerships of these) are already in operation, but these appear to be localised and project based, and not yet mainstreamed.

- There was interest in **stacking** revenues from PBC markets and co-benefit payments on the same piece of land. However, stakeholders questioned eligibility, highlighting the fact that these options are as yet untested, and that they involve high transaction costs for farmers. **Blended finance** where public grants are combined with private investment for initiatives like habitat creation and carbon sequestration is another option relevant for larger landowners or groups of farmers looking to make long-term improvements in sustainability (although this commonly supports permanent land use change).

3.3 Integration strategies and support mechanisms: hypothetical pathways

Building on the four strategies shown in Figure 2, hypothetical pathways were developed combining the strategies and support mechanisms, for the farm level (Figure 3) and the landscape level (Figure 4)

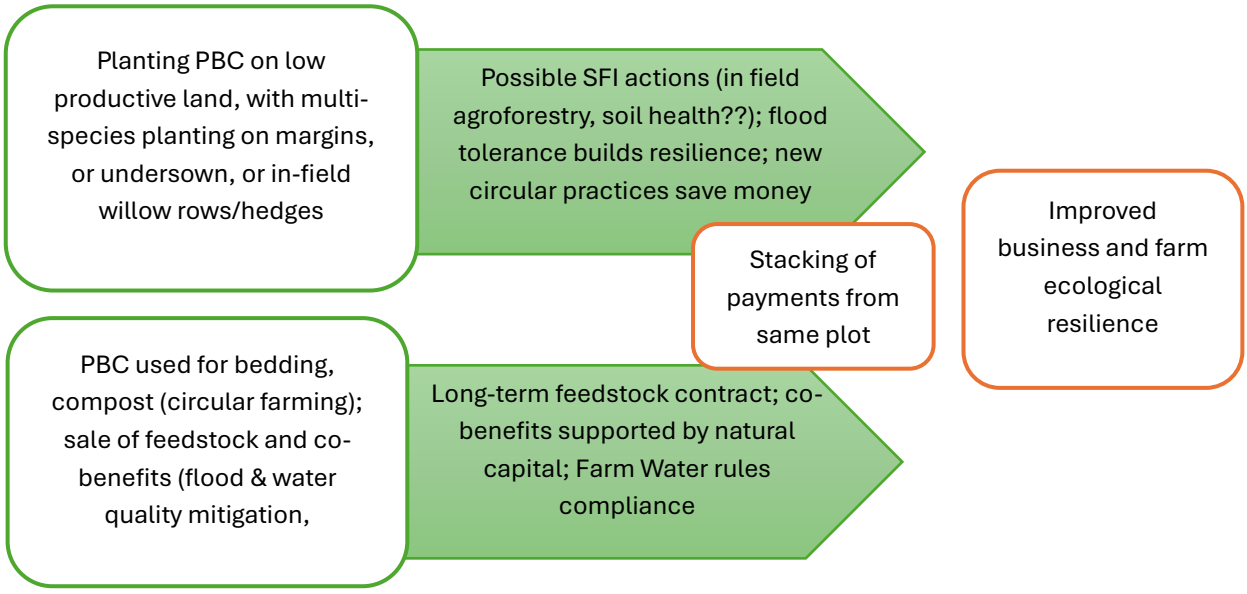

Figure 3: Farm level: On-farm practices to diversify revenues for business and on-farm ecological resilience

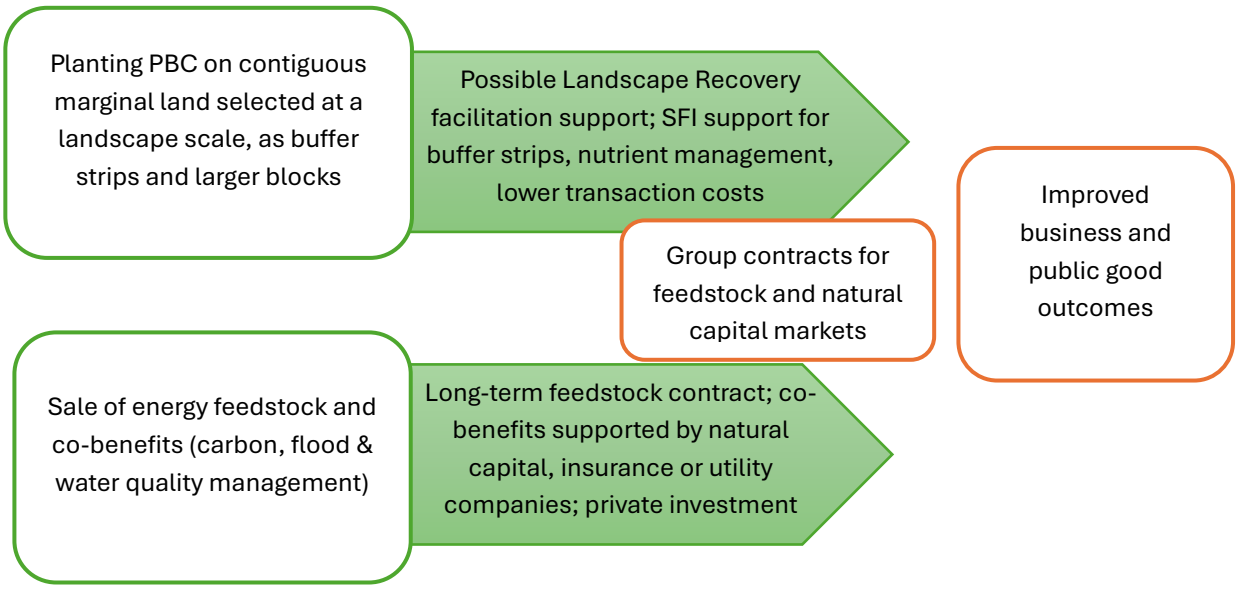

Figure 4: Landscape level: A group of farmers collaborate in the landscape/catchment-with income from feedstock and natural capital markets

3.4 Conditions that need to be in place for strategies to be implemented

An online workshop was held with ten participants: growers, researchers, supply chain, natural capital and policy representatives. The participants evaluated the integration strategies, support mechanisms and hypothetical pathways identified in the analysis and discussed the conditions that need to be in place for them to be implemented, as follows:

- **Reconcile how the two models work together.** The anticipated demand for high volumes of domestic feedstock (and necessary planting scale, locality, logistics) does not align with the small-scale integration farm strategies identified, that tend to optimise co-benefits but not necessarily GGR. Opportunities for complementarity exist but reconciling this tension is seen as a fundamental challenge and linked to the GGR potential of the different strategies. This leads to the next point.
- **Recognise Defra's and DESNZ's** different political responsibilities and interests. PBC meet DESNZ's energy and net zero objectives while for Defra, they see PBC as more problematic with potential socio, cultural, economic and biodiversity impacts. Defra would prefer the principle of "the right energy crops in the right place for the right reason" which sits well with the smaller scale integration strategies. This model also aligns with many of the outcomes the government is seeking to deliver in the Land Use Framework which promotes multifunctional land use.

- **A coherent policy is needed**. Demand for domestically produced biomass is expected to increase as DESNZ plans to develop BECCS capacity. DESNZ will need a policy position on this with respect to whether they incentivise planting offered or continue to rely on the market.
- **Policy recognition- PBC need a level playing field.** With the absence of any support, industry stakeholders and growers feel that PBC is 'forgotten', and at a disadvantage. A small incentive is needed to encourage planting combined with recognition of PBC co-benefits for 'get them on the radar'.
- **A strong industry story is needed.** There is interest in emerging alternative markets and future opportunities for premium prices in bio-based materials that support a low carbon transition. However, a good industry story is needed to instil farmer confidence in this revenue base as well as market and supply chain infrastructure development at scale.
- **Stronger governance of natural capital markets**. These markets offer potential opportunities mostly for carbon sequestration and water (nutrient and flood management), but there is hesitancy due to uncertainty, market integrity, and transactions costs are high for individual farmers.
- **Evidence of measurable co-benefits of PBC**. There is caution about how measurable PBC co-benefits are with respect to all support: SFI, alternative markets, natural capital markets. This includes PBC potential in helping manage the carbon footprint at a farm level. This is becoming important for compliance with supply chain reporting (for Scope 3 emissions) and for some devolved administrations' new farm support schemes.
- **Improve perceptions.** Stakeholders felt it is essential to shift perceptions among farmers, policymakers, and the public. The political landscape is not conducive at the moment for growing PBC due to inherent perception issues and this spills over into industry and farming.

4. Conclusion

Building on previous research and document analysis, stakeholders from across farming, the biomass industry, natural capital and policy identified potential integration strategies and support mechanisms that would allow PBC to complement, rather than compete with, other land use. Combining new business models and markets (commercial and nature), with PBC feedstock payments offer diversification of revenue streams at an individual farm business or landscape scale. However, a number of conditions need to be in place to enable these strategies to achieve their potential. Underpinning these is the need to find to some complementary between the larger scale planting model envisaged by DESNZ to meet their GGR objectives, and the smaller scale integration models which are more aligned with Defra's objectives of supporting co-benefits and multifunctional land use principles.

Figure 5 summaries the main findings from all tasks and their linkages.

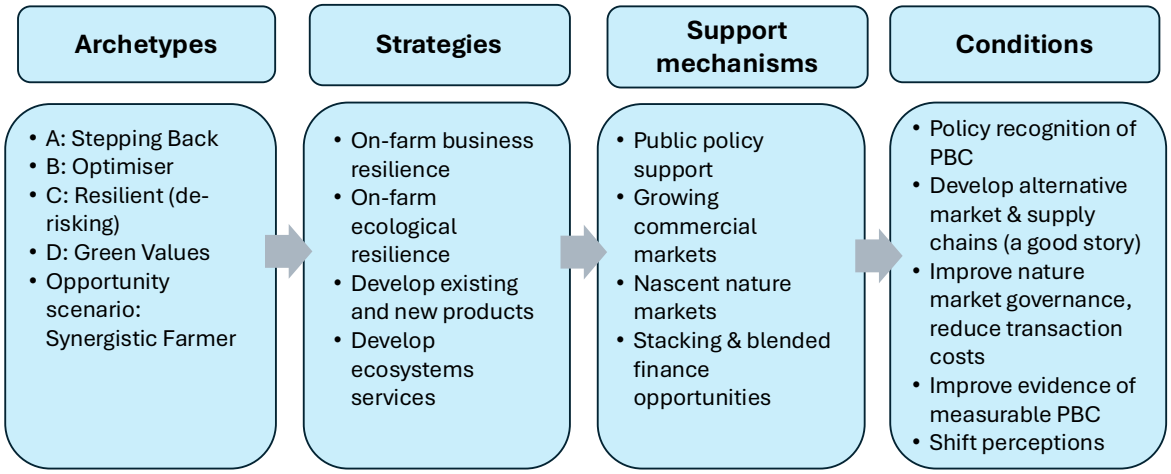

Figure 5: Main findings and their linkages