

How biobased building crops contribute to a resilient farmland portfolio

**The impact and feasibility of fibre crop integration
within climate-smart farming practices.**



Introduction

In this article about the impact of fibre crops on institutional farmland investments, we set out to examine the effect of the integration of these crops on farmland investment portfolios and the agricultural sector as a whole. The goal of this research is to examine the relation between the biobased transition and overarching ESG goals. It builds on quantitative modelling of the portfolio of the ASR Dutch Farmland Fund that has been performed in collaboration with the Wageningen University & Research.

Key take-aways

- 1 The integration of climate positive crops contributes to the climate resilience of farmland.**
- 2 Institutionalisation of carbon credits would allow biobased building materials to become more profitable than most conventional crops.**
- 3 Climate resilience and robustness of farming activities are increased through the transition to biobased building materials.**

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The construction sector's emission challenge

Climate positive crops have a positive environmental effect, contributing actively to carbon sequestration, soil regeneration, biodiversity support and the overall nutrient cycle within climate-smart farming practices. Two major categories are distinguished by the ASR Dutch Farmland Fund: legumes and bio-based building material crops. Legumes naturally fix atmospheric nitrogen reducing the need for synthetic fertilizers, which have a high CO₂ footprint during production. Legumes are crops such as soybeans or clover and are widely implemented within the Dutch agricultural sector. On the other hand, bio-based building crops consist of fibre crops and wood. Fibre crops can be utilised in the production of bio-based building materials, reducing the demand for carbon-intensive construction materials. Additionally, using the biomass of these crops in the building sector makes them potentially carbon-negative and eligible for carbon credits.

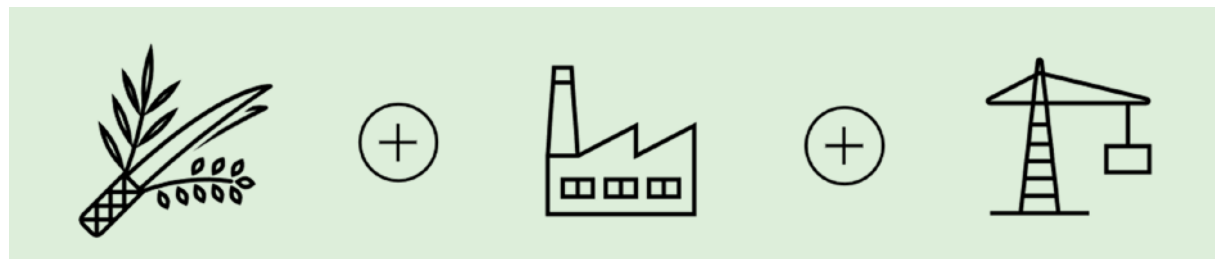
The dual challenge

The construction sector is one of the most emission intensive industries globally, accounting for an estimated 37% of global CO₂ emissions, 13% of which originate in the production and use of construction materials¹. Governments worldwide, including in the Netherlands, are currently facing an acute need for the development of new homes. However, current building practices heavily rely on carbon intensive materials and are thus incompatible with climate targets.

As the Netherlands faces the dual challenge of climate change and a national housing crisis, bio-based building crops are emerging as a powerful tool for sustainable transition. This article specifically focuses on fibre crops, including a variety of arable crops such as hemp, flax and miscanthus. While the focus in this report is mostly on building materials, fibres can also be used to substitute conventional

plastic packaging or polyester in textiles. These are just two out of many items that are essential for turning a linear system into a circular one, where fibre crops will be indispensable.

Biobased materials currently represent a rather small share of the building materials used in the Netherlands. As in 2024, 1.2%² of newly-built homes in the Netherlands included at least 30% bio-based building materials. From a supply perspective, farmers remain hesitant to adopt fibre crops due to limited agronomic familiarity, lack of appropriate machinery, and concerns over profitability. While government subsidies and pilot programmes have begun to address these barriers, market development remains fragmented. On the demand side, processors often struggle to secure consistent and scalable supply, deterring further investment. This "chicken and egg" dynamic between growers and processors has limited the growth of stable, regional supply chains.



1 United Nations Environment Programme, & Global Alliance for Buildings and Construction (2025). Not just another brick in the wall: The solutions exist - Scaling them will build on progress and cut emissions fast. Global Status Report for Buildings and Construction 2024/2025. <https://wedocs.unep.org/20.500.11822/47214>.

2 Building Balance (2025). Van Land tot Pand: Biobased (ver)bouwen aan de toekomst. Internal document

Accelerating the Transition Towards Biobased Construction

Government policy is playing a catalytic role in shaping this emerging sector. Through the national Biobased Building Approach and its dedicated implementation body, Building Balance, the Dutch government has outlined clear targets: by 2030, at least 50,000 hectares of farmland should be dedicated to fibre crops, supplying the raw material for a minimum of 30% bio-based content

in 30% of all new homes built. These ambitions are driven by the dual pressures of climate mitigation and an intensifying housing crisis. The construction of approximately 900,000 new homes by 2030 will require vast amounts of material – ideally from renewable sources. According to estimates, fibre crops could contribute to annual carbon emission reductions of up to 1.57 million tons when integrated into construction materials, providing an effective means of decarbonising both agriculture and the built environment³.

ASR Dutch Farmland Fund's Climate-smart Agriculture Strategy

The ASR Dutch Farmland Fund manages approximately 39.000 hectares of farmland. Responsible portfolio management is a key priority to the Fund, as it believes that it can serve the interests of its tenants and investors in the best possible way by creating and maintaining farmland investments that have a long-term value from a financial, environmental and social perspective. The Fund encourages farmers to apply the principles of climate-smart agriculture. This is done through a green lease system, offering discounts on lease payments. To qualify for a green lease, farmers must meet specific criteria implementation of the 'Open Soil Index', the implementation of biodiversity measures or climate positive crops and a detailed business plan in which sustainability measures and strategy are described on company level. Through this incentive, the Fund focuses on sustainable productivity and farmer's income. Other pillars of the Fund's environmental strategy focus on reducing environmental impact and adapting and building resilience to climate change as well as improving biodiversity.

Adapting and building resilience to climate change

The integration of fibre crops in the portfolio has been studied through quantitative modelling in collaboration with the Wageningen University

& Research and has proved to hold numerous environmental advantages, contributing to overarching ESG objectives. Scenario analyses show that introducing fibre crops even at a moderate scale, such as replacing rest crops in dairy systems or utilising buffer strips, leads to measurable

Figure 1: Carbon uptake as modeled in the ASR DFLF portfolio

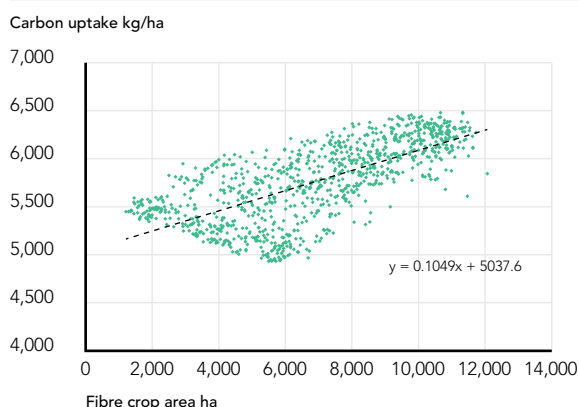
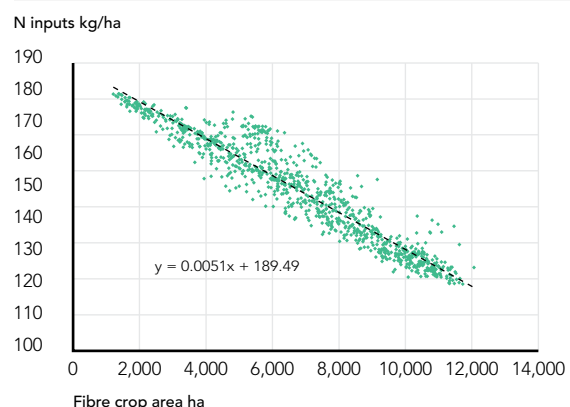


Figure 2: Nitrogen inputs as modeled in the ASR DFLF portfolio



3 Building Balance (2025). Van Land tot Pand: Biobased (ver)bouwen aan de toekomst. Internal document

reductions in greenhouse gas emissions, pesticide use, and nitrogen inputs as well as improvements with regards to carbon uptake of crops. Larger-scale transitions, where arable feed crop areas are converted to fibre crops, yield even higher environmental and social benefits, although this would be the result of a systemic transition in which livestock becomes less prominent.

As depicted in Figures 1 and 2, modelling of the portfolio constitution at Fund level proves a linear relation between the area of fibre crops and the carbon uptake in crops in the portfolio as well as between the area of fibre crops and the required nitrogen inputs.

However, profitability remains the Achilles' heel of the fibre crop economy. When compared to conventional crops like potatoes or maize, fibre crops consistently underperform in terms of gross margins per hectare. This financial gap poses a

major hurdle to widespread adoption, especially given the high land prices in the Netherlands and the thin margins many farmers are facing already. While carbon credit systems and ecosystem service payments hold promise, they remain underdeveloped, and questions surrounding certification, ownership, and administrative burden persist.

Yet the broader systemic potential of fibre crops should not be overlooked. Their utility in circular construction, their role in lowering emissions, and their capacity to support regenerative agricultural practices place them at the nexus of several national priorities: climate action, housing development, water protection, and soil restoration. The Dutch agricultural sector, known for its innovation and productivity, is well-positioned to become a leader in this space – provided that structural investments, policy coherence, and market coordination follow suit.

Carbon credits: Unlocking financial value through fibre crops

When used in construction, fibre crops sequester carbon in long-lived materials. This opens the door to future carbon credit revenues, with estimates ranging from €75 to €125 per ton CO₂ sequestered in the biomass of crops. Fibre crops show lots of potential for carbon credits due to their high production levels of biomass. Crops that seem especially relevant in this context are miscanthus and fibre hemp. Even with current carbon prices, carbon credits are projected to elevate the gross income by around 50% for miscanthus and fibre hemp. However, in a world that continues going down a path of decarbonisation, carbon prices are poised to increase in the future. Higher carbon prices would not only consolidate the business case of fibre crops, it would make them more competitive than most of today's conventional crops in terms of profitability.

Recent developments within the Dutch carbon credit market further strengthen this positive outlook. Although the Dutch voluntary carbon market is still in its early stages with approximately only 22,000 credits sold and an inventory of 200,000 credits as of August 2024, the demand is expected to grow significantly due to increasing regulatory pressure and climate ambitions. Additionally, the adaptation of the European Carbon Removal Certification Framework (CRCF) established the first EU-wide system for certifying carbon removals. This framework has significantly boosted investor confidence and accelerated the deployment of carbon farming and construction stored carbon credits. To address further challenges and increase institutional interest, the EU is establishing a central purchasing program for permanent carbon removals (CDR) of which a pilot program launched in 2025. This program will stimulate the creation of a robust market by generating public and private demand.

4 K. Vadalkar (2024). Marktonderzoek Nederlandse carbon credits. Rapport. Nieuw Groen <https://open.overheid.nl/documenten/3572f477-aa90-47e4-a9d5-e4ade8ff9efd/file>

5 K. Vadalkar (2024). Marktonderzoek Nederlandse carbon credits. Rapport. Nieuw Groen <https://open.overheid.nl/documenten/3572f477-aa90-47e4-a9d5-e4ade8ff9efd/file>

The use case for fibre crops from an investor's perspective

Fibre crops such as miscanthus are not just champions at sequestering carbon but also incredibly labour and input sparing. This makes them efficient at delivering sustainable impact. With global supply chains, such as those for agricultural inputs, being generally vulnerable for shocks leading to volatility of input prices, the frugality of fibre crops also improves the financial resilience of farms. Being less dependent on inputs, decreases costs, reduces the financial risk of input price spikes and is subsequently better for the environment, as many inputs are reliant on fossil fuel in one form or another. Additionally, the relatively small amount of labour required to cultivate most fibre crops helps to address and anticipate labour shortages in the agricultural sector that will be exacerbated by an aging farming population in the future. Fibre crops are considered climate positive due to their low input requirements and their ability to sequester and store carbon. Also, positive economic (and social) outcomes arise depending on the success of the institutionalisation of carbon markets. All the above make fibre crops worthy of becoming a land use priority next to the production of food and feed.

Increasing climate resilience and diversification through climate positive crops

From an investor's perspective, the integration of fibre crops allows to reduce exposure to environmental and climate risks. As sectoral diversification and exposure to the bioeconomy and sustainable construction sectors not only enhance ecological resilience but also contribute to financial stability and long-term value creation. At the same time, fibre crops foster new connections between agriculture and the bio-based construction sector, creating synergies that extend beyond traditional food and feed markets. This intersectoral linkage strengthens the resilience of the agricultural portfolio by embedding it within broader sustainability transitions.

The integration of fibre crops into the Fund's portfolio strengthens its ability to build a resilient and future-oriented agricultural portfolio. These crops do not only contribute to environmental goals but also enhance the structural robustness of farmland investments. With fibre crops empowering farmers through alternative income streams and reducing dependency on volatile input markets. Their compatibility with regenerative farming practices supports long-term soil health and sustainability, enabling farmers to take proactive steps toward climate-smart agriculture.

Moreover, fibre crops create new linkages between agriculture and emerging sectors such as sustainable construction and carbon markets. These connections open up new value chains and investment opportunities, embedding farmland assets within broader societal transitions toward circularity and decarbonization. Diversification of land use through fibre crops reduces the exposure to sectoral dependency and enhances ecological resilience. It also positions the Fund to benefit from future regulatory incentives and market developments, such as the carbon credit systems and bio-based building mandates.

This leads to the conclusion that integrating fibre crops into a farmland portfolio does not only contribute to overall ESG performance, but also allows to build a robust, adaptive, and forward-looking investment portfolio that aligns with both environmental and financial objectives. Simultaneously, the integration of biobased building crops as a green lease requirement contributes to both biodiversity and broader (climate) resilience of tenants, leading to reduced risks for tenants and investors. Because of these compelling insights, the Fund actively engages in the development of the biobased material chain as well as initiatives focussing solely on biobased crops and their integration in the farmland sector.

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