SUSTAINABLE WHEAT INITIATIVE EUROPE

Guidance for the implementation of the SWIE Manifesto

VERSION 1.0 (JUNE 2025)

An initiative by the Association of International Plant Bakeries (AIBI)

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1. Foreword

This document was developed within the framework of the Sustainable Wheat Initiative Europe (SWIE) by representatives of the bakery sector, with the aim of contributing to more sustainable wheat production through close cooperation between value chain partners.

This guidance document aims to assist the European bakery value chain in its journey to reduce carbon emissions associated to wheat & wheat flour across its entire value chain. The guidelines have been developed for use by all professionals from bakeries and their core value chain partners from flour mills and agri-commodity intermediaries but can equally be used by other wheat & wheat flour off-takers interested in reducing emissions of their sourced products.

It can be used as a reference document for harmonizing sustainability programs for wheat and flour across different suppliers and geographies. Companies do not have to be Manifesto signatories to apply the principles of this guidance paper.

By implementing this guidance and standardized approach, the actions taken and resulting impact will become more consistent and comparable across different bakery supply chains, different wheat farming systems and different geographies across Europe.

We are fully aware that, as members of the bakery industry, we are not experts in wheat farming, flour milling or carbon footprint calculation standards. Therefore, the content of this guidance paper was developed based on a sizeable amount of scientific and non-scientific references (see reference list in Annex) and in close consultation with national bakery federations and their members as well as farmers, millers (and some of their federations), consultants and scientific experts. Their expertise and feedback were actively incorporated and have contributed significantly to the evolution of the document.

The document includes a toolbox of practices and approaches, allowing farmers and their value chain partners to identify and prioritize actions that are most suitable to their regional conditions, farming systems, market situations and business models. The aim of this document is not to develop a one-size-fits-all approach but a flexible framework for stepwise transformation.

This guidance paper does not claim to be exhaustive or universally applicable, nor does it intend to make any agreements constituting a restriction of competition. Rather, it is intended as a practical document that fosters dialogue and transparency and offers concrete entry points for improving sustainability across the supply chain. It should be considered a living document which will continue to be refined in the future based on continued discussions with stakeholders across the full bakery ecosystem. A legal expert has been consulted to ensure compliance with competition law.

We wholeheartedly wish you immense success as you embark on your inspiring journey towards low-carbon wheat and flour. May your efforts lead to a more sustainable and more resilient future.

The SWIE Expert Group

AIBI: Didier Jans (General Secretary)

Délifrance: Nathalie Genebes, Suzanne Marquant

Europastry: Josep Serret Lopez, Roman Tejero Gil

Harry Brot: Florian Otten

La Lorraine Bakery Group: Gita Prochazkova, Nele Van Malderen (Chair of Expert Group), Sean Lestiboudois,

Lantmännen Unibake: Anna-Karin Wahlgren

Mademoiselle Desserts: Barbara Bosquette

Novepan: Eloïse Desobry

Pandriks Group: Sharon Ten Berge

Vandemoortele: Astrid De Paepe, Hilal Berouag, Marc Croonen

2. The Sustainable Wheat Manifesto

We*, undersigned, believe that sustainability is essential for the resilience of the sector and our credibility with consumers & other stakeholders.

We firmly believe that the transition to low-carbon wheat & wheat flour produced with sustainable agricultural practices, such as regenerative agriculture, is the most important pillar to achieve this.

We want to make this transition in a trusting, pre-competitive, efficient and coordinated way with a correct rhythm and transparent roadmap, so that farmers and other value chain actors can plan accordingly.

The entire European bakery sector consumes ~25 million tons of wheat, representing 12,5 million tons of CO_2-equivalent emissions. As the federation of industrial bakeries (AIBI) including a significant part of their large bakeries' CEO's, we represent a critical mass of ~50% and have a responsibility and opportunity for change.

That's why, as bakery sector*, we express our ambition to reduce our wheat & wheat flour emissions by 30% by 2030 compared to 2022, in line with the latest climate science. This ambition represents a gradual shift of conventional wheat & wheat flour volumes to sustainable wheat & wheat flour with a -30% carbon footprint per kg by 2030.

Ultimately, we want to support European wheat farmers and millers so that this transition can happen in a way that is fair for the whole value chain and the bakery sector can purchase sufficient volumes and the right quality of sustainable wheat flour in a predictable and cost-effective manner.

We sign up for a sustainable future of bakery in Europe.

*CEOs of major European Bakeries, national federations of large bakeries, bakeries, millers, cooperatives, suppliers, value chain partners & stakeholders. View all on www.sustainablewheatinitiative.eu/signatories

This Manifesto should always be read in conjunction with the Guidance on the implementation of the SWIE Manifesto (www.sustainablewheatinitiative.eu/manifesto).

3. Introduction

The increasing pace of adverse climate change-related events is staggering and is increasingly being felt across the European bakery supply chain, making urgent action necessary to limit global warming.

Global greenhouse gas emissions originate from various sectors, with over 70% of emissions driven by energy, whether in the form of heat, electricity, transport, or industrial processes and about 26% relating to food production (including emissions in the end-to-end supply chain) (1). This illustrates that tackling climate change requires action across multiple sectors while the food system is a significant contributor.

In response to this, the Sustainable Wheat Initiative Europe (SWIE) was launched in 2024. It was initiated by a leading group of CEOs of member companies of the International Association of Plant Bakeries (AIBI). These companies decided to put a strategic focus on the bakery sector's sustainability transition as it is essential for the resilience of the sector and its credibility with customers and consumers.

The SWIE was established to facilitate and accelerate the transition to low-carbon[1] wheat flour, any bakery's most important ingredient, in a trusting, pre-competitive, efficient and coordinated way with a correct rhythm and transparent roadmap, so that farmers and other value chain actors can plan accordingly. To this end, the SWIE is adopting a Manifesto, a joint commitment to aim for a carbon emissions reduction of 30% per tonne of purchased wheat and wheat flour by 2030 compared to 2022. This was inspired by the Science Based Targets initiative to limit global warming to 1.5 degrees Celsius by 2100.

As over 80% of these emissions typically occur at agricultural level, this can only be achieved through collaboration across the wheat value chain. The core value chain is actively being involved to this end, as illustrated in Figure 1. A shared vision is needed between bakeries, flour mills and the agricultural sector to move forward in a more efficient and orchestrated way in a framework of mutual trust.

While some companies in the bakery ecosystem are already well advanced in their sustainability journey, others are just at the beginning. This document aims to provide all bakery value chain stakeholders, no matter their level of advancement on their journey, with a common understanding of the main drivers of the carbon footprint of wheat flour and the basic components needed for designing sustainable wheat farming programs or evaluating a program initiated by a value chain partner.

Each program should be scalable, adaptable, effective, transparent and fair for all stakeholders. This basic framework for sustainable wheat farming programs provides each stakeholder with a simple six component model which the SWIE feels should be part of any program. It is explained why each component is needed and how companies can incorporate this into their programs. By aligning approaches, the transition may be accelerated in a harmonized manner while lowering the cost of the transition and ensuring a stable supply and quality of flour.

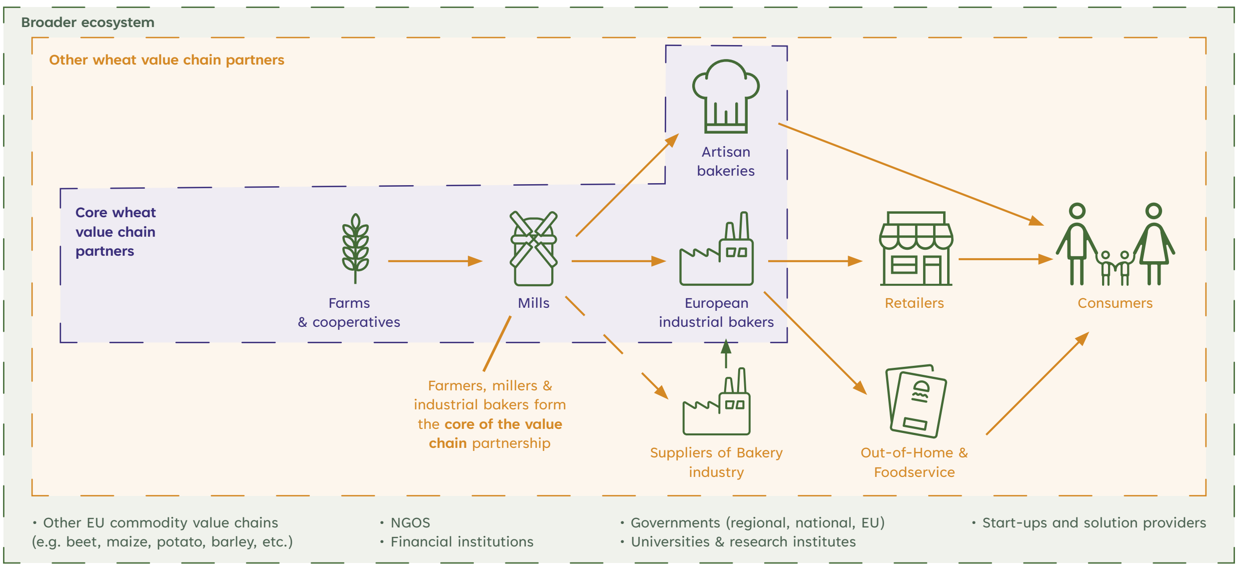


Figure 1: Broader ecosystem (own illustration)

[1]Note that with 'carbon' all greenhouse gases are meant, consolidated as the CO_2-equivalent emissions.

4. The European Bakery sector and its reliance on wheat

4.1 The importance of Bakery and Wheat for Europe and the World

Bread and other bakery products are staple foods providing daily nutrition and delight to about 40% of the world's population (2). On average, EU citizens consume 50 kg of bread per person per year, or around 137g per day (3). Fresh bread was the manufactured food and beverage product with the highest value (€40.0 billion) of EU production in 2023(4).

Flour, its most used ingredient, is typically derived from wheat, which is one of the most traded agricultural commodities in the world. In its various processed forms (wheat is also used in many other applications beyond bakery), wheat accounts for 20% of all calories consumed by humans (5).

Wheat is the second most-produced cereal worldwide for human consumption after rice, covering about 219 million hectares (the size of Greenland) and accounting for 761 million tonnes in 2022 (5).

Wheat is an important crop for European agriculture. Due to its climatic conditions, the suitability of wheat to be cultivated on any given tract of land, is particularly high in Europe (5) (see Figure 2). Common wheat (and spelt) production in the EU represented 126 million tonnes in 2023 (6), 40% of which was grown for human consumption. Around half of this, covering an area the size of Portugal, was used to produce 40 million tonnes of bakery products in the EU in 2023 according to Euromonitor.

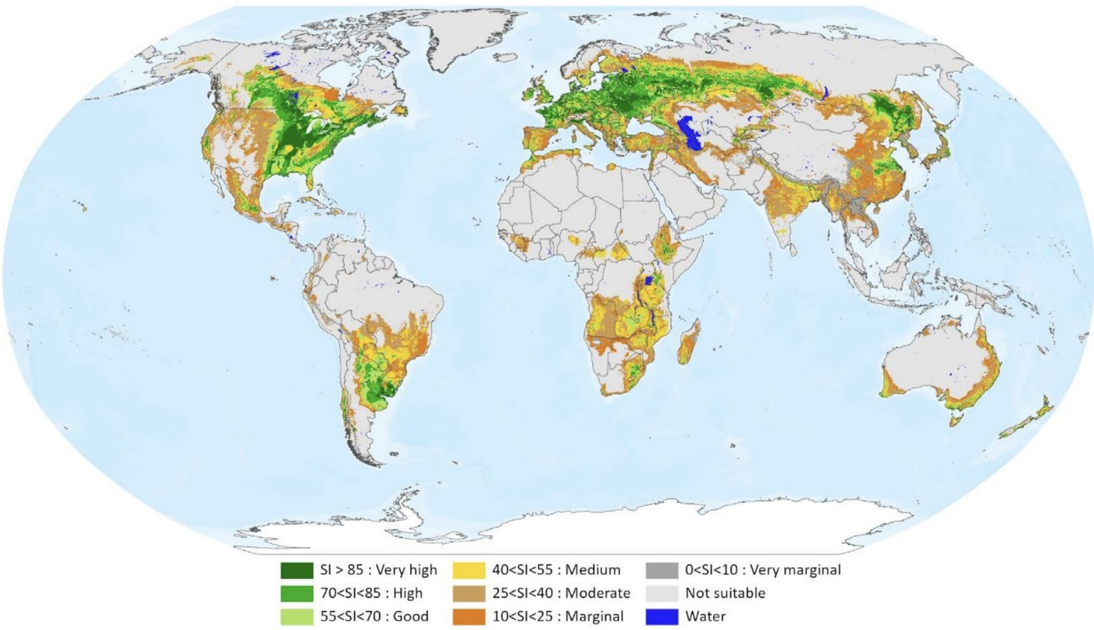


Figure 2: Suitability index (range 0-100) by class for rain-fed wheat. Results are for baseline climate (1981-2010) and assumed advanced level of inputs and management (Source: FAO and IIASA 2021)

European Bakeries rely heavily on agricultural supply chains for their raw materials, and in particular on wheat supply chains. Over half of their total corporate CO_2-equivalent emissions[2] are associated to these raw materials and wheat flour is typically also their largest emission driver. Wheat cultivation for the bakery sector alone, generated over 12 million tonnes CO_2e emissions in Europe in 2022 and typically accounts for over 80% of flour emissions (7).

[2] In the rest of this document we will use 'carbon emissions' as an equivalent to CO_2-equivalent emissions or greenhouse gas emissions.

4.2 Sustainable wheat is critical for the future of Bakery

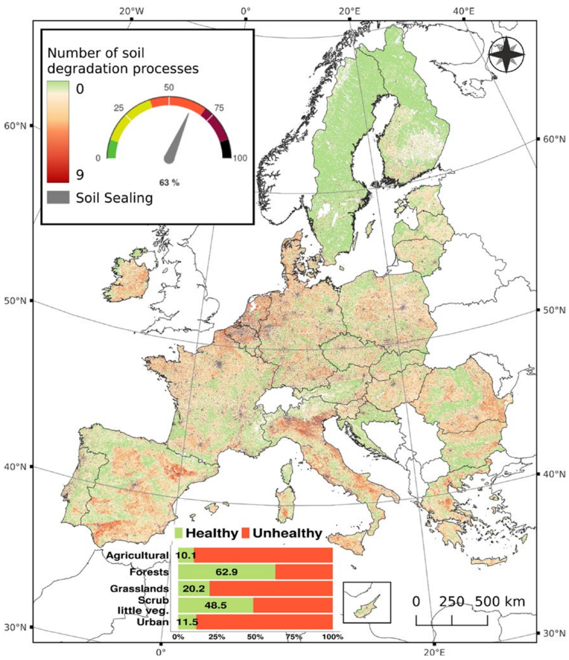
An assessment by the Food and Agriculture Organization of the United Nations (FAO) indicates that under a pathway of rapid and continued global warming, the area of current cropland suitable for wheat cultivation may decrease by as much as 20%, even when considering selection of best adapted cultivars and shifts of crop calendars to optimize climatic conditions (5).

Studies show that wheat yield globally is already hitting a ceiling due to plants' sensitivity to higher temperatures caused by global warming (8).

Impacts are only expected to be modest in Europe but serious decreases in production potential elsewhere may put significant pressure on demand, prices and production of European wheat. Nonetheless, exceptionally hot and/or dry weather conditions across large parts of Southern Europe, while other regions experienced heavy rainfall and flooding, led to a second consecutive year of falling production levels for various types of cereals (4).

In Europe, wheat production is often characterized by high-yield systems that rely on synthetic fertilizers and tillage practices to secure yield and grain quality for bread making. While these practices help ensure food security and efficient production, they typically account for over half of the carbon emissions (2) associated with wheat cultivation (7) and, depending on local conditions, have contributed to soil erosion and pollution in certain European regions (9).

An estimated 90% of agricultural soils in Europe are affected by soil degradation processes and are considered to be unhealthy (10) (see Figure 3). Some of the most important wheat growing regions in Europe (see Figure 4) are among the most degraded. This makes them vulnerable to and less resilient against adverse weather events.



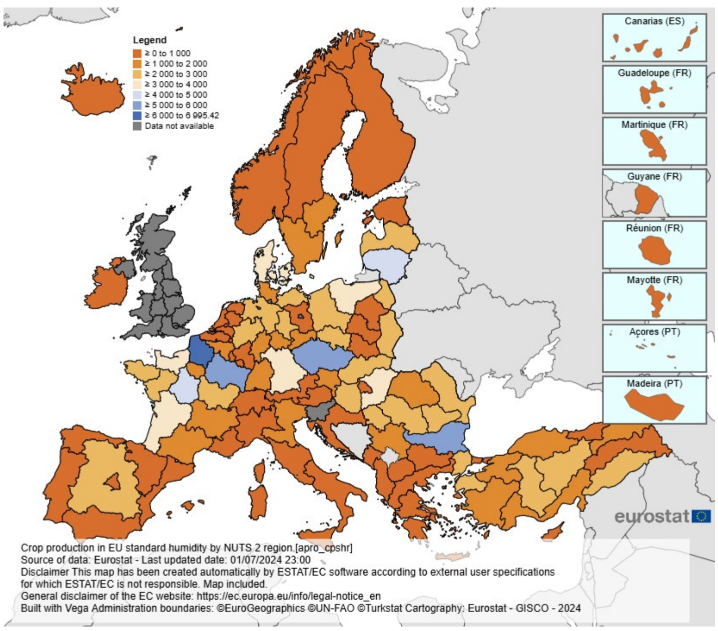


Figure 3 (left): Pan-EU assessment of soil degradation based on the latest state-of-the-art indicators of soil degradation as demonstrated in the EU Soil Health Dashboard
Figure 4 (right): Harvested production of wheat and spelt by NUTS 1 region in 2023 (Eurostat)

[2] In the rest of this document we will use 'carbon emissions' as an equivalent to CO_2-equivalent emissions or greenhouse gas emissions

There is robust evidence that soil degradation leads to a decline in its ability to support crop growth (9). In time, this will result in lower agricultural yields, affecting wheat production and economic sustainability for wheat farmers.

Unsustainable land use and conventional forms of intensive agriculture typically contribute to soil degradation as well as to climate change, which in turn may accelerate degradation of the soil (9). Prolonged periods of drought, rising temperatures, extreme fluctuations in temperature and the frequency, intensity and distribution of rainfall all have a profound impact on soil.

Meanwhile, the impact of climate change is being felt increasingly strong across wheat cultivation regions of Europe through more frequent adverse weather events. Lower crop yields due to extreme weather events could reduce bakeries' supply of flour or put pressure on prices. Therefore, the risk of climate change on bakeries that rely on these agricultural supply chains has become undeniable and joint action is needed to contain these risks and to minimize agriculture's contribution to it.

However, contrary to popular belief, sustainable farming does not necessarily have to lead to lower productivity, nor does intensive agriculture have to lead to ecosystem degradation. **By shifting to sustainable practices, European growers have the potential to reduce the climate footprint of wheat in Europe and to secure the long-term supply and quality of wheat through better climate adaptation and increased resilience of the land (12). Research also shows that the farmer's business case of transitioning to sustainable practices is often positive in the long run, but financial and non-financial transition support is needed.** These topics are discussed in more detail in the following sections.

5. Accounting for the Bakery sector's climate impact of wheat flour

5.1 Breaking down the carbon footprint of wheat flour

As what is not measured cannot be improved, it is of critical importance that a standardized approach is used by bakeries to quantify the current and future impact of their sourced wheat flour. The climate impact of wheat flour is commonly measured by its product carbon footprint based on the life cycle assessment (LCA) methodology.

There are several sources providing carbon footprint estimations of agricultural goods and food products. Examples are Agribalyse and the World Food LCA Database. For this guidance, the carbon footprint of European wheat flour was taken from CarbonCloud. This source follows the ISO and GHG Protocol Product Life-Cycle Accounting and Reporting Standards. The SWIE allows but does not expect companies to use this source to set their baseline.

The scope of the product carbon footprint is defined as the cradle-to-mill-gate. All direct and indirect emissions as detailed by Greenhouse Gas Protocol Product Standard are included. For Europe, the average life-cycle carbon footprint of wheat flour at the factory gate is estimated at 0.81 kg CO_2e per kg of flour. The average life-cycle carbon footprint of European wheat at the farm gate is estimated at 0.55 kg CO_2e per kg of wheat (Figure 5). However, this is based on statistical averages across Europe and significant differences may exist in carbon footprints between different wheat producing countries and regions.

The milling process of wheat generates more than one product, resulting into a main product (the refined white flour) and the by-products from the milling process (the germ and bran of the wheat grain). The climate impact from the agricultural processes needs to be allocated between these co-product(s). This can be done based on an economical or (bio-) physical allocation model. The economic allocation method attributes emissions to co-products based on their relative market value while the physical method attributes emissions based on a physical relationship between the input (wheat) and the outputs, such as their mass.

Per tonne of wheat around 75% of the mass of the original grain remains to form refined wheat flour. When the mass allocation method is applied, emissions are allocated in proportion to their mass and consequently the resulting emission factor per kg of flour is equivalent to that of its by-products. When using the economic method, most emissions (i.e. around 90% depending on the prevalent market values of wheat flour and its co-products) are allocated to flour given the low relative economic value of by-products compared to flour. Consequently, the resulting emission factor of flour based on the economic allocation method is 25 to 30% higher than when it is based on the mass allocation method.

There are varying perspectives on whether a physical or economical allocation method or a system expansion method should be used. Many, but not all, milling companies across Europe use the physical allocation method rather than the economic allocation method for allocating emissions to the different co-products of wheat processing. The SWIE remains agnostic and accepts both methods but requests its signing partners to ensure the same allocation method is applied consistently across all its sourcing origins and to transparently report which allocation method was used.

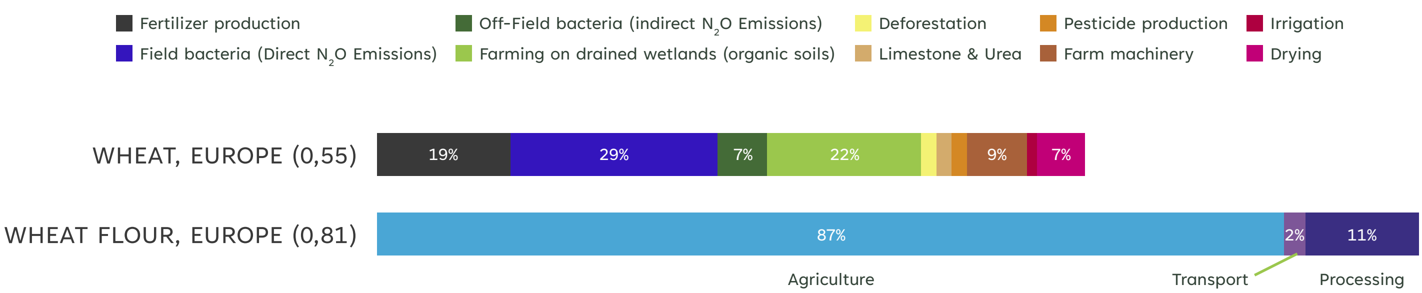


Figure 5: Carbon footprint of wheat and wheat flour in Europe, expressed in CO_2e emissions per kg of product (Source: CarbonCloud, 2025)

In this source, the climate impact is allocated based on the economic method. As a result, agricultural emissions typically drive over 80% of flour emissions as mentioned previously in this document. This percentage differs by country depending, for example, on the carbon footprint of wheat and the energy mix of each country where the mill is located.

At farm level, synthetic nitrogen fertilizer use is the largest driver of wheat emissions in Europe. Cereal crops, including wheat, are known to have a low Nitrogen Use Efficiency (NUE), meaning that a large part of applied nitrogen is not taken up by the crop and is lost to the environment due to breakdown by field bacteria or leaching into the soil (13). Estimates of the amount of applied nitrogen not used by the wheat plant vary widely depending on the region and context but range between 35% and 70% (3,14). Concretely this happens in three distinct steps, together driving over 50% of wheat emissions:

- **Fertilizer production**: synthetic fertilizers are produced from ammonia. The production process of ammonia is a highly energy-intensive chemical process using large volumes of fossil sources as both feedstock and fuel, emitting greenhouse gases in the process (15).
- **Direct N_2O emissions**: further GHG emissions are generated when fertilizers are used on-field. Naturally present field bacteria break down excess nitrogen fertilizer, releasing nitrous oxide (N_2O) (16). This is caused by application of both synthetic and organic fertilizers, and from nitrogen in crop residues left in fields.
- **Indirect N_2O emissions**: excess nitrogen is often leached and washed away into the environment and broken down into N_2O emissions by off-field bacteria later in time.

Farming on drained wetlands (organic soils) is also a significant driver (22%) of wheat emissions in Europe. One third of all organic soils are found in Europe, in the form of peatlands under waterlogged conditions. Drainage of peatlands, which have huge stocks of built-up Soil Organic Carbon (SOC), for agricultural purposes turns them into emission hotspots. Especially in (parts of) Germany, Poland, Romania, Sweden and the Baltics wheat production is at risk of being exposed to these hotspots (11,17).

Note that the n**et emissions due to land management** are not included in the wheat and wheat flour carbon footprint data points. This includes the net impact of the actual farming practices such as tillage intensity, the crop rotation, the addition of organic fertilizers and the degree of removal of crop residues on Soil Organic Matter (SOM) (18).

As a result of conventional cultivation methods SOM tends to decrease and, as SOM contains about 50% carbon, a decrease in SOM contributes to climate change through CO_2 into the atmosphere. However, the rate of decrease is heavily dependent on the management practices and can even become net positive. For example, no-tillage systems can lead to increased soil organic matter contents (18) and therefore build up carbon in the soil. Calculation of soil carbon dynamics is complex and requires large amounts of primary data of long-term measurements.

5.2 Balancing primary and secondary data for effective emissions reporting

Today, bakeries have different approaches to calculate the emissions of their sourced wheat flour, each with their own advantages and limitations

Secondary data: One approach relies on credible secondary data sources, which provide broad estimations based on established methodologies. This is a practical starting point, particularly in cases where no sustainability programs have been implemented yet. Secondary data is widely available, cost-effective, and follows robust product carbon footprint calculation standards. However, as these data sets are often based on national or continental averages, they may not fully capture variations **at a sub-national level (such as differences in energy mixes or agricultural conditions)** or of the wheat type by level of protein content.

Primary data: A further step involves utilizing primary data, obtained directly from specific value chains, especially from farm activities. This data enables bakeries to account for real-world practices, track supplier-driven sustainability improvements, and claim verified reductions in emissions. However, gathering primary data can be complex and resource-intensive, especially for companies with extensive supply chains involving multiple intermediaries.

To facilitate action towards the Manifesto target, signing partners will benefit from:

- Refining secondary data to better reflect the climate impact of purchased wheat flour based on its specific sourcing region or wheat type by level of protein content.

- Increasing the use of primary data to measure actual outcomes and track progress on emissions reduction generated by specific farming practices adopted by wheat suppliers.

Secondary data is useful for calculating emissions and making decisions but adding more granular, and primary data where possible improves accuracy and enhances sustainability efforts.

The SWIE acknowledges that shifting to primary data collection is time and resource intensive and requires collaboration across the supply chain. While this is a long-term journey, the SWIE sees emission factors based on primary data as a north star and supports using both secondary and primary data to continuously improve, while also recognizing the potential risks related to primary data quality.

5.3 Ensuring cost-effective traceability: the mass balance approach

To accelerate climate interventions at scale, the SWIE's view is that a mass balance approach is the most practical method to manage the chain of custody of lower-carbon wheat flours. The mass balance approach ensures the reliable tracking and accounting of certified product volumes across the supply chain without requiring physical segregation from non-certified products. This method is built on key principles such as transparency, accurate documentation, and consistent monitoring to ensure credibility and traceability.

The EU Green Claims Directive does not explicitly mandate full physical traceability for bakeries to be able to make certified claims. However, it does emphasize the need for reliable, comparable, and verifiable environmental information. This means that companies must substantiate their green claims using robust, science-based methods and have these claims verified by an independent and accredited verifier. Whether the mass balance approach is generally considered sufficient under the directive still needs to be confirmed once the proposal is adopted.

If companies want to account for and report all land management emissions and removals, they should adhere to the requirements specified by the Draft Land Sector Removals Guidance (LSRG) of the GHG Protocol (19), including the requirement to have physical traceability. To comply with the conditions of physical traceability, a mass balance chain of custody model is not supported if companies want to account for carbon removals or emissions based on primary farm level data. However, a 'controlled blending' mechanism may be allowed.

A controlled blending mechanism is defined as a chain of custody model in which materials or products with a set of specified characteristics are mixed according to certain criteria (e.g. a lower carbon footprint) with materials or products without that set of characteristics resulting in a known proportion of the specified characteristics in the final output.

Given the importance of a mass balance approach for the viability of sustainable wheat farming programs and given that the specific requirements regarding physical traceability in the Draft Land Sector Removals Guidance were still subject to review, the SWIE allows for a mass balance approach. This document will be updated if the final version differs from the draft version.

The mass balance approach is widely used in certification schemes like the International Sustainability and Carbon Certification (ISCC), which aligns closely with the directive's requirements. The SWIE recommends that any mass balance system should adhere to the ISSC EU 203 standard on Traceability and Chain of Custody (20).

Looking ahead, better segregation by quality and CO_2 intensity may be needed to fully be able to leverage the benefits of improved wheat quality and lower carbon footprints achieved through sustainable farming practices or advancements in breeding. However, while this could open up new opportunities along the value chain, it is important to acknowledge that such measures will likely require additional capital investments, particularly in storage capacity at the mill level, and operational expenditures in the form of added product handling. This may in turn cause unintended new emissions.

[3] The GHG Protocol Land Sector Removals Guidance was still in a draft version at the time of writing. The specific requirements regarding physical traceability of removals is still subject to review. This document will be updated if the final version differs from the draft version.

6. Putting the Manifesto into action: the SWIE Guidance

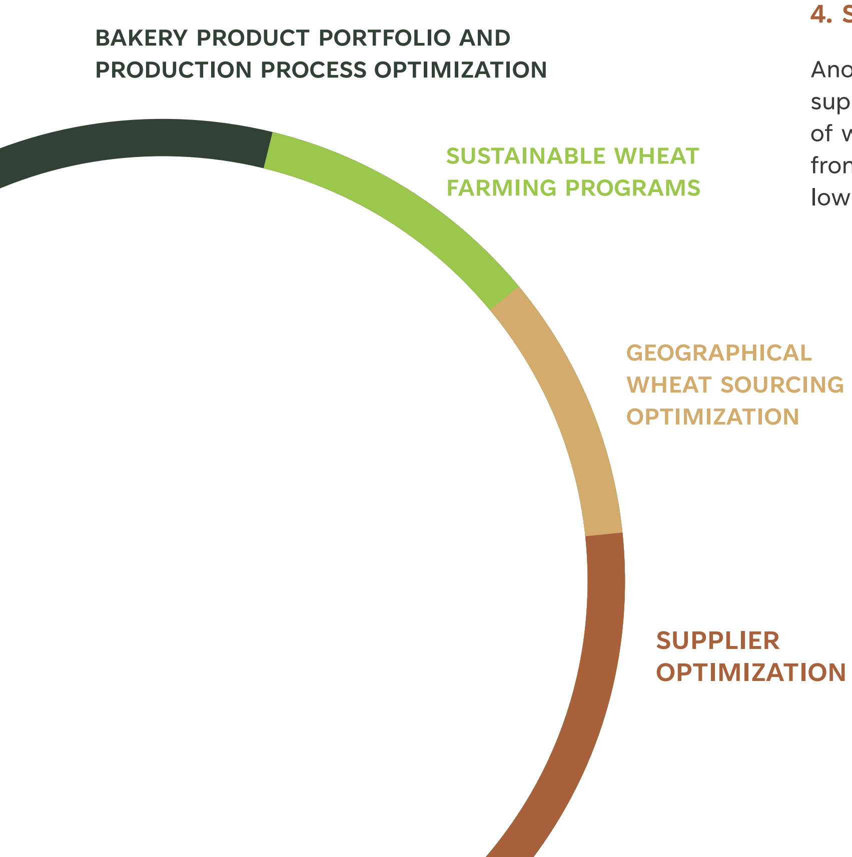
6.1 What action levers do bakeries have to reduce emissions?

Bakeries have several important levers in hand to directly reduce the climate impact of the wheat flour they source through the business decisions they take.

1. Bakery product portfolio and production process optimization

In the first place, bakeries should assess internally how they can reduce their wheat carbon footprint. This can be done by optimizing their product portfolio through new product development, recipe revisions or ingredient substitutions, for example by using more wholegrain wheat and rye flour. Another set of measures could be found by optimizing production processes to minimize wheat-related food waste.

In addition, loosening certain product and ingredient specifications can help open up opportunities for more sustainably produced wheat within the supply chain. Not every application necessarily requires the highest possible protein levels in wheat flour. In certain cases, carefully adjusting specifications while maintaining baking quality and product taste can enable the use of more sustainable wheat.



2. Sustainable wheat farming programs

Collaborations with supply chain partners on targeted sustainable wheat farming programs are the most promising lever to tackle emissions, as they aim to contribute directly to reducing on-the-ground emissions from wheat cultivation.

When wheat growers apply a holistic set of sustainable farming practices (described in more detail in section 6.3), the carbon footprint of wheat could potentially drop significantly over time. However, to ensure a positive business case for sustainable farming programs it needs to be done in a profitable, fair, transparent and durable manner and several conditions need to be met to ensure this. These conditions are described in the following sections.

3. Geographical wheat sourcing optimization

Large variations exist between regions in terms of climate impact in different growing regions of Europe due to a range of different reasons: degrees of soil fertility and suitability for wheat, different cultivation techniques, different fertilizer types and energy mixes, etc. Within reasonable limits, bakeries and their value chain partners can leverage these regional variations by optimizing the different cultivation origins to minimize the total climate impact of purchased wheat flour.

4. Supplier optimization

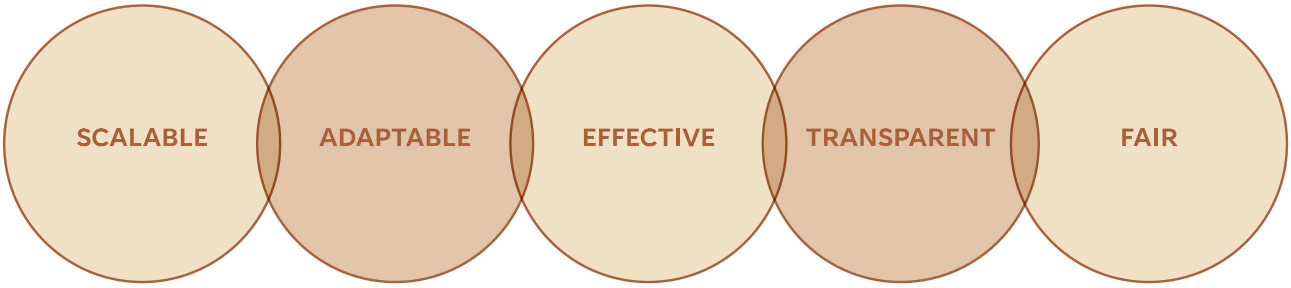
Another way to reduce emissions is by optimizing the supplier base to shift purchased volumes to suppliers of wheat with lower emissions, e.g. by sourcing wheat from farmers applying soil conservation practices or low-carbon fertilizers.

6.2 A basic framework for designing and evaluating programs

To reach the target of 30% carbon footprint reduction per tonne of wheat and wheat flour by 2030, each signing partner will need to devise a strategic action plan for reducing their emissions. While these plans are essential for achieving the target, they do not need to be publicly disclosed. The SWIE also leaves freedom for companies to devise a strategy suitable for their context and does not stipulate any criteria in terms of which action levers to prioritize or how to deploy them.

However, bakeries will almost certainly need to collaborate with supply chain partners on sustainable wheat farming programs (either co-developed, bakery-led or supplier-led) to drive direct and significant emissions reductions. There are many ways to set up such programs, but the SWIE has defined a set of design principles against which any new or existing sustainable wheat farming program should be evaluated. Concretely, each program should be designed in such a way that it is scalable, adaptable, effective, transparent and fair. These concepts are described in more detail below.

Figure 6: Key design principles of any sustainable farming program



- Standardized method & approach applicable to all farming scenarios
- Approach can be copied across geographies, suppliers, crops, etc.

- Considering farms' state of advancement on sustainable practices
- Acknowledging that it is a journey: step-by-step roll-out of practices
- Taking a long-term perspective & commitment

- Pragmatic focus on real improvements over perfect data accuracy
- Prioritizing practices with the highest 'Sustainable ROI'
- Ensuring that farmers understand what they can and need to do

- Applying recognized measurement and calculation methods
- Primary data is verified by credible third-party auditors

- Farmers are compensated for costs incurred, risks of transitioning and outcomes
- Costs are fairly distributed across the value chain

The SWIE also recommends any sustainable wheat agriculture program to cover at least the following 6 basic components which are described in more detail in the following sections. This was inspired by a combination of existing frameworks developed by corporate-driven sustainability coalitions, such as the SAI Platform, OP2B and the Sustainable Markets Initiative (see Annex A for an overview of example existing frameworks and where they differ).

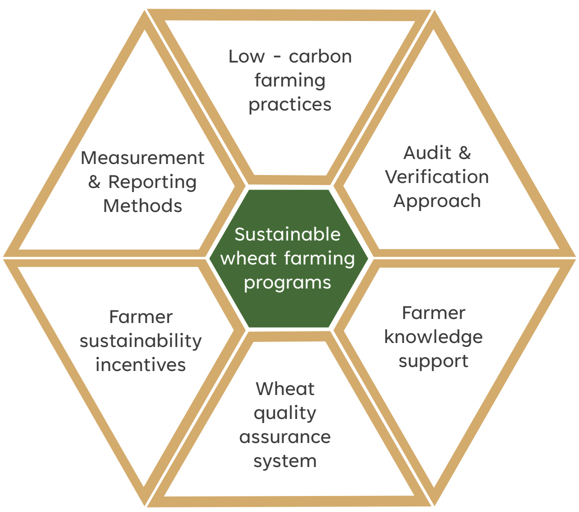


Figure 7: 6 basic components of any sustainable wheat farming program

6.3 Low carbon farming practices

Companies will need to focus their resources on reducing the impact at the level of wheat cultivation. Growers have a toolbox of agricultural practices at their disposal with the potential to reduce GHG emissions or to remove carbon through soil carbon sequestration.

The SWIE encourages bakeries and their supply chain partners to design sustainable wheat farming programs adopting the agricultural practices that align best with their local context, provided they contribute to lowering the climate impact of wheat.

The SWIE encourages practices that not only reduce GHG emissions but can also enhance carbon sequestration while improving soil health (21,22). These are commonly referred to as Carbon Farming Practices, which we will categorize as Category 1 practices. Carbon farming is a practical approach to farming. These practices are an important contributor to mitigating climate impact (23), while also unlocking other co-benefits such as reduced soil erosion, improved water retention, more resilient farming yields, improved above- and below-ground biodiversity. There is also an increasingly large body of scientific evidence pointing to the positive link between soil health and higher nutrient density of crops.

The SWIE also encourages pure Soil Health Practices (Category 2) that are beneficial for soil health but have limited direct impact on emissions, or Low-Carbon Input Practices (Category 3), that primarily reduce emissions without a direct impact on soil health. The toolbox contains practices from all three categories, enabling a flexible yet structured pathway for transition. The figure below provides an overview of a (non-exhaustive) list of practices included in the toolbox.

Any program should ideally include measures across all three categories to ensure it contributes to carbon footprint reduction and the improvement of soil health where soils have been degraded, or its maintenance in areas where soil health is considered favourable (e.g. large parts of the Nordics).

In contrast, certain agricultural practices can contribute to challenges such as soil degradation, biodiversity loss, and carbon emissions, depending on how and where they are applied. Practices like intensive tillage, over-application of fertilizers or pesticides, mono-cropping, or leaving soils bare between crop cycles may have negative effects under most farming conditions. These practices are discouraged in such conditions. It is important to note that many farmers already implement some sustainable practices, also within conventional systems, to safeguard soil health and productivity.

CATEGORY 1 Carbon Farming Practices	CATEGORY 2 Soil Health Practices	CATEGORY 3 Low-Carbon Input Practices
• Diverse cover crops (including nitrogen-fixing legume crops) • Integrating crop residues • Diverse crop rotations • Mixed cropping, including with nitrogen-fixing crops • Zero tillage or conservation tillage • Substitution of artificial by organic fertilizers and other organic soil amendments • Integrating grazing livestock to build soil carbon and stimulate root growth • Integrating agro-forestry and perennials	• Precision crop protection product application • Reduced application (and eventual elimination) of chemical crop protection products • Substitution of chemical by organic crop protection • Integrated pest management (combination of the above) • Planting diverse flower strips (that host beneficial insects that feed on pests) • Re-wilding parts of agricultural fields	• Precision fertilization • Use of ‘green’ or ‘blue’ fertilizers • Use of nitrification inhibitors • Electrification of farm equipment • Use of renewable energy (produced on-or off-farm) to power farm equipment • Use of biofuels (produced on- or off-farm) to power farm equipment • Other precision farming techniques (e.g. mechanical weed removers) • Selecting the appropriate wheat variety

Figure 8: Toolbox of possible sustainable wheat farming practices to be chosen by any farmer

The SWIE understands that the practices most suitable for any given farmer are highly dependent on their local climatic, agronomic, ecologic, political and economic context and as well as their starting point and progress towards adopting more sustainable practices.

For example, regenerative practices may have much lower effectiveness in regions with high Soil Organic Carbon saturation levels (e.g. Nordics countries) and adoption rates of cover cropping vary across countries (France - High, Romania - Moderate, and Spain - Low) due to differences in local agricultural policy (24).

We propose a framework with a phased approach for farmers to adopt sustainable farming practices depending on their complexity (25). For example, some practices, such as crop rotation, can be considered general practices for many European growers today. Others, such as conservation tillage, can be considered intermediate practices. Finally, no-till farming and undersowing with a suitable cover crop are considered advanced practices.

This was combined with the 3 Categories in Table 1 below. Farmers may begin Stage 1 on a part of their land and wait until the system is stabilized before expanding to the entire farm and transitioning to Stage 2. Depending on the starting point of the farmer (e.g. degraded land, nutrient excess/deficiency, etc.) the decision tree in Annex B can be followed for prioritizing practices.

	Discouraged practices	**Stage 0: Common practice**	**Stage 1: Intermediate**	**Stage 2: Advanced**
Category 1 Carbon Farming practices	N/A	Annual crop rotation One cover crop	Legume crop in rotation Diverse cover crops Conservation tillage Crop residue integration Intercrop with legume Use of biofertilizers	2 added crops in rotation Undersowed cover crops No-till Switch to biofertilizers Livestock integration
Category 2 Soil health practices	N/A	Wildflower strips	Lower pesticide toxicity	Use pest-resistant species Organic crop protection Re-wilding part of field
Category 3 Low carbon input practices	N/A	Renewable energy use Equipment electrification Use of biofuels	Precision fertilization Green/Blue fertilizers Nitrification inhibitors	N/A
Discouraged practices	Intensive tillage Leaving soils bare Over-application of fertilizers (low NUE)	N/A	N/A	N/A

Figure 9: Phased sustainable farming transition

6.4 Farmer sustainability incentives

Research shows that the farmer business case of transitioning to sustainable practices can be positive in the long run, but the journey to get there has challenges (27). Farmers cite tangible benefits from sustainable farming, notably healthier soil, reduced input costs, and better yield resilience to climate events.

Evidence suggests that sustainable farming practices do not necessarily negatively affect profitability when compared to conventional farming and farmer's profit can increase (25,28–30) when a farm reaches a steady state after implementing sustainable farming practices. Moreover, they are likely to increase resilience to extreme weather events and market disruptions (28).

Several reports stated positive outcomes for farmers following the transition, a few of these are described below:

- A 2019 report from Systemiq and Soil Capital (31) estimated a break-even point after 2 years of transition for cereal farmers in the Marne region in France, fully driven by input cost savings (~€12 per ha) while keeping yields (and revenue) steady.
- A 2023 report from BCG in collaboration with NABU (25) estimated that farmers' profits after implementing sustainable farming practices can increase by 30% or more based on a modelled cost-benefit analysis for representative cereal and oil seed farmers in Germany.
- A 2024 report by AHDB (30) reported that UK winter wheat farmers who adopted the largest number of sustainable practices had around 10% lower cost of production than other farmers, while yields declined by around 5% compared to those other groups.
- A 2025 report by Deloitte in collaboration with OP2B (WBCSD) (32) estimates that implementing the six most common regenerative practices in an average UK farm with a diverse crop rotation including wheat increases net profit by €70/ha/year in the first 5 years and €210/ha/year in the subsequent 5 years compared to a conventional system. The main drivers are projected yield increases (+10% for wheat in a mature stage) and reduced costs.

Notably crop rotation, reduced tillage, cover crops and the effects of less fertilizer usage are reported to reduce the cost of production in many cases (28). **In other cases, the cost of production may increase, for example if the focus lies primarily on emissions reduction through use of so-called 'green ammonia'. The extent of the net impact on profit (positive or negative), while often positive, is highly dependent on such factors as the applied practices, the farmer's location and context (e.g. soil health, farm economics and commodity prices)** (23).

Investigation by the Sustainable Markets Initiative showed the following reasons why it is not scaling today despite the potentially positive business case (25,29):

- The perceived short-term economic risk is considered high for the average farmer. Farmers look for economic incentives to adopt sustainable farming practices. It is an important roadblock.
- While many farmers already possess strong knowledge and experience, there can still be a potential knowledge gap regarding the implementation of sustainable farming, depending on local conditions.

Typically, shifting to sustainable farming practices leads to a temporary yield drop in the first two to seven years, leading to a revenue drop. The length and depth of this dip period depends on factors such as location, and specific practices applied. Many studies have shown that sustainable agriculture can produce yields that are comparable or even higher than conventional methods (31). It has even been shown that some farmers see positive economic results and no yield reduction during the first year (25).

Often, this revenue drop also coincides with new operating costs (e.g. cover crop seed mixes, higher cost of green/blue fertilizers) and new capital costs (e.g. specialized harvesting equipment, precision fertilization technology) that are not yet compensated by lower costs in the long run as the system is not yet in a steady state (i.e. when yields have recovered and stabilized).

A 2025 report by Deloitte (32) estimated an average yearly profit impact of between approximately -€100 to -€200 per hectare for wheat farmers in France, Germany and the UK during the transition compared to a situation of conventional farming[4]. This translates to a negative profit impact of approximately -€15 to -€30 per tonne of wheat produced during the transition. While highly context dependent, this corresponds in order of magnitude with impacts estimated in other reports (25). **The numbers reported here should by no means be seen as covering every farming scenario.**

Today, most wheat farms tend to be low-margin

[4] This reflects the following assumptions:

1) a 15% lower yield compared to an average yield of 7.5 tonnes of wheat per hectare before the transition

2) an investment cost of €2000 to €5000 per hectare

3) a cost per tonne of wheat of €200 to €240

operations applying intensive practices to maximize yields, often relying on financial credit. As farmers are already exposed to significant financial and weather risks, they are not inclined to take on the additional risk of shifting to new production methods.

Farmers need help. Holistic incentive schemes and risk-sharing mechanisms are needed (25) to stimulate the farmer to transition while sharing costs along the bakery ecosystem so that it remains affordable for all stakeholders providing funding.

These incentive schemes may take the form of sustainability premiums, supply chain finance, debt instruments, insurance mechanisms, subsidies, philanthropy, etc. Ideally, it would be a combination to distribute the burden equitably among stakeholders. Additionally, economic costs and risks may not only be shared along the wheat value chain but also across commodity value chains – as most farms grow multiple crops – and outside of value chains (e.g. with governments, banks, investors)

Examples of instruments to make the economic incentive for farmers more attractive (32,33):

For Bakeries and other farm off-takers: offer a sustainability premium on top of the market price for conventional wheat and other crops produced at the farm during the transition. This could cover (a portion of) the additional costs and investments associated with agreed-upon practices or by attaching a monetary value to verified positive carbon footprint outcomes, or a combination of both. Given that sustainable agricultural practices affect the entire crop rotation, risks, costs, and emissions should be pooled among all off-takers purchasing different crops from the same farmer.

No official reports were found that estimated the ideal size of a premium (on a per tonne basis) a wheat farmer should receive to adopt sustainable practices and safely get through the transition. This remains within the remit of individual companies to decide together with their value chain partners.

For Banks: offer transition loans (e.g. reduced rates, flexible repayments, extended grace periods and longer repayment periods) that reduce the financing burden during the riskier transition period in order to improve farmer resilience and environmental outcomes in the long-term, resulting in a stronger risk profile.

For Insurers: offer special crop insurance for sustainable wheat, reflecting improved long-term resilience. Examples include reduced insurance premiums and higher coverage.

For Landowners (if the farmer does not own the land): integrate sustainable farming requirements and incentives (such as reduced rent and long-term contracts) into the tenancy agreement, given that healthier land may cause its value to increase.

For Governments: award subsidies and grants to farmers for applying individual practices or a set of practices. This can be within or beyond the existing CAP mechanism.

When starting a new sustainable wheat farming program with suppliers, or when evaluating an existing program, it is important to ensure that it has a blend of incentives built in to foster sustainable practices adoption by farmers. Combining incentives into one sustainable wheat farming program in a coordinated manner helps share the risks and costs of the transition (34).

While farmers clearly need to be incentivized in their transition, it is also of crucial importance that sustainable farming programs are set up in a way that is fair, effective and transparent for bakeries and other value chain actors. To this end, in their individual commercial negotiations, parties may ask questions such as:

Actual sustainable practices: Are premiums for actual, verifiable sustainable practices by the farmer or are they solely due to pre-existing geographical differences?

Additionality beyond common practices: Are premiums for additional sustainable practices with verifiable outcomes by the farmer or are they simply reflecting a shift from discouraged practices to common practices? What is considered 'common practice' may vary between different EU countries.

No duplication: Do premiums reflect a fair value for the sustainable practices applied by the farmer and/or the outcomes achieved and has this cost not already been covered by a different farm off-taker?

Farmer-centric: Do the incentives go to sustainable practices by the farmer rather than being diverted to other actors, such as consultancies or service providers? If part of these incentives are diverted to other actors, do these incentives present a clear added value for the farmer?

6.5 Farmer knowledge support

Adopting sustainable agriculture at scale requires a mindset shift from the bakery ecosystem, and in the first place from wheat farmers. To accelerate this shift, new knowledge and skills are required which need to be shared across the value chain. Sustainable farming programs should ideally have educational elements built in.

Sustainable systems rely on nature's complex ecological relationships to drive down the carbon footprint of wheat and to restore soil health. This is a paradigm shift compared to conventional farming, and it is essential that farmers master the skills needed to work with soil ecosystems.

This can be done in sustainable wheat farming programs by providing farmers with access to trusted sources of knowledge in a coordinated way. A few possibilities are described below.

Independent expert advice: Agronomists typically are trusted advisors of farmers, and it is important that they understand soil health processes and sustainable farming systems and can support them on their sustainable transition. They are often connected to the historical farming cooperative the farmer is associated with. NGOs, agricultural ministries, universities and farm consultancies also provide specialized advice on sustainable practices. The SWIE encourages involving independent agronomic training and advice.

Local peer knowledge sharing: Farmers often also learn a lot from other local farmers facing the same context. In many countries, networks already exist where farmers gather on- or offline to share knowledge. Where such networks exist, programs can support these initiatives with funding and expertise. Where it does not exist, the program could create a new forum for peer-to-peer knowledge exchange. These peer-to-peer networks can be complemented with model farms where farmers can observe and learn in practice how sustainable and regenerative farming works.

Digital tools: Other methods for supporting farmers in bridging the knowledge gap is by providing them with access to data, tools and technologies that provide farmers with insights in their farming operation and help them in optimizing their practices to steer towards sustainable and profitable outcomes. Several MRV vendors have added specific farmer modules to this end.

Incentive-based knowledge building: Finally, programs can build in incentive mechanisms for famers to pursue training programs, for example, by contracting with farmers who have participated in recognized programs and demonstrated they have shifted to sustainable farming.

6.6 Credible measurement & reporting methods

Calculating the impact of selected farming practices on wheat emissions as part of a sustainable wheat farming program is a complicated effort requiring many data points that reflect the actual practices applied by farmers and possibly also details on the local agro-ecological zone (including climate and soil type).

This is because agriculture relies on nature's complex ecological systems. How these systems behave is dependent on the local landscape, including climate and the properties of the soil, and can also be significantly influenced by farming practices and the inputs applied to the field. It is also dependent on the legacy of farming activities on the farm in question.

To avoid the risk of greenwashing concerns, this calculation process needs to be done as diligently as possible and in line with the latest scientific insights and calculation standards to ensure accuracy, especially if soil carbon sequestration outcomes are to be included.

The SWIE requests signees to align with existing standards. The Framework provides a standardized methodology for calculating and exchanging product-level carbon footprints (PCFs). It aims to create accurate, granular, and comparable emissions data across value chains by aligning with existing guidelines and standards like the GHG Protocol.

If a company chooses to account for carbon removals in its reported emissions, particular attention should be given to ensuring long-term credibility. Removals should be reported separately and should adhere to the EU's Carbon Removals and Carbon Farming Regulation (CRCF) and the GHG Protocol's Land Sector Removals Guidance (LSRG).

According to the GHG Protocol LSRG, companies are required to account for land use change (LUC) and land management emissions in addition to non-land (i.e. fossil fuel driven) emissions may account for and report carbon removals (e.g. soil carbon sequestration) only if the following requirements are met:

- Ongoing storage monitoring to demonstrate that the carbon remains stored or to detect losses
- Traceability throughout the full CO_2 removals pathway, including to the carbon sinks
- Primary data specific to the carbon sinks where carbon is stored in the value chain
- Quantitative uncertainty estimates for removals
- Removal reversals accounting if and when losses occur

On the other hand, for the average bakery the process of collecting these data points at farm level from a typically large number of farms requires an unreasonably high time investment, even if this data is first gathered and consolidated by its suppliers. Moreover, many bakeries are not able to trace back purchased flours to their specific farm origins. A pragmatic balance needs to be found that combines ease of data collection at scale with credible, verifiable and science-based calculation of outcomes.

Digital Measurement, Reporting & Verification (MRV) platforms often streamline and accelerate the data collection process by consolidating data from sources such as remote sensing, soil sampling, and farmer reports and typically have carbon accounting rules from prevalent standards already built in.

6.7 Audit & verification approach

Credibility in sustainability reporting is critically important for the SWIE. Engaging independent third parties to verify the data and calculation methods ensures that reported data is robust, consistent, and aligned with international standards. This builds trust in the reported outcomes while minimizing the risk of greenwashing. At the same time, verification underscores the commitment of member companies to transparency and accountability.

Verification should be conducted by accredited and independent organizations. All reported emissions must adhere to the recognized and robust standards mentioned in previous sections. There are numerous providers in the market offering third-party verification services.

These providers assess compliance with international standards, validate data accuracy, and assist companies in implementing effective climate strategies. Companies should select providers based on their specific requirements and contexts, balancing the need for robust verification with strategic goals.

Verification relies on data that meets stringent quality criteria. Reported emissions must be comprehensive, geographically and temporally relevant, and fully transparent. High-quality data allows for credible comparisons and ensures that emission calculations are consistent with key standards.

Companies should engage accredited organizations at an early stage of the verification process to ensure compliance with relevant standards. The focus should be on high-quality primary data and robust calculation methodologies to achieve credibility in reported emissions.

Digital Measurement, Reporting & Verification (MRV) platforms often simplify the verification process by enabling automated data processing, enhancing traceability and transparency of agricultural practices, and can be instrumental in establishing a reliable foundation for data collection and reporting.

6.8 Wheat quality assurance system

As wheat flour is the most important ingredient for bakeries, maintaining consistent wheat quality is non-negotiable for the baking industry, regardless of the agricultural practices applied. It is important to ensure that its quality can be guaranteed in the context of a sustainable wheat farming program. Flour mills are the core gatekeepers for assuring flour quality.

The mass balance principle and blending strategies (i.e. mixing of various wheat streams of various quality to meet final flour customer specifications) will play a crucial and increasingly important role to mitigate the increased variability we expect to see due to the introduced farming changes as well as climate change, disruptive markets and geopolitical dynamics. Programs should build in quality assurance mechanisms with mills and other value chain partners to assure a sustainable supply of high-quality flour from farms transitioning to sustainable practices.

To this end, it is important to have a clear understanding of how quality is measured and how it can be influenced. Bakery wheat represents a specific group of wheat types (varieties/cultivars) having certain chemical composition and genetic characteristics. These wheat types assure the correct specific range of dough forming, physico-chemical and rheological properties for producing high quality bakery products such as breads, baguettes, rolls, viennoiserie, pastries, snacks, and cakes. In this context, wheat breeding also becomes particularly relevant.

Among the key quality attributes of bakery wheat are grain size, protein and gluten content and quality (including a good and balanced distribution of gliadins and glutenins), starch properties, enzymatic activity, color, smell, absence of foreign material, pests, and microbial contamination (35).

These wheat quality attributes are highly influenced by many factors, such as:

- Genetic makeup of seeds (i.e. some varieties are better suited for bread making, some have better disease resistance, or produce bigger grains, etc.)
- Climate (temperature, rainfall/drought, hours of sunlight)
- Soil characteristics (amount of nutrients and their availability, pH, microbial activity)
- Farming practices (e.g. planting density, time of sowing, fertilization, pest control, crop rotation)

- Harvest conditions (e.g. time of harvest)
- Post-harvest and storage conditions (temperature, humidity, ventilation)

A typical example of such influence is the direct relationship between nitrogen (N) fertilizer and wheat protein content together with the other quality attributes of the grain at harvest (36). Subsequent flour quality is dependent on incoming wheat quality, but also on the transport and milling process.

Not every application requires the absolute highest protein content. Thoughtfully adjusted specifications can enable the use of more sustainable wheat while maintaining product performance and quality standards. In this context, variety selection becomes equally important: the right wheat variety, thanks to its specific genetic characteristics, can deliver the desired baking quality even at lower protein levels. This opens up opportunities for utilizing a broader range of wheat qualities while supporting farming systems with reduced nitrogen input (37).

By increasing yields breeding has significantly reduced emissions intensity across the last decades. However, significant negative correlations have been observed for grain yield and baking quality as well as grain yield and mineral content (i.e. important micro-nutrients for human health such as Iron, Zinc and Manganese) (38,39).

Conversely, scientific research indicates that improved crop quality is among the long-term benefits of sustainable farming practices (40). Farming practices have been shown to affect the gluten sub-components, namely a variation in gliadins and specific glutenins, rather than the total gluten content of the wheat flours. This suggests higher grain quality with a possible positive effect on dough-handling properties (41) can be achieved without increasing the gluten content (and hence nitrogen fertilizers), while yields may reduce slightly.

The impact of sustainable farming practices on wheat quality, yield and environmental performance is complex. On the face of it, it appears that all three cannot be optimized in conjunction. However, as research continues, we can expect to see a growing body of evidence supporting the potential benefits of sustainable practices and breeding for both crop quality, yield and environmental impact (42).

7. Conclusion and future perspectives

The transition to sustainable wheat farming is not only a response to the increasing climate- and market-related risks facing the European bakery sector, but also a major opportunity to secure long-term resilience, product supply and quality and economic sustainability.

The Sustainable Wheat Initiative Europe provides a common framework for collective action and shared learning. It allows bakeries and their supply chain partners to make credible progress towards a 30% emission reduction by 2030 through a combination of actions including sustainable farming programs. Three areas will deserve particular attention in the near term:

1. The development and scaling of sustainability programs that are tailored to local farming realities while supporting farmers in their transition through fair incentives and access to knowledge and implementation support.
2. Availability of robust yet cost-efficient systems for measuring, verifying and reporting progress using credible, science-based methods.
3. Quality assurance systems ensuring that flour quality remains high and stable by reinforcing collaboration with mills and investing in blending and quality assurance systems.

In addition, breeding can effectively complement and enable sustainable agricultural practices on the path to more sustainable, climate-friendly farming. While wheat varieties are often selected for traits leading to high yield in conventional agricultural systems with organic-matter poor soils (43), these are not expected to perform as well in sustainable farming systems aiming to mitigate climate impact. Breeding should increasingly focus on performance in soil-health building farming systems to close the yield gap while enhancing breadmaking & nutritional quality, and environmental sustainability (43).

Looking toward the future, the success and scalability of the Sustainable Wheat Initiative will hinge on several critical factors. First, policy coherence across EU member states must be strengthened to create an enabling environment that supports sustainable practices through incentives, subsidies, and regulatory alignment. The upcoming iterations of the Common Agricultural Policy (CAP) offer a crucial opportunity to integrate SWI principles more explicitly into Europe's broader agricultural agenda.

Second, greater investment in research and development will be essential to advance innovations in crop genetics, digital farming, and sustainable inputs. Technologies such as artificial intelligence, remote sensing, and blockchain offer transformative potential in optimizing resource use, enhancing traceability, and improving decision-making on the farm level. These innovations must be made accessible to small and medium-scale farmers to ensure inclusivity and widespread adoption.

Third, engaging the next generation of farmers, researchers, and policy advocates is vital to sustaining long-term momentum. Education and training programs, particularly those that bridge scientific research with practical application, can play a key role in this endeavor. Moreover, cross-sector partnerships—linking the broader wheat ecosystem and other commodity value chains—should be expanded to pool resources and expertise toward shared sustainability goals.

As Europe continues to grapple with the realities of climate change, geopolitical tensions, and shifting trade dynamics, the Sustainable Wheat Initiative stands as a timely and adaptable model for resilient agriculture. Its continued evolution will not only shape the future of wheat production in Europe but may also serve as a template for sustainable cereal systems worldwide.

8. Annexes

A. Frameworks & platforms

The AIBI CEO Sounding Board expert group investigated the sustainable agriculture frameworks provided by the below listed initiatives with the aim of drawing inputs and inspiration for its own guidance for bakeries for setting up or participating in sustainable wheat farming programs.

- Sustainable Agriculture Initiative (SAI) Platform
- Sustainable Markets Initiative
- One Planet for Biodiversity (OP2B)
- Regen10
- Land to Market
- Food and Land Use Coalition (FOLU)
- Cool Farm Alliance

All these initiatives aim to provide a framework for food and beverage actors to address the needs of farmers and the wider agricultural value chain to implement sustainable agricultural practices

However, they differ to a greater or lesser extent on a number of aspects:

- Definition of Regenerative Agriculture
- Service offerings (tools, guides, manuals, handbooks) for regenerative farming
- Best practice sharing, support and networking opportunities
- Guidance for farmers to drive outcomes and implement practices
- Guidance on how to measure and evaluate the impact of regenerative practices
- Independent third-party validation
- Identifying the barriers and how to manage them
- Case studies, specifically on wheat
- Alignment with SBTi and GHG protocol
- Guidance on financial solutions and incentives for farmers
- Geographical presence/support in Europe

Given the unique characteristics and requirements of the bakery sector, it is important to remain aware that not all elements of international broad frameworks are 100% applicable under all circumstances. As a result, the SWIE developed a bakery-specific guidance.

B. Decision tree for prioritizing sustainable farming practices

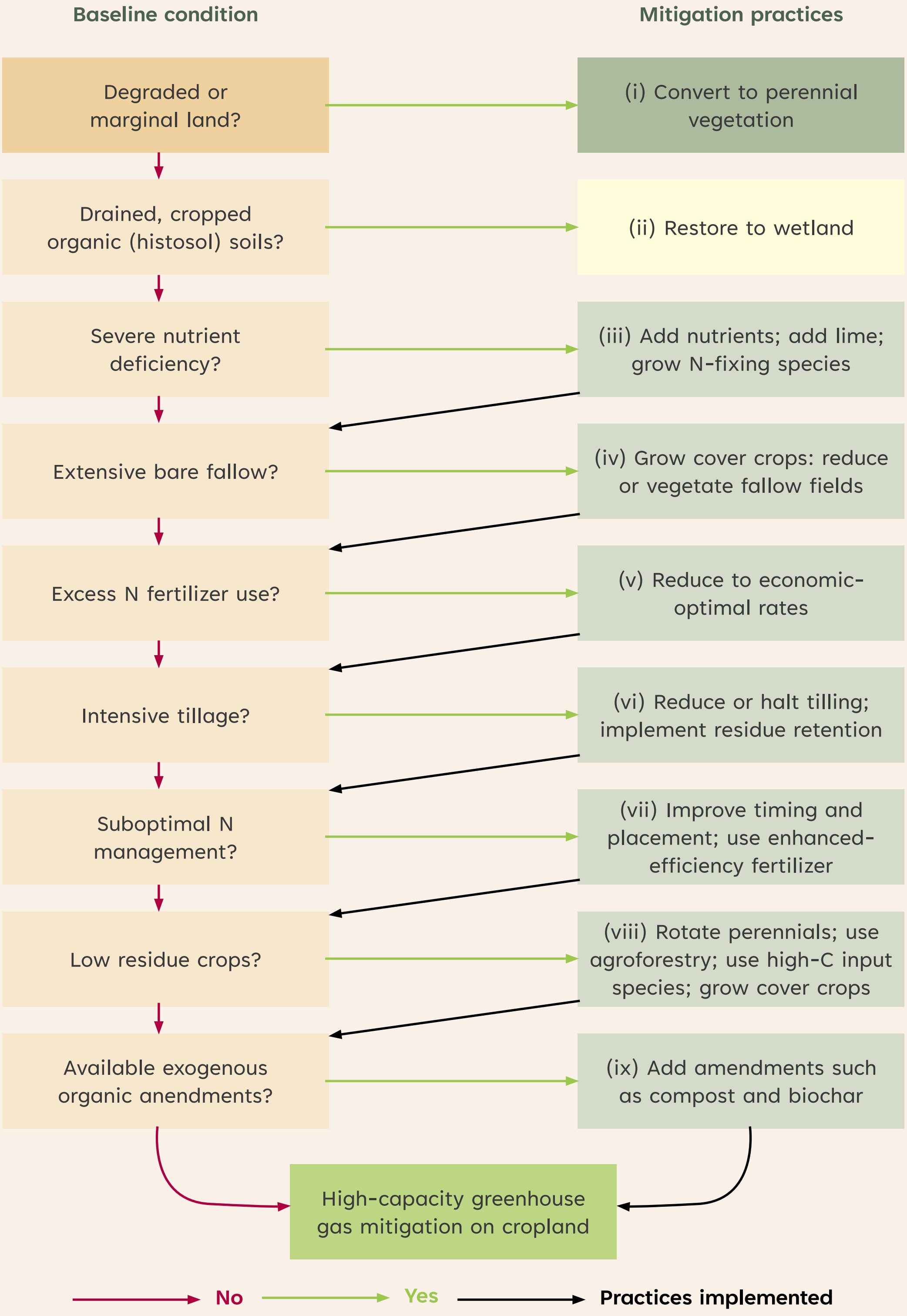


Figure 10: Decision tree for cropland greenhouse gas mitigating practices illustrating how carbon smart agriculture depends on the starting context of any given wheat farming activity (26).

C. Table of figures

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