

Water protection bread

Actors of the whole value chain from the wheat producing farmers to the consumers are engaging in the initiative for groundwater and drinking water protection. The farmers renounce late fertilisation of their wheat fields and by doing so avoid nitrate leaching into the groundwater. The initiative encompasses a communication strategy targeted towards the consumers. It addresses the importance of clean water as well as the possibility to contribute to it by buying the so called 'water protection bread'.

Summary

The initiative called "water protection bread (Wasserschutzbrot)" that has been initiated by the government of Lower Franconia started in 2014 with one water supplier, one farmer, one mill, and one bakery. In 2022 there are 102 participants in 4 regions of Bavaria. The farmers deliver the wheat to the mills that are processing it to flour for regional bakeries, keeping it separated from other wheat. The participating bakeries engage to use this flour and make use of a special label. Eligible are farmers who farm land in drinking water abstraction areas from a public water supplier and/or in water sensible areas. They renounce late fertilisation of wheat that is heavily criticised from the point of view of groundwater protection and guarantee applying a maximum of 160 kg N/ha. This allows to significantly reduce the nitrogen surpluses in the soil and to avoid leaching into the groundwater. Wheat from selected varieties has good baking properties despite a lower protein content of 11-11,5% instead of 13%. A communication campaign targeted at the consumers is part of the initiative to inform about the importance of clean ground- and drinking water as well as the possibility to contribute to it by buying bakery products made out of this wheat.



VALUE CHAIN

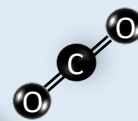


farmer – mill – bakery –
consumer and water
supplier

PUBLIC GOODS



Groundwater quality



Climate mitigation - through
less mineral fertilizers

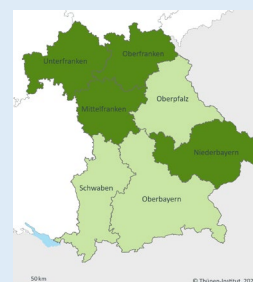
Further PGs



Rural viability and vitality

LOCATION

Germany



The project area is located in the south of Germany in the Bavarian governmental districts Upper, Middle and Lower Franconia as well as Lower Bavaria. In Lower Franconia wheat is cultivated on one fourth of the arable land.

Objectives

The aim is the protection of ground and drinking water through a sustainable and regional value chain. Reducing the nitrogen load in groundwater is hereby in the foreground.



Problem description

Problems with the groundwater quality arise in areas with high agricultural intensity combined with low precipitation rates, a low groundwater recharge rate and in parts very shallow soils. The government from Lower Franconia has started the initiative as a response to it; today it includes as well Central and Upper Franconia.

Data and Facts

Participation: 42 farmers, 7 mills und 39 bakeries with approx. 120 selling points, 14 water suppliers (in 2021). The participating farmers cultivated 370 ha on which 2.500 t of wheat have been harvested.

Further participation: The governments of four regions in Bavaria, section water management; public water suppliers from the region; The Research Institute of Organic Agriculture (FiBL) Germany as external service provider.

CONTRACT

No water protection bread contracts signed, but participants sign a voluntary commitment declaration



Private contracts outside of the initiative set the rules for the purchase of the products.

Payment:

There is no payment by the project to the participating farmers, mills and bakeries, but farmers get a fair price according to a pricing model for their wheat.

Project financing:

Bavarian Ministry of the Environment (project activities and communication strategy)

Duration of contract:

The commitment declarations are open ended.

Start: 2014

End: ongoing (financing secured until 2025)

The water protection bread

- bakery products from wheat with reduced protein content
- cultivation and use of selected wheat varieties
- separate storage and processing of the water protection wheat
- regional selling points

Farming requirements:

Farmers: project signs to be installed along the wheat fields; cultivation of selected varieties with good baking properties regardless lower protein content; ensure compliance with the required fertilizer conditions (max, 160 kg N/ha, no late fertilisation); ban on glyphosate from the harvest of the preceding crop onwards; regularly soil analysis from the participating wheat fields; a detailed field recording with all management practices

Mills: separate collection; analysis and storage of the wheat from the water protection fields; separate processing to flour; quarterly reporting of the wheat / flour stocks of the wheat from the initiative as well as the amount of flour ordered by the participating bakeries

Bakeries: The participating bakeries commit to replace at least 50% of their annual requirement of wheat flour by flour from the initiative. As entry-level variant in the first year the bakeries can alternatively commit to sell especially labelled bread containing at least 60% of wheat flour from the initiative.

Controls / monitoring: Annual controls are performed. Farmers are checked for compliance with the conditions of participation either by the local water supplier or by FiBL as external service provider. FiBL does also carry out the controls of the participating mills and bakeries. In addition, the participants of the initiative committed to provide relevant information on a regular basis. For each calendar year the applied fertilizer amount as well as the harvested wheat yields, the amounts of milled wheat, and the wheat flour used in bakery products are recorded. The value of the remaining mineralised nitrogen in the autumn (N_{min} value) is surveyed from the concerned wheat fields.

Conditions of participation: Even though the commitment declarations are not legally binding the signatories engage in respecting certain rules. For each of the three parties, farmers, mills, and bakeries, specific criteria have been defined in a participatory process.

Risks / uncertainties for participants: Actually there are more farmers willing to participate than can be accepted. The limiting factor is the number of participating bakeries and their demand for flour from the initiative. The purchase quantity is fixed every year in spring, so that the farmers know before the second fertilization how much they can supply to the participating mills. Participating farmers only grow a small part of their wheat on selected fields as water protection wheat. The bakeries are dependent upon a good selling of their bread and other baked goods prepared with flour labelled under the initiative.

Contract features combination: A number of farmers grow the water protection wheat on fields for which voluntary agreements exist with a water supplier; rented as well as owned land is eligible.

Framework conditions

Landscape and climate: The climate of Franconia is sunny, in the summer Lower Franconia belongs to the warmest areas of Germany. The precipitation is lower than could be expected in that geographical location; in particular in the rain shadow of the Franconian mountainous region, the annual precipitation can be as low as 500 mm. The soils are often shallow, nevertheless rich in humus. Due to the geologic conditions, already small nutrient surpluses from agriculture have negative effects on the groundwater quality. According to the Water Framework Directive, 50% of the groundwater bodies in Lower Franconia are in poor condition due to high levels of nitrate. The main cause is relative intensive agriculture regardless a low livestock density with only 0.4 livestock units per hectare on average.

Farm system: Usually participating farmers are purely cropping farmers doing conventional farming. They adapt their fertilizer application in order to respect the rules for the production of water protection wheat.



Information/contact: <https://wasserschutzbrot.de/>



SUCCESS



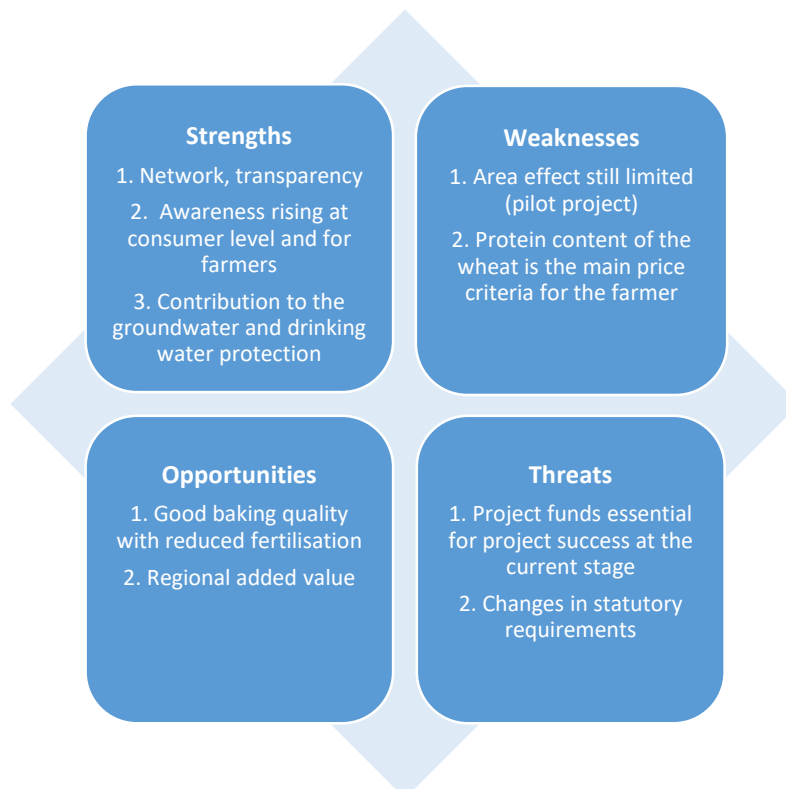
The initiative is a successful example for environmental protection along the value chain. The number of participants has continuously increased since the start of the initiative eight years ago. There are more farmers willing to participate that are actually able to do so. Even if meanwhile more than 100 selling points are offering bakery products produced with the specific wheat flour, still the market for bread wheat with reduced protein content is rather limited. Nevertheless it was possible to reduce the content of mineralised nitrogen in autumn by 30% on the participating fields and to save 25.900 kg of nitrogen.

Reasons for success:

- Focus on regional value chains
- Accompanying communication strategy, for example through the slogan 'Regional and water-friendly'.
- In parts long-term contractual relationships between the farmers and the participating mills



SWOT analysis



Main external factors influencing success

Political/governance, economic/market, social, technological, legal and environmental factors can all have a strong impact on the success of contract solutions. In this case study an in-depth analysis found that the following, selected factors were of specific importance.

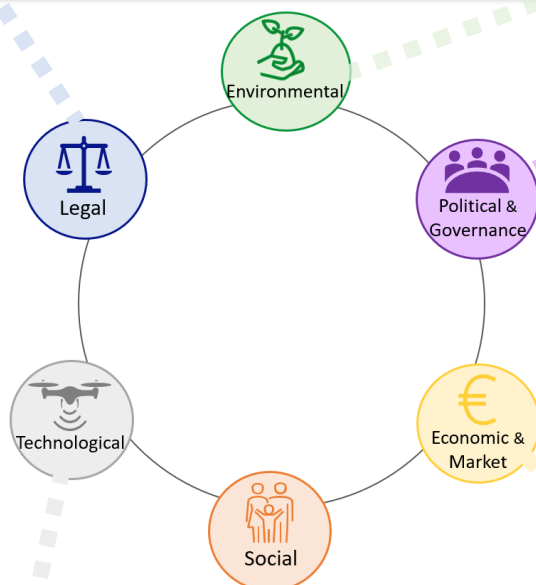


Water legislation as driver for action:

The European Water Framework Directive (WFD) alongside with the Nitrates Directive, and hereby in particular the requirement to achieve or maintain the good quality of groundwater and the sensitive drinking water situation were decisive for the start of the water protection bread initiative.

Complementary voluntary activities:

Bavaria has decided to establish water protection cooperations with farmers in drinking water protection areas. The water protection bread initiative builds upon such cooperations.



Political will of the Bavarian environmental ministry to amplify the activities in water protection:

The government of Upper Franconia, section water management, has initiated the program as a contribution to a dedicated action on water protection that started in 2001 in Bavaria.

Securing water supply with decentral structures:

In Bavaria the provision of drinking water is mainly under the responsibility of municipal water suppliers. A low groundwater recharge rate in combination with nitrate leaching during autumn and winter are significant risks for a good water quality. Costly chemical treatment becomes necessary if the nitrate content is beyond the permitted level of 50 mg/l and should therefore be avoided.

Good bakery quality properties even with lower protein content:

Breeding efforts resulting in new wheat varieties alongside with the development of novel tests for flour quality made it possible.

Developments since 2020

- Territorial expansion of the initiative
- Increase in number of participating farmers, mills and bakeries
- Growing consumer recognition through intensive communication work
- Several prestigious awards for bread made out of the flour from water protection wheat
- Recognition reduced fertilization does not only benefit water protection, but is also a climate mitigation measure
- The initiative has kick started preliminary discussions about a possible revision of German quality criteria for bakery wheat

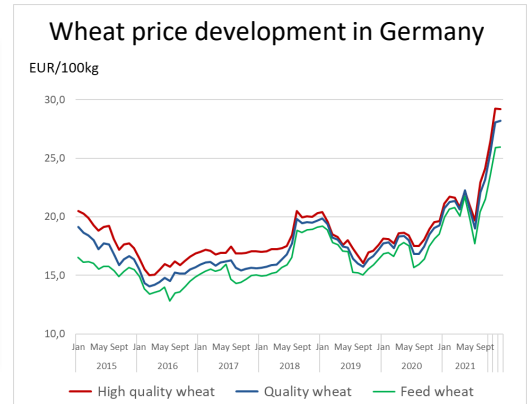
CONSOLE scientific analysis – results and recommendations

Wheat with reduced protein content for bakery purposes - feasibility and profitability alongside with water benefits

Research idea and question

Quality wheat production is characterized by high levels of nitrogen application in order to reach a high protein content, including a late fertilization. The current standardized pricing system is protein content based with high quality wheat > 14% and quality wheat >13% protein content.

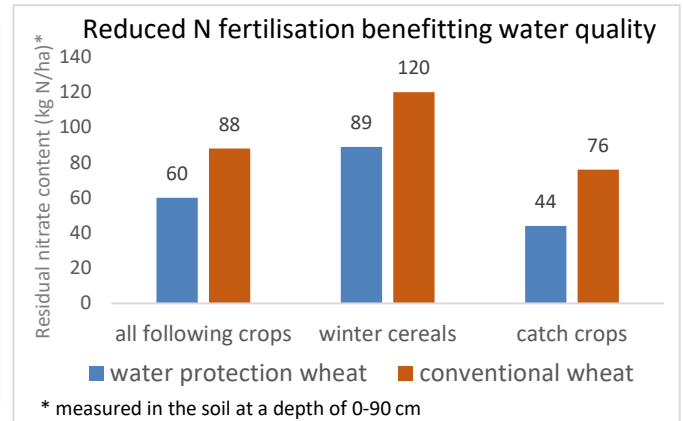
Renouncing the most harmful late fertilization benefits water quality, but requires value chain contracts to maintain farmers' profitability.



Source: Agrarmarkt Informations-Gesellschaft mbH (AMI)

Methodology

- The value of the residual nitrate content has been measured in autumn after wheat harvest making a distinction between soil covered by winter cereals or catch crops.
- 118 wheat fields from 31 farmers were sampled in 2020
- 96 plots were grown under the regime of water protection wheat and 22 under conventional farming



Source: Report „Monitoring-Programm Wasserschutzweizen 2020“, GeoTeam GmbH 2021

Main results

For the water protection wheat production the residual nitrate was one third lower in autumn compared to the conventional farming resulting in around 25 kg nitrogen per hectare less with lowest leaching under catch crops. In the typical wheat-growing areas of Franconia, this leads to a reduction of the nitrate content in the leachate by 30 to 35 milligrams per litre.

Recommendations

- The extension of contracts along the wheat value chain for bakery purposes with sustainability requirements beyond the pilot area would allow to significantly reduce the risk of nitrate leaching to groundwater without endangering wheat production for bakery goods.
- The selection of breeds with high nitrogen and protein efficiency and good bakery characteristics is crucial in order to ensure farmers' acceptance.