Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
https://foodsystemsjournal.org

Understanding organic market dynamics under data constraints through multimethod analysis and value-chain mapping

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Submitted February 11, 2026 / Revised March 27 and June 18, 2026 / Accepted June 22, 2026 / Published online November 24, 2026

Citation: Strobel-Unbehaun, T. J. (2026). Understanding organic market dynamics under data constraints through multimethod analysis and value-chain mapping. *Journal of Agriculture, Food Systems, and Community Development*, *16*(1), Article 002. https://doi.org/10.5304/jafscd.2026.161.002

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Abstract

The organic sector has gained growing attention due to shifting consumer preferences, climate-conscious dietary trends, and expanding policy targets for organic agriculture. Yet, the market mechanisms governing production, distribution, and retailing of organic commodities, such as oats and barley, remain poorly understood. This study investigates how market actors (i.e., producers, processors, and retailers) navigate the structural and strategic challenges of this sector. A case study was conducted that focused on two agricultural crops, organic barley and oats, and one region, Bavaria, Germany. Combining primary data from in-depth interviews with stakeholders and store checks (physical visits to retail stores to gather and assess real-world market insights), with secondary data on production quantities and prices and geospatial data on production and processing sites, and with value-chain mapping, the research reveals key constraints and enablers across supply chains. Findings highlight bottlenecks in processing capacity, price volatility, and consumer knowledge, as well as emerging opportunities such as local sourcing networks, policy incentives, and value-added differentiation. Store checks show further significant variation in product availability and pricing strategies across retail formats. The study offers an actor-centered view of market dynamics, with implications for policy design and value chain coordination. By situating organic oats and barley within broader debates on agri-food transitions, this work contributes to understanding how trends and interventions shape the scalability of organic markets.

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Funding Disclosures

This research received funding from the Bavarian State Ministry for Nutrition, Agriculture, Forestry and Tourism (Funding reference number: A/22/15). The article publishing charge was funded by the Open Access Publication Fund of Weihenstephan-Triesdorf University of Applied Sciences.

Conflict of Interest

The author declares no competing interests.

Keywords
value-chain mapping, organic markets, market dynamics, multimethod, oats, barley, Bavaria

Introduction

This study demonstrates that methodological triangulation, combining value-chain mapping, geospatial analysis, stakeholder interviews, and store checks, can generate theoretically meaningful insights in contexts where conventional quantitative approaches are not viable. It shows how a multimethod qualitative and descriptive approach can help to identify organic value-chain structures, stakeholder interactions, systemic bottlenecks, market patterns, and action fields. The analysis furthermore connects these findings to community development and regional food systems, offering transferable lessons for policy and practice in other regional contexts.

Effective management of agricultural and ecological sustainability is a central theme in resilient food systems literature, and organic agriculture offers a concrete expression of this principle in practice (Cabell & Oelofse, 2012; Duncan et al., 2018; Worstell & Green, 2017). Compared to conventional methods, organic farming delivers significant benefits in terms of environmental protection and resource conservation (Sanders et al., 2025), by rejecting synthetic inputs and prioritizing ecological integrity as a foundational operating principle. Actors within resilient food systems orient their practices toward working with nature rather than against it, minimizing reliance on manufactured inputs and advancing deeper ecological integration (Worstell & Green, 2017). The principles of organic agriculture are reflected in certified, traceable practices throughout the value chain (Worstell & Green, 2017).

Beyond its environmental dimensions, organic agriculture extends its significance through an equally important social role, contributing to community economic development (CED) through multiple interconnected pathways. The price premiums associated with organic certification support farm income and retain economic value within local and regional economies, while the closer coordination among producers, processors, and retailers characteristic of organic markets fosters trust-based relationships and social capital (Magnano et al., 2024). Transitioning to and maintaining organic practices further require shared knowledge and technical exchange, building human and organizational capacity at the community level with spillover effects beyond the individual farm. These dynamics are reinforced by the normative foundations of organic agriculture, which explicitly encompasses principles of fairness, intergenerational responsibility, and local embeddedness, values that align closely with community development objectives as reflected in rural development policy (Worstell & Green, 2017). Organic value chains thus function not merely as commodity systems but as socially embedded networks that generate broader community co-benefits, and support community economic development. These dynamics connect directly to wider food system goals, often grounded in sustainability principles, ensuring that food production, distribution, and consumption meet present nutritional needs without compromising future resource availability (Tendall et al., 2015; Willett et al., 2019). Situated within a social-ecological perspective, organic agriculture thus serves as an anchor concept in this study.

As organic markets continue to expand in Germany, Europe, and globally (Willer et al., 2025), research increasingly highlights that the success of organic farming depends not only on production practices but also on the performance of the associated value chains.

Studies have identified enabling factors (Table 1) influencing the development of the organic sector, including consumer attitudes and purchase behaviors, market initiatives, and producer strategies (Schäufele & Janssen, 2021). Factors such as origin labeling and different distribution channels have an impact as well on consumer perceptions and their willingness to buy organic products (Baourakis, 2004). Organic pioneers have played a significant role in transforming food markets through strategic management of resources and professionalization, demonstrating that even small businesses can influence market structures (Stöhr & Herzig, 2022).

However, studies also describe challenges and barriers along the value chains (Table 1). Research has often been done in the early, developing phase

of organic markets (Górska-Warsewicz et al., 2021; Kociszewski et al., 2023; Popa & Dabija, 2019). For example, organic supply often struggles to match rising demand because production is limited by lower yields, higher labor and certification costs, and slower conversion rates from conventional farming, leading to supply gaps (Aertsens et al., 2009) and reliance on imports in some segments (Agricultural Market Information Company, 2025).

Additionally, logistical and processing bottlenecks (e.g., insufficient local processing capacity, fragmented regional networks) hinder the efficient aggregation and distribution of organic products, particularly for smaller producers. Price sensitivity among consumers (Schäufele & Janssen, 2021) and competition from conventional supply chains further constrain market expansion, as organic products command premiums that many buyers are reluctant to pay during economic uncertainty. A major obstacle in small and niche markets is the lack of reliable quantitative data on yields, produced amounts, and market dynamics. However, these data are essential to identifying growing markets and their further development.

Statistics on organic farming about areas under organic management, land use and crops, number of farms, retail sales, and international trade data are available at the global and European Union (EU) level (Willer et al., 2025). At the European level, DG Agri and Eurostat provide reports, dashboards, and datasets. In Germany, the Federal Ministry of Food and Agriculture (BMEL), the Federal Office for Agriculture and Food (BLE), the Federal Statistical Office, the German Organic Food Production Alliance (BOELW), and the German Agricultural Market Information Company (AMI) publish data on organic agriculture. At the Bavarian level, the state statistical office and the Bavarian State Research Center for Agriculture (LfL) provide openly available data on variables such as land use, number of farms, and contribution margins. Yet systematic data on production quantities are largely absent, limiting both analysis and informed decision-making. Our study makes a significant contribution to understanding the dynamics of the sector and adds substantial value by providing new insights that fill this important knowledge gap.

To overcome the issue of limited data availability, our work employs a multimethod approach and value-chain mapping to reveal market mechanisms. This enables us to gain a differentiated picture of market realities where data availability is limited, one that is well founded, comprehensible, and suitable for political, community, and business decisions. We selected two crops, barley and oats, and one region. Organic barley and organic oats were selected as representative examples due to their widespread consumption, nutritional significance, and relevance in sustainable agriculture. Bavaria, Germany, was selected as the study region due to its significant agricultural production, particularly of cereals, and its well-established organic farming sector. The region provides a representative setting for examining organic markets in a temperate European region. The focus on Bavaria reflects our interest in how geographically embedded value chains contribute to resilience and actor coordination beyond purely market-level concerns.

Table 1. Challenges and Constraints vs. Enabling Conditions and Strategic Opportunities

Characteristic	Challenges and Constraints	Enabling Conditions and Strategic Opportunities
Market	Small market size	Diverse market strategies
Support	Limited public aid	Policy support for sustainability
Marketing	Weak marketing	Superior marketing
Price	High prices	Pricing strategy
Awareness	Low consumer awareness	Awareness growth
Logistics	Logistics issues	Operational integration
Finance	Weak financial support	Financial support
Communication	Consumer outreach problems	Effective communication strategies

Barley

The predominant crops in the world in terms of harvested acreage are wheat, maize, rice, and soya beans, and barley (FAOSTAT, 2025). Barley *(Hordeum vulgare L.)* is one of the earliest domesticated food crops and remains widely cultivated today (Giraldo et al., 2019), both in highly productive agricultural systems and in marginal and subsistence environments (Newton et al., 2011). Barley is grown over diverse eco-geographical environmental conditions and is highly suitable as a rainfed cereal crop that has low input requirements and can be grown even in stressful environments like drought, cold, and heat (Newton et al., 2011).

Barley is primarily used for animal feed and fodder, and as an important industrial raw material in the production of various foods and beverages for human consumption. Consequently, global land use and production of barley have continued to expand (Newton et al., 2011; Singh Verma, 2019; Tricase et al., 2018). Among its industrial uses, barley is primarily used for preparing malt, which is further utilized by food industries. Malt is used particularly for beer brewing (both alcoholic and non-alcoholic), as well as for single-malt whisky, energy drinks and powders, confectionary items, and bakery items. The key quality requirements for malt barley are highly specific and serve as the basis for quality programs, such as the German Malting Barley Association's "Berliner Program." Varieties that have successfully completed the program are awarded with the "processing recommendation" of the association. These requirements are adjusted according to the intended end product, regional taste preferences, agro-climatic constraints, and export objectives (Kumar et al., 2022).

Barley is also a healthy cereal with nutraceutical properties. It is nutrient-dense, containing high levels of dietary fiber, especially β-glucan, alongside complex carbohydrates, 11–14% protein, 4–7% lipids, and essential micronutrients such as iron, magnesium, selenium, and B-vitamins. It also provides notable amounts of tocols and phenolic compounds with health-promoting properties (Geng et al., 2022).

As a result of climate change causing water and temperature stress (Yawson et al., 2020), net barley production is projected to decline, leading to an adverse socio-economic impact on small farmers who use barley as food and animal feed. The beverage industry will also be affected (Food and Agricultural Organization of the United Nations [FAO], 2017). Research techniques such as genome editing and nanotechnological interventions have shown promising pathways for the cultivation of barley and its varieties, making it more tolerant to changing climate (Kashyap et al., 2022). Organic barley producers, in particular, benefit from barley cultivation innovations as they desire high-yielding, multiuse barley varieties suitable for organic farming conditions (Baker et al., 2020).

Oats

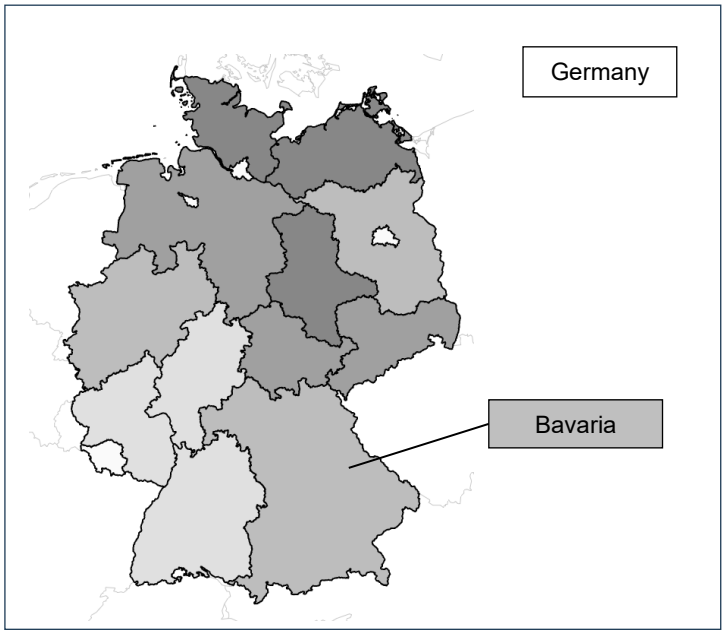
Oats have earned a worldwide reputation as a healthy and nutritious food and a valuable livestock feed due to high protein content. Global production of oats ranks sixth among grain crops, following maize, wheat, rice, and barley (FAOSTAT, 2025). Although most oats are used as feed for horses and ruminants, oats are also suitable for human consumption, with different applications. The crop is mainly cultivated in wetter and cooler regions of the northern hemisphere (Central and Northern Europe). Most cultivated oats are varieties with the seed covered by a hull (*Avena sativa*); some varieties are without hulls (*Avena nuda*), often called naked oat (Webster & Wood, 2011). Oats contain about 60% starch, 14% protein, 7% lipids, and 4% β-glucan. In contrast to other grains, oats are high in protein and lipids. The distinguishing feature of oats is their rich content of dietary fiber, especially soluble β-glucans. For micronutrients, oats are particularly rich in potassium as well as other minor components, such as phenolics. Avenanthramides, which are found only in oats, have attracted considerable interest (Webster & Wood, 2011). Studies have established the health benefits of oats in lowering glycemic response, reducing blood cholesterol level, balancing gut microbiota, and regulating blood pressure. Special emphasis has been put on the beneficial effects of oats on blood glucose levels (Zhang et al., 2021). Oats are consumed as flakes, oatmeal, cookies, bars, bread, and also as produce for plant-based milk alternatives (e.g., milk, yogurt, cream).

Summer oat grain yield and quality are highly sensitive to variability in seasonal temperature and precipitation. Consequently, climate-induced shifts in winter conditions, such as warmer winters and irregular rainfall, have increased interest in expanding winter oat cultivation to enhance production stability.

Study Area

Bavaria is the largest federal state in Germany with 70,550 km^2 (Figure 1). It has 13.1 million inhabitants, 16% of the German population, and 85% is rural (Bayerisches Staatsministerium für Ernährung, Landwirtschaft, Forsten und Tourismus (StMELF) [Bavarian State Ministry of Food, Agriculture, Forestry and Tourism], 2021). It has 2.6 million hectares (ha) of forest and 3.2 million ha of agricultural land, consisting of 65% arable land and 34% grassland (StMELF, 2021). The share of organic agriculture in Bavaria is the highest in Germany, with 13% coverage (StMELF, 2025b). Bavaria has its own organic label, with requirements exceeding the regulations of the German organic associations. The most important requirement is that the raw materials must all originate from Bavaria and be processed there.

Figure 1. Map of Germany and Bavaria



Note: The lines within Germany indicate the federal states. The different shades have of no meaning for the purpose of this study.

The average farm size in Bavaria is 36 ha, compared to the German average of 62.4 ha; 41% are full-time holdings. Bavaria's food economy is very substantial and has an important dairy sector; nearly 50% of German organic milk is produced and processed in Bavaria. Bavaria has many organic mills and as of 2017 it had about 640 breweries, nearly half the German total. The Hallertau area in Bavaria is the largest hop-growing area in the world, with about 19,500 ha (StMELF, 2021). The Bavarian agricultural policy includes agri-environmental programs, including organic agriculture, and supports training, research, sales promotion, alternative sources of income, and rural development.

Aim of the Study

Currently, only a few studies have examined organic markets at the Bavarian regional level, and most existing research has predominantly focused on consumer attitudes and purchasing behavior. This study addresses this gap by developing a multimethod approach to analyze the structure and dynamics of the organic oats and barley markets in the region.

Focusing on the value chain from producers to retailers, excluding the feed sector, this research adopts a holistic perspective that allows for a crosscutting analysis of market mechanisms. A key challenge in organic market analysis is a lack of granular and reliable quantitative data. However, this study demonstrates that through methodological triangulation, including value-chain mapping, geospatial analysis, and stakeholder interviews, it is possible to generate meaningful insights into how organic markets function, even in data-constrained environments.

Our explicit research questions are:

- Market Structure: How can organic value chains and market structures be systematically analyzed under conditions of limited data availability?
- Constraints and Enablers: How can bottlenecks and enabling factors confronting market actors, including

producers, processors, and retailers, be assessed in organic agricultural sectors under conditions of data scarcity?

- Retail Dynamics: What roles do product availability and pricing strategies play in shaping organic market performance across heterogeneous retail formats?
- Policy and Coordination: How can our multimethod approach be used to gain empirically grounded insights into the governance mechanisms and policy interventions that can most effectively address the identified structural constraints and improve value-chain coordination in organic markets?

Material and Methods

The multimethod approach developed in this research is shown in Figure 2. First, secondary data, on production quantities and prices and geospatial data on production and processing sites, were collected and analyzed. Second, primary data were collected from (a) in-depth interviews with key actors in organic value chains ("expert interviews"), and (b) a survey among the project managers of Bavarian organic model regions, which are state-funded regional alliances for organic farming and organic products, covering the entire value chain. Store checks were then conducted as a market research tool. From this data, value-chain maps were developed to derive options for action and eventually recommendations.

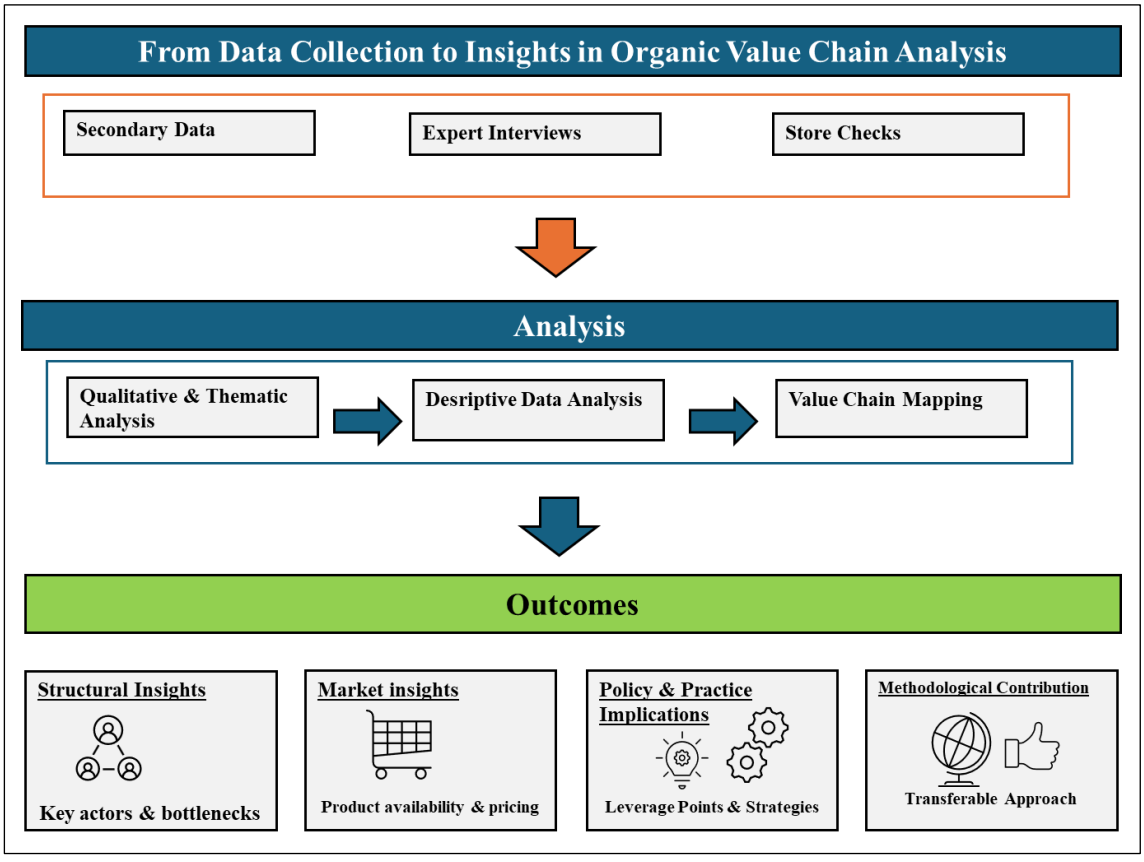
The following section describes the secondary and primary data in more detail.

Data Sources

At the various stages of the value-chain process, different data sources were used (Table 2). For example,

- for production areas of organic barley and organic oats, data from the Bavarian State Ministry and from the Bavarian State

Figure 2. Methodical Workflow, from Data Collection to Insights



Research Center for Agriculture (Bayerische Landesanstalt für Landwirtschaft [LfL], 2024) were used.
- for data on first processing, the expert interviews were used.
- for data on distribution and retail data, the Agricultural Market Information Company (AMI) and the store checks were used.

Secondary data from the official statistics on agriculture and processing structures at the regional level (Germany, Bavaria) and Bavarian IACS (Integrated Administration and Control System) from 2018 to 2024 were collected and analyzed. Other sources include AMI, the German Organic Food Production Alliance (BOELW), the Bavarian State Research Center for Agriculture (LfL), the International Federation of Organic Agriculture Movements (IFOAM) and the Food and Agriculture Organization of the United Nations (FAO).

Geospatial data were developed from the Bavarian IACS data, visualizing the spatial cultivation focus areas with QGIS software. Information on processing sites derives from expert interviews, online research, or data from the BioC database, a database of certified organic operators.

Table 2. Data Sources

Value-chain process	Barley	Oats
Input supply		
Seed supply and/or cultivars	Bundessortenamt, 2024	Bundessortenamt, 2024
Equipment	Expert interviews	Expert interviews
Production		
Areas	StMELF, 2021; Bayerische Landesanstalt für Landwirtschaft (LfL), 2024	StMELF, 2021; LfL, 2024
Yields	LfL, 2024	LfL, 2024
Production and processing sites	StMELF, 2021; expert interviews; BioC database	StMELF, 2021; expert interviews; BioC database
Prices	Agricultural Market Information Company (AMI), 2025	AMI, 2025
Farmer groups	Expert interviews	Expert interviews
Harvesting and transport		
Harvesting	Expert interviews	Expert interviews
Storage	Expert interviews	Expert interviews
Trading activities	Expert interviews	Expert interviews
Trading associations	Expert interviews	Expert interviews
Processing		
First processing	Expert interviews	Expert interviews
Second processing	Expert interviews	Expert interviews
Distribution and retail		
Organic supermarkets	AMI, 2025; store checks	AMI, 2025; store checks
Supermarkets	AMI, 2025; store checks	AMI, 2025; store checks
Discounter supermarkets	AMI, 2025; store checks	AMI, 2025; store checks
Drugstores	store checks	store checks
Consumption		
Prices	AMI, 2025; store checks	AMI, 2025; store checks
Availability	AMI, 2025	AMI, 2025

Primary data were collected through in-depth interviews with experts during March and June 2024. Experts were selected using role-based purposive sampling through two complementary recruitment pathways: a broad professional and academic network associated with the research team, and multiplicators such as industry associations and regional farming networks, who facilitated access to practitioners beyond the immediate network. We restricted recruitment to individuals with direct operational or strategic involvement in at least one value-chain node. To minimize selection bias, we sought diversity across actor types and value-chain positions. Sampling continued until thematic saturation was reached. All participants provided informed consent prior to taking part in the study; they were given a consent form outlining the study's objectives, assuring the confidentiality of their data, and providing contact information for the principal investigator for any questions or concerns.

Experts included farmers or producers (5) and advisors (4), grain traders (5), representatives of the food processing industry (5) and of food retail (3), and of the scientific community (4) (N = 26). The semi-structured questionnaire comprised 21 open and closed questions. Closed questions consisted of multiple-choice and scaling questions. A five-point continuous Likert scale of 1 to 5 (1 = lowest and 5 = highest) was used to collect various quantitative information related to the value chains. The questionnaire was divided into four parts, including questions on cultivation strengths and obstacles, trading issues and market developments, regional marketing initiatives such as the Bavarian organic label, processing units, and value-chain management.

Furthermore, to collect first-hand information, we conducted an online survey among all Bavarian organic model regions. These state-supported alliances comprise representatives of cities and counties, farmers, traders, processing companies, and other stakeholders. In addition to promoting organic production, the model regions aim to strengthen regional value creation. The regions participated in a competitive process to be designated as an organic model region and to be eligible for state funding, submitting an outline of how they intended to implement their goals in concrete terms. The regions are led by project managers. As of 2025, there are 35 organic model regions in Bavaria (Bayerische Verwaltung für Ländliche Entwicklung, 2026). A total of 28 project managers participated in the survey, a response rate of 80%. The survey was conducted using the software umfrageOnline. The questionnaire contained 23 open and closed questions, with a five-point scale of 1 to 5 (1 = lowest and 5 = highest) for closed questions. Questions involved the strengths of and obstacles to existing food value chains, value-chain management, processing infrastructure for organic food, and success factors in value chains.

We conducted store checks—physically visiting retail stores to gather and assess real-world market insights—to analyze several aspects of organic food involving (brewing) malt and oats at the point of sale, such as product availability, placement, pricing (in comparison to conventional food), and branding. To generate an overview, the recorded products containing oats and barley were divided into distinct categories and subcategories. The store checks took place from October to December 2023. Study areas were the regions around Nuremberg (in northern Bavaria) and Munich (in southern Bavaria). In total, we analyzed 19 stores, from discount supermarkets and drugstores to organic food shops and online retailers.

We conducted value-chain mapping, which has been described as an institutional or functional analysis (Akyüz et al., 2023), to summarize the value-chain process, relevant actors, influencing factors, and fields of action (Ponte et al., 2019).

Data Analysis

We processed quantitative data in QGIS Desktop 3.34.9 (geospatial data and mapping), Microsoft Excel (data from store checks and secondary data), and R (price data from store checks). The qualitative data obtained from the surveys were collected, tabulated, and divided into various categories, and then coded and processed by means of a qualitative content analysis (Mayring, 2019). We developed the codes inductively based on the data. Consistency was ensured through iterative refinement of the codes and repeated checks during the coding process. Statistical analyses were not conducted

because the study follows a qualitative, exploratory design aimed at building a theory rather than testing a hypothesis. The primary data (expert interviews) and heterogeneous secondary sources are not adequately standardized or fully comparable to support meaningful statistical inference. Instead, the analysis focuses on identifying structural relationships, actor roles, and systemic bottlenecks using qualitative methods appropriate for complex, context-dependent phenomena through a multimethod approach.

Results

Our secondary data describe production and harvesting, production volumes, pricing, sales information, market trends, and one selected policy implication. Maps illustrate cultivation hotspots, processing infrastructures, and possible product flows. Value-chain mappings summarize the value-chain process, relevant actors, and influential factors and fields of action. Although our quantitative analysis is primarily descriptive due to data limitations, it is employed to identify patterns systematically and, in combination with qualitative insights, to support a more in-depth interpretation of value-chain structures and dynamics.

Secondary Data

In the following sections the results of the secondary data for organic barley and organic oats are described.

Production and Harvesting

Spring barley and oats are sown in Germany in early spring from February to March while harvest usually takes place in July or August. Spring barley has a relatively broad suitability for cultivation and thrives on weaker sites, albeit with lower yields. One of the decisive factors for successful cultivation is the early trafficability of the soil. A major advantage of spring barley is its flexibility in terms of site selection and position in the crop rotation. In practice, it often takes second or third place in the crop rotation cycle and usually comes after winter cereals (Ökolandbau.de, 2025). Several malting varieties are recommended by the German Berliner Program, a nationally recognized testing scheme that evaluates newly registered malting barley varieties for their malting and brewing performance and provides processing recommendations for industry use. No organic variety exists in the Berliner Program, highlighting the limited availability of varieties specifically tested and recommended under organic production conditions.

Oats are suitable as a crop following other grains. After harvesting oats, it is vital to ensure that moisture in subsequent storage facilities is kept at a minimal to relatively low level. Compared to other cereals, oats have a higher fat content and should not exceed a grain moisture content of 14%, often only achieved by additional drying. The required quality characteristics for oats are a hectoliter weight of 55 kilograms, a grading of 90% over 2 mm grain size, a protein content of over 14%, a healthy smell, light color, and, in the case of hulled oats, good hulling properties (Ökolandbau.de, 2025). Conventional as well as organic cultivars exist. One of the most popular organic cultivars is "Max," grown on about 60% of the organic oats areas in Bavaria (LfL, 2024b).

Production Volumes: Barley

In 2023, the largest barley producers in Europe were France and Germany. The largest organic cultivation area is in Spain, followed by Germany (European Commission, 2025). In Germany, the usable production of barley has been decreasing over the years, but exports still exceed imports. Thus, self-sufficiency rates are well above 100% (BMEL, 2025).

In the following sections, only Bavarian organic spring (i.e., brewing) barley is considered, as winter barley is mainly used for feed and not human consumption. As Figure 3 shows, the area of organic spring barley in Bavaria has remained at approximately 6,000 ha for some time.

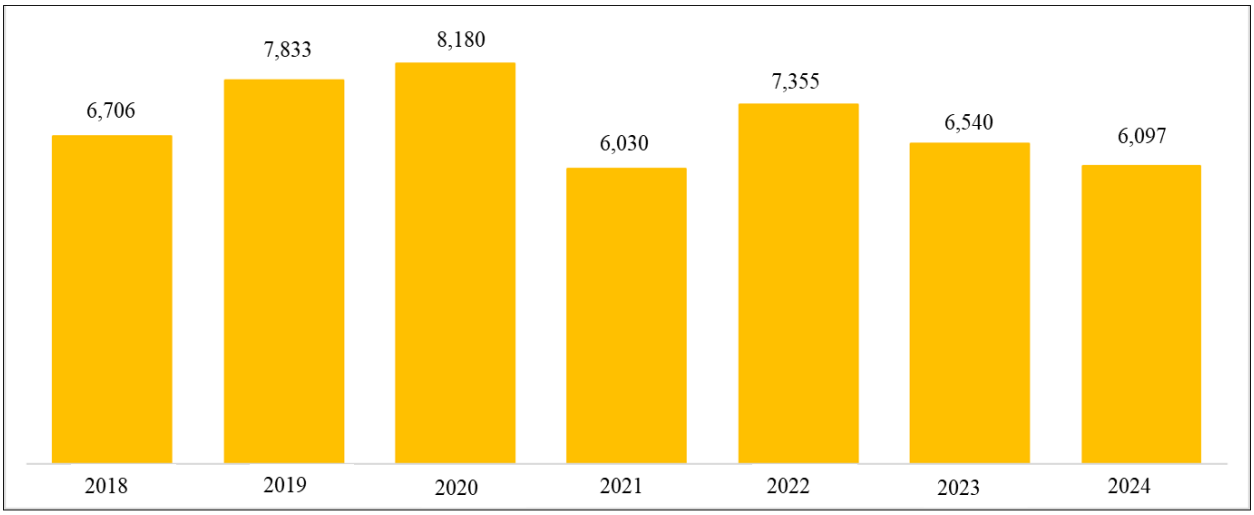
The organic yield is 65% lower than conventional yield, which equals 3.5 tons per hectare. As the cultivation of barley has been stagnating for years, this means low harvest quantities (Figure 4).

Production Volumes: Oats

In Europe, the largest oats producers are Spain, Poland, Finland, and Germany (FAOSTAT, 2025). This also holds true for the organic sector. In the

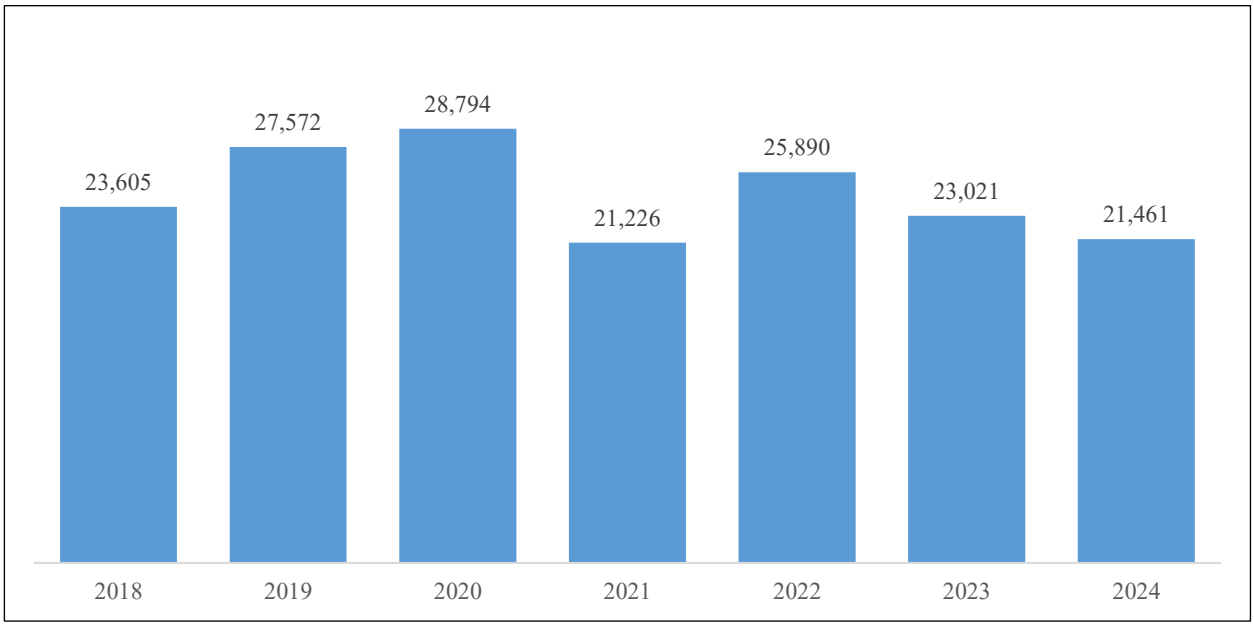
2023/24 marketing year, the average organic oat yield was 2.59 t/ha in Europe and 3.24 t/ha in Germany, while the average conventional oat yield in Germany reached 4.3 t/ha. In 2024, oats were cultivated on approximately 156,200 ha in Germany (organic and conventional production combined), resulting in a harvest of around 696,800 metric tons. Despite Germany's role as one of Europe's major oat producers, national oat production has declined substantially over recent decades. Usable production decreased from more than 2.14 million metric tons in 1991/92 to less than 0.70 million metric tons in 2024. Consequently, the self-sufficiency rate fell from almost 100% to around 76%, increasing reliance on imports. In 2023/24, Germany imported more

Figure 3. Area of Organic Spring Barley in Bavaria in Hectares



Source: Author's illustration using data from the Bavarian State Research Center for Agriculture (Bayerische Landesanstalt für Landwirtschaft [LfL]), 2024a.

Figure 4. Total Produced Amounts of Organic Spring Barley in Bavaria (in Metric Tons)



Source: Author's illustration using data from Bayerische Landesanstalt für Landwirtschaft [LfL], 2024a.

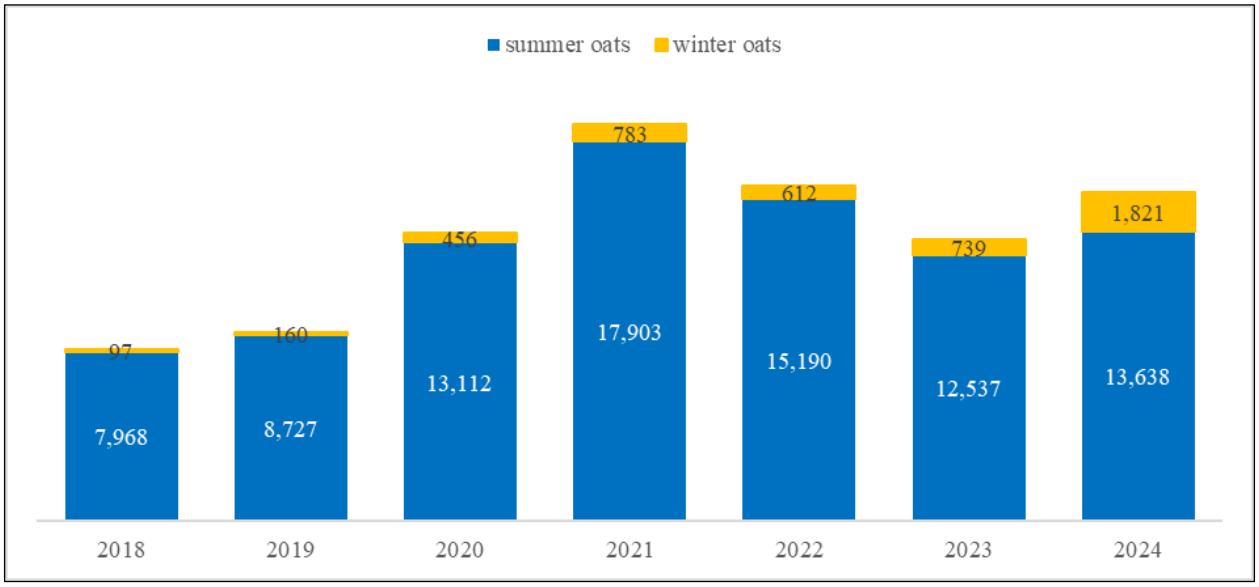
than 0.58 million metric tons of oats. At the same time, approximately 0.29 million metric tons were exported, reflecting Germany's important role as a processing hub, where imported oats are processed and marketed as value-added products, particularly oat flakes (BMEL, 2025).

The share of seed multiplication areas in Germany was 4.4% in 2021, whereas in Bavaria it was 5.6%. Federal states in the north of Germany with favored areas for the cultivation of oats have a share of 6%–8%. Although breeding capacities for oats are very poor, there are established cultivars for conventional farming, and a limited number of organic cultivars are available. However, quality problems such as low hectoliter weights, a major quality criterion, are very common (Ökolandbau.de, 2025).

In contrast, especially in Bavaria, the area cultivated for organic oats has increased and stabilized during the past 10 years (Figure 5), with the cultivation of winter oats (yellow bars) becoming more popular. Oats are one of the most important organic crops in Bavaria, with a share of 35% of cultivated oats (Table 3).

Yields vary not only annually but also regionally. Often oats are not cultivated in favored areas as other decisions play a more important role, such as margins, crop rotation necessities, or marketing opportunities. In 2022, the main export countries for Bavarian oats were Switzerland, Italy, Austria, and the Netherlands. The main import countries were the Czech Republic, Austria, Sweden, and Hungary. Bavaria has an oats import surplus (Bayerisches Landesamt für Statistik, 2022).

Figure 5. Cultivated Area of Organic Oats in Bavaria in Hectares (Blue: Summer Oats; Yellow: Winter Oats)



Source: Author's illustration using data from Bayerische Landesanstalt für Landwirtschaft [LfL], 2024a.

Table 3. Production of Organic and Conventional Oats in Bavaria

Oats Bavaria, 2024	Area in hectares (ha)	Yield (tons/ha)	Produced amount in metric tons (t)
Conventional (including whole plant silage)	25,703	3.91	100,499
Organic (only summer oats)	13,638	3.16	43,096
Sum (conventional + organic)	**39,341**		**143,595**
Share organic	35%		30%

Source: Data from Bayerische Landesanstalt für Landwirtschaft [LfL], 2024a; 2024b.

Product Flow

Barley and oats are sold directly to the mills and malting units or via traders (marketing associations). As storage capacities of the marketing associations are limited, private storage capacities on the holdings are essential. Farmers' associations play a key role in bundling the commodities for malting barley. Unlike oats, most of the barley is sold under a farming contract.

The obligatory certification makes it possible to track the goods and the holdings and avoid fraud. German organic associations such as Bioland, Naturland, Biokreis, and Demeter have their own regulations in addition to the EU regulation 2018/848 of organic production, and award individual logos to their conforming members. This discourages fraud and ensures that consumers are buying certified organic products with no cross-contamination with non-organic products.

Most organic farms sell their oats to traders or marketing associations, which deliver goods to processing and manufacturing units that sell their products to retailers. A minor share of farmers sells oats to local retailers either as grains or processed as flakes or oatmeal, or directly to consumers, including their own product outlets, a well established form of marketing in Bavaria (AMI, 2025).

Value Chain Upgrading

Organic barley is sold as grain and without any added value. Apart from basic activities such as cleaning, storage, weighing, bagging, picking, and transporting, producers are often not involved in adding further value. Organic oats either are sold as grain, including similar basic activities, or are outsourced to be processed into hulled flakes or oatmeal.

Selling Information

We found that sales strategies depend on market prices, contractual specifications, additional post-harvest treatments (such as drying and hulling), and whether a farm is a member of a marketing association of an organic association. Traders of oats and barley usually buy directly after the harvesting period (August and September) and in February and March. Farmers' associations and/or AMI make selling information available, in print and online.

Market prices for organic barley are shown in Figure 6. The fact that low amounts of barley led to higher prices indicates that it is a small (niche) market.

Pricing Oats

Oat prices tend to show a certain volatility. Globally, external factors such as the COVID-19 pandemic and the war in Ukraine, especially, led to price increases. In Bavaria, price volatility mainly expresses supply and demand for local processing units such as mills. Wholesale purchase prices for organic oats in Germany are shown in Figure 7. Supply-oriented pricing is less evident than for barley.

Market and Consumption Trends: Organic Malting Barley

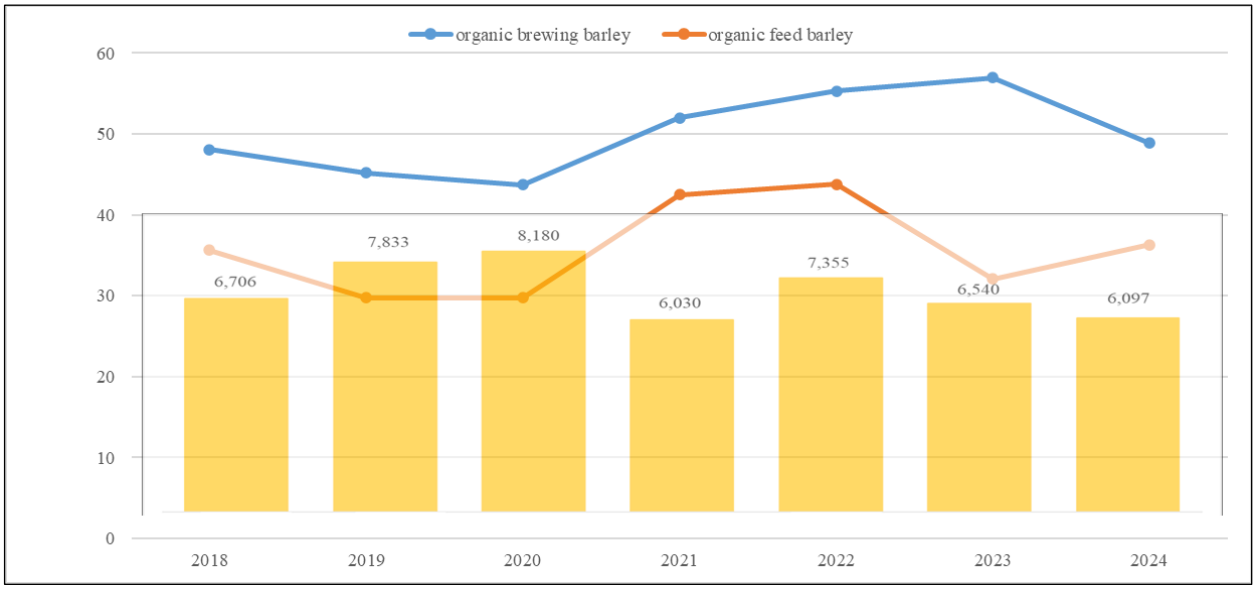
Although the market for organic barley is a niche, it may slowly expand due to growing interest in alternative grains, health-conscious diets, and sustainable agriculture. The craft beer and specialty spirits sectors have also shown growing demand for organic barley malt, and the market for non-alcoholic beverages is growing. Breweries aiming for organic certifications or eco-conscious branding are driving this niche but premium market segment.

Market and Consumption Trends: Organic Oats

Since oats are considered a healthy ingredient, consumption data show an increase in the purchased amount of oats (as flakes) and especially as beverages in Germany from 2017 to 2023 (AMI, 2025). Almond, soy, and rice beverages do not show comparable purchases (Figure 8). On the other hand, the share of organic oat beverages decreased from 80% to 60% of all plant-based beverages from 2017 to 2023. The predominant places to buy organic oat products are discount supermarkets, drugstores, and organic supermarkets.

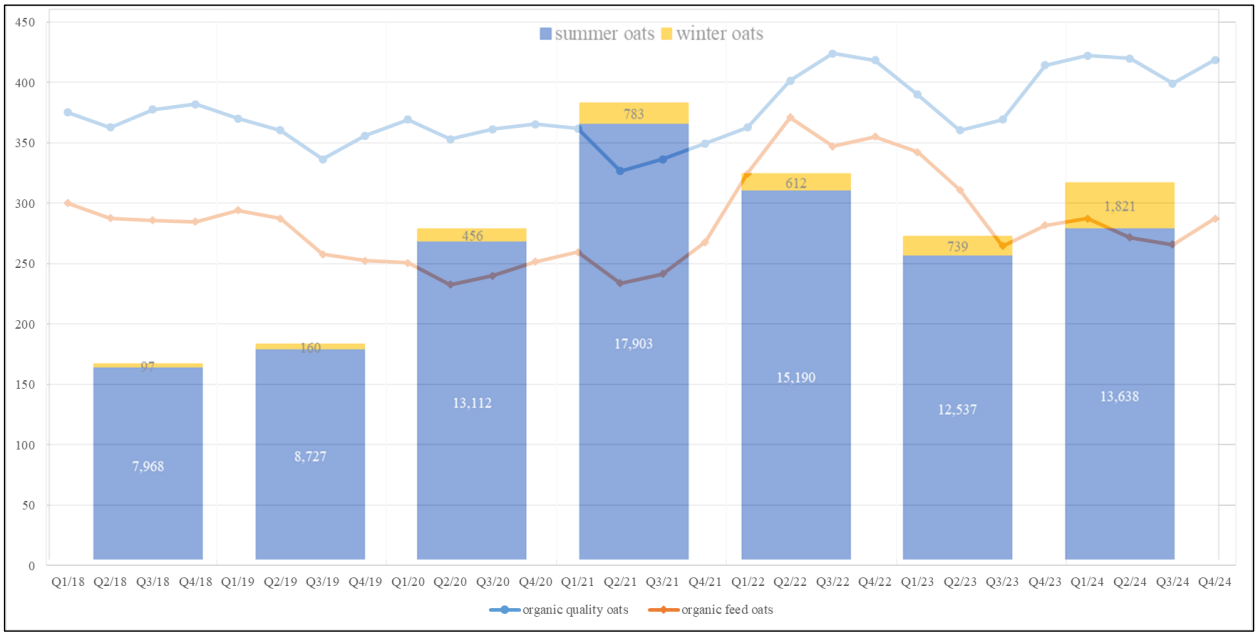
Total revenues increased until 2021 and have remained stable since. Conventional plant-based milk alternative revenues equal organic plant-based milk alternative revenues (Figure 9). Consumer prices for conventional alternatives are €0.50 higher (AMI, 205).

Figure 6. Market Prices for Organic Barley (in Euro per Metric Ton, including Value-Added Tax) in Germany and Cultivated Area in Hectares



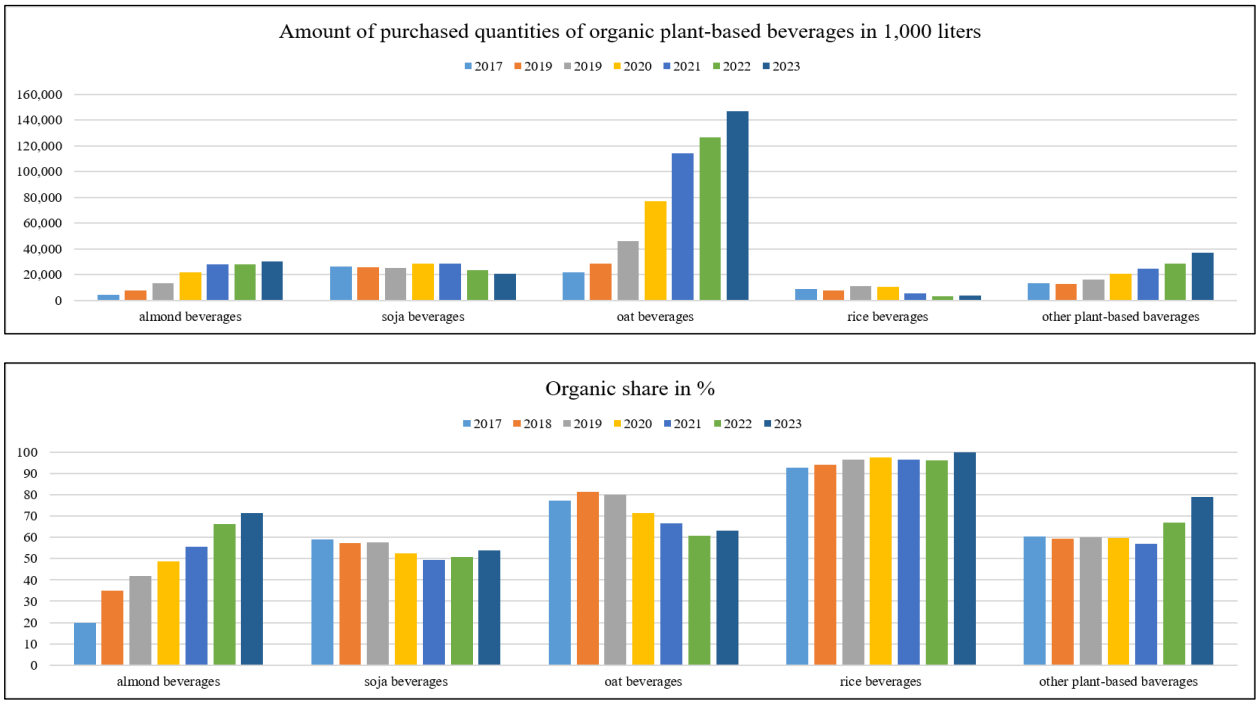
Source: Author's illustration using data from Bayerische Landesanstalt für Landwirtschaft [LfL], 2024a, and German Agricultural Market Information Company (AMI), 2025.

Figure 7. Wholesale Purchase Prices for Organic Oats in Germany in Euro per Metric Ton and Cultivated Area in Hectares (Blue: Summer Oats; Yellow: Winter Oats)



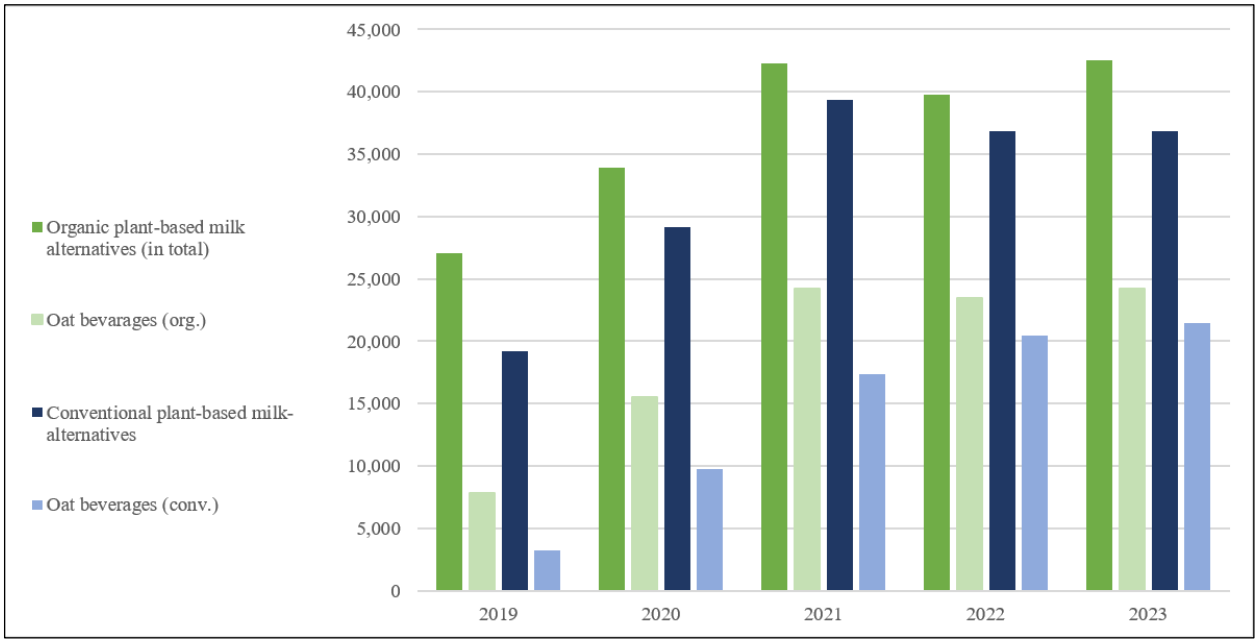
Source: Author's illustration using data from Bayerische Landesanstalt für Landwirtschaft [LfL], 2024a, and German Agricultural Market Information Company (AMI), 2025.

Figure 8. Amount of Purchased Quantities of Organic Plant-Based Beverages in 1,000 Liters and Share of Organic Plant-Based Beverages of Total in Germany in % (2017–2023)



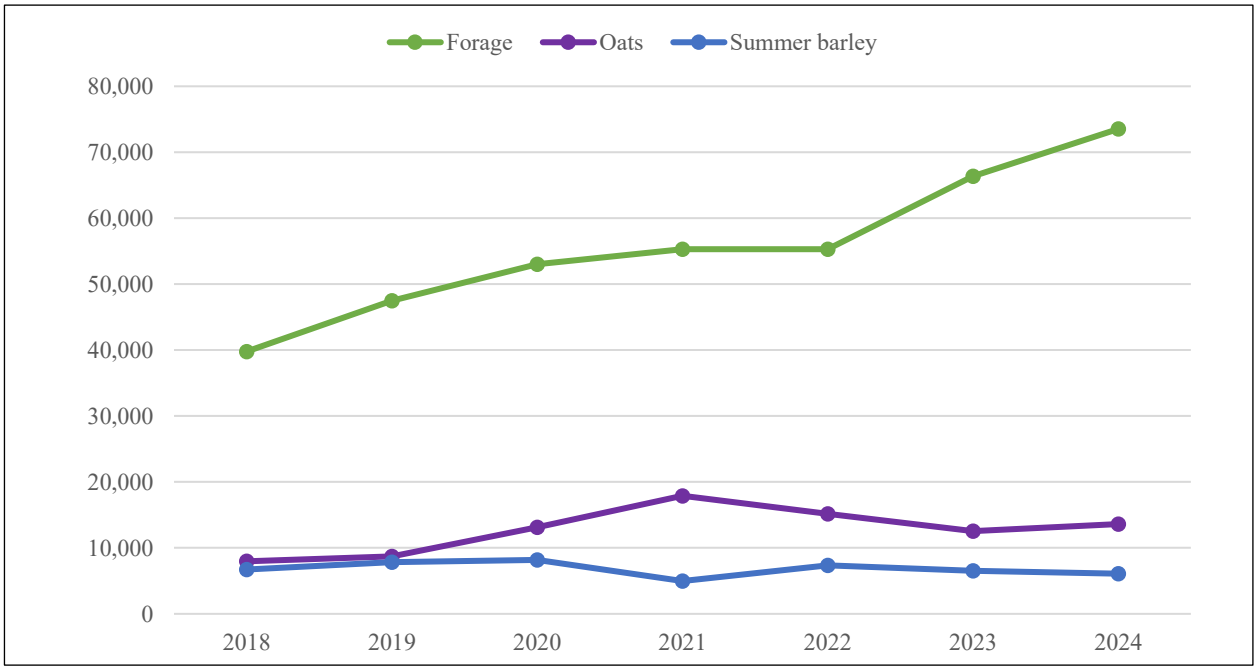
Source: German Agricultural Market Information Company (AMI), 2025.

Figure 9. Revenue (in €1,000) of Organic Plant-Based Alternatives (in Total) and Oat Beverages Compared to Conventional Plant-Based Milk Alternatives in Bavaria



Source: German Agricultural Market Information Company (AMI), 2025.

Figure 10. Arable Land of Forage in Hectares in Comparison to Oats (Purple Line) and Summer Barley (Blue Line) in Bavaria (2018–2024)

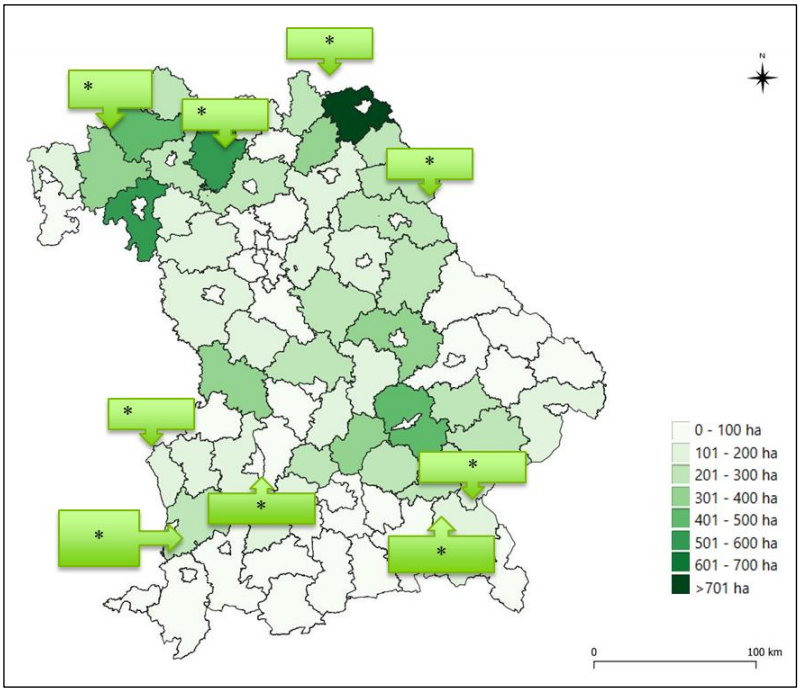


Source: Author's illustration using data from Bayerische Landesanstalt für Landwirtschaft [LfL], 2024a.

Selected Policy Implications

The requirement for the specific Bavarian agri-environmental measure (K-33, diverse crop rotation to preserve humus) was the cultivation of at least five different main crops. The extent of cultivation of one main crop per year must be at least 10% of the arable land but must not exceed 30%. The total proportion of cereals may not exceed 66%, and the proportion of potatoes, maize, and sugar beet must not exceed 20% of the arable land. The annual cultivation volume of the arable forage crop group must be at least 40% of the arable land (StMELF, 2025a). With the implementation of the measure in 2023, the share of arable forage increased (Figure 10). In turn, this reduced the area under cultivation for other crops, such as summer barley, oats, and grain legumes,

Figure 11. Acreage of Organic Oats and Processing Units and Mills in Bavaria



The different shaded areas are Bavarian counties ("Landkreise"); * indicate processing units/ mills for organic oats in or near Bavaria. Source: Author's illustration using data from Bayerische Landesanstalt für Landwirtschaft [LfL], 2024a.

leading to a shortage downstream in certain value chains. The measure was paused in 2025 as the available budget was exhausted.

Geospatial Mapping

For organic oats and barley, the regional allocations of production and processing are shown in Figure 11 and Figure 12. Several oats processing units such as mills are located in or very close to Bavarian agricultural production sites. This proximity is substantially more evident for organic barley. Nonetheless, shorter routes are not always more efficient. Together with the "white spots" (i.e., areas without processing facilities), this reveals logistical bottlenecks and regional dependencies.

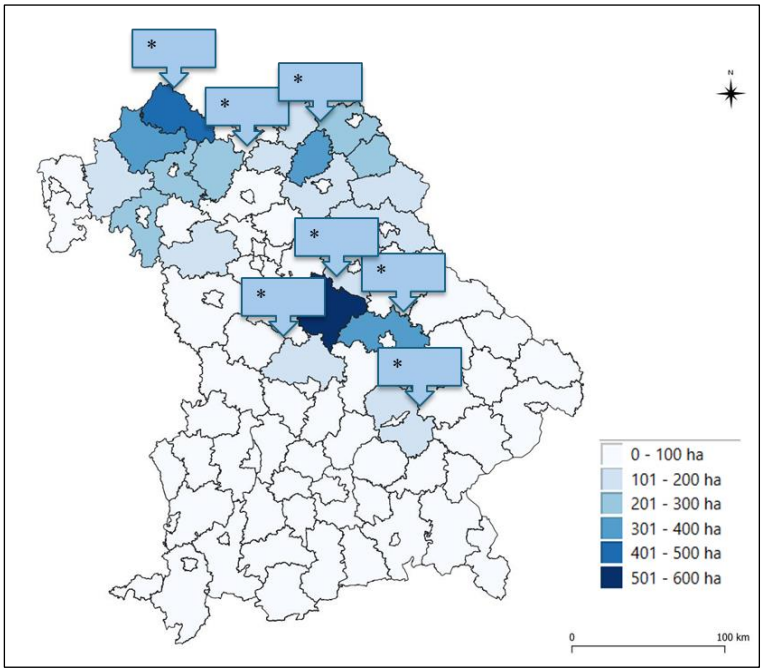
For organic beer, supply-chain mapping is possible because the required barley and hops are produced in Bavaria. Barley flows can be shown but are not quantifiable, due to lack of data. This is a critical issue, as while there are special yield and harvest estimates in Germany, there are no representative yield data for organic farming.

Primary Data: Qualitative Data Analysis

Our primary data reveal the motivations, opportunities, and constraints of market actors. This enables us to identify important market drivers, such as prices, consumer trends, educational and informational issues, and market mechanisms. Among other drivers, funding plays a key role at the farm level. Additionally, side supply-chain dynamics play a vital role, especially in small value chains as applicable to barley.

Tables 4–7 list the constraints, motivations, and drivers

Figure 12. Acreage of Organic Barley and Malting Plants and Breweries in Bavaria



The different shaded areas are Bavarian counties ("Landkreise"); * indicate malting plants and breweries for organic barley. Source: Author's illustration using data from Bayerische Landesanstalt für Landwirtschaft [LfL], 2024a.

Table 4. Constraints in the Value Chains—View of the Experts

Constraints	Percentage of experts (*N* = 26) referring to the following items
Climate change	71.4
Too many logos	61.9
Seed producer or availability of seed	57.1
Domestic goods are too expensive/too few	57.1
Structural changes of holdings	52.4
Low yields/cultivation risk	47.6
Lack of storage possibilities	47.6
Buyer reluctant to pay premium prices for organic products	47.6
Utilization of by-products	42.9
Transportation and logistics	38.1
Quality problems	38.1
Information and education (consumer)	38.1
Lack of breeding capacities	38.1
Policy support to promote organic markets	38.1
Lack of local farmers/colleagues for cooperation	33.3
Sell during harvest not always possible	28.6
Post-harvest treatment	23.8
Lack of organic markets	19.0
Lack of processing units	19.0
Lack of organic out-of-home catering	19.0
Buyers do not trust the product as organic	9.5

in the value chains according to the aggregated view of the respondent experts and the organic model regions, respectively. The views provide insight into both the oats and the barley markets.

Store Checks

Store checks were valuable as a ground-level verification of product availability, price positioning, branding strategies, and labeling. They allowed a realistic assessment of the market situation from the consumer's perspective. The store checks found 920 products in total that contain organic oats, demonstrating easy consumer access to organic oats. This high abundance of organic oat products contributes to a clear market signal. Most of the documented oat products are muesli and oatmeal, followed by cereal bars and bakery products (Figure 13). Plant-based milk alternatives also play a key role, as do convenience products. Most products were found in organic supermarkets and drugstores, followed by supermarkets and wholesalers. The discount supermarkets had a limited number of organic oats products.

Although origin information was provided for all investigated products, it was mostly limited to an indication of EU or non-EU origin. Consequently, a specific geographical origin could be confirmed for only a small share of products. Among the investigated products, 12% contained oats originating from Germany and just 2% from Bavaria. Most of the products are manufacturer brands, rather than private labels. About 20% of oat-containing products carry the logo of an organic association such as Bioland, Naturland, or Demeter.

Figure 14 shows the prices for different categories of oats in organic supermarkets.

For organic barley, the results look quite different. Organic barley, in the form of beer, was hardly visible in the various distribution channels. In Bavaria, there are well-known organic breweries, but only 84 products were found, mostly online. With organic barley, as well, higher prices can be realized because consumers are looking for specialties, with organic beer generally being more expensive than conventional beer. Our data also show a certain dependence on purchasing power. In combination, this leads to a low demand for organic beer combined with concentration of the number of malting and brewing units.

Table 5. Motivations and Drivers in the Value Chains—View of the Experts

Montivations and drivers	Percentage of experts (*N* = 26) referring to the following items
Partnerships/value chain cooperation	90.5
Consumer trends	71.4
Joint projects	52.4
Processing infrastructure	52.4
Markets available	42.9
Consumer education	42.9
Committed stakeholders along value chains	42.9
Adequate producer prices	38.1
Simple crops	33.3
Discounter entry	33.3
Winter crops available	23.8
Agricultural prerequisites	23.8
Cooperation with other model regions	23.8
Political support	23.8
Support from associations	23.8
Utilization of by-products	19.0
Funding opportunities available	14.3
Education and advice	14.3

Table 6. Constraints in the Value Chains—View of the Organic Model Regions

Constraints	Percentage of experts (*N* = 28) referring to the following items
Lack of organic out-of-home catering	71.4
Storage possibilities	46.4
Lack of farmer associations	42.9
Transportation and logistics	39.3
Post-harvest treatment	32.1
Lack of organic supermarkets	17.9
Seed producer or availability	14.3
Lack of local farmers	10.7

Value-Chain Mapping

The following value-chain maps (Figures 15 and 16) illustrate the production and distribution pathways of organic barley and oats, identifying key processes, actors involved, influencing factors, and fields of action.

Value-Chain Mapping: Organic Barley

The value-chain map reveals a multi-actor, standards-driven barley chain in which coordination, certification, and processing capacity are central to value creation and distribution. While primary production is relatively well supported, structural bottlenecks in processing, market access, and coordination constrain upgrading opportunities. The fragmented upstream structure contrasts with midstream actors, particularly traders, storage facilities, and processors, which function as key governance nodes by translating market and certification requirements into production constraints. Downstream actors reinforce this structure through branding and demand for certified products. Major bottlenecks include limited processing infrastructure, high compliance costs associated with quality and certification standards, and market and bureaucratic risks, all intensified by climate and seed availability challenges. Leverage points include stronger farmer organization, targeted investment in processing and logistics, enhanced knowledge transfer, and supportive policy frameworks to reduce entry barriers and promote innovation.

Value-Chain Mapping: Organic Oats

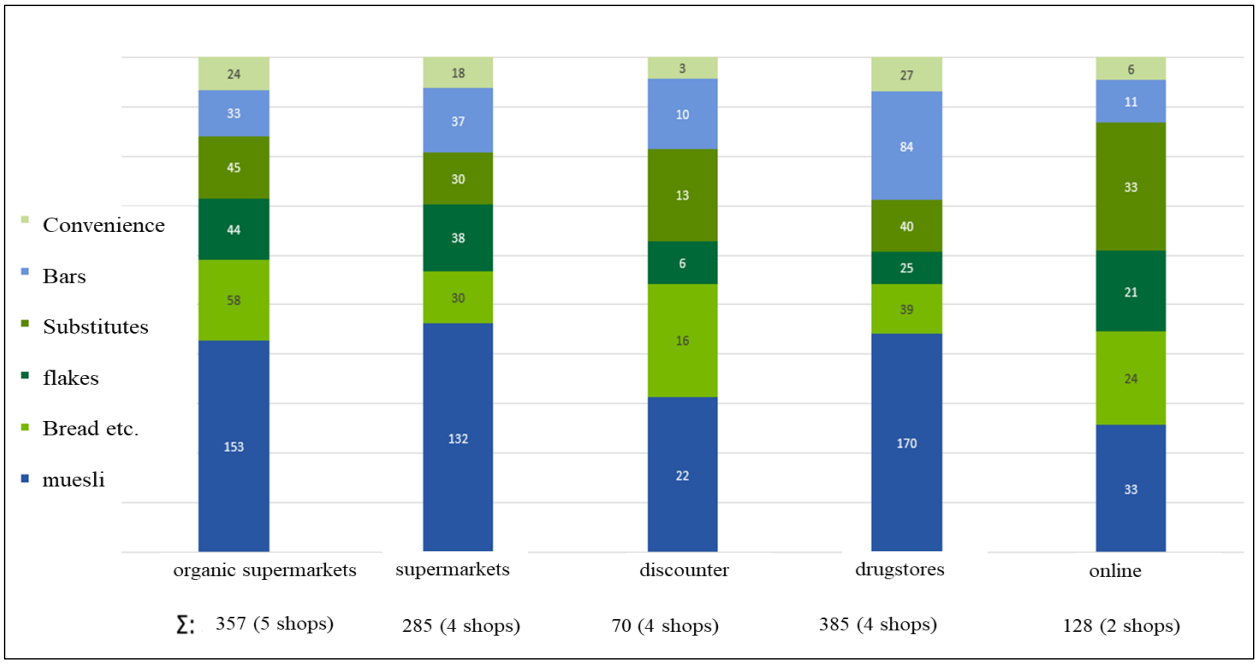
The organic oats value chain is shaped by agronomic advantages and established processing pathways, but it offers limited economic differentiation compared to other organic crops.

Table 7. Motivations and Drivers in the Value Chains—View of the Organic Model Regions

Chances	Percentage of experts (*N* = 28) referring to the following items
Involved stakeholders	78.6
Market access	75.0
Agricultural prerequisites	67.9
Processing infrastructure	64.3
Funding opportunities available	60.7
Municipal policy	50.0
Cooperation with model regions	46.4
Political support	39.3
Tourism is present	32.1
Support from organic associations	28.6

Note: Results derive from qualitative interviews.

Figure 13. Number of Oats Products per Distribution Channel



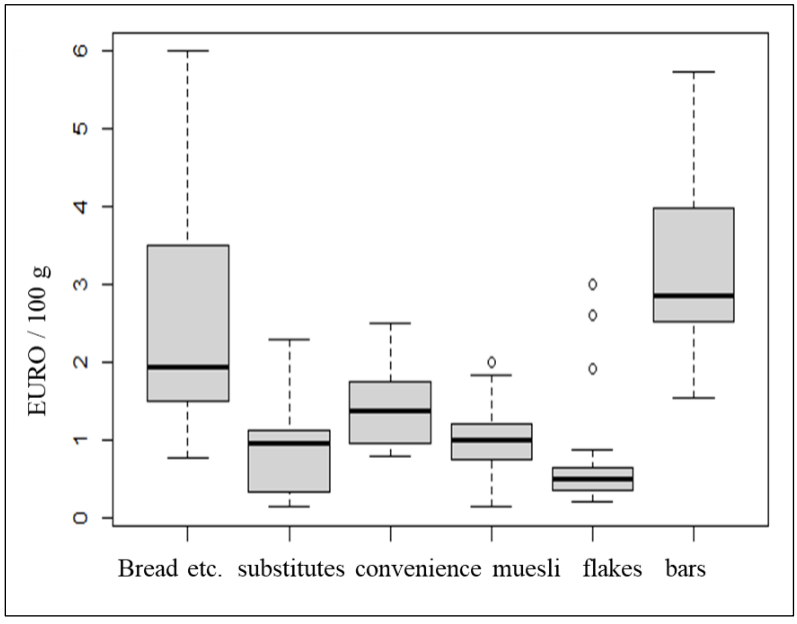
Source: Author's calculations based on the store checks.

While the chain is functionally well integrated, opportunities for value capture remain constrained.

On the production side, organic oats benefit from a positive precrop effect, meaning that they can improve the performance of subsequent crops within the rotation and therefore represent an attractive component of organic crop rotations. Ongoing breeding activities support their adaptation to organic systems and contribute to yield stability. At the processing stage, existing processing infrastructure enables efficient cleaning and refinement, while product innovations, particularly in food and plant-based markets, support stable demand. However, the chain faces several structural constraints. Compared with higher-value organic crops, organic oats generate relatively low economic returns per hectare. As a result, farmers could relatively easily substitute oats with alternative crops that offer higher profitability, making oat production highly interchangeable at the farm level.

Overall, the maps provide a structured overview of how institutions, standards, and infrastructure jointly shape value-chain outcomes. By linking actors, influencing factors, and fields of action, our value chain mapping identifies where targeted interventions are most likely to alleviate bottlenecks and enable more inclusive and resilient value-chain development.

Figure 14. Prices in Euros per 100 grams for Selected Product Groups in Organic Supermarkets



Source: Author's calculations based on the store checks.

Discussion

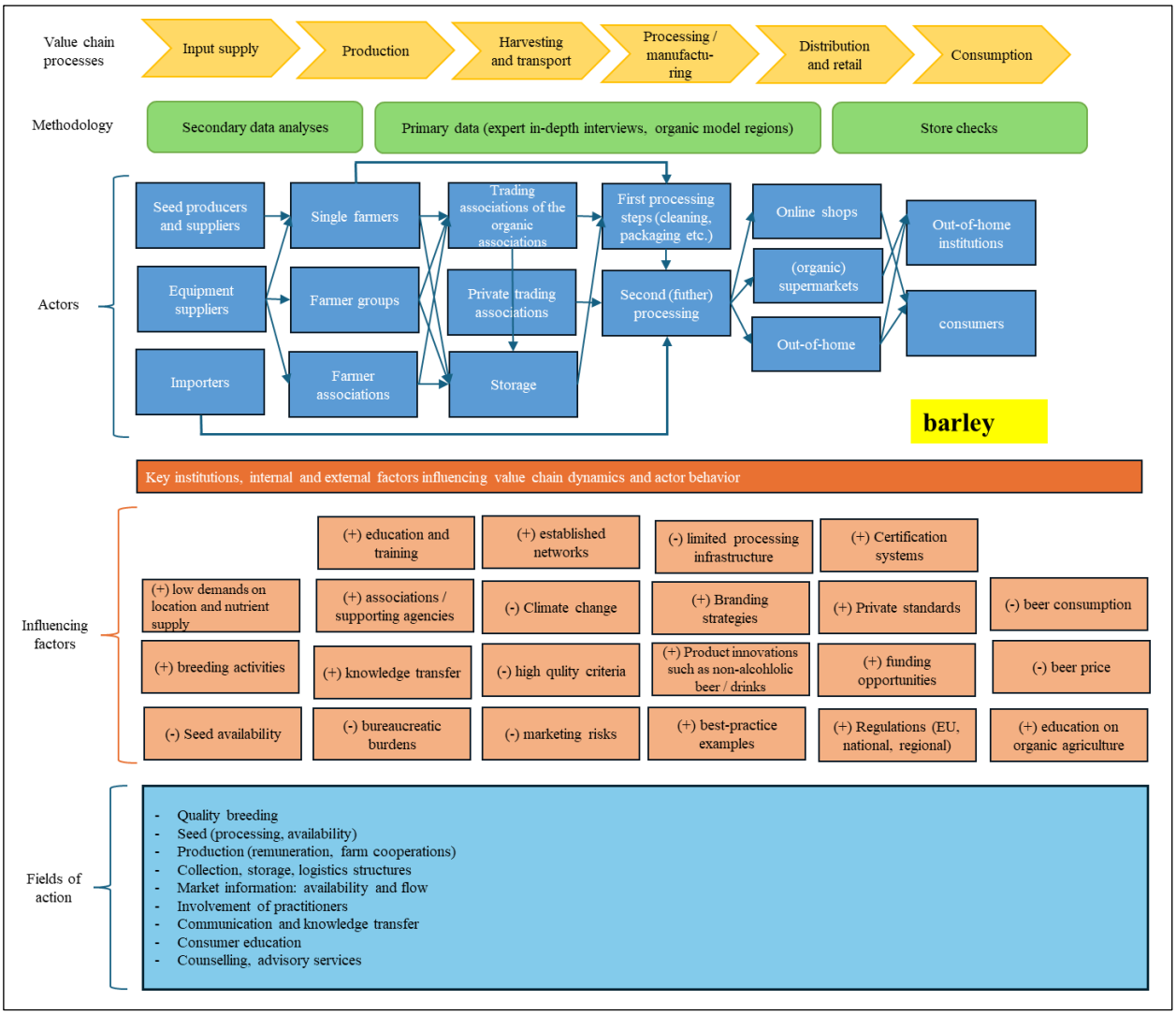
Previous research on organic markets has predominantly focused on consumer behavior, health-related motivations, and cultivation practices (Baker et al., 2020; Schäufele & Janssen, 2021; Wier & Calverley, 2002). Additional studies have explored enabling conditions and barriers to the sector's development, typically relying on singular methodological approaches such as interviews or panel data (Aertsens et al., 2009; Kociszewski et al., 2023). However, many of these contributions are outdated (e.g., Hamm et al., 2002), and they often lack spatial or structural specificity. Moreover, market studies either take a pan-European perspective (e.g., Richter, 2006) or focus on emerging markets, as in Eastern Europe (Kociszewski et al., 2023; Popa & Dabija, 2019), leaving a gap in research on mature organic markets and tools suitable for their analysis. To address this gap, our study adopts a multimethod approach to investigate market mechanisms and structural dynamics in the organic sector, using the example of organic cereals in Germany. The integration of secondary data analysis, geospatial mapping, semi-structured interviews, and store checks allowed for a multifaceted and spatially contextualized understanding of market flows and dynamics.

Secondary data provided insights into long-term trends in production volumes and price developments. Although public datasets often lack granularity, they are helpful in detecting structural patterns and quantifying market volatility. Geospatial data further enriched this analysis by displaying spatial relationships between production areas and processing capacities, enabling the identification of logistical bottlenecks and regional dependencies. Qualitative interviews added

significant analytical depth. Stakeholder insights along the value chain revealed mechanisms that remain hidden in quantitative datasets. In particular, value-chain mapping emerged as a critical tool to visualize actors, processes, influencing factors, and leverage points for action. Taken together, our multimethod approach triangulated findings to overcome data scarcity.

Our findings demonstrate that market actors such as producers and retailers actively respond to broader shifts, including price signals, policy incentives, and consumer preferences. Farmers' decisions, for instance, are strongly influenced by price premiums and subsidies. Organic farming, under favorable conditions, can enable farmers to capture a larger share of value, particularly through collaboration, improved infrastructure, and vertical integration in the supply chain (Orsini et al., 2019). Institutions and policy frameworks can facilitate the emergence of organic markets in response to rising consumer demand, highlighting the entrepreneurial potential for identifying new market niches (Baker & Russel, 2017). Policy instruments, particularly within the European Common Agricultural Policy (CAP), such as GAEC (good agricultural and environmental conditions) standards in Pillar I

Figure 15. Value-Chain Mapping: Organic Barley



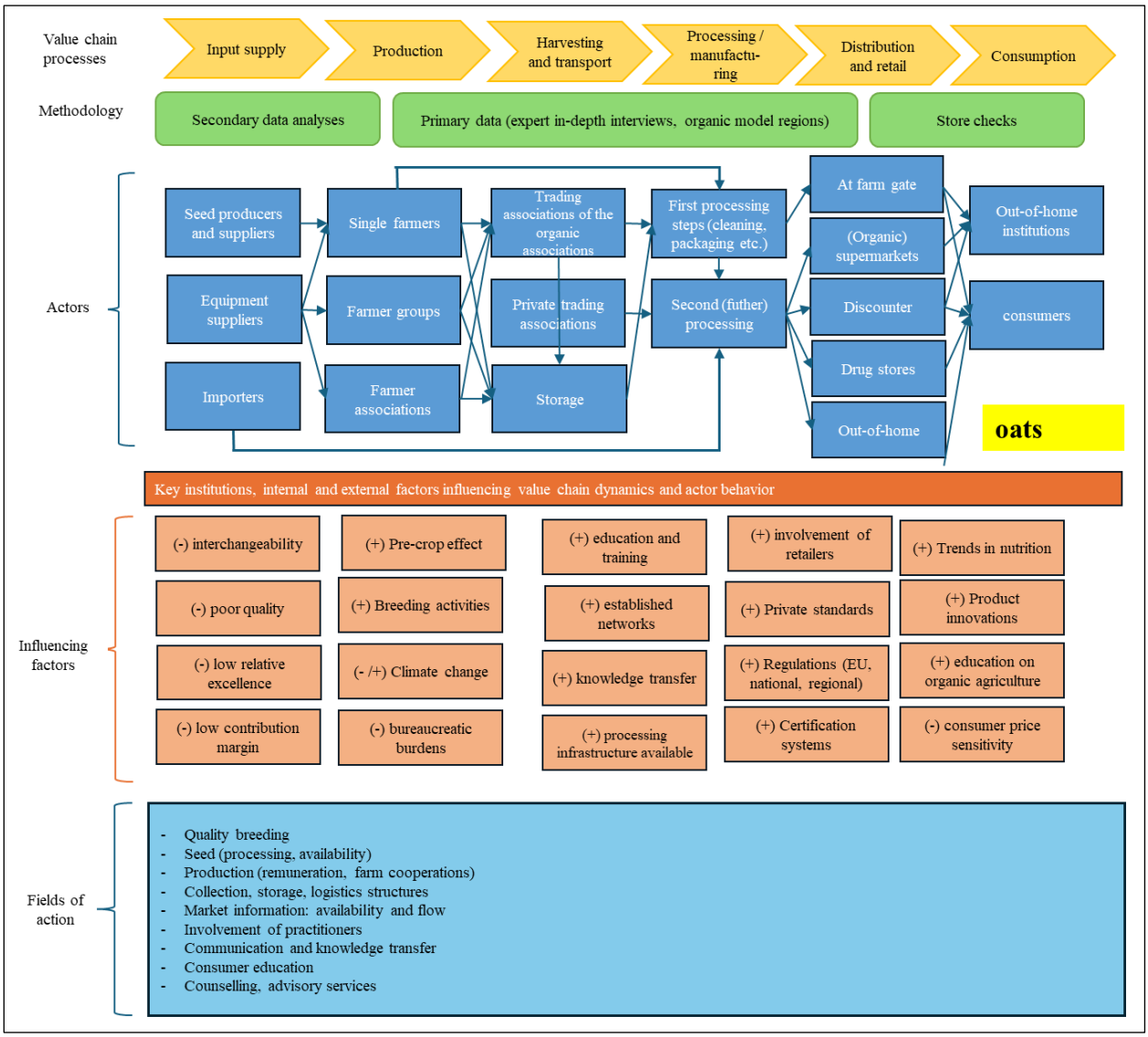
Source: Author's compilation.

and agri-environmental measures in Pillar II, have a significant impact on production quantities and regional value-chain formation (David et al., 2012). These interventions function primarily as push strategies.

However, policies alone do not create resilient community food systems, but rather a supportive environment in which producers, consumers, and community groups can work together with local governments to develop initiatives and pursue goals (Campbell et al., 2022). Thus, pull mechanisms, driven by consumer demand and the strategic actions of processing firms, also shape production choices; a high level of market transparency is essential for effective pull strategies (Hamm et al., 2002), a claim that our findings support. A balanced co-development of supply and demand is essential for the organic sector's resilience and growth.

Our store checks provided valuable real-time insights into the retail availability, pricing, and positioning of organic cereals. In general, German supermarkets had the largest variety of organic products of any sector of the food retail market. In

Figure 16. Value-Chain Mapping: Organic Oats



Source: Author's compilation.

2025 they held the largest share of the overall market at just under 31% (BOELW, 2025). In contrast, in Italy the market share of organic products is less than 3% (Zanoli & Solfanelli, 2025). Our results show a well established market presence for organic oats in supermarkets, characterized by product diversity and competitive pricing across retail formats. Organic barley was less prevalent, primarily found in niche or specialty outlets, with higher prices and limited consumer visibility. This disparity reflects both supply-side limitations and lower consumer demand.

However, the role and abundance of organic oats in plant-based diets and beverages documented by store checks indicate the market potential for product innovation. Despite the strengths of store checks, they offer only a static snapshot and are limited in capturing seasonal trends, online retail dynamics, and upstream market influences. Subjective assessments of placement and labeling may affect reliability. Notably, our study does not include a consumer preference analysis. However, a study on milk alternatives (Etter et al., 2024) suggests that consumer perceptions are influenced by taxonomic distinctions, limiting substitution. Nonetheless, when plant-based products align with the shared functional values of dairy, they are more readily accepted as stand-alone categories. Schmidt et al. (2025) emphasize that branding is crucial, as local or regional ingredients are more likely to attract consumers when they are well branded.

The value chain mapping revealed critical flows, gaps, bottlenecks, and opportunities. This integrative tool helped identify leverage points for both policy and market interventions. In particular, the abundance and product variety of organic oats suggest opportunities for business model innovation.

While our study focuses on production, pricing, and infrastructure, the findings also point to broader dimensions relevant to community economic development. In particular, the observed interactions among value-chain actors reflect elements of social capital, such as trust-based relationships and knowledge exchange, which can facilitate coordination and adaptive capacity. At the same time, the identified bottlenecks highlight the role of governance structures in shaping market access and decision-making processes. Our results suggest that value-chain performance is closely linked to institutional arrangements and network dynamics.

The use of multiple methods enabled a nuanced understanding of organic grain markets that would not be possible through a single-method approach. This underlines the importance of methodological triangulation in researching complex and evolving sectors. Future research could build on this study by investigating price transmission, conducting environmental and social value-chain assessments (Akyüz et al., 2023), and exploring how power relations shape coordination, decision-making, and market outcomes.

Limitations

Our study faces several limitations. Data representativeness is constrained by limited regional and temporal coverage, restricting the generalizability of results. Aggregated or incomplete datasets may obscure internal market heterogeneities, while the absence of longitudinal data limits causal inference. Primary data from interviews are susceptible to selection and reporting biases. We acknowledge that the expert interview sample, while appropriate, is relatively small ($N = 26$), which limits generalizability. We did not address aspects on equity, inclusion, and regional resilience, but we are aware that observed structures and bottlenecks could affect different communities and their capacity to adapt. Furthermore, the store checks provide a snapshot in time and place, and seasonal variations are not captured.

Recommendations

This study offers insights into the organization and performance of selected organic value chains. Findings suggest that functional and value-generating marketing channels are in place, offering farmers and traders access to premium markets. However, the structural bottlenecks identified, including limited processing capacity, fragmented actor coordination, variation in product availability and pricing across retail formats, not only constrain market growth but also undermine the ability of regional food systems to deliver stable, locally sourced organic products. These constraints have direct community development implications: when

regional organic value chains underperform, the benefits of local food production, including rural employment, producer income stability, and equitable access to food, remain unevenly distributed and difficult to sustain.

Addressing these constraints requires coordinated action not only along but across the value chain, with actors, producers, cooperatives, processors, retailers, and policymakers, working in concert (Figure 17). With increasing consumer demand and a growing organic market share, strengthening value addition and deepening interactor collaboration will further enhance the resilience of domestic organic markets while creating conditions for more inclusive and community-oriented food economies. From a food system perspective, the emerging role of local sourcing networks, agricultural associations, and policy incentives points to the civic and institutional foundations upon which more resilient and community-oriented organic value chains can be built. By demonstrating even with limited data how empirical, multimethod approaches can reveal actionable leverage points, the study contributes to ongoing debates on value-chain governance, market development, and the role of social networks in resilient, sustainable community economic development and food systems.

Managers of organic model regions are well positioned to serve as facilitators in this process, supporting stakeholder engagement, value-chain development, and knowledge transfer across actor groups in ways that align economic objectives with broader community development goals (Stiele et al., 2025).

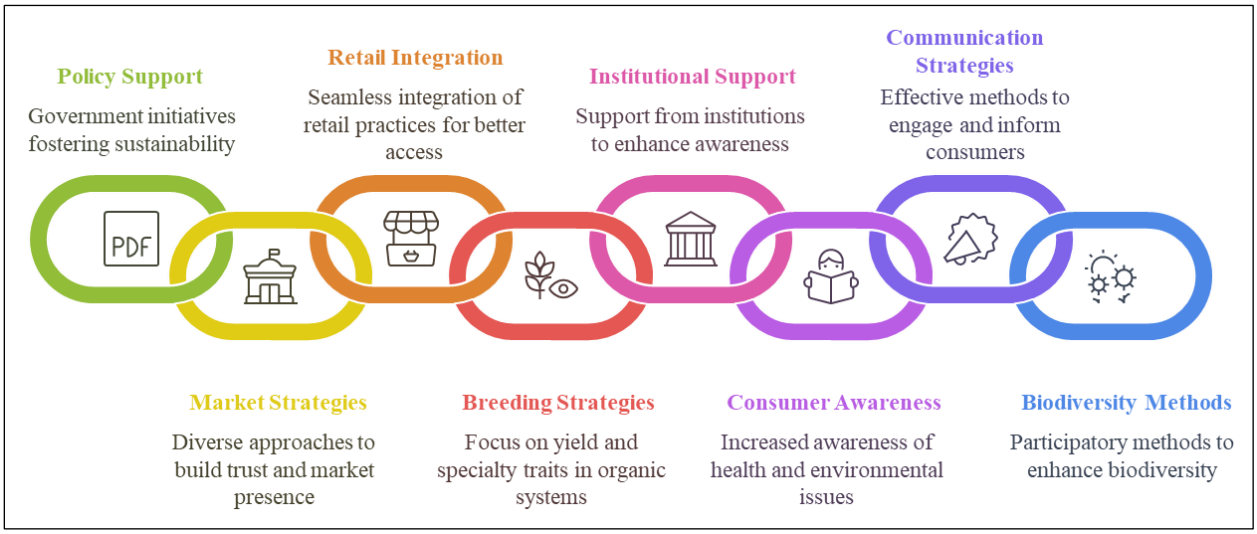
Table 8 provides an overview of the key recommendations emerging from the study findings.

Conclusion

Organic farming is increasingly acknowledged not only for its environmental contributions but also for its social dimensions in agricultural value chains, which profoundly influence producer well-being and community economic development. Participation in organic value chains is associated with enhanced social networks and collaborative arrangements among farmers, processors, and other stakeholders, enabling the exchange of knowledge and innovations, building trust, and facilitating collective problem-solving that can improve adaptive capacity and strengthen community resilience (Magnano et al., 2024).

Our study sheds light on organic value-chain structures and stakeholder interactions in a mature market context, providing insights into drivers, barriers, and leverage points that are relevant beyond Bavaria. The methodological approach is transferable from Bavaria and can guide policymakers and practitioners in other regions seeking to improve

Figure 17. Coordinated Involvement of All Actors



Source: Author's compilation.

market functionality, strengthen value-chain coordination, and enhance sustainable and resilient community food systems and community economic development. The descriptive foundation established in this study provides a basis for future research to advance analytical depth through several approaches. Regression-based or econometric modelling could test the hypothesized relationships among organic market development, regional structural factors, and policy conditions, while longitudinal analysis of time-series data would allow for identifying trends and potential causal pathways. Scenario or simulation modelling could further translate descriptive market data into forward-looking analytical frameworks, directly addressing the policy implications dimension. Beyond analytical refinement, future research could apply this approach across diverse geographic and socio-economic contexts to validate the findings and support the development of robust organic value-chain models, contributing to more resilient food systems worldwide.

Acknowledgment

I thank Prof. Dr. Peter Breunig for constructive feedback on my work and proofreading.

Table 8. Key Recommendations Derived from the Study Findings

Recommendation	Relevant stakeholders target group
Decentralized development of infrastructure for collection, drying, purification, and storage—including quality analytics	Farmers, first processors
Establishment of supply groups consisting of farmers to aggregate produce and reduce logistical costs	Farmers
Diversification of crops to manage risk and meet developing consumer demand for organic cereals	Farmers
Optimization of logistics and distribution systems	First processors, second processors, trade and wholesale
Forming partnerships with farmers to provide contracted growing arrangements, securing stable supply	First processors
Investment in quality improvement measures (e.g., sorting, cleaning, grading) to meet premium market requirements	First processors
Promoting product differentiation by highlighting organic origin, sustainability, and regional identity	Second processors
Optimizing sourcing strategies to balance cost, quality, and supply reliability	Second processors
Educating consumers about the value of organic products to justify premium pricing	Second processors
Developing marketing strategies emphasizing transparency, certification, and sustainability	Wholesale/retail
Fostering partnerships with local producers to strengthen regional supply chains	Wholesale/retail
Establishment of a market-reporting center (comparable to the dairy sector)	Policymakers
Expansion of regional organic food procurement in public institutions	Policymakers, public institutions
Strengthening stakeholder cooperatives and strategic alliances	Policymakers
Capacity-building and training for administrative and control authorities	Policymakers
Investment in plant breeding and applied research	Policymakers
Expansion and training of organic advisory services	Policymakers, organic farming associations
Funding simplified, accessible schemes for organic farming and processing	Policymakers
Systematic dissemination of best practices and technical knowledge	Policymakers, organic farming associations
Supporting infrastructure development for storage, processing, and transport of organic crops	Policymakers

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