

Article

Potentials and Limitations of Regional Organic Food Supply: A Qualitative Analysis of Two Food Chain Types in the Berlin Metropolitan Region

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Abstract: Regional food systems and organic agriculture are both considered more sustainable than the conventional, globalized food system they provide an alternative to. The emergence and expansion of alternative forms of food supply are influenced by various factors on different scales. Using the food systems approach we aim to study potentials and limitations of regional organic food supply in the Berlin metropolitan region (BMR). Based on the literature, we developed an analytical framework and identified determinants of regional organic food provision along the three major levels of the supply chain: agricultural production, food chain organization, and consumption. Then, we examined a qualitative case study with two different types of alternative food networks (A) organic community supported agriculture (CSA) and (B) organic retail trade. Factors that hinder or promote the provision of regional organic food were identified through qualitative interviews and assessed by regional stakeholders in a workshop. Our findings show that demand for regional organic food is higher than regional supply, which could offer good possibilities for organic farmers. However, actors in these two food chains need to overcome some obstacles, including limited access to land, increasing renting prices, insufficient processing capacities, and unsupportive political environment for organic farming.

Keywords: food system; community supported agriculture; retail trade; alternative food networks; food policy

1. Introduction

The modern globalized conventional food system (with intensive agriculture and long supply chains) has contributed to enhance productivity, increase food security and safety, but is also related to negative environmental and social effects as well as economic uncertainties [1–3]. Critics call for alternative approaches to food supply, as production is increasingly disconnected from consumption [4] and depends on non-renewable resources [5]. In addition, the relations in the food system have changed; reducing the role of farming and increasing the importance of packaging and processing [6]. The food market has become more anonymous and many ‘food scandals’ since the 1970s onwards and the introduction of genetically modified organisms (GMO) have created a negative image of modern food production [4,7]. People are concerned about animal welfare, increasing transportation distances, and the sources and ingredients of food. Changes in food consumption have contributed to inequality in food distribution [8] and farm-based ‘price squeeze’ which cause lower income for

farmers [9]. The organic food sector also tends to become globalized and conventionalized and has already experienced food scandals [10].

In response, food chain innovations contributing towards more sustainability in conventional chains and the consideration of regional and even local means of (organic) food production and distribution have been observed [11]. Furthermore, alternative food chains or networks (AFN) such as urban gardening, community supported agriculture (CSA) and box schemes have been gaining more attention. These are built upon social and technological innovations as well as behavioural changes [3] and the increasing relevance of ecological and social values [12].

Within the multi-faceted research about Alternative Food Networks (AFN) the concept of short food supply chains is quite prominent [13]. Shortness of the food supply chain represents one major attribute of AFN and can be understood in two ways: (a) its spatial dimension, meaning that production, processing, and retail occur within a defined geographical area and/or (b) its social dimension as chain organization reduces the number of intermediaries between food producer and consumer to one or fewer [14–17]. However, short food supply in AFN is associated with social and economic benefits and is thus increasingly advocated by a variety of stakeholders [18,19]. It contributes to enhanced information about the origin of products [20], to social capital, trust, and transparency [21,22], and to added value [23]. In addition it supports regional economies and competitiveness [24–26]. Interaction with customers provides an improved information base for farmers to better meet changing demands and market conditions [27,28]. At the same time, AFN contribute to reduced risk and dependency on the single outlet, and price pressure, and have the potential to generate better incomes for farmers [29].

In 2013, the food sector was responsible for more than 26% of the final energy consumption in the European Union (EU). Here transport (9.4%) and packaging (10.7%) have relatively high shares within the food chain beyond the farm gate [30]. The conventional mode of global food production and distribution has led to long food chains with expanded transportation distances and intermediary steps.

Here, short food supply and the consumption of locally grown seasonal and organic food with reduced packaging can make another significant impact [16,24,30].

Although there is the shared perception of many authors and practitioners on the potential contribution of AFN to more sustainable food systems, there is lacking comprehensive as well as empirical evidence for the manifold benefits [17,24]. In addition, there is controversy about the extent of trade-offs between impacts of AFN and the methodologies that are most feasible to measure the impacts and trade-offs of food chains between different sectors and scales adequately [31,32].

Drawbacks of AFN concern all dimensions of sustainability [33]. Taking the example of energy and transport efficiency among different chain types and scales—some studies show that small-scale producers need more energy per unit than larger producers (“ecologies of scales”, [34]) and mass distribution is more efficient than individual consumer travels to local farm shops [35]. All in all, the knowledge about benefits and drawbacks is quite patchy and further research is needed. Nonetheless, policymakers become aware of the importance and potential benefits of AFN. Beyond market mechanisms, monetary incentives supporting organic farming, producer groups, direct marketing or geographic indications are in place, such as in the second pillar of the European Common Agriculture Policy (CAP). Otherwise, regulations such as hygiene standards and trade legislation are described as constraints [17,36]. As a multi-level policy issue, topics of regional food and self-sufficiency have also reached the political debate at a regional and municipal level. Recent research responds to increasing political interest in urban and metropolitan food planning and the acknowledgement of impacts in various fields of urban policy, such as health, education, local economy, quality of life, and social issues [37].

A multitude of alternative models and food chain innovations are discussed in research and implemented in practice. Differences are particularly observed between regional marketing models in organic farming that make use of existing traditional food-chain infrastructure [38] and concepts that fundamentally challenge roles and relationships between producers and consumers such as

CSA [39]. Their distinctive features need to be taken into consideration in food policy to re-establish links between urban food consumption and regional production [40,41]. Policy-relevant information, with conceptual and robust empirical evidence on potentials and requirements of specific food chains, is therefore needed in order to develop an alternative food system [42].

Accordingly, the first research objective of the paper is to develop an analytical framework and identify factors involved in regional supply of organic food along the three stages of the supply chain: agricultural production, food chain organization, and consumption. The second objective is to implement the analytical framework for two examples of alternative food networks: CSA and organic regional products in retail trade. They were assessed by regional stakeholders, practitioners, and decision-makers regarding their potential contribution to regional food supply in the agri-food system of the BMR. Individual strengths and weaknesses of the two chain types and their opportunities and limitations determined by regional framework conditions are examined. In addressing the research objectives, we use a case study approach to investigate limiting and fostering factors for the specific situation of two different types of food chain. The research design consists of three steps: (i) developing an analytical framework; (ii) collecting empirical data; and (iii) conducting a SWOT analysis (strengths, weaknesses, opportunities and threats). Finally, we discuss the potentials of regional organic food supply in BMR in general and specifically for the two studied food chains types.

2. Analytical Framework

Within the recent academic debate, several theoretical models and frameworks have been developed to improve the understanding of food chains and food systems and their impacts on and contribution to sustainable and resilient development. These include socioeconomic [7] and sustainability perspectives [4] as well as perception and legitimacy [36,43]. Further energy efficiency and carbon emissions [5,35,44] or analyses of ecological impacts through life cycle or balance assessments [45–47] are discussed. Addressing the political decision-making process directly, Roep and Wiskerke [48] presented a framework for managing and developing AFN that may contribute to more sustainability in the agro-food system. Studying the performance and dynamics of food systems can be a part of national food strategies [17,49,50] or local (urban) food planning [17,51,52].

On the level of food systems, the conceptual frameworks by Sobal et al. [53] and Ericksen [6] are particularly useful. Sobal et al. [53] examined existing food system models, distinguishing producer, consumer, and nutrition subsystems as well as geographical and social environments as the system context. Focusing on the structure and processes of food systems, Ericksen [6] applied a system approach which considers activities and related actors from production, processing and packaging, and distribution and retail of food as main components of the food system. Interactions between and within biophysical and human environments, activities, outcomes of activities, and finally other determinants have been especially taken into consideration in order to synthesize them into a conceptual model of food systems analysis in the context of global change.

In this paper, we adapted the models developed by Sobal et al. [53] and Ericksen [6] by focusing on food system activities and differentiating them according to: (i) agricultural production; (ii) food chain organisation, i.e., upstream activities and actors and their organizational and logistical structure; and (iii) consumption (see Figure 1).

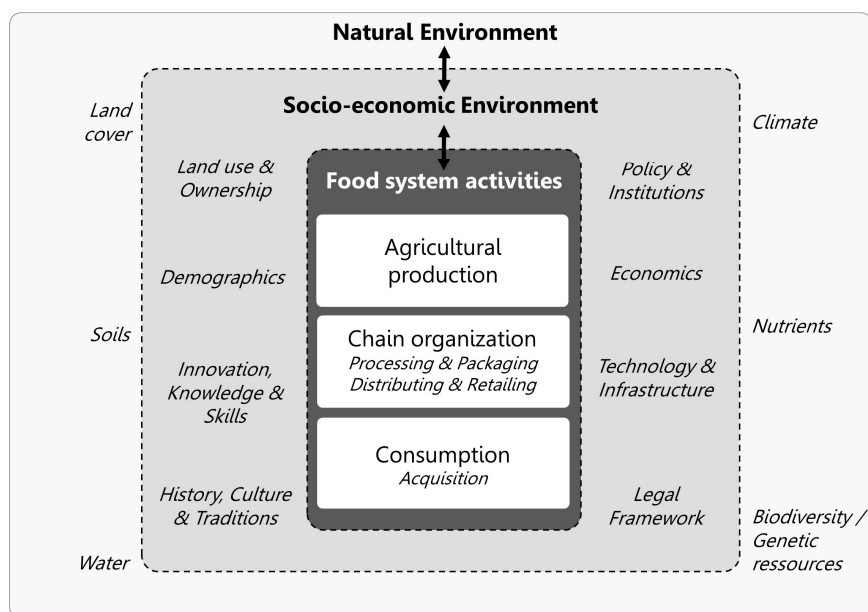


Figure 1. Analytical framework and system boundaries of the study inspired by Sobal et al., 1998 [53], Ericksen, 2008 [6] and Westhoek et al., 2014 [48].

We use the term “agricultural production” for production of agricultural commodities (primary production) without considering input suppliers, the term “food chain organization” for all activities related to processing (transformation of raw agricultural products into consumable food), packaging, and distribution of food through different types of outlets and their logistical organization. In the stage of “consumption”, we only consider the aspect of acquisition of food. This means that the boundaries of our studied subsystem reach from “farm gate to consumer’s door” and can therefore be considered as a food supply chain. Food system activities and related processes are interlinked with their wider socio-economic and natural environment and complete the food system.

We apply the notion “regional organic food” if the major food system activities and related steps (i.e., production, processing, distribution and consumption) take place within a certain region and if organic production methods (irrespective of organic certification) are applied. The role of the region in the food system research shall be highlighted here, as it acknowledges the spatial level of geographic fixation of the different production factors, but also regional demand, markets and corresponding policies [54]. For the empirical research in this paper, we focus on (BMR), which consists of the city of Berlin and the surrounding Federal State of Brandenburg.

The developed framework can be universally applied for any food system, regardless its geographical scale (from local to global) and whether it is conventional or alternative (e.g., organic). It allows for a systematic analysis of food chains as elements of the food system as a whole, including external conditions that frame the development of food chains and their potential to meet demand and supply. By expanding the perspective on food chains as part of the food system, the framework goes beyond linear food chain models focusing on a sequence of steps and flows of materials and objects [53] and provides a set of influencing factors for analysis.

In this study, the analytical framework is firstly applied to a literature review on the main determinants, conditions, and requirements for regional organic food supply. Secondly, it provides a structure for the description of the case study region and the SWOT analysis of the case studies of community supported agriculture (CSA) and organic retail trade in the BMR. Taking the three major food system activities as a starting point for analysis, we identify specific factors influencing regional organic food supply. Table 1 gives an overview of these factors compiled from literature.

Table 1. Determinants for the feasibility of regional organic food supply.

Policy and Institutions (legal framework, regulation)	Agricultural policy, regulation (e.g., hygiene)	Agricultural Production
		Availability and access to land Site conditions, i.e., soil quality, water balance, climate conditions Agricultural system, i.e., land use, farm size and structure, commodity variety, Cultivation and management, i.e., intensity, production efficiency, methods, cooperation Costs, i.e., labour, input prices, equipment, incomes, volatility
		Food Chain Organization
		Logistics and distribution, i.e., infrastructure, efficiency, shortness (distance, chain member) Processing and packaging, i.e., business structure, capacities, food production traditions Product, i.e., type, quality, seasonality, freshness, access, variety, provenance Marketing and retail, i.e., communication, labelling, transparency, traceability
		Food Consumption
		Market size, i.e., population size; societal demand, purchasing power Consumer, i.e., willingness-to-pay, knowledge, attitude, trust, needs, food traditions

Source: own compilation based on literature review.

2.1. Agricultural Production

First of all, the availability of suitable farmland and prevailing site conditions including soil quality, nutrition, and water balance as well as climatic situation represent basic framework conditions for regional agriculture and food production. They contribute to determine the variety of commodities as well as yields and production volumes. In this sense, regions will be differently able to cover the food demand, although rural hinterlands of many urban and metropolitan areas such as Paris, Milan or Barcelona are historically oriented to specific demands of urban areas for fresh and perishable food, such as fruits and vegetables. As the second criteria, the regional agricultural structure, characterized by farm sizes and specialization, land use, and crop diversity, determines the feasibility of regional food production. Whereas a small-scale farm structure allows better compliance with and flexibility for the regional marketing structure, large-scale agribusinesses are more likely to make use of economies of scale and are therefore rather oriented towards the long food chains of the global market [55]. Related to the agricultural structure, prevailing cultivation and management practices need to be taken into consideration when assessing the potentials and limitations of regional food supply. It is for instance argued that particularly organic and quality production is more easily distributed via alternative, regional food networks, where consumers actually seek out direct interaction with producers and the food production process. In addition, cooperation between farmers (e.g., through associations and networks) and food production traditions are favouring regional food supply. On the other side, large-scale, intensified, and mechanized production complies with the quantity requirements of the non-regional food distribution system [4].

The adoption of short and regional food supply represents an opportunity to charge higher prices and generate additional income also through vertical integration along the food value chain [14,36]. However, initial investments for conversion to organic farming and integration into regional food networks require financial resources and knowledge [11].

2.2. Food Chain Organization

Logistical aspects are distinguished into transportation distance from producer to consumer, the number of intermediates involved and organization of the supply chain [15,56,57]. Longer food chains are usually more efficiently organized, due to the quantities available. Regional food chains, on the other hand, reduce the actual distance and the number of intermediaries at the expense of efficient logistics, creating high distribution costs of regional food [4,58]. In turn they increase product margins for individual stakeholder, especially producers [59] as the value of the final product increases. Institutionalized networks e.g., regional food and producer groups [29,58] or food hubs [60] are

addressing this shortcoming. Market access is influenced by the quality and governance of regional food infrastructures, networks to commercial partners, and the capacity to meet specific criteria [36,48]. Regional producers are often dependent on “conventional” intermediaries in the food chain like wholesalers [4]. However, the use of conventional food system infrastructure might be helpful for the development of regional food chains and can take over a role in the transition process towards more regional food systems [38,61].

Food processing facilities represent another relevant determinant for regional food supply. Concentration processes in food processing and retail as well as food hygiene regulations contributed to the disappearance of small-scale and regional processing units, because enterprises usually have non-regional, multinational organization [1,62]. Existing centralized, large-scale structures represent the main obstacle for regional food supply. However, in smaller scale and quantities, on-farm processing is also possible, positively influencing the relation between producer and consumer [7].

The variety of food products and their features, including quality, freshness, taste, look, and healthiness is relevant when analysing the feasibility of regional supply [63,64]. The ability to interact with the consumer, marketing and retail are important elements in regional food chains. Transparency and traceability through product labelling or organization of selling points play a particularly important role in the communication with consumers for creating a product image, conveying information on product quality and provenance [48,63].

2.3. Food Consumption

Regional demand is mainly determined by regional market sizes as a function of population size, consumer characteristics and preferences. Consumer behaviour and purchasing decisions for organic regional food and the willingness to pay are influenced by socio-economic factors. Income, education, awareness, motivation, and the attitude towards or feeling of belonging to a region are all relevant determinants [65–67]. Several studies have shown that consumers are willing to pay higher prices for regional (organic) compared to conventional food [36,63].

In addition, concerns and distrust against conventional food production are frequently discussed as an influential factor for turning to alternatives, like organic or local food [68]. That stimulates consumers’ interest in organic food, meaning they are more likely to consider regionally grown products [19]. However, the importance of regional supply varies across different commodity groups. Surveys among consumers and regional food initiatives revealed the particular relevance of regional origin for fresh products with a low processing depth, such as fruit and vegetables, meat and eggs as well as bakery and dairy products [69,70].

3. Methodology and Data Collection

The analysis of the potentials and limitations of regional supply with organic food in BMR consists of three major analytical steps: (1) Description of the case study region; (2) SWOT analysis for two different food chain types, which provides (3) the basis for the final discussion of potentials and limitation of regional organic food supply.

In a first step, we introduced (BMR) as case study region and describe relevant socio-economic and natural framework conditions, where the regional food system is embedded in. For the description of the local food demand, the situation of the agricultural production and the food distribution as well as the political context, we mainly used grey literature, documents and secondary statistical data.

In a second step, we applied a SWOT analysis for two different case studies: case study A is community supported agriculture (CSA), and case study B is retail trade of regional organic products. The rationale for the selection of the two types was to have contrasting examples of marketing channels for organic food produced in the same region. Both models are newly emerging in BMR and Germany (e.g., in contrast to more traditional marketing channels like farm shops). While CSA represents a small-scale model of food supply with direct and short interaction between producer and consumer, the retail model includes the full range of chain actors (incl. different intermediaries) and exists mainly

on large scale [71]. For the understanding of CSA in this study, we follow the narrow definition by Saltmarsh, et al. [72] (p. 7), who describes CSA as “any food, fuel or fibre producing initiative where the community shares the risks and rewards of production, whether through ownership, investment, sharing the costs of production, or provision of labour”. Essentially, the participation in the production process discriminates CSA from other direct marketing alternatives, such as box schemes. By retail trade of regional organic products we mean in this study the marketing of locally grown and processed organic food, which is distributed in the region of production in outlet stores (conventional and organic supermarkets). The supply of food to the retail store can be organised in two major ways (1) directly from farmer or food processor towards retailer (single-stage) or (2) via wholesalers (multi-stage). Retail outlets are the major distribution channel for (organic) food in many countries. The relation between farmer/producer and consumer is market-based and indirect [17,73–77]. In a third step, we analyse and discuss the (1) potentials and limitations for regional diffusion (increasing frequency of the application of the model) and upscaling (growth of size) of the two food chain types [78] and (2) their expected contribution to the supply of regional organic food in the current food system of BMR. Therefore we use the results of the SWOT analysis and reflect them with the regional situation in the case study region and estimations from international literature.

For the structured evaluation of the environment for these system activities in specific food chain types we used the SWOT analysis. SWOT analysis is defined as methodology in strategic planning that evaluates Strengths, Weaknesses, Opportunities, and Threats of a project, product, market, region etc. [79]. SWOT supports the structuring of qualitative and quantitative information from different sources and is commonly used in business management (enterprises), but also in regional and city planning [80]. For the final SWOT analysis information gained from interviews and a workshop (only CSA) were summarised. The final evaluation regarding upscaling, diffusion and contribution of the two food chain types to regional supply with organic food within the food system of BMR is part of the discussion section.

Data on the CSA case study were gathered through eight in-depth interviews with farmers (N = 4), participating consumers (N = 2), a consultant (N = 1) and a non-governmental organization (N = 1) conducted in March and April 2013 and complemented during a workshop with practitioners and experts from (BMR) and Germany. The workshop took place in May 2013 in Berlin with 12 purposefully selected practitioners (farmers or participating consumers) from CSA initiatives in the region (N = 6) and experts from policy, administration, and research, who are directly involved in the CSA topic (N = 6). In this workshop interview results were presented in form of a SWOT, discussed and completed by the participants.

For the case study of organic retail trade, data were collected from 11 in-depth semi-structured interviews with selected experts (purchasing manager, sales manager) of (i) food retailing companies (N = 5), including REWE, Bio Company, Terra Naturkost and Denn's, which cover a major share of the regional organic retail market and (ii) associations of organic products (N = 6), including Bundesverband Naturkost und Naturwaren (BNN), Pro Agro e.V. and FÖL, which are active in the BMR. All interviews were conducted between January and August 2014 using a common guideline and were recorded on tape.

Results from the two case studies were structured according to the analytical framework and were evaluated whether or not they represent specific internal strengths or weaknesses of the particular food chain type as well as external opportunities or threats (limiting factors) for further development of the regional organic food system.

4. Description of the Case Study Berlin Metropolitan Region (BMR)

With its population size of 3.5 million Berlin represents one of the largest markets for organic food in Europe. Apparently 70% of the residents buy organic food at least occasionally [81]. A significant additional willingness-to-pay was found for regional products [63]. There is a strong link between food consumption and traditions as well as commodity production in the rural hinterland [82,83].

Agriculture is characterized by sandy soils with low fertility and large-scale farm structure (average farm size of 238 ha) dominated by large farming co-operatives [84]. Among the 5400 agricultural holdings, 650 farms cultivate 137,700 ha agricultural land according to organic standards. This equates 10.5% of the agricultural land and is above the average for Germany [85,86]. Due to cost pressure and the stressed economic situation of many farm holdings, they show only modest investment behaviour, which prevents full exploitation of regional market potentials [87]. Besides this, the decrease in vegetable and fruit production and loss of know-how in the last decades contribute also to insufficient regional food provision [69].

Berlin is home to a wide range of organic food distributors and retailers, including specialized stores, around 85 organic supermarkets and more than 250 weekly markets across the whole city, of which 23 are directly dedicated to organic, regional food [88]. In addition, conventional food retail trade chains (supermarkets and discounter) introduced organic and regional food into their assortment and became in the recent years a relevant distribution channel for organic food [77,89]. However, despite the given potential, only about 10% of the organic food sold in Berlin in 2007 was produced in the region, whereas the majority is originated from outside the region, including from 50% from abroad [81]. According to recent estimates, the share of regional products varies between 7% and 15% depending on distribution type, often limited due to product variety deficits [90].

Over the recent years, manifold AFN such as CSA, self-harvesting gardens or box schemes have been established in the region. In addition, the thriving urban gardening scene with over 70 initiatives indicates high demand for organic local food [91]. CSA as emerging phenomenon in the region started in 2004, was 2012 already supplying around 600 households from 11 farms. These farms cultivate a high diversity of crops (also old and rare) and offer mainly vegetables, fruits, herbs and eggs. Most of the CSA farms apply organic farming methods, but not all of them are certified. [92].

As an important element in the organic regional food system, the processing industry has seen a sharp growth in the last decade, with cereal crop and milk processing leading the way. The regional processing industry is mainly specialized in basic processing steps and their capacities are not sufficient to cope with the regional organic production. Particularly, facilities for meat processing and fine foods production are missing [88].

From a legal perspective, organic and regional food is treated quite differently in Germany and in the European Union. Although there exist strict certification and labelling regulations for organic food and for quality agricultural products (PDI, PGI) on European level [93,94], there are no particular standards for local and regional food at national level. Except from the certification of regional food through a national umbrella association [95], basically retailer and other actors in the food system create their own regional food labels.

The food issue in general and the promotion of organic regional food in particular has not seen high priority beyond the European agricultural funding schemes for organic farming, regional branding or direct marketing. On a more local level, the city of Berlin aimed to address the topic through individual actions for instance in the Agenda 21 process. Measures included the formulation of regional organic food supply goals for public catering or the exercising of its role as agricultural land owner in the city's vicinity to require organic farming practices [96].

5. Results

In this section, we present results from the SWOT analysis of the two case studies and identify limiting and driving factors for the regional supply of organic food by two different types of chain. An overview of the findings is presented in Table 2 differentiated for CSA and retail sale of regional organic products.

Table 2. SWOT-Analysis of two case studies (synthesised results from interviews and workshop *).

	Agricultural Production	Chain Organization	Consumption
	Community Supported Agriculture (CSA)		
Strengths and Weaknesses	S: Reliability of production conditions S: Diversity of commodities S: Shared responsibilities between producer and consumer S: Consumer participation in planning leads to a better match between demand and supply W: High labour input required W: Problems with financing and member recruitment W: Limited target (consumer) group	S: Short transport distances directly from farm to consumer/collection points	S: Provision of fresh, healthy, regional organic food S: Transparency through direct communication with farmers S: Influence on consumption behaviour and attitude W: Limitation of variety through seasonality of products and fluctuating qualities W: No full food provision (mainly vegetables, fruits)
Opportunities and Threats	O: Strategy and specialization for small-scale organic farming O: Independence from subsidies T: Limited access to land T: High costs for renting agricultural land T: Unclear legal situation (e.g., taxes)		O: Raising societal interest in alternative food networks O: Food sharing as a new trend
	Organic Food Retail		
Strength and Weaknesses	W: Shortage of organic food supply	S: Growth of organic and regional food market (sales) S: Improved image and marketing due to organic products S: Existing regional processing facilities in some branches (esp. bakery) W: Limited processing capacities (esp. meat) W: Difficult market entrance for micro and small-scale producers	S: Increasing popularity of organic food among individual consumers S: Higher willingness to pay for organic products S: Increasing demand for processed regional organic products and convenience food among individual consumers and gastronomy
Opportunities & Threats	T: High costs for renting agricultural land	O: Existing institutional embedding through supporting associations and networks O: for regional organic products	

Source: own compilation, S: strength, W: weakness, O: opportunity, T: threat. * Workshop only for the case study CSA.

5.1. Case Study A: Community Supported Agriculture (CSA)

Community supported agriculture (CSA) creates a possibility for development and specialization in organic agriculture, especially for (family-owned) small-scale farms, and contributes to sustainable land use (e.g., retaining soil fertility and agro-biodiversity). The studied CSA farms in BMR have a high diversity of horticultural products (also old and rare crops and varieties), which requires a high level of hand work. This is supported through active cooperation with urban CSA members, although not all farms depend on this labour input for field work. The CSA model assures cooperation and sharing responsibilities, threats, and costs between CSA participants. This creates more reliable production conditions, along with stable incomes and employment for farmers. Two interviewed farmers mentioned the chance for them to become or stay independent from direct support schemes (and other subsidies). For them CSA provide an economic alternative to the existing market model. From the farmers' perspective, the critical points are the time-consuming recruitment of new members and high labour input for organizational activities. CSA as an enterprise model is sensitive to losing participants when there are problems with product quality or quantity. These two points were brought up by farmers and consumers. Another risk for farmers is that solidarity-based agriculture can conceal significant structural and economic problems of a farm and is therefore more suitable for well-managed farms. Limited access to land resources and increasing costs for renting agricultural land were also mentioned by farmers and workshop participants. Other obstacles are the unclear legal and tax situation for CSA, problems with financing, food losses during harvest time due to the holiday period and limited diversity of products during the year.

In terms of the organisation of the chain, there are no intermediate steps due to the direct interaction between farmer and urban consumer and the type of products (mainly fresh vegetables, fruit and eggs). The limited amount of packaging is seen as an advantage as far as farmers use multi-way boxes. Transport distances from farm to collecting points in Berlin are quite short. At collecting points, CSA members are in charge of organizing the further food distribution.

From the consumers' perspective, direct communication, as well as transparency and quality of production, represent strengths of this alternative model of food provision. CSA provides opportunities for "learning by doing" and direct experiences with agriculture, which may contribute to changing behaviours and consumption attitudes (eating habits, preference of seasonal crops, avoidance of food waste, etc.). Problems, identified by consumers and farmers in the interview and during the workshop regard the insufficiently meet demand, the seasonality of products, and the fact that food losses during harvest time are quite high. On the other hand, the option that consumers influence cultivation plans is perceived as opportunity matching demand and supply better. Interviewees and workshop participants recognized a rising societal interest in alternative types of food supply, which is regarded as an opportunity for further development of CSA in the region. However, it was consensus in the workshop, that the overall target group for the CSA model is limited.

5.2. Case Study B: Retail Chains of Regional Organic Products

The interviewed retail experts consider the small quantity and variety of regional organic products, especially fresh food as a reason for market shortages, but with little improvement recently. On the supply side there are also problems to achieve consistent high quality and to cope with seasonality. One company estimates that increasing costs for renting land might create a future obstacle for regional farmers to cover the additional costs of organic production.

All the companies and four of the six associations share the opinion that offering organic regional products positively influences the image of conventional enterprises. For organic and natural food traders, regional food is seen as an opportunity to raise their profile and differentiate themselves from competitors. Interviewees highlight personal high priority ("must-haves"), justification of higher prices and increasing sales of regional organic products as reasons.

Majority of interviewees agree that regional organic food will play a role in retail in the future generally. Especially the company representatives foresee an increasing trend of regional food as part of

their inventory. Within conventional retail, regional food will be intergrated into the inventory, but the strategy does not focus explicitly on regional organic food, which is viewed as a niche product with low growth rates—an estimation which is also shared by interviewed associations. Whereas one expert even estimates growth rates of 10% per year driven by sales in organic supermarkets, another also sees the risk that the organic food sector may be outperformed by conventional regional products.

Organic retail enterprises source their products mainly from wholesale, similarly to conventional chains. However, there are three other supply channels for regional organic retail chains: (a) Producers transport their products directly to logistics centers of wholesale enterprises; (b) Traders pick up products during regular routes (“trailer shipment”); (c) Small and micro producers deliver directly with a truck (fresh products) or parcel shipment to a small number of selected shops.

There is large agreement among interviewees that inadequate processing structures and capacities represent main weaknesses or regional organic food supply as the number and size of organic processing enterprises are too small to cover the demand and fulfill retail requirements regarding quantity and quality. This is especially noticeable for further processed meat products, whereas the bakery branch is well established.

Interviewed unions and associations support farmers, producers and other regional actors, for example through networking, advice, marketing, and certification of products as well as through political lobbying. For the provision of regional food in retail, they operate in different fields and for different actors in the food supply chain (farmers, wholesalers, small and micro producers).

The creation of a regional label is viewed with scepticism by all companies and associations. It might become an obstacle for small-scale producers while favouring larger companies. Due to a large variety of labels, some experts are also not convinced that regional labels contribute to enhanced consumer transparency at all.

Both regional and organic foods have become more prominent in retail enterprises in the BMR. According to all companies, consumers demand for organic food is steadily increasing and regional organic food is also becoming increasingly standard in organic supermarkets. Most interviewees notice increasing willingness to pay more for organic products of regional origin. The associations state also that more consumers are interested in the product origin. Beside this, a growing demand for regional organic food (especially processed and convenient) in the gastronomy sector is observed.

Fresh products like fruits, vegetables, eggs and dairy products have the highest share in sales of regional organic products, whereas one enterprise would like to raise the market share of other product groups (e.g., beverages). The decision to incorporate regional organic food in the assortment is mainly determined by quality, freshness, and transparency, whereas delivery reliability and seasonality play only a minor role. Enterprises identify regional organic meat and sausages, vegan products, raw fruits and vegetables, and special products for allergic consumers as future trends.

6. Discussion of Potentials and Conclusions

While a large body of AFN literature deals mainly with characteristics, impacts, and governance of alternative or regional food chains, we applied a food systems approach to identify potentials and limitations for the emergence or development of alternative food networks in one region. The main challenge for studying food chains and food systems consists of the complexity and dynamics of prevailing subsystems and the heterogeneity of influencing factors, paired with a lack of quantitative data on the regional level especially for the organic food sector [69]. The identification of systemic impacts requires future growth in the phenomenon itself [36]. In addition, in the studied case, not all influencing factors identified in the literature (see Table 2) were addressed by the experts and stakeholders who participated in the study. Based on the empirical results, we discuss the main influencing factors of the food chain types in order to contribute to a regional organic food supply in the BMR along with future upscaling and diffusion perspectives.

6.1. Community Supported Agriculture (CSA)

Results have shown that CSA provides new opportunities for existing small and organic farms, which can adapt to changing conditions, and for new entrants to organic farming. One important external limitation is the access to land, which hinders the expansion of existing farms and the foundation of new CSA farms. Due to the need for direct interaction and communication between consumers and farmer, the potential for upscaling the CSA model might be limited [72,92]. A further scale increase might even jeopardize intangible qualities like trust and authenticity [36]. Besides this, a variety of other alternative concepts of regional food supply like urban gardening, self-harvesting gardens, food coops, box schemes and farmers' markets contribute to the diversity in the food system, but also compete with the CSA model [97]. Some of these concepts also address consumer willingness to get involved in regional food production and distribution. On the other hand, in the CSA model consumers can take part in the decision making about the cultivation plan and farmers can more easily match the consumers demand, e.g., for traditional commodities.

The high dependence of CSA on having a high rate of retention of a core group of engaged consumers shows the fragility of this model of food provision [98,99]. In addition, the CSA model provides no per se economic benefits for farmers. Despite the perceived benefits like shared risks and up-front payment some authors reveal that the model in some cases features disadvantages like uncovered operating costs and self-exploitation of farmers (e.g., [16,100]), so that some of them quit after a short time [100]. Given all these reasons, it is very likely that CSA will remain a niche segment in the regional food system. There are further development perspectives envisioned for cooperations between several CSA farms, which could better address consumer's requests for product diversity or critical mass, which is relevant for public catering such as canteens, as well as cooperation in processing between farms and with regional processing enterprises [97].

Even though CSA farms will not provide food for a high number of households in the region, they bring other functions and qualities to the regional food system. They contribute to sustainable land use (e.g., maintain agro-biodiversity) and to linking urban and rural areas. They also offer environmental education and contribute to awareness regarding origin, quality, and seasonality of food, which can lead to behavioural and attitude changes in consumers, such as sustainable consumption [72,97,101]. According to some authors, these changes might finally initiate the transformation of the existing food and economic system [98,102,103].

6.2. Retail Chains of Regional Organic Products

In contrast to the former niche market situation of organic production, rising consumer interest in the last decade has led to high growth rates and the entrance of new powerful market players like supermarkets and discounters, which reach more consumer groups [104]. For organic and conventional retail enterprises, marketing regional organic products offers opportunities for profile raising and image building (ibid). This trend towards organic and regional food represents an important development in the food sector which is also observed elsewhere [4,17]. A German consumer survey has pointed out that the preference for local food, independent of whether it is organic or conventional, even exceeds the demand for regional organic products [105], which corresponds with the observation of a positive consumer perception shift from organic to local food [76]. At the same time, regional and organic food should not be understood in competition. According to Bodini and Naspetti [106], the regional or local component rather supports the organic food market as complementary strategy. However, retailers were often not aware of organic products available in the region [89]. The introduction of labels and trademarks indicating regional origin or other qualities is often advocated in literature, but was rejected by experts in the case study because it may add confusion to the existing heterogeneity of labels.

Despite increasing consumer demand across the entire food sector, organic food still represents a niche market, contributing less than five percent of turnover. Within this niche, conventional retail (supermarkets and discounters) has gained more and more prominence and is the favoured point of

sale for shoppers [7,105]. Therefore, retail could be an appropriate channel for enhancing regional organic food in the BMR, which can only find its full potential if local sourcing problems regarding sufficient quantity and quality of produce are solved. However, the increasing interest of the large-scale agri-food sector in regional and organic food might also be a threat to the alternative niche markets, such as CSAs [76]. Those challenges become more serious with increasing popularity of processed and convenience products. The expansion of processing capacities also increases the likelihood of longer chains, specialization, concentration of production and distribution, and subsequently larger production and market areas also outside the region [107]. This would interfere with the idea of alternative or short food chains. Furthermore, due to the dominant role of retail enterprises, even regional organic food is not immune to price squeezing and tends to become “conventionalized” [7,10].

A lack of regional processing capacities in the organic food sector is specific for the Berlin region and for Eastern Germany, where organic agriculture was only established in the 1990s, often on large former socialist farms where producers mainly supply to national chains [107]. The establishment of processing capacity could not keep pace neither with the growth of organic farmland and produce nor with rising regional demand. This is also an effect of the former socialist economy where only a very limited number of artisanal food producers existed [88].

6.3. *Towards a Regional Organic Food System*

The main obstacles for further development of regional organic food chains in the BMR as centrepiece of an alternative food system can be seen in the first two elements of this analysis. They mainly consist of insufficient agricultural production and the lack of processing capacities. Overall, demand and supply of regional and organic food are not well balanced in the region. While CSA farms mainly provide fresh and unprocessed food, the lack of processing capacity is one important hindering factor for the expansion of regional organic and non-organic food in retail chains.

Both, CSA and the organic retail trade struggle with access to arable land and continually increasing land rents, which make organic production less profitable. This can become a serious barrier to the emergence of alternative food networks generally, as well as for regional value adding and rural development [108]. This situation is not specific for the studied region, but applies to all of Germany, where the extension of organic agriculture is stagnating due to rising land prices. This rise is mainly driven by the increase in biofuel production, external investors, and uncertain future governmental support [109].

Current policies at the national and European levels (i.e., Common Agricultural Policy) aim for more favourable conditions for organic farmers and might contribute to reaching the federal government goal of 20% of farmland managed with organic practices [110]. Larger civil society and enterprises (e.g., organic supermarkets, alternative banks) are becoming increasingly engaged in this topic of farmland competition, as they acquire farmland to distribute to small-scale organic producers [111]. Alternative models of financing and organizing organic agriculture such as community or solidarity-based agriculture and citizen shareholders which aim at overcoming the identified obstacles for alternative food networks, have emerged in the BMR in the recent years, but exist currently only as niche concepts. In addition, attempts towards a municipal food policy, has only now been made with the setup of a Food Policy Council (“Ernährungsrat”) [112], which includes important food system stakeholders, also from organic regional food supply.

Despite their qualitative character, our findings mainly confirm previous observations of the organic agri-food sector in the BMR [69,89]. The regional organic food sector continuously shows that structural problems, such as the lack of processing capacity, still persist and constitute a major obstacle to regional organic food supply in a dynamically developing organic food market. Potentials for regional value added and employment as well as benefits from ecosystem services cannot be not fully utilized. Even more “the capacity to change the structure of the food system” [76: 7] as a whole through localized food, which is assumed to be different than those of organic agriculture will not be used entirely.

However, the use of existing conventional processing and wholesale structures represents a possibility through which a transition to a more regional organic-oriented food system can be facilitated. Bloom and Hinrichs [38] and Ilbery and Maye [4] have clearly shown that many small-scale producers do not rely only on alternative or short chains, but also make use of conventional long chains. In addition, a recent German study into regional initiatives reveals hybrid strategies of food chain actors, who market conventional and organic produce through different channels, including direct marketing and conventional retail [113].

Business opportunities for organic farming are increasingly acknowledged throughout the agri-food sector in the region. In recent years, numerous conventional processing enterprises have started production of organic food [88]. In addition, the presence of regional wholesaler distributing organic and partially regional products can enable market access for small producers [89]. Decentralized processing structures on and off-farm and the establishment of mills and manufactories that produce high-quality products represent another option for enhanced value-adding production in the region [69]. However, frequently, the emergence of hybrid food systems solutions are observed, which incorporate alternative and conventional food chains, where producers sell to conventional and regional markets and consumers purchase from both [1,4,36,114]. Although the conventional and alternative food systems do not exist as ideal types, the engagement in conventional chains influences the perception of regional food chains. This might lead to a loss of identity and trust and causes consumer scepticism [36].

Despite growing consumer demand for regional organic food in BMR, market mechanisms are not able to provide adequate regional supply structures as producers are unable to safeguard continuous delivery in adequate qualities and quantities. Existing large-scale agri-food chains, rising land prices and the competition with bio fuel production interfere with the establishment of regional organic food chains. The design of food policy and the regulatory framework at different levels requires targeting towards the prevailing potentials and obstacles of the multitude of individual food chain innovations. These include (a) re-establishing a remuneration system for conversion to organic farming, which has been mostly abolished in the recent years; (b) supporting structures and institutions that enable small-scale regional producers to gain greater access to farmland, regional markets, and knowledge as well as the integration into regional networks; and (c) raising awareness of policy-makers to the individual values of the different regional organic food chain types as elements within a consistent cross-sectorial food policy.

The developed framework and the identified factors for regional organic food supply can be transferred for the systematic assessment of other regional systems and for different food chains types to examine their ability to “scale-up” and “diffuse”. The information gained through such studies may be used from actors in the food chain, stakeholders and policy makers in the food system to design and implement consistent strategies and policies that are feasible for their territorial situation.

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