Understanding regional variation in the use of local food in public catering

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Abstract

Purpose – The main aim of this study is to identify the factors that can affect regional differences in the procurement of local food in public catering. Understanding how some regions procure more local food products than others could help promote the use of local food in public catering. Regions with a lower share of local food can learn from regions that have a higher local food share.

Design/methodology/approach – The studied phenomenon is complex; therefore, we used several approaches to identify the share of local food procurement and the reasons behind the regional differences. The study gathered survey data and used fuzzy-set qualitative comparative analysis (fsQCA), a computable general equilibrium model and several data sources.

Findings – The share of local food within the total food procurement varies markedly between regions. The highest local food share can be linked to a combination of three factors: sufficient and suitable supply, adequate organisational conditions and a political atmosphere that encourages the use of local food. In addition to limited political incentives, poor supply or inadequate organisational conditions effectively characterise why some regions use very few local food products. Hence, a move towards using more local food in public catering requires political decision makers, food producers and procurement personnel to demonstrate a common will and take cohesive action.

Originality – By examining regional variation, the results of this study offer a new perspective on the use of local food in public catering.

Keywords – Local food, public catering, procurement, regional differences, fsQCA

Paper type – Research paper

1. Introduction

Food sustainability is a topic that has generated much discussion. Worldwide, governments have implemented numerous different targets and actions to increase the sustainability of food systems. However, food sustainability is an ambiguous term because of the differing opinions and views on what constitutes food sustainability. Morley (2021) identified four categories of food production that have been connected to food sustainability in the western context over recent decades. These categories are organic, local, welfare friendly and fair trade. Several studies have suggested that short supply chains are not necessarily sustainable or the best option for every situation or area (e.g. Kinnunen et al., 2020; Lehtinen, 2012). However, the use of local food is one aspect of food production that is often connected to sustainability targets (e.g. Goggins and Rau, 2016; Braun et al., 2018).

Public food procurement has been recognised for its potential to promote more sustainable food systems (Smith et al., 2016; Morley, 2021; Kaye Nijaki and Worrel, 2012; Swensson and Tartanac, 2020; Salvatore et al., 2021). The Farm to Fork strategy, produced for the EU (European Commission, 2020), identified public catering as a sector that can influence food sustainability issues. In addition to addressing environmental concerns, sustainable public procurement also includes economic and social aspects (European Commission, 2021). Consequently, the current criteria for public food procurement rarely focus solely on price (Salvatore et al., 2021).

Overall, the potential of public food procurement has not been fully realised or understood in the transition to sustainability (Swensson and Tartanac, 2020). For example, stakeholders in the Madrid region have low expectations of public procurement, even though it has become a valuable way to enhance local agriculture (Simón-Rojo et al., 2020). The move towards using more local food in public catering is a long process that requires the implementation of several decisions and actions to be effective (Tikkanen, 2014). Sonnino (2019) also emphasised the need for civil society participation in the governance of food systems. Furthermore, the sustainability transition in the food sector is difficult and complex (Stahlbrand, 2016). To structure this complexity, Goggins (2018) defined four groups that categorise the contextual factors that influence food procurement in organisations: production and distribution, policies, consumption, and organisational aspects. Morley (2021) has also identified similar groups.

Local food is currently included in several targets addressing sustainable public food procurement. Despite these aims, the knowledge regarding the actual use of local food is limited. While some studies have examined the factors that influence food procurement in organisations (e.g. Goggins, 2018; Morley, 2021), previous research has not fully investigated the reasons for regional differences in the use of local food in public catering. This knowledge would be beneficial for the practitioners involved in food procurement; therefore, our aim is to address these gaps in the literature.

This paper aims to contribute to the research on the factors affecting the use of local food in public catering by identifying the factors that influence regional differences in the use of local food. According to our research, this is the first time that Goggins' (2018) categorisation – supplemented with one additional factor – has been tested to determine if it can extend the understanding of regional differences in public food procurement. Determining how some regions procure more local food products than others should help identify the opportunities for improving and promoting the use of local food in public catering. In addition, examining regional differences by applying and testing Goggins' (2018) categories could help future studies. To achieve our aim, we gathered Finnish regional data on local food procurement. Finland provides an interesting case study because of the government's set target to increase the use of local food in public kitchens (Government resolution, 2013); in addition, the volume of public food procurement in Finland is relatively high (over 300M€ and more than 0.1% of GDP) (Statistic Finland, 2020; Official Statistics of Finland, 2019a). The issues addressed in this study are complex; therefore, we use qualitative comparative analysis (QCA) to study the factors affecting local food shares.

2. Factors affecting (local) food procurement in public catering

To understand the use of local food in public catering, it is essential to first identify the factors that affect food procurement in general. Public food procurement is carried out by workers within organisations or municipalities who are guided by laws and policies, dependent on supply and governed by a service to clients. These aspects of food procurement align with the study of Goggins (2018) that identified the factors that have an impact on food service delivery in organisations. Goggins (2018) highlighted that better knowledge of the contextual effects on food provisioning can help identify the constraints of food sustainability and the opportunities for improvement. Goggins (2018) divided the factors into four categories: first, production and distribution, which includes supply issues such as distance from markets; second, international and national policies that cover rules, laws, guidelines and standards; third, consumption, which includes factors such as consumer demand and willingness to pay; and fourth, organisational food provisioning itself, which covers the organisational details from identifying the key decision makers through to managing the available resources. Each factor influences food procurement, and the impact of each category is a two-way process. Goggins (2018) also noted that food procurement has the potential to affect the food system.

Morley (2021) identified similar factors connected to sustainable food procurement and devised a conceptual framework that includes three categories for the relevant factors: sustainability framework (e.g. regulations and standards), demand architecture (scale, budget and contractual requirements) and production system (product type and supply chain type). Morley (2021) highlighted that procurement policies can encourage businesses to adopt more sustainable practices. Furthermore, introducing a more sustainable approach to food procurement is dependent on political will as well as leadership and infrastructure (Smith et al., 2016). In addition, many other studies have concluded that factors such as supply, political atmosphere, organisational aspects and demand have relevant roles in promoting sustainability in public food procurement (e.g. Filippini et al., 2018; Braun et al., 2018).

2.1 The specificity of local food procurement

In the case of local food, it can be assumed that its production is more crucial than for food procurement in general. A local food cannot be obtained if there is no (suitable) food processing in the region. This limits the supply of food, especially if local food has a very narrow definition. The imprecise and varied definitions of local food create challenges when studying this topic. Local food is a complex concept that researchers and politicians have defined in a variety of ways: in relation to distance in kilometres, by geographical area or in broad terms. A definition that is widely accepted is that local food is produced relatively close to the point of consumption. In Finland, the following definition is also used: "*Local food means locally-produced food that promotes the local economy, employment and food culture of the region concerned, has been produced and processed from raw material of that region, and is marketed and consumed in that region*" (Government resolution, 2013). This definition is open to multiple interpretations; thus, there is not a unified understanding of local food in Finland.

Multiple studies have produced results that show several different factors can affect local food procurement. Risku-Norja and Muukka (2013) observed that rules and laws influence local food use in public catering. More specifically, they highlighted the problems associated with a strict interpretation of procurement law. In addition, limited resources present a challenge because price is generally the decisive factor rather than sustainability considerations (Lehtinen, 2012; Risku-Norja and Muukka, 2013). Local producers find it difficult to participate in public procurement offers (Simón-Rojo et al., 2020) and compete on price with national and multinational companies (Lehtinen, 2012). However, by understanding and collaborating with local markets, it would be possible to foster the conditions required for local firms to bid successfully for public contracts (Bloomfield, 2015). Tikkanen (2014) produced the following recommendations to increase the consumption of local and organic food products: allocate extra resources, integrate targets into municipal strategies, train catering personnel, develop products with producers and organise local procurement procedures.

Helenius et al. (2007) identified several influencing factors that affect the local food system. Their LOFO local food system model includes the food system and its subsystems, information and material flows and the system's inputs and outputs. Although the LOFO model focuses on the whole local food system and not just food procurement, the subsystems are very similar to the categories or factors that Goggins (2018) identified as relevant for food delivery and, therefore, food procurement. The LOFO model includes the following three subsystems: the socioeconomic subsystem (e.g. norms, rules and subsidies), the learning subsystem (people as active actors and decisionmakers) and the biophysical subsystem (e.g. material flows and people as consumers) (Helenius et al., 2007). In addition, Helenius et al. (2007) recognised that there are two-way connections between food systems and other systems. Therefore, based on the findings of numerous studies, it can be concluded that several factors affect both the entire food system and (local) food procurement.

2.2 Situations may vary between countries, regions and organisations

Countries, regions and organisations differ from each other, and therefore, the factors influencing local food procurement can vary. Goggins (2018) identified that food procurement activities of organisations are heterogenous and can differ in terms of size and scale, primary function and food procurement practices, for example. These factors all have an impact on the types of food organisations use. In addition, regions are often heterogeneous in various ways, and these differences may affect regional levels of local food procurement.

Many of the (local) food procurement studies are case studies of one region (e.g. Braun et al., 2018; Lehtinen, 2012; Tikkanen, 2014). These studies only describe the situation in the selected region and do not concentrate on possible variations among regions. For example, Braun et al. (2018) found that the key factors constraining the use of local organic products in the Berlin-Brandenburg region were limited budget and limited preprocessed supply; however, the issues identified in this study may not correspond to the key factors in other regions. Therefore, Braun at al. (2018) recommended that it would be beneficial to carry out similar examinations in other European regions to identify possible differences. Purchasing practices are another factor that varies among countries and potentially within a country (Neto and Gama Caldas, 2018). As this is an overlooked research area, more studies should focus on the use of local food in public catering and the reasons for regional differences.

3. Materials and methods

3.1 QCA

In this study, qualitative comparative analysis (QCA) has been used to analyse the factors affecting regional differences in the use of local food in public catering. Ragin (1987) stated that QCA can be viewed as a combination of qualitative and quantitative methods. More specifically, QCA is a technique based on the logic of Boolean algebra. It is implemented by computer programs to identify the prime implicants in a truth table that shows the data as a list of configurations (Rihoux, 2006). QCA can be used for several purposes (Rihoux, 2006) and we selected QCA to test the existing conceptualisation established by Goggins (2018) and the new ideas related to it.

In recent years, the use of QCA has increased, for example, in the fields of political science, geography and applied sciences (Verweij and Trell, 2019). Verweij and Trell (2019) noted that QCA has several advantages, especially for spatial planning research: a sensitivity to context allows QCA to use a small or medium number of cases and enables the examination of complex entities with causalities. In addition, multiple types of data can be used with QCA (Verweij and Trell, 2019) to widely cover the studied phenomenon. Cairns et al. (2017) observed that QCA can also be a useful method to study complex spatial phenomena. Collectively, these arguments strongly advocate the use of QCA in this research.

This study used the four-value fuzzy-set QCA (fsQCA) technique. The fuzzy-set technique was selected because neither the studied outcome nor the conditions are solely in or out but also somewhere in between and the use of fsQCA means that the factors can be divided into more than two categories. The analysis was performed with fsQCA 3.0 software (see Ragin and Davey, 2016). More precisely, this QCA study consists of two different analyses. First, a necessity analysis was performed to test if some of the factors are necessary (almost always present) for the outcome. Second, a sufficiency analysis was performed to discover the so-called pathways for the outcome. The analysis started with developing a truth table from the fuzzy set scores

(see section 4.3). The truth table comprises one row for every observed causal configuration. The following steps iteratively eliminate the redundant conditions and reveals all the possible pathways that are sufficient to achieve the outcome.

The studied cases are 12 regions (NUTS-3 level regions according to the Eurostat regional classification) from different parts of Finland. These regions cover almost two thirds of Finland's 19 regions and broadly represent the heterogeneous regions of the country. Three regions are from Southern Finland (Päijät-Häme, South Karelia, Uusimaa), four are from Western Finland (Central Finland, Pirkanmaa, Satakunta, South Ostrobothnia), three are from Eastern Finland (North Savo, South Savo, North Karelia) and two are from Northern Finland (Lapland, North Ostrobothnia).

The studied outcome in this research is the share of local food within the total food procurement in public catering for each region (LOC). Local food is defined in this research as food produced and consumed in the same region. Using a theoretical background, the five factors listed below were selected as the possible factors that affect food procurement.

1) Supply of local food (SUP)
   Regional (versatile) supply is a prerequisite for the use of regional/local food. Food production is also one of the categories affecting food delivery in the conceptualisation by Goggins (2018). According to Official Statistics of Finland (2020), in 2018, turnover from food production varied regionally from a few tens of millions of euros to over two billion euros. Therefore, the level of supply appears to differ significantly between regions. In addition to the level of supply, the supply needs to be suitable for the public kitchens. Moreover, public kitchens generally require highly processed products (Braun et al., 2018). The supply situation in each region can be assessed by evaluating both the scale of the regional food supply and the suitability of the products.

2) Organisational infrastructure and resources (ORG)
   According to Goggins (2018), organisational aspects are an important category affecting food delivery. One of these organisational aspects is the size of procurement units. Food procurement for public kitchens is generally managed by large procurement consortiums. The bigger the consortium, the bigger the food procurement arrangements; therefore, the delivery requirements of these large-scale entities may be out of scope for small producers. The size of procurement units potentially makes a significant difference in Finland where most food processing companies are small (77 percent of food companies employ less than 10 people, (Official Statistics of Finland, 2020)). The availability of resources is another relevant organisational aspect that affects food procurement (Goggins, 2018; Salvatore et al., 2021). In some cases, the local food available for procurement is regarded as more expensive on average than other food products (Lehtinen, 2012). Organisational conditions in each region can be revealed by examining the size of procurement units and the available appropriations.

3) Political atmosphere and local food (POL)
   According to Goggins (2018), policies relating to local food belong to another category that has an impact on food delivery in organisations. National policies and legislation are the same for all regions within a country; however, regional policies can differ. While some regions in Finland specifically concentrate on (local) food, other regions choose to focus on different aspects. Finland's Regional Programmes reveal the political preferences of each region because they allocate resources and act as a steering framework for regional development. Several regions in Finland have used the Regional Programmes to identify local food as a topic for future development (e.g. Central Finland [I]). A willingness to improve the use of local

food has also been demonstrated by regions that have added local food to their list of regional goals or actions (e.g. Pohjois-Savo [II]).

4) Consumer demand (DEM)
Consumption is the fourth category of local food procurement identified by Goggins (2018). The first example in this category is consumer demand (Goggins, 2018). The procurement of local food is affected if consumer interest is low and they are unwilling to pay the necessary costs. Therefore, consumer demand is a relevant factor to include in this study.

5) Regional economic impacts of changes in the use of local food (ECO)
The use of local food has been found to improve regional employment (Kaye Nijaki and Worrel, 2012). However, the impacts of local food procurement are not necessarily the same in every region because of the regional differences relating to the size of the economy, food chains, and economic structures, for example. Helenius et al. (2007) demonstrated that food systems influence other systems and vice versa. However, when considering the sustainability elements, the economic aspects are the areas with limited research (Lehtinen, 2012). Therefore, our study investigates the potential connections between regional economic impacts and the use of local food. An assumption can be made that a growth in local food procurement would correspond with an increase in the regional benefits obtained through local food use. As a benchmark, this study uses the impact of a one million euro increase in local food purchases.

The complexity of the studied issue has led to this research using a variety of data. It is not possible to retrieve data on all the relevant factors from a single source. Therefore, the data include statistics (Official Statistics of Finland, 2020), policy documents (The Regional Programmes), a survey on public catering and regional economic modelling results.

3.2 Survey

Data was gathered from a survey that targeted the studied outcome (LOC) and the following primary factors: suitability of products (part of SUP), organisational conditions (ORG) and consumer demand (DEM). The web-based survey was sent to all public procurement units in Finland in autumn 2019.

Altogether, 86 answers were obtained from 18 of Finland's 19 regions. Despite several post-survey reminders, the survey coverage and the quality of the responses was low in some of the regions. For this reason, the study focused on 69 answers from 12 regions. The yearly food purchases for the 12 regions are over 1.1 billion euros, and in 2019 this covered approximately one third of the Finnish public food procurement (Statistics Finland, 2020). The answers from each of the 12 regions were generally comprehensive with three to nine answers received per region. Some of the units that responded to the survey were very large; therefore, the surveys with only three answers still covered most of the regional procurement. The smallest units that participated have less than 0.1 million euros of food procurement per year, while the largest have approximately 20 million euros per year. The majority of the respondents were food service managers or similar.

The following topics are examples of the subjects covered by the survey questions: the total value of the food procurement and its distribution into different food product groups (meat products, milk products etc.), the share of local food in the total value of the food procurement, the local food share by product type, attitudes towards local food and barriers to using local food. For each region, the average share of local food used in public catering was calculated from the answers on product type because this information appeared more accurate than the answers provided for the total procurement. Nevertheless, the results were the same or

very similar when the local food share was calculated using either product type or total procurement. In this study, the regional local food shares reflect the share of the food procurement budget that is used by each region to purchase food products produced in the region (province).

3.3 Regional economic impact analysis

The regional economic impacts generated by an increase in the use of local food (ECO) were assessed with a computable general equilibrium (CGE) model called RegFin (Regional model for Finland). As Partridge and Rickman (2010) noted, regional CGE models can unite all the required features to assess complex issues; a process that cannot be achieved using more simple regional models. By using a CGE model, it is possible to uncover the total economic impact of a studied change, including both direct and indirect effects.

RegFin is a comparative-static model that has been influenced by the Australian TERM model (see e.g. Horridge, 2012). RegFin and its dynamic version RegFinDyn have been used in Finland in several dozen cases (e.g. Peura et al., 2018). Descriptions of the comparative-static model used in this study are presented in articles by Törmä (2008) and Rutherford and Törmä (2010). The modelling was performed using GEMPACK economic modelling software (Horridge et al., 2018).

The data for the RegFin model are from the year 2015 and were sourced from Finland's official national and regional statistics (Official Statistics of Finland, 2019a; 2019b). The model version used includes 29 industries and 19 regions from across Finland.

The modelling was performed as hypothetical scenarios where regional public catering organisations spent one million euros more on local (regional) food products. This same scenario also meant that the public catering organisations spent one million euros less on food products from other regions or countries. This change in purchasing alters the demand structure for food products in the regions. The calculations were performed separately for each region to demonstrate the individual regional impact of the change in local food use. It is assumed that the products are processed food products because of the requirements of the public catering organisations. Therefore, the demand change is targeted towards the food manufacturing sector and not the agriculture sector.

4. Results

4.1 Survey results

When examining the total food procurement in Finnish public catering, the survey results show that there are significant regional differences in the use of local (regional) food (Table I). The regions that have the largest share of local food are Satakunta and South Ostrobothnia. Both of these regions are in Western Finland. The regions with the smallest share of local food are Uusimaa and South Karelia. These regions are both located in Southern Finland. According to the survey results, approximately 16 percent of the total food procurement in Finland is sourced locally. Bakery products are the most common local food products purchased by public catering units.

One question in the survey focused on the barriers to local food procurement. The answers to this question reveal that one significant barrier is the suitability of the local products for public catering. A scale from 1 to 5 was used to measure the barrier statements (1 = the issue is not an obstacle; 5 = the issue is a significant obstacle). Table I presents the survey answers that are relevant to the selected conditions or affecting factors.

According to the survey answers, there are some regional differences in the assessment of the barriers. For example, the suitability of local products is given as a significant obstacle in Uusimaa (average score 4.4) and less of a barrier in Lapland (average score 2.8). Centralised procurement units appear to be more of an obstacle in South Savo (average score 4.0) than in South Ostrobothnia (average score 1.8). The survey answers show that the available appropriation is generally regarded as an obstacle in all of the regions, but particularly in Päijät-Häme (average score 4.8). Low consumer interest in local food does not appear to be a prominent obstacle to local food procurement: the average scores for the question on consumer interest are all lower than 3. For this reason, the condition DEM was excluded from the QCA analysis.

4.2 CGE results

According to the results on demand change, increasing local food purchasing by one million euros and decreasing imports from other regions and countries by a corresponding amount have positive impacts on a region. The demand change increases the productivity of a region in areas such as regional output, employment, private consumption and labour income. This discussion focuses on regional output and employment.

The results show that the studied food demand change would increase regional output by 1.4 to 1.9 million euros. Lapland and South Karelia would have the lowest output (1.4M€) as the impacts would partly transfer to other regions. The impacts would be slightly bigger in Central Finland, North Karelia, Päijät-Häme, Satakunta and South Savo (1.5-1.6M€). The impact would be between 1.7-1.8 million euros in North Ostrobothnia, North Savo, Pirkanmaa and South Ostrobothnia. The highest output would occur in Uusimaa (1.9M€), where the demand change would increase the output in the food chain (e.g. manufacturing of food products, agriculture, trade, transport). The Uusimaa region would also experience a moderate increase in other areas such as the service sectors and consumption. The highest impact based solely on the output of the food chain would occur in South Ostrobothnia; however, the impacts on the service sectors would be fairly limited because some of the increased income would shift to other regions through consumption. Therefore, South Ostrobothnia does not have the highest total impact on based on output.

4.3 QCA calibration and results

Following the selection of the variables and data gathering, QCA calibration was the next phase in our study. The variables were carefully chosen according to the framework and their relevance to the studied cases. Consumer demand for local food does not appear to be a barrier in Finnish public kitchens; therefore, we did not include consumer demand in the calibration phase. In total, four conditions (supply SUP, organisational infrastructure and resources ORG, political atmosphere POL and regional economic impacts ECO) were calibrated. The data had to be converted into applicable QCA values for the calibration phase. As we chose to use the four-value fuzzy-set QCA technique, we divided each data set into four values: 0, 0.33, 0.67 and 1. Value 0 means that the factor is least in line with the established theories. In contrast, value 1 indicates that the factor is the most in line with previous studies. The values in between are 0.33 and 0.67, with 0.33 being closer to 0 than 1, for example. Overall, we used the indirect method of calibration. For cases that were initially grouped into different levels of set membership, the coding was adjusted according to the case details and the scores were then iteratively refined (e.g. Kaminsky and Jordan, 2017). The details for the calibration of the outcome and the conditions are presented in Table A (appendix).

As a result of the calibration, the fuzzy-set data was formed (Table I). Two of the regions received a value of 1 for the outcome LOC. Four of the regions have a score of 0 and the remaining regions are either 0.33 or 0.67. The necessity of the conditions was tested for both high and low local food shares (LOC and ~LOC).

According to the results, three factors (SUP, ORG and POL) received consistency scores over 0.9 for LOC. Therefore, these factors can be regarded as necessary to reach higher local food shares. In turn, none of the conditions are always absent when the local food share is low; however, in these cases SUP also frequently has a low value.

TABLE I here

The factor ECO is the least theory driven of the selected conditions and the only unnecessary condition. To determine its relevance to the outcome, we performed the sufficiency analysis both with factor ECO and without it. According to the comparison, the factor ECO does not help to identify the regional variation in the local food procurement shares. Therefore, the final sufficiency analysis was performed only with factors SUP, ORG and POL. The consistency threshold was set to over 0.75 as recommended (0.78 for presence and 0.80 for absence of LOC) and frequency to 1. The results are presented according to the intermediate solution.

The results indicate that one pathway is engaged for all of the higher local food share regions and also for one lower share region. This pathway decodes good supply, good organisational conditions and an encouraging political atmosphere. These factors are all present in the higher local food share regions of Satakunta, South Ostrobothnia and North Savo. Although North Ostrobothnia has a lower calibrated local food share, these three factors are also present in this region. The consistency score indicates the set-theoretical importance of the outcome, and the coverage reveals the empirical importance of the results (Ragin, 2006). Therefore, the solution consistency for a high local food share (0.79) suggests some set-theoretical relevance, and the solution coverage (0.85) indicates that the solution encompasses 85 percent of the cases.

Sufficiency analysis for the lower local food procurement shares reveals two pathways. A weak supply is a factor in Lapland, Central Finland, South Savo, North Karelia, Pirkanmaa, Päijät-Häme and South Karelia (consistency 0.95 and coverage 0.83). The other pathway for the lower local food shares is marked by lower organisational conditions and lower political investment (consistency 1.0 and coverage 0.52). These conditions cover Central Finland, Päijät-Häme and Uusimaa. Solution consistency discloses relatively high set-theoretical relevance, and the coverage score shows that the empirical relevance is about 87 percent (consistency 0.95).

5. Discussion and conclusions

Public food procurement has the potential to promote more sustainable food systems (e.g. Salvatore et al., 2021; Swensson and Tartanac, 2020), and local food is a key resource for this development (e.g. Morley, 2021; Braun et al., 2018). Therefore, this study examined the use of local food in public catering in multiple Finnish regions and tested if the factors conceptualised by Goggins (2018) could be used to develop a better understanding of regional differences in the use of local food. The Finnish government has set a national goal to increase the share of local food in public catering (Government resolution, 2013); however, our results showed that some regions currently procure only a small amount of local food. The results also demonstrated that the factors grouped by Goggins (2018) effectively revealed the factors affecting regional differences in local food procurement; namely, adequate and suitable supply (production), adequate organisational infrastructure (organisational aspects), and a political atmosphere that encourages the use of local food (policies). The findings aligned with previous studies that have also suggested that several factors affect local food procurement (e.g. Braun et al., 2018; Filippini et al., 2018; Lehtinen, 2012; Tikkanen, 2014; Morley, 2021). Goggins (2018) demonstrated that aspects of consumption may have an impact on food procurement;

however, our results indicated that the consumer's role in driving sustainability change in public food procurement is not necessarily significant, especially in the context of regional differences.

Overall, the selected factors were linked to most of the high and low regional local food shares. However, some outcomes were not linked to these factors. We can therefore conclude that other aspects may also have an impact on the use of local food, and North Ostrobothnia provides a good example. In this region with a low local food share, all the studied conditions were present, indicating that the local food share should or could be high. Regions such as North Ostrobothnia have preconditions that are well suited to achieving an increase in local food procurement; therefore, future studies should examine these areas in depth to find out if there is untapped potential to enhance food sustainability, as noted by Swensson and Tartanac (2020).

On the other hand, the absence of a single condition can reveal a pattern that indicates a lower local food share. Thus, the results are in line with the conclusions of Stahlbrand (2016) regarding the difficulty and complexity of sustainability transition in the food sector. Decision makers, producers and procurement personnel must all maintain a similar focus to achieve positive results; this observation also confirms the findings of Tikkanen (2014). The situation in the Uusimaa region can be used to highlight the importance of other factors alongside the volume of supply. Uusimaa is the largest food processing region in Finland; however, the results of our survey indicated that the current supply of local food is not always appropriate for public kitchens, and the large size of some procurement units can act as a barrier to accessing local food. Alternatively, Uusimaa could be a region where local food (as we defined it) may not be the best resource for enhancing food sustainability (see Kinnunen et al., 2020).

This study also tested the relationship between the regional economic impacts of local food use and the regional levels of local food procurement. The CGE analysis revealed that an increase in regional food demand affects outputs with some regional variation; however, it did not provide a clear connection to the regional local food shares in public catering. The CGE analysis did confirm the findings of Helenius et al. (2007): food systems also affect other systems, but the return links to local food shares are not necessarily straightforward. As Goggins (2018) and Morley (2021) disclosed, it is important to note that the studied factors do not solely affect food procurement, but food procurement does have an impact on these factors.

Our results were drawn from Finnish regions; however, previous studies and EU level guidelines and regulations indicate that similar factors are likely to be relevant in other countries, particularly in Europe. For example, the supply of local food – or, more precisely, the supply of processed local food – appears to be the most obvious similarity between countries (e.g. Braun et al., 2018). Likewise, the importance of policies has also been broadly observed (e.g. Simón-Rojo et al., 2020; Bloomfield, 2015). While organisational details and practices may vary between countries, limited budgets are an example of a universally consistent factor (e.g. Braun et al., 2018). Our results can therefore be applied to other countries to reveal their regional differences in the use of local food in public catering. Although, future studies should account for country specific factors.

Despite careful planning and implementation, our research has several limitations. The definitions of local food are imperfect, and they cannot be applied universally. The definition used in this study may be challenging, particularly for catering units located near regional borders. However, the definition we provide is clear, and it facilitates the comparison of answers. In addition, our survey does not necessarily provide a definitive picture of local food procurement because we did not receive responses from all the public catering units in the selected regions. Surveys generally provide an incomplete view of the studied issue; however, they do reveal the broad categories relevant to a situation. Overall, every region in this study was sufficiently covered by the survey. We also recognise that this study may not identify all the factors affecting the use of local food. For example, the knowledge of procurement professionals may be important to the procurement

processes (Tikkanen, 2014), although this factor is difficult to disclose reliably. Nevertheless, the selected conditions used in our study were carefully chosen according to Goggins' (2018) conceptualisation and other previous studies. Thus, the selection of the studied factors was comprehensive rather than inclusive, and this could have had some influence on the reliability of the results.

In conclusion, our study reveals that there is notable variation in the share of local food procurement among Finnish regions, and this variation is influenced by supply, organisational aspects and the political atmosphere. To the best of our knowledge, our study is the first to show that these factors are connected to regional variation in the use of local food in public catering. This new research broadens the understanding of regional differences and identifies ways to improve and realise the potential of public procurement in the transition towards sustainability. While the conceptualisation by Goggins (2018) was not developed as a framework to directly explore regional differences in food procurement, our study has demonstrated that it can be used for this purpose.

Sonnino (2019) noted that political decision makers, food producers and procurement personnel must demonstrate a collective will to change the use of local food in public catering. To achieve positive results, we recommend that these actors enhance their cooperation and operate on a long-term basis. In general, the use of local food in public catering is not well understood and lacks effective monitoring; therefore, we suggest that local food procurement statistics should be collected so that those involved are better informed about the current situation and potential developments. In addition, further research is needed to assess if the same factors and framework could also be utilised in other countries.

Notes

[I] https://keskisuomi.fi/wp-content/uploads/sites/3/2020/09/25410-A42.pdf

[II] https://www.pohjois-savo.fi/media/ps-maakuntasuunnitelma-2018-2021_a4_3_11_2017_aukeamat_pieni_reso.pdf

Appendix

TABLE A here

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Table I. Survey results and fuzzy set scores.

	Sata-kunta	South Ostro-bothnia	North Savo	Lapland	Central Finland	North Ostro-bothnia	South Savo	North Karelia	Pirkan-maa	Päijät-Häme	South Karelia	Uusi-maa
The share of local food, %	47	40	22	15	13	13	12	10	6	5	4	1
Barriers, 1=not an obstacle, 5=a significant obstacle												
Suitability of local products	4.0	3.8	3.2	2.8	4.2	3.5	3.5	3.2	4.0	4.3	4.0	4.4
Centralised procurement units	3.0	1.8	2.1	3.0	3.4	2.3	4.0	2.6	3.3	3.3	2.3	3.2
Available appropriations	3.6	4.0	3.9	3.7	3.3	3.0	4.3	4.0	3.7	4.8	3.7	3.8
Low consumer interest in local food	2.7	2.8	2.2	2.2	2.3	1.8	2.5	2.4	2.4	2.8	2.0	2.2
Fuzzy set scores												
LOC	1	1	0.67	0.33	0.33	0.33	0.33	0.33	0	0	0	0
SUP	0.67	1	0.67	0.33	0.33	0.67	0.33	0.33	0.33	0	0	0.67
ORG	0.67	1	0.67	0.67	0.33	0.67	0.33	0.67	0.33	0.33	0.67	0.33
POL	1	0.67	1	0.33	0.33	0.67	0.67	0.67	0.67	0	0.33	0.33
ECO	0.33	0.67	0.67	0	0.33	0.67	0.33	0.33	0.67	0.33	0	1

Table A. Definitions, operationalisation and sources of the outcome and conditions.

Variable name	Definition	Operationalisation	Source of data*
Outcome:			
LOC	Share of local food within the total food procurement	0 = Local food share low (<10%) 0.33 = Local food share rather low (10-15%) 0.67 = Local food share rather high (16-25%) 1 = Local food share high (>25%)	SUR
Conditions:			
SUP	Supply of local food: turnover of food production and suitability of products	0 = Low and (fairly) unsuitable supply 0.33 = Rather low and (rather) unsuitable supply OR low and (relatively) suitable supply 0.67 = Rather broad and relatively suitable supply OR broad but unsuitable supply 1 = Broad and relatively suitable supply	STA/ SUR
ORG	Organisational infrastructure: centralised procurement units and available appropriations	0 = Centralised procurement units and available appropriations are significant barriers 0.33 = Centralised procurement units are partial barriers and available appropriations are partial or significant barriers 0.67 = Centralised procurement units are minor barriers and available appropriations are not significant barriers 1 = Centralised procurement units are not (almost not) barriers and available appropriations are not significant barriers	SUR
POL	Political atmosphere and local food	0 = Local food not mentioned in policy documents 0.33 = Local food mentioned as a possibility etc., but not included in the development targets 0.67 = Local food included in the development targets, but not connected to public food procurement 1 = Local food included in the development targets and connected to the public food procurement	DOC
ECO	Regional economic impacts of a 1 M€ increase in local food demand	0 = Impact on regional output clearly among the lowest 0.33 = Impact on regional output rather low 0.67 = Impact on regional output rather high 1 = Impact on regional output clearly among the highest	CGE

* SUR=Survey results, STA=Statistics, DOC=Policy documents, CGE=CGE calculations