Original scientific paper DOI https://doi.org/10.63356/agrores.2026.031

The impact of storage capacity on the integration of local foods in school catering: Evidence from the Czech Republic

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Abstract

This paper aims to assess how storage capacity affects the integration of regional foods into school catering, drawing on empirical evidence from the South Moravian Region of the Czech Republic. The analysis is based on 216 valid responses (41.5% of the targeted population) gathered via a questionnaire distributed electronically to representatives of school canteens in the region. The analysis examines two key variables: perception of sufficiency of storage facilities in school kitchens and the willingness of school canteens to increase the share of local food in students' meals in the future, evaluated using the chi-square test of independence. The calculated test criterion reaches 7.386, which exceeds the critical values for both the 5% significance level (3.84) and the stricter 1% significance level (6.635). The strength of this association was quantified by Cramér's V coefficient, which is recorded at 0.185. This indicates a detectible but weak link between adequate storage capacity and the willingness of school canteens to integrate regional foods into their operations. These results suggest that while physical infrastructure and storage facilities are important factors for shortening food supply chains in the South Moravian Region, they are not the sole determinants; however, modernising and expanding storage capacities appear to be a vital step toward the successful implementation of local foods in school catering in the South Moravian Region.

Keywords: short food supply chains, farms, farm-to-school, barriers, infrastructure, storage facility

INTRODUCTION

Short food supply chains (SFSC) and integration of local foods in school catering are two aspects of the alternative agrifood system that have received a great deal of attention recently from scholars and practitioners (Conner et al., 2011; Bobronnikov, 2021) because of their potential to contribute to the regional economies and food system resilience (Smedzik-Ambrozy et al., 2025; Svobodova et al., 2025; Westerdahl et al., 2025). Also, it is in line with the EU (European Commission, 2020) initiatives such as the Farm to Fork Strategy, that is indicating pathways enhancing sustainable development of European food systems.

The original conceptualisation of SFSCs was done by Marsden et al. (2000) and Renting et al. (2003). Over time, SFSC has gained significant prominence, particularly in the realm of policymaking. A report by the United Nations Industrial Development Organization (UNIDO, 2020) outlines six broad operational types of SFSCs: 1) on-farm sales, 2) farmers' markets, 3) farmers' collective retail spaces and box schemes, 4) consumer-driven initiatives, 5) sales to the HoReCa sector, and 6) public procurement models. Public

procurement models involve the sale of agricultural products to the institutional catering sector, such as schools and hospitals. These farm-to-school (FTS) models can create robust economic channels for local producers while strengthening community food security by providing populations with quality and nutritious meals. FTS initiatives typically integrate local food procurement with interactive learning to improve student nutrition. These educational components often detail the origins of food and the people who produce it, thereby cultivating the bond between students and the agricultural community (Allen & Guthman, 2006). The potential of this model to sustain demand for alternative agri-food products is significant, primarily due to the scale of the Czech school catering system. It serves nearly 2 million meals daily (approximately 20% of the population), with state operating expenditures alone exceeding EUR 260 million in 2024 (CSU, 2025). Combined with new legislation (MSMT, 2025a; MSMT, 2025b; MSMT, 2025c), effective from 2025, which prioritises fresh and minimally processed ingredients in Czech school catering, this segment represents a stable and high-volume market for local producers.

Nonetheless, recent research (Zdrahal et al., 2024) also suggests a set of barriers found in SFSC implementation. Specifically in FTS efforts, Conner et al. (2011) point to 1) lack of a reliable supply of consistently quality products, 2) logistical difficulties and high transaction costs, 3) reliance on processed rather than whole and/or raw products, and 4) difficulties in creating seasonal menus using regional products. Love et al. (2020) summarised sources documenting FTS procurement barriers as 1) availability, 2) price and budget constraints, 3) communication barriers between FTS managers and producers, 4) lack of regional supply chain infrastructure, and 5) concerns regarding local producers' food safety practices.

Previous studies (e.g. Aliyar et al., 2015; Roche et al, 2015) have noted the vast difference in school food environments across different countries and found that there is no uniformity in the provision of school-provided meals across countries. Although studies (Izumi et al., 2010; Gaddis & Coplen, 2018; Hawkins, 2023; Miller et al., 2025) identify inadequate storage and refrigeration as a logistical hurdle for local food procurement in schools, researchers have largely overlooked transitional economies with unique historical developments in their food and education systems. To address this research gap, this paper evaluates how storage capacity affects the integration of local foods into school catering, drawing on empirical evidence from the South Moravian Region of the Czech Republic.

MATERIAL AND METHODS

Hypothesis Development

The integration of local foods into school catering is widely recognised as a key strategy for fostering sustainable public food procurement. However, translating this policy goal into practice is often hindered by physical and infrastructural barriers within schools, particularly in logistics, distribution, and storage (Gaitán-Cremashi et al., 2024).

Existing literature (Gaddis and Coplen, 2017) provides evidence of a shift in many school canteens toward a heat-and-serve practice. Driven by financial pressures and the pursuit of economic efficiency, many institutional kitchens have become highly dependent on pre-packaged, highly processed foods sourced through conventional, globalised supply chains. In school catering, local foods often require different handling than processed, frozen, or shelf-stable goods from large-scale distributors (Lahtinen, 2012; Barbosa Jr. et al., 2022). Incorporating farm-fresh raw materials into school menus requires significant physical space and, crucially, sufficient refrigerated storage capacity (Izumi et al. 2010). Also, storage isn't just about space; it’s about the type of space (Miller et al., 2025). Local foods often arrive dirty or unprocessed (Thompson et al. 2016), requiring separate storage to prevent cross-contamination, which older facilities may not support. The path dependency principle (David, 1985) suggests that the historical infrastructure determines current constraints. When schools lack the physical and adequate space to safely store bulk purchases of fresh local food, they are forced to adapt their procurement strategies, often relying on more just-in-time deliveries (Lahtinen, 2012). This lack of adequate on-site storage or refrigeration space shifts the logistical burden onto the local farmers. For small- and mid-scale regional producers, managing frequent, small-volume deliveries to multiple school sites generates prohibitively high transaction costs and represents a primary obstacle to integration of local foods in school catering (Izumi et al., 2010).

Due to these spatial and technological limitations, school catering operators often adopt risk-averse purchasing behaviours. To bypass the logistical complexities, coordination efforts, and spoilage risks associated with local food, schools frequently default to conventional wholesale items that do not require any alterations to their existing storage, transport, or cooking routines (Izumi et al., 2010; Barbosa Jr. et al., 2022). Also, the school catering relies on large-volume storage to lower costs, but integrating local foods shifts the focus to the problem of achieving the economies of scope (variety and freshness). Institutional theory (Scott, 2014) suggests that organisations (like schools) are governed by sets of rules and norms that prioritise efficiency and risk mitigation. This implies that even when procurement laws are changed to favour local sourcing, the physical infrastructure (storage) could remain the missing link that prevents policy from becoming practice. Therefore, the availability of adequate storage capacity is a structural determinant for shortening food supply chains and integrating local food into the school catering. Based on this summary of the existing knowledge, we propose to formally test the following hypothesis.

Null Hypothesis (H_0): There is no positive relationship between the available storage capacity of school canteens and their intention to increase the share of local food in the meals they prepare.

Data and Methods

The analysis is based on primary data from quantitative questionnaire survey conducted among school canteens of primary schools in the South Moravian Region of the Czech Republic. The questionnaire was distributed electronically to representatives of all school canteens in the target population. The survey targeted the entire population of school canteens in the region, identified through the official register of educational institutions. In total, 521 school canteens were contacted; first in the Brno Metropolitan area in 2025 and in the rest of the South Moravian Region in 2026. For the present analysis, 216 valid responses were available, corresponding to 41.5% of the contacted population. For a population of this size, commonly used sample size guidelines suggest approximately 220 responses for a 95% confidence level and a 5% margin of error. The analysis is based on 216 valid responses, which is close to this threshold and provides a reasonable basis for identifying general patterns in the analysed relationship. Accordingly, the present analysis examines two key variables: perception of sufficiency of storage space in school kitchens and the willingness of school canteens to increase the share of local food in the future. The relationship between these variables was evaluated using the chi-square test of independence. The strength of the association was assessed using Cramér's V coefficient.

RESULTS AND DISCUSSION

Based on the empirical evidence from school canteens in the South Moravian Region, the following figures (Figure 1a and 1b) illustrate the perception of storage capacity of these facilities and their strategic intentions regarding local food procurement. The school canteens mostly report a sufficient and adequate storage space (67.6%). Among school canteens, the 69.4% of them expressed a plan to increase the share of local foods in their prepared dishes. This highlights that the willingness to participate in farm-to-school initiatives is high.

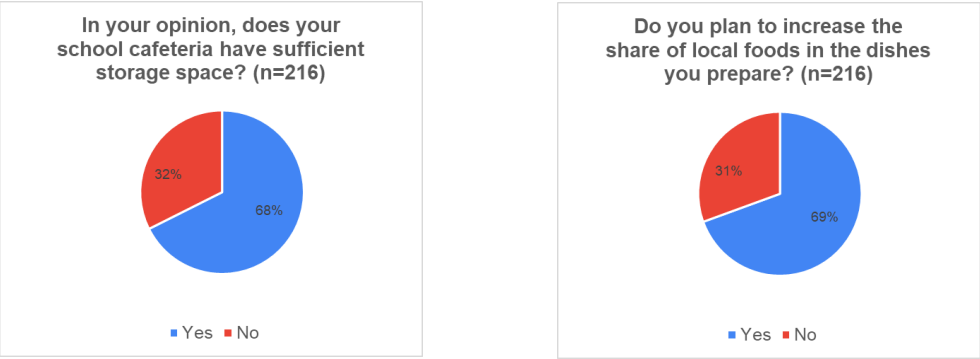


Figure 1 a and 1 b.
Source: The authors' construct based on data from the survey

The following figure (Figure 2) demonstrates what perceived storage sufficiency has on the actual operational capabilities of school canteens to handle fresh produce (using the example of fresh fruits and vegetables). For canteens reporting sufficient storage space, the majority are capable of storing fresh fruits and vegetables for a week, whereas those with insufficient space are restricted to much shorter windows, often limited to just one day or requiring frequent, immediate deliveries. This indicates that the physical infrastructure may appear as a structural barrier that may prevent policy goals from being translated into practice in the South Moravia.

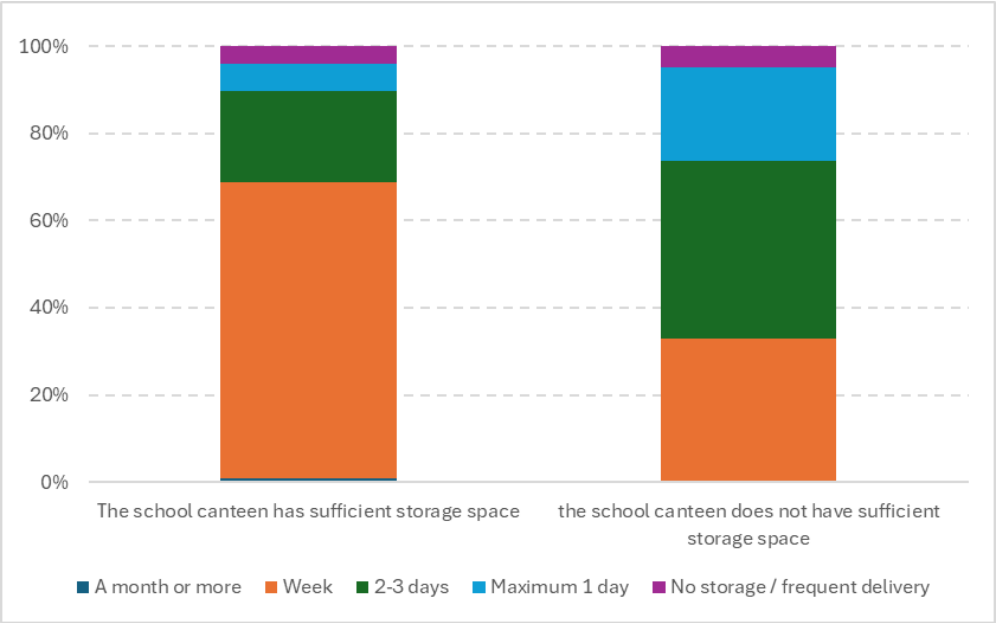


Figure 2: The ability of analysed schools to store fresh fruits and vegetables in refrigerated areas
Source: The authors' construct based on data from the survey

In a further step, we examined the relationship between the perceived sufficiency of storage space in school canteens and their intention to increase the proportion of local foods in the meals they prepare. Based on the contingency table of respondents from the South Moravian Region, 110 out of 146 canteens (75.3%) have a sufficient storage plan to increase their use of local products. Of the 70 canteens with insufficient storage, only 40 plan (57.1%) to increase regional food use.

The statistical evaluation using the chi-square test of independence confirms the existence of a relation between the tested variables. The calculated test criterion reaches 7.386, which exceeds the critical values for both the 5% significance level (3.84) and the stricter 1% significance level (6.635). The strength of this association was quantified by Cramér's V coefficient, which is recorded at 0.185. In the context of statistical measurements, this indicates a detectible but weak link between adequate storage capacity and the willingness of school canteens to integrate regional foods into their operations.

CONCLUSION

This paper evaluates how storage capacity affects the integration of local foods into school catering, drawing on empirical evidence from the South Moravian Region of the Czech Republic. These results suggest that while storage facilities are factors for shortening food supply chains in the South Moravian Region, they are not the sole determinants; however, modernising and expanding storage capacities appear to be a vital step toward the successful implementation of local foods in school catering.

This result supports the path dependency principle cited in the research, suggesting that historical infrastructure constraints dictate current procurement limits. Specifically, the lack of refrigerated areas forces schools into a more just-in-time delivery model, which shifts the logistical burden onto local farmers and creates a primary obstacle to integrating local foods due to high transaction costs.

The study contributes to the global knowledge base by providing additional geographical evidence that suggests physical infrastructure is serving as a structural determinant for the success of FTS initiatives in transitional economies like the Czech Republic. The study also contributes to the local knowledge base by providing the first analysis of barriers in school catering and quantifying the specific operational constraints faced by these facilities. The Czech school catering system can serve as a stable and high-volume market for local producers if structural limitations are addressed.

Despite its merits, the study has several limitations. First, the analysis is based on self-reported data, which may be subject to response bias. Second, although the concept of local food is discussed in the literature (Martinez et al., 2010; Granvik et al, 1981), it is not uniformly defined and may be interpreted differently by respondents, which could affect the consistency of the responses.

Further research should identify other factors that serve as barriers to integrating local food into school canteens in the South Moravian Region, as well as address the complexity and interplay of these factors.

ACKNOWLEDGEMENT

This paper is part of the Grant Program: Visegrad+ Grants (Project ID: 22430104) Family Farms in Short Food Supply Chains: Transfer of experience from Czechia, Slovakia and Poland and project IGA25-FRRMS-007 (Possibilities of Utilising Local Farms within School Canteen).

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