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Examining purchasing strategies in public food procurement: Integrating sustainability, nutrition, and health in Spanish school meals and social care centres

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ABSTRACT

Sustainable Public Food Procurement (SPFP) is pivotal in advancing sustainable and healthier food systems. However, practical gaps persist in understanding how policies function at the local implementation. This study addresses these gaps by analysing 22 SPFP contracts for school meals and social care centres in Spain, focusing on implementation while contextualizing findings within the broader policy cycle. This research categorizes SPFP criteria in tenders and evaluate their potential for actionability across sustainability, nutrition, & health dimensions. It also explores how these criteria are combined into purchasing strategies to achieve simultaneous or individual goals. Key findings reveal a strong use of product quality criteria, particularly organic foods, supported by policy and ease of implementation. However, non-ambitious targets, market constraints and procurement officers' limited knowledge hinder progress. The study highlights significant adoption of nutritional & health criteria, though non-mandatory policies and varying regional targets impede consistent implementation and reveal gaps in promoting healthy and sustainable dietary practices. Environmental criteria are widely used signalling policy priorities within the EU policy framework. In contrast, proximity and social criteria are underutilized due to regulatory constraints and insufficient guidance. Despite these challenges, innovative local procurement strategies are utilized to overcome barriers. At the strategy level, the study reveals diverse approaches to SPFP implementation, highlighting adaptability but underscoring the need for flexible frameworks that accommodate local variations while aligning with broader EU or national goals. This research advocates for a holistic approach to SPFP that addresses both the practical challenges of implementation and the systemic issues present in the earlier stages of policy development.

1. Introduction

The European Union's (EU) food systems faces profound challenges that span environmental, social and economic dimensions. Dominant agricultural practices, characterized by monocultures, heavy pesticide use, and chemical fertilizers, contribute significantly to biodiversity loss, greenhouse gas emissions and soil degradation (TEEB 2010). Simultaneously, shifting dietary patterns have contributed to raising levels of overweight and obesity, and an increased risk of chronic diseases like cardiovascular conditions and diabetes (WHO 2022). Additionally, persistent power imbalances in food value chains continue to undermine labor conditions and the livelihoods of smallholder farmers (IPES-Food 2019).

In response, there are growing calls to leverage Sustainable Public Food Procurement (SPFP) as a strategic policy tool to foster the transition towards sustainable, healthy and just food systems (Swensson & Tartanac 2020; FAO et al. 2021; Steiner 2021; Swensson et al. 2021; Gaitán-Cremaschi et al. 2022).

SPFP, as defined by the European Commission, is a process by which public authorities balance the economic, social, and environmental pillars of sustainable development when procuring food and food services (Núñez 2020). This approach is applied across various public institutions, including schools, healthcare facilities, universities, and care centres, through strategic procurement choices (Swensson & Tartanac 2020; FAO et al. 2021). The potential impact of SPFP is significant across multiple areas. SPFP can address malnutrition and promote healthier

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diets by prioritizing menu design that emphasizes fresh, diverse, and nutritious foods (Smith et al. 2016; Caldeira et al. 2017; FAO et al. 2021). Furthermore, sourcing local food strengthens urban–rural connections, supports social development and bolsters local economies (Sonnino 2016; Soares et al. 2017; FAO et al. 2021). SPFP can also promote environmentally sustainable agricultural practices, such as organic farming, helping mitigate the environmental impacts of conventional agriculture (Valencia et al. 2019; Borsatto et al. 2020). In addition, procurement choices related to packaging, waste management, and transportation offer opportunities to further reduce environmental footprints (Goggins & Rau 2016; Boyano et al. 2019). SPFP can also address social objectives, such as gender equity, labor rights, and food education.

The scale of public procurement in the EU offers a significant opportunity to drive food system transformation. Public procurement represents approximately 14 % of the EU's GDP annually (European Commission 2023), with an estimated 85 million catered meals served daily in 2019 (ICLEI 2019), underscoring the potential for impact. Recognizing this, the EU has promoted SPFP through Directive 2014/24/EU, encouraging Member States to integrate environmental, and social considerations alongside cost-efficiency in procurement processes (European Commission 2014; Caldeira et al. 2017). However, despite this progressive policy framework, the practical implementation of SPFP across Member States remains insufficient (EPHA & HCWH Europe 2019; Client Earth 2023), with numerous barriers arising at various stages of the policy cycle, as discussed in Section 2.

Recent research has made significant contributions to the field of SPFP, exploring areas such as its innovation potential (Morley 2021), policy designs and regulatory frameworks (Smith et al. 2016; Krivašonoka 2017; Swensson 2018; Swensson & Tartanac 2020; Parsons & Barling 2022), sustainability performance (Stefanovic 2022; Tregear et al. 2022; Gómez-Ramos & Rico González 2023), and assessments of recommended Green Public Procurement (GPP) criteria in EU food procurement schemes (Neto & Gama Caldas 2018, Neto 2020; Salvatore et al. 2021). However, there remains a knowledge gap, as studies often overlook the practical implementation of SPFP at the local level (Wilkinson et al. 2024). This gap is reflected in: (i) a limited understanding of which SPFP criteria are prioritized or excluded in food service tenders (Testa et al. 2016; Neto 2020), and (ii) insufficient knowledge of how these criteria are strategically combined into purchasing strategies. These strategies may focus on individual goals (e.g., environmental sustainability or economic development through local sourcing) or combine multiple sustainability, nutritional & health objectives, revealing how policies are interpreted and applied or exposing shortcomings in existing policy frameworks (Smith et al. 2016).

This study aims to address these knowledge gaps by examining 22 public food service contracts (hereafter referred to as "initiatives") in Spain, focusing on school meals and social care centres. Our analysis is centred on the implementation stage of the policy cycle (described in Section 2), where SPFP criteria are applied in practice. We explore this at two levels: (1) the SPFP criteria, and (2) how these criteria are combined to form purchasing strategies. At the criteria level, we systematically identify and categorize the specific requirements in the tender documents, assessing their potential actionability in sustainability, nutritional, and health dimensions. At the strategy level, we analyse how these criteria are used together in purchasing strategies to achieve individual or combined goals, revealing a variety of approaches and limitations in SPFP implementation.

Although the primary focus is on the implementation stage, we contextualize our findings within the broader policy cycle. By considering barriers at each stage, from high-level policy decisions to operational challenges, we gain a clearer understanding of how these obstacles shape the selection of criteria and local purchasing strategies. This approach also uncovers opportunities to improve the effectiveness of SPFP in both Spain and across the EU.

2. Sustainable public food procurement in the policy cycle

The policy cycle framework, which includes agenda setting, policy formulation, implementation, and evaluation, offers a structured approach to analysing SPFP. This framework highlights the interconnectedness of these stages and how challenges and opportunities evolve throughout the policy process. In this study, we focus primarily on the implementation stage while also reviewing opportunities and barriers at each policy stage discussed in the literature to provide context for our findings (refer to Fig. 1).

2.1. Agenda setting and policy formulation

The EU's regulatory framework has progressively embraced non-economic considerations in public tenders (FAO et al. 2021). Directive 2014/24/EU marked a significant shift towards a "best value" approach, allowing Member States to incorporate environmental and social considerations into procurement processes (European Commission 2014; Núñez 2020). Furthermore, to promote harmonization, particularly in the inclusion of environmental aspects, the EU issued voluntary GPP criteria, updated in 2019 for the food sector (Boyano et al. 2019; ClientEarth 2023). Member States are encouraged to adapt these directives into their national frameworks, with have inspired sector-specific policies such as France's Egalim Law (2018) and Italy's Minimum Environmental Criteria (FAO et al. 2021).

Despite advancements, significant barriers persist. Fragmentation across policy areas, such as agriculture, health, and environmental protection, hinders the effective coordination and integration of sustainability goals (Grivins et al. 2018; Sonnino 2019). The EU's overemphasis on environmental goals, coupled with limited attention to social and nutritional aspects, undermines a holistic approach to SPFP (Smith et al. 2016; Stoffel et al. 2019; Alberdi & Begiristain-Zubillaga 2021). Additionally, procurement regulations emphasizing non-discrimination and equal market access can challenge Member States trying to prioritize various sustainability goals, including local food sourcing and other regional initiatives. The voluntary nature of EU policies further exacerbates these issues, resulting in inconsistent SPFP implementation across Member States (EPHA & HCWH Europe 2019; Núñez 2020; Galt & Elbrecht 2021; ClientEarth 2023). These challenges extend to national contexts, where most countries still lack comprehensive frameworks to effectively leverage procurement for sustainable, nutritional, and health-related objectives (Núñez 2020). These challenges underscore the often-overlooked importance of the regulatory framework in SPFP implementation (Swensson & Tartanac 2020).

2.2. Policy implementation: SPFP criteria, actionability and purchasing strategies

The implementation phase of SPFP involves procurement authorities adapting policy frameworks to local contexts by formulating purchasing strategies that incorporate various SPFP criteria outlined in tender documents (Schotanus & Grandia 2023). These criteria, categorized in this study into product quality, proximity, social, environmental, and nutritional & health (see subsection 3.3. for further description), guide decisions regarding food selection, menu design, supplier choice, production models, among others. Tender documents specify these criteria as either mandatory requirements (MR) and/or award criteria (AC). MRs, which include selection criteria (SC), technical specifications (TS), and contract performance clauses (CPC), must be met by all bidders, while ACs are used to evaluate and select the best tender, encouraging bidders to surpass minimum requirements (Boyano et al. 2019).

Policy implementation is characterized by flexibility, allowing for diverse purchasing strategies. These strategies are shaped by policy frameworks, political priorities, organizational goals, and market conditions (Smith et al. 2016; Grivins et al. 2018; Stoffel et al. 2019; Swensson & Tartanac 2020; Wilkinson et al. 2024). While this flexibility

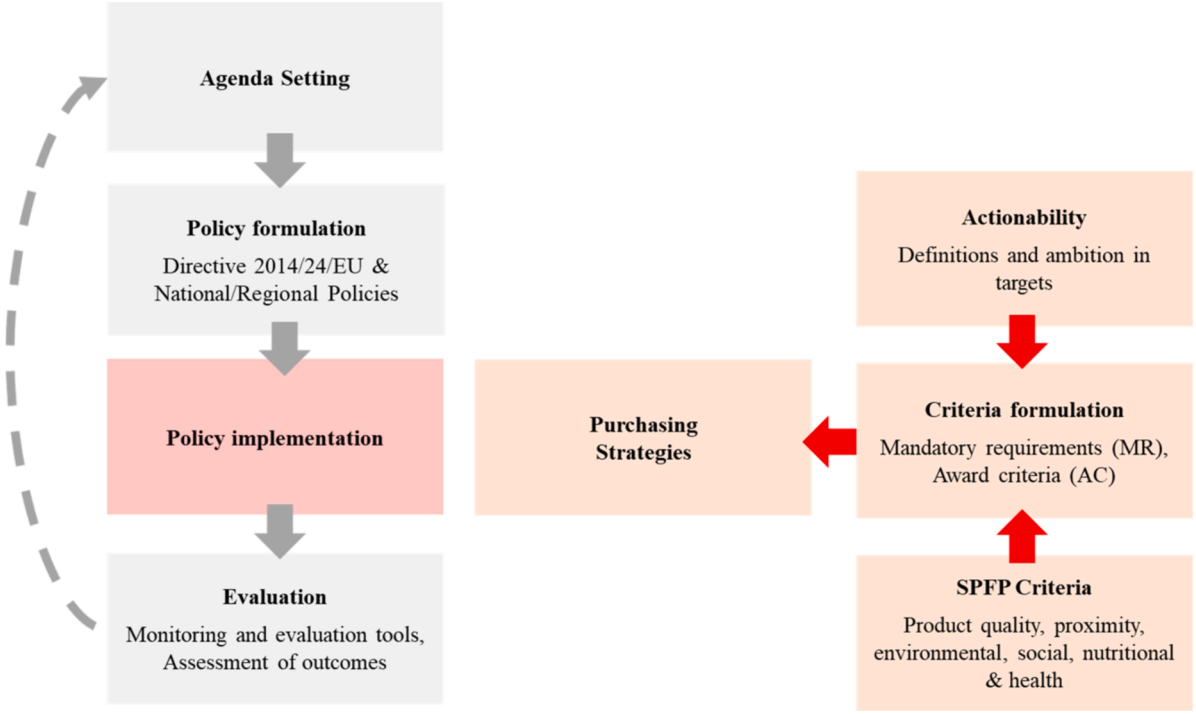


Fig. 1. SPFP in the policy cycle. The red squares highlight the focus of this study in the implementation stage, including purchasing strategies that incorporate SPFP criteria with varying levels of actionability. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

can encourage local innovation, it may also lead to gaps between procurement policy goals and actual practices due to varied interpretations and commitment levels (Wilkinson et al. 2024). SPFP strategies can range from focused approaches that target specific goals (e.g., environmental sustainability or local economic development through regional food sourcing) to integrated designs that balance multiple objectives (e.g., sustainability and nutrition simultaneously). The design of these strategies involves managing inherent synergies and trade-offs among criteria (Morley 2021; Tregear et al. 2022). For example, prioritizing organic products may offer environmental benefits but can result in higher costs, potentially limiting the volume of sustainable food procured (Morley 2021; Tregear et al. 2022).

The actionability of purchasing strategies for food system transformation relies heavily on clear definitions and ambitious targets for criteria. However, the literature highlights several challenges in this regard. Procurement officers often lack the necessary market knowledge and technical expertise to effectively integrate SPFP criteria into tenders (Grivins et al., 2018; Stoffel et al., 2019; Núñez 2020; Galt & Elbrecht 2021; WHO 2021; Parsons & Barling 2022; Tregear et al. 2022; Wilkinson et al. 2024). This knowledge gap can lead to poorly developed strategies with unrealistic criteria, potentially discouraging bidder participation or causing financial difficulties for contractors adopting sustainable practices (Smith et al. 2016; Testa et al. 2016). Compounding these issues is the widespread perception of procurement as an administrative task rather than a strategic tool for sustainability (Smith et al. 2016). This mindset often accompanies a tendency among procurement authorities to prioritize cost over sustainability, frequently resulting in the selection of the cheapest suppliers (Soares & Davó-Blanes 2019; Sonnino 2019; Pernas García & Lazo 2024). Implementation is further complicated by challenges in supplier coordination, particularly in adapting tender criteria to local food systems' capabilities, as well as logistical issues and varying market readiness for sustainable food provision (Parsons & Barling 2022; Alberdi et al. 2023; Gaitán-Cremaschi et al. 2024; Wilkinson et al. 2024). Within institutions, resistance to change due to established routines presents another barrier. Redesigning menus to include seasonal and fresh ingredients requires new skills and adaptations. Moreover, cultural preferences for certain foods can conflict with sustainability and health goals, adding complexity to the implementation process (Smith et al. 2016; Testa et al. 2016; Gaitán-Cremaschi et al. 2024).

2.3. Policy monitoring and evaluation

In the final stage policy, monitoring is conducted to assess the contractor's compliance to SPFP criteria and evaluate SPFP outcomes of implemented SPFP strategies. This allows identifying areas for improvement, and informing future agendas, policy or implementation adjustments.

In this stage, new challenges emerge that are closely linked to those in the implementation stage. The multifaceted nature of SPFP goals creates difficulties in developing appropriate indicators to measure impacts (Smith et al. 2016). This challenge is intensified by the long-term nature of many SPFP outcomes, which may only become apparent over extended periods. The lack of technical expertise noted in the implementation stage manifests here as a lack of institutional capacity for comprehensive compliance assessment across various SPFP dimensions (FAO et al. 2021). Consequently, effective monitoring continues to be one of the most persistent barriers to SPFP (FAO et al. 2021; Parsons & Barling 2022; Gaitan-Cremaschi et al. 2024).

3. Case study and methodological approach

We first briefly describe the policy context of SPFP in Spain, followed by an explanation of the selection process for specific initiatives and criteria. Next, we detail the data collection and analysis at the criteria and the purchasing strategy levels.

3.1. Policy context of sustainable public food procurement (SPFP) in Spain

In Spain, Law 9/2017 on Public Sector Contracts establishes the regulatory framework for public procurement, aligning with the EU Directive 2014/23/EU (Sánchez 2019). This law mandates contracting authorities to incorporate social and environmental considerations into public procurement documents (Caranta 2023; Pernas García & Lazo 2024). Simultaneously, Spanish legislation addressing climate change, waste management, circular economy practices, and rural population policies underscores the significance of sustainable procurement as a crucial policy tool for tackling these challenges (Pernas García & Lazo 2024).

Building upon this regulatory foundation and bolstered by EU initiatives such as the European Green Deal and the Farm to Fork Strategy (European Commission 2020), initiatives in Spain have arisen to advance SPFP, particularly focusing on institutions such as schools and elderly care centres. Beyond these, SPFP has not been adopted in other public canteen services, for example, in health services, universities, and prisons, despite grassroot efforts (Gaitán-Cremaschi & Córdoba 2024). These initiatives operate at both regional and municipal levels, with activity particularly observed in regions like Catalunya, Navarra, Valencia, and País Vasco. Collaboration stands as a defining feature of many of these initiatives, facilitated by political backing, the motivation of contracting authorities' technical personnel, and involvement from civil society (Soares & Davó-Blanes 2019; Gaitán-Cremaschi & Córdoba 2024). At the municipal level, these initiatives frequently align with cities' commitments to the Milan Urban Food Policy Pact, as exemplified by cities such as Valencia, Pamplona (Navarra), and Vitoria-Gasteiz (País Vasco) (Gaitán-Cremaschi & Córdoba 2024). Such commitments have served as catalysts for the adoption of novel and more sustainable food procurement paradigms (Gaitán-Cremaschi & Córdoba 2024). However, SPFP efforts in Spain remain fragmented and face challenges throughout the policy cycle, as detailed in Section 2. Key issues include the lack of systematic development of technical criteria and guidelines at the national level, a tendency to prioritize cost over sustainability in tender design, and a knowledge gap among procurement officers regarding procurement laws. These challenges are further exacerbated by insufficient training in food-related matters and cultural resistance to dietary shifts (Soares & Davó-Blanes 2019; Gaitán-Cremaschi & Córdoba 2024; Pernas García & Lazo 2024).

3.2. Selection of initiatives and data collection

The selection of representative initiatives was facilitated by insights from five key experts knowledgeable about public food procurement practices in Spain. Criteria guiding the selection process included the following: (i) the incorporation of a minimum of five sustainability, nutritional & health criteria within tender documents to ensure that the selected initiatives prioritized these considerations; (ii) representation across diverse administrative scales, encompassing both regional and municipality levels; and (iii) coverage of various contract scopes, including supply of food products alone or in combination with food and/or catering services provided through central kitchens, in-situ preparation, or hybrid systems. These criteria recognized the heterogeneity of SPFP practices in Spain and allows capturing the range of approaches employed in procuring food for public institutions. While the selected initiatives may not be expected to statistically represent SPFP in Spain, they are considered, to the best of expert knowledge and consensus of experts, as frontrunners of Spain's most advanced efforts towards SPFP.

3.2.1. Overview of selected SPFP initiatives

A total of 22 initiatives were selected, spanning across six regions (Table 1): Catalunya (n = 12), País Vasco (n = 4), Navarra (n = 3), Castilla y León (n = 1), Murcia (n = 1), and Valencia (n = 1). They operate at both municipal (n = 16) and regional levels (n = 6), and encompass various contract scopes, including the supply of products alone (n = 5), combined with catering services (n = 3), in-situ preparation (n = 6), and hybrid systems (n = 8). For a description of each initiative, please refer to Supplementary Material 1.

Table 1
Selected initiatives for schools and social care centres in Spain.

Region	Public entity		Administrative scale		Contract scope	
	Schools	Home care	Municipal	Regional	Food supply	Food supply & food service
Catalunya	12	–	7	5	–	12
País Vasco	2	2	4	–	3	1
Navarra	2	1	2	1	1	2
Valencia	1	–	1	–	–	1
Castilla y León	1	–	1	–	–	1
Murcia	1	–	1	–	1	–
Total	19	3	16	6	5	17

3.3. Selection of sustainability, nutritional & health criteria

A systematic process was employed to develop a predefined set of sustainability, nutritional & health criteria recommended for transitioning to SPFP, forming the base of the analysis. Initially, a list of criteria was established drawing upon the recommended EU GPP criteria. Subsequently, this list was enriched by integrating criteria sourced from social, nutritional & health aspects identified by Neto (2020) in a comprehensive review of 21 public schemes across European countries, along with reports advocating for SPFP in Spain (Álvarez 2020; Justicia Alimentaria 2020; CERAI 2021). These steps resulted in a final list comprising 37 criteria.

These criteria were then categorized into five dimensions: product quality, proximity, environmental, social, and nutritional & health criteria, as detailed in Table 2, as these dimensions are essential for catalyzing transition in food systems. We recognize that certain criteria may overlap, such as fair-trade impacting both product quality and social sustainability, or organic foods affecting both environmental sustainability and product quality. To prevent redundancy, we distinguish each criterion based on its primary focus to ensure clarity in the analysis.

Product quality (P) criteria aim to ensure that sourced food items meet quality standards for sustainability, health, fairness, and ethics, while also promoting seasonal and diverse foods. *Proximity (C) criteria* involve requirements for contractors to prioritize the use of local or nearby products, addressing geographic factors either directly, such as requesting products sourced from direct marketing channels or indirectly by ensuring a quick supplier response time. Despite encompassing environmental and social implications like reducing food miles and supporting local economies, proximity criteria were categorized separately due to challenges associated with their integration into procurement practices, potentially conflicting with the principles of free movement of goods and free competition in the EU (EU Food Policy Coalition 2021). *Environmental (E) criteria* aim to minimize the ecological footprint of contractor operations, including transportation of sourced foods or meals and activities within public kitchens. *Social (S) criteria* encompass considerations for gender equity and community well-being, particularly for contractor staff, and educational programs and awareness campaigns aimed at enhancing the social impact of food procurement initiatives, extending beyond public canteens. *Nutritional & health (N)* criteria focus on promoting healthy eating habits and balanced diets within public food procurement initiatives. These criteria mandate contractors to include nutritious and prohibit unhealthy foods, and adhere to dietary guidelines in menu preparation, aiming to mitigate non-communicable chronic diseases and enhance health.

Table 2
Dimensions and criteria for sustainable public food procurement.

Product quality (P) criteria
P1. Use of organic products
P2. Use of products from integrated production
P3. Use of sustainable and/or healthier marine & aquaculture food
P4. Use of seasonal & fresh products
P5. Diversity of food products in menu preparation
P6. Use of agricultural products labelled with geographical indications
P7. Use of fair & ethical trade food
P8. Use of GMO-free products
Proximity (C) criteria
C1. Use of agricultural products from nearby locations
C2. Proximity of the supplier/central kitchen to the public canteen
C3. Supplier emergency response time
C4. Use of products sourced from direct or short marketing channels
Environmental (E) criteria[1]
E1. Food waste prevention
E2. Waste management in public canteens
E3. Chemical products for cleaning in public canteens
E4. Consumable goods in transport and public canteens
E5. Energy & water saving measures
E6. Use of green vehicles for food transportation
E7. Reduction in greenhouse gas emissions associated with transportation
E8. Implementation of other environmental management measures & practices
Social (S) criteria
S1. Gender equality measures for contractor's staff
S2. Employment of individuals facing social exclusion or labour insertion difficulties in the contractor's workforce
S3. Educational project development and implementation
S4. Contractor's staff training measures
S5. Engagement of civil society
S6. Food waste redistribution measures
S7. Work-life balance measures for contractor's staff
Nutritional & health (N) criteria
N1. Frequency of vegetables in menu preparation
N2. Frequency of fruits in menu preparation
N3. Frequency of legumes in menu preparation
N4. Frequency of fish in menu preparation
N5. Reduction in meat diets in menu preparation (especially red meat)
N6. Fried food prohibition or reduction in menu preparation
N7. Precooked food prohibition or reduction in menu preparation
N8. Use of healthier fats in menu preparation
N9. Use of whole-grain products in menu preparation
N10. Other nutritional & health criteria for menu preparation

[1] The criteria *animal welfare*, and *more environmentally responsible fats* were removed from the analysis as they are not included in any of the 22 initiatives selected.

3.4. Data collection

The data collection process relied on a manual content analysis of tender documents, focusing on the Particular Administrative Clauses and Technical Conditions that outline the framework of each initiative. These documents were sourced from publicly accessible platforms of national/regional procurement authorities. We first identified the presence or absence of each criterion outlined in Table 2. For example, we delved into whether the documents stipulate the use of criteria such as P1. organic products for preparation of meals.

Then, we analysed how each criterion was articulated within the tender documents, distinguishing between Mandatory Requirements (MR) and Award Criteria (AC) formulations.

3.5. Data analysis: Assessment of SPFP initiatives at the criteria and purchasing strategy levels

Data analysis encompassed evaluating both the usage and potential actionability of dimensions and individual criteria, alongside strategic integration at the purchasing level to achieve goals.

3.5.1. Analysis at the SPFP criteria level

The evaluation of initiatives at the criteria level followed a two-step approach. First, we assessed the prevalence of criteria across the initiatives to identify usage patterns, recording whether each criterion (either as MR or AC formulation) was present or absent, and calculating the average usage across all 22 initiatives.

Next, we evaluated the potential actionability of each criterion through qualitative analysis of its formulations (MR, AC, or both if present), focusing on clarity of definitions and ambition in targets. High potential actionability does not necessarily translate into effective practices. For example, challenges related to monitoring and enforcement can impede the practical implementation of criteria. However, evaluating the implementation of criteria from purchasing strategy design to practice is beyond the scope of this study.

To minimize subjectivity, we employed a structured scoring system, rating each formulation from 0 to 1: 0 indicated non-utilization, 0.5 indicated vague definitions or lack of ambitious targets, and 1 indicated clear definitions and ambitious targets. The evaluation of "vagueness" focused on identifying unclear or ambiguous language used in defining criteria, which can create challenges in interpretation. For example, criteria lacking defined seasonality or formulated with ambiguous terms like "prioritize" or "to the extent possible", without clear definitions. Ambition in targets referred to the goal levels set within the criteria. Nutritional & health targets were evaluated against the Public Health Agency of Catalonia (ASPCAT), which sets minimum recommended frequencies for various food categories. In contrast, targets for product quality, proximity, environmental, and social criteria were evaluated in terms of their relative ambition across initiatives, with higher scores given to those initiatives with more ambitious targets. Our method provides a standardized approach across diverse contexts, though ambition levels may vary regionally due to policy, procurement goals,

agricultural practices, and market availability.

In cases where a criterion was formulated as both an MR and AC within the same initiative, we applied specific scoring rules to ensure complementarity. When the MR had clear definitions and ambitious targets, receiving a score of 1, the corresponding AC was capped at a maximum score of 0.5, even if equally well-defined. This approach ensured that the AC complements rather than duplicates the MR. For example, if an MR aimed for 70 % organic food (scored 1), an AC requesting an additional 30 % organic would be scored up to 0.5. This combination allows both criteria to collectively contribute towards achieving a comprehensive target (in this case, 100 % organic food).

The potential actionability of each criterion within each initiative was assessed by aggregating scores from both MR and AC formulations if used together or based on the score of the existing formulation. MR were given twice the weight to emphasize their higher potential for practical implementation, supported by contractual obligations specified in tender documents. In contrast, AC formulations were assigned lower weight due to their reliance on bidder willingness to exceed minimum requirements (Table 3). Please refer to Supplementary Material 2 for an overview of the mandatory and/or award formulations for each individual criterion across initiatives.

Lastly, the total score for each criterion was computed by averaging aggregated potential actionability scores across all initiatives utilizing the criterion.

3.5.2. Analysis of the purchasing strategy

The analysis at the purchasing strategy involved the investigation of how SPFP criteria were combined to achieve single or simultaneous sustainability, nutritional & health goals.

To conduct this analysis, SPFP criteria with usage below 30 % across the initiatives were excluded to strike a balance between inclusivity and selectivity and helped to focus on the most relevant criteria for further examination.

Subsequently, the analysis computed the number of remaining criteria per dimension for each initiative, accompanied by their potential actionability score. Initiatives that incorporated at least 50 % of the criteria within each dimension were recognized as prioritizing that specific dimension. A purchasing strategy with an average actionability score exceeding 50 % was deemed indicative of medium to high quality, emphasizing its potential for practical execution. The overall purchasing strategy of each initiatives was then identified. Initiatives addressing all dimensions were considered to have an integrated strategy. Those covering most but not all dimensions were classified as partially integrated, while initiatives focused on two or fewer dimensions were implementing a specialized strategy. This limited focus might also indicate challenges in addressing other dimensions due to specific constraints or priorities.

4. Findings

4.1. Usage and actionability of criteria dimensions

The analysis of the initiatives revealed variations in the utilization of SPFP criteria across different dimensions (Fig. 2). Nutritional & health criteria emerged as the most prevalent, with over 50 % of the initiatives incorporating 9 out of 10 criteria.

Product quality criteria followed, with more than half of the initiatives adopting 4 out of 8 criteria. In contrast, environmental and proximity criteria were less frequently utilized. Only 3 out of 8 environmental criteria and 1 out of 4 proximity criteria were adopted by at least half of the initiatives. Social criteria exhibited the lowest adoption rates, with none of the criteria utilized by more than half of the initiatives.

The potential actionability of dimensions also exhibited disparities. Nutritional & health criteria, primarily formulated as MR, stood out for their high potential for practical implementation due to their clear definitions and targets closely aligned with ASPCAT recommendations. Product quality, environmental and social criteria, though less frequently utilized, also showcased a medium to high potential actionability for most of their criteria. These criteria were commonly formulated as both MR and AC, sometimes in combination. Conversely, proximity criteria, predominantly formulated as AC, exhibited medium potential actionability, with none reaching high potential levels.

4.2. Commonality and actionability of key criteria across initiatives

The results identified nine criteria that were most widely employed. The use of organic products (P1) was universally adopted, followed by sustainable marine & aquaculture food (P3), seasonal & fresh products (P4), and diversity of food products in menu preparation (P5), among product quality-related criteria. The utilization of agricultural products from nearby locations (C1) was widely used in the proximity dimension. Among nutritional & health, the most prevalent were the use of healthier fats in menu preparation (N8), followed by the frequency of vegetables (N1) and fruits (N2). Environmental criteria showed high adoption of consumable goods (E4). Social criteria though not widely used, highlighted gender equality measures for contractors' staff (S1), and the development and implementation of an educational project in food service (S4) as the most utilized.

Examining the formulations of the most prevalent criteria revealed varying levels of potential actionability. Some criteria had clear definitions and moderately ambitious targets, indicating medium to high potential for practical implementation. For instance, N1 and N2 specify mandatory minimum weekly frequencies for vegetables and fruits, while N8 predominantly mandates the exclusive use of olive oil. Additionally, P4 and P5 require contractors to supply fresh, seasonal, and diverse products sourced from predetermined lots, especially in food supply contracts. Combined with AC formulations, these criteria incentivize bidders to exceed minimum requirements.

Conversely, some prevalent criteria like P1 and C1 lacked clarity and ambition in some initiatives, reducing their actionability. While certain initiatives utilizing P1 set ambitious MR and/or AC targets (e.g., ranging from 50 % to 100 % of the mass as organic products across most food groups), others focused on a few products (e.g., bananas instead of all fruits). Inconsistencies in organic standards also undermine implementation. Similarly, C1, primarily as an AC, focused primarily on individual products rather than comprehensive food groups. The concept of "proximity" also lacked clear definition and regulatory backing, complicating its implementation.

Results also identified 10 criteria with less than 30 % adoption, including product-related criteria such as the use of products from integrated production (P2) and GMO-free products (P8); proximity criteria like the distance of the supplier/central kitchen to the public canteen (C2), and the supplier's emergency response time (C3); environmental criteria such as the use of green vehicles (E6), measures to mitigate greenhouse gas emissions from transportation (E7), and other environmental management practices (E8); social criteria like food waste redistribution (S6) and work-life balance measures (S7); and nutritional & health criteria such as other nutritional standards for menu

Table 3
Maximum potential actionability scores based on the clarity of definitions and ambition in targets within a single initiative.

SPFP criterion within initiative	Maximum score
Only Mandatory Requirement (MR) used	
MR used and clear	2
MR used but not clear	1
Only Award Criteria (AC) used	
AC used and clear	1
AC used but not clear	0.5
Use of MR and AC in combination	
MR and AC used and clear	2.5

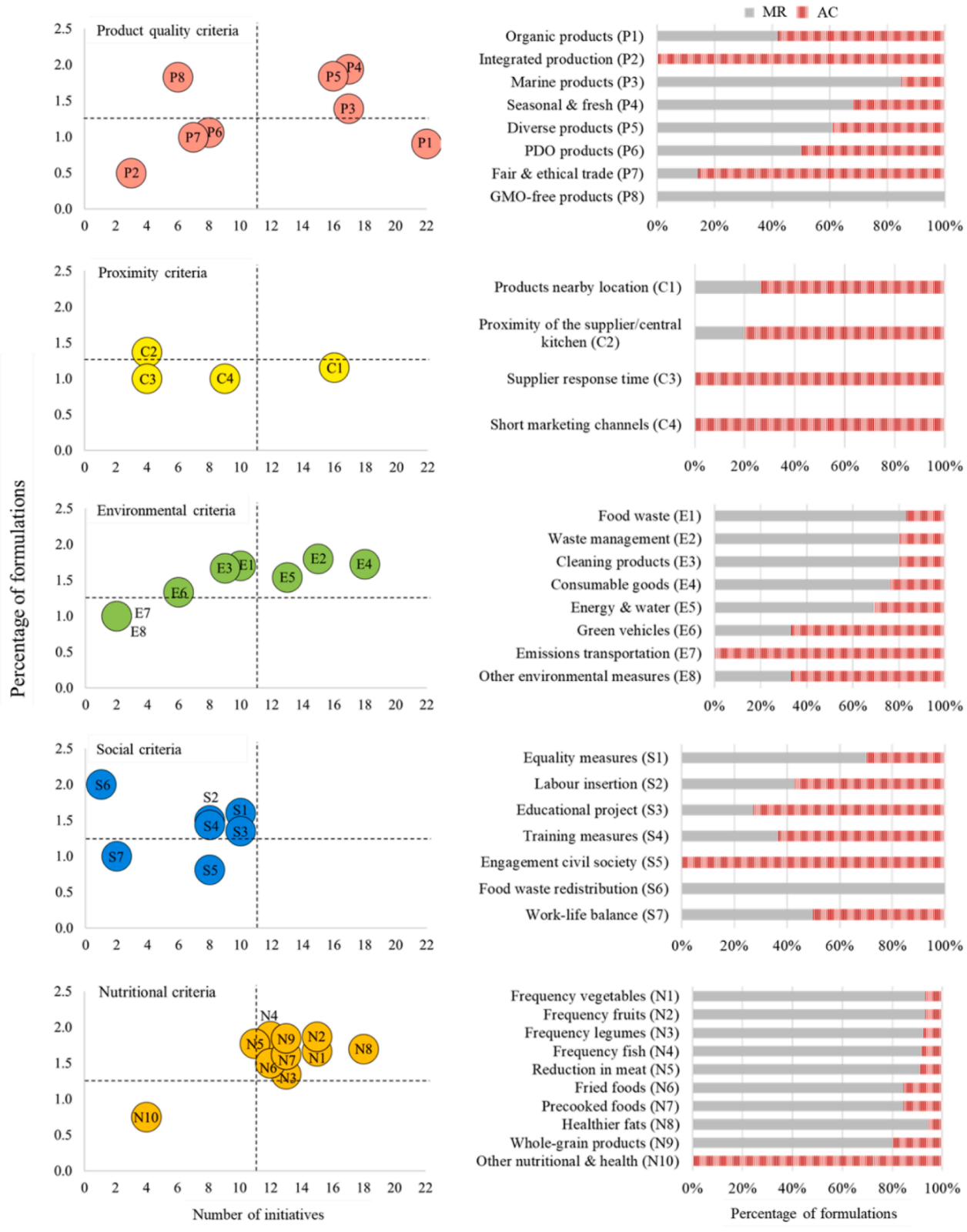


Fig. 2. Usage and potential actionability of dimensions and individual criteria. On the left-hand side the x-axis represents the frequency of usage of dimensions and individual criteria across the 22 initiatives. The y-axis illustrates the potential actionability. On the right-hand side, the percentage of formulations for each criterion, distinguishing between Mandatory Requirement (MR) and Award Criteria (AC) formulations.

preparation (N10). While legumes (N3), fish (N4), and reductions in red meat (N5) exceeded 30 % adoption, their usage within this dimension remained relatively lower, at around 55 %.

4.3. Purchasing strategies in SPFP initiatives

The analysis at the initiative level identified five SPFP strategies across the initiatives (Fig. 3A). Four initiatives employed an "integrated" approach, while twelve showcased partial integration (six following a "high partially integrated" strategy and six a "moderate partially integrated" strategy. Additionally, three initiatives focused exclusively on two dimensions ("specialized strategy"), and three showed no clear prioritization. Approximately 75–80 % of integrated and partially integrated strategies exhibited medium to high potential for actionability, which aligns closely with the scores achieved by specialized strategies.

Further examination (Fig. 3B-F) showed that initiatives employing an "integrated" strategy prioritized all criteria dimensions, covering both product supply and food/catering services at municipal and regional levels. "High partially integrated" strategies focused on all dimensions except social criteria, while "moderate partially integrated" strategies emphasized product quality and nutritional & health criteria, with occasional consideration of environmental, proximity or social dimensions. Both are common in contracts combining product supply and food/catering services. Conversely, "specialized" strategies focused solely on municipal-level product supply, prioritizing product quality and local sourcing.

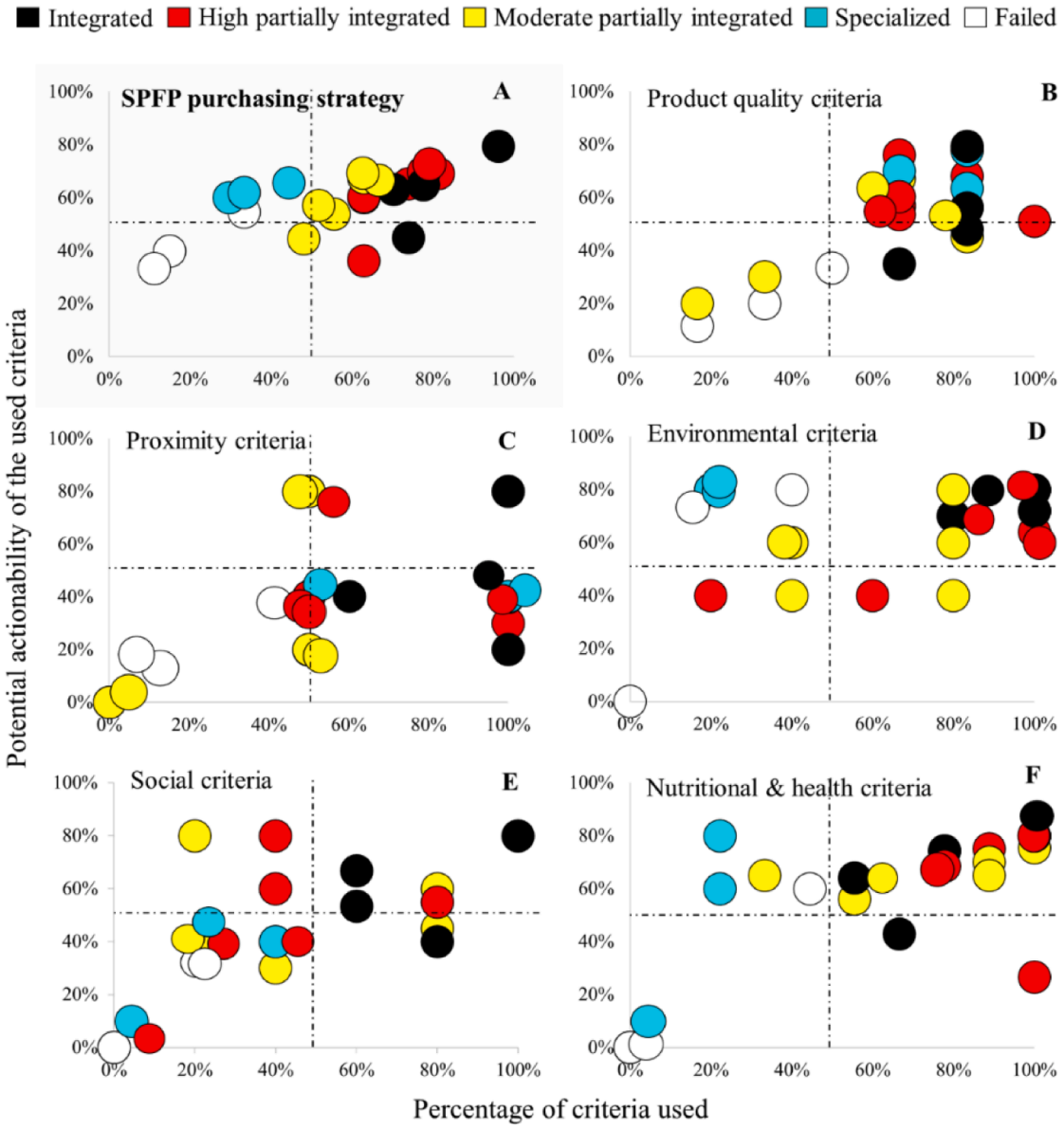


Fig. 3. Panel A in grey depicts the distribution of initiatives based on their purchasing strategy and potential actionability (names for individual initiatives are provided in Supplementary Material 3). Initiatives achieving at least 50% of criteria in all dimensions (panel B: Product quality, C: Proximity, D: Environmental, E: Social, F: −Nutritional & health) are highlighted in black, indicating an "integrated strategy". Initiatives meeting this threshold in any four dimensions are highlighted in red as "high partially integrated strategies", in yellow for any three dimensions as "moderate partially integrated strategies", and in light blue for any two dimensions as "specialized strategies". Initiatives denoted in white fail to incorporate SPFP criteria. The x-axis in squares B-F represents the percentage of criteria of the dimensions utilized by each initiative, while the y-axis denotes their average potential actionability score. Colours assigned to initiatives in B-F correspond to their overall purchasing strategy. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

5. Implications for practice and policy

Building on the insights from our literature review and the policy cycle framework outlined in Section 2, we now discuss our findings. We first discuss the use of main dimensions and criteria and how opportunities and barriers in policy formulation and implementation influence their application to draw lessons for broader application (Section 5.1). Subsequently, we discuss the purchasing strategies of these initiatives and their transformative potential in food systems (Section 5.2). Lastly, we discuss some limitations and provide areas for further research (Section 5.3).

5.1. Dimensions, SPFP criteria and policy alignment: Lessons and entry points for intervention

The criteria-level analysis reveals how policy frameworks and operational challenges influence the use of specific criteria in SPFP, highlighting three major challenges and opportunities in implementation.

5.1.1. Product quality criteria prioritize organic foods, reflecting policy support but facing implementation challenges

Our findings confirm a strong emphasis on product quality criteria, particularly organic foods (P1), aligning with recent studies (EPHA & HCWH Europe 2019; Neto 2020; Salvatore et al. 2021; Molin et al. 2024; Stein et al. 2024). This widespread adoption reflects broader policy efforts, such as the EU's Farm to Fork Strategy, which aims for 25 % of agricultural land to be organic by 2030 (European Commission 2020), and the EU's emphasis on GPP criteria (GPP categorizes organic foods as environmental criteria). The relative ease of verifying organic certification likely contributes to this uptake at the implementation stage.

However, we observed a significant implementation gap characterized by non-ambitious targets. This gap may stem from three factors across different policy cycle stages. First, non-mandatory or unambitious policies in Spain, with only the Comunidad Valenciana region mandating organic public food procurement at a modest 3 %, despite ample supply (Gaitán-Cremaschi & Córdoba 2024). Second, market constraints, including a limited organic supply in certain regions, high costs, and logistical challenges for local producers to meet institutional food demands. Third, knowledge deficits among procurement officers, who often lack training in sustainable procurement practices and understanding of organic supply chains. In Spain, for example, school procurement officers typically specialize in education, making it difficult for them to effectively integrate organic foods and design sustainable menus (Gaitán-Cremaschi & Córdoba 2024).

While including organic criteria in tenders is important, it may not be sufficient to drive meaningful change. Effective implementation likely requires a broader strategy involving policy reform, market development, and capacity building. This could include more ambitious national and regional strategies, greater investment in organic farming and infrastructure, targeted training programs for procurement officers, and stronger collaboration between procurement officers and organic suppliers (Gaitán-Cremaschi & Córdoba 2024; Stein et al. 2024). These actions are equally applicable to other product quality and proximity criteria, such as seasonal and fresh produce, and local sourcing.

5.1.2. Nutritional & health criteria show policy support but lack mandatory status and alignment with sustainable diets. Environmental criteria require enforcement and monitoring

Our findings revealed strong use of nutritional & health criteria, followed by environmental considerations,[1] though both less frequent than product quality. This indicates broad policy support (e.g., GPP criteria, health-sensitive nutritional and procurement guidelines, Spain's NAOS Strategy, and waste management and circular economy laws). However, gaps in policy formulation and implementation remain.

Despite appearing mandatory, nutritional & health criteria showed significant variability in food consumption targets and restrictions. For instance, limits on fried foods (N6) ranged from complete prohibition to three servings per week. This inconsistency may stem from the voluntary nature of current nutritional policies, where recommendations often replace mandatory targets. This has led to implementation disparities across Spain (González et al. 2021; Trescastro-López 2021), mirroring challenges observed in other European countries (Caldeira et al. 2017; Picken et al. 2021). Standardized, mandatory minimum health standards are needed, with flexibility for regional dietary preferences.

Our analysis also revealed a disconnect between nutritional & health goals and environmental sustainability. There was insufficient emphasis on increasing legume (N3) and fish consumption (N4) while reducing red meat intake (N5), which aligns with Bechthold et al. (2018) on limited environmental focus in EU nutritional guidelines. Addressing this requires integrated policies that align health and sustainability goals while tackling barriers like cultural meat preferences and misconceptions about plant-based diets (Graça et al. 2019; Carvalho et al. 2022; Gaitán-Cremaschi & Córdoba 2024; Schleicher & Töller 2024).

Our findings on environmental criteria revealed a nuanced challenge. Although the EU's GPP guidelines are well-developed (Stoffel et al. 2019), redundancy with existing regulations may be problematic. Mandated environmental criteria should not be reiterated as MR in tenders to avoid administrative burden, such as in the case of waste management in the initiatives we reviewed. Instead, emphasis should shift to enforcement and monitoring, areas needing improvement, especially in Spain (Gaitán-Cremaschi & Córdoba 2024). For unregulated environmental criteria, inclusion in tenders remains appropriate.

5.1.3. Proximity and social criteria saw limited adoption due to weak or restrictive policies, yet creative procurement opportunities persist

Our findings revealed limited use and actionability of proximity and social criteria. The use of proximity criteria was consistently low, mainly as AC, reflecting similar trends seen across Spain (Pernas García & Lazo 2024). This highlights the challenges posed by EU principles of non-discrimination and single market rules, which prevent preferential treatment of local suppliers and create legal uncertainties (Pernas García & Lazo 2024). These issues are actively debated in sustainable procurement forums like the EU Food Policy Coalition (2021). Furthermore, the absence of clear legal definitions for proximity or local products in Spain further complicates their implementation in public procurement.

Our analysis identified a notable lack in the integration of social criteria, particularly those pertaining to catering staff well-being and education (S3, S4, S5, and S7). Unlike environmental and product quality criteria, social criteria have received comparatively less EU guidance during policy formulation, thereby complicating their operationalization (Stoffel et al. 2019). This challenge is further compounded by difficulties in monitoring and evaluation due to the absence of clear, quantifiable metrics for social factors. This stands in contrast to well-established methodologies available for environmental and quality criteria (Smith et al. 2016), often resulting in subjective value judgments, as observed across various initiatives. Addressing this requires instruments guiding procurement entities in implementing social aspects. Additionally, sector-specific guidelines should integrate social aspects throughout the procurement process, from planning to evaluation (Parsons & Hawkes 2018), like those in GPP.

Despite these challenges, which mirror barriers highlighted in the SPFP literature, our research uncovered instances of "creative procurement" (Morgan & Sonnino 2013). For example, certain initiatives have integrated proximity criteria by leveraging environmental factors (e.g., climate legislation) to bypass EU procurement constraints. Similar efforts have been observed in other European countries, like Italy, where

[1] The literature also highlights the widespread use of environmental criteria such as organic and seasonal foods, and sustainable fishing products. However, this study categorizes these criteria as product quality criteria.

regional identity helped overcome non-discrimination rules (Kraljevic & Zanasi 2023). These pioneering efforts may influence future EU regulations, as seen when municipal environmental initiatives previously contributed to the inclusion of non-price and sustainability in current procurement directives (Stoffel et al. 2019).

5.2. Purchasing strategies and food system transformations through SPFP

This study showed diverse purchasing strategies varying in comprehensiveness, local suitability, and potential actionability in achieving SPFP goals, leading to three main policy insights.

Firstly, the diversity of strategies highlights that there is no one-size-fits-all solution in SPFP, demonstrating both the flexibility, allowing for local adaptation and the challenge of maintaining policy coherence across regions. Comprehensive approaches such as "integrated" and "high partially integrated" align with systemic food procurement practices, impacting the entire food chain from production to consumption (Van Berkum et al. 2018). These strategies aim to simultaneously address environmental, social, nutritional, & health objectives. In contrast, the "specialized" strategy prioritizes local organic food sourcing, focusing on supporting the territorialisation of food systems, as observed in other European contexts (Hasquenoph 2024). The "moderate partially integrated" strategy raises questions about its tailoring to specific contexts and goals, potentially signifying a transitional phase towards more integrated SPFP practices (Smith et al. 2016) or indicating challenges in effectively prioritizing goals.

Secondly, our analysis emphasizes the critical need to evaluate these strategies' potential for driving meaningful food system transformation. Many initiatives neglected social and proximity criteria, which are essential for relocalizing food systems and driving systemic change beyond simply prioritizing organic food production (Tregear et al. 2022). This oversight is particularly concerning, as organic production alone does not always equate to sustainability (Tscharntke et al. 2021). However, the addition of proximity criteria requires careful consideration to avoid the 'local trap', the assumption that local is inherently more sustainable or socially just (Sonnino 2010; Stein & Santini 2022; Molin et al. 2024). Balancing these factors is crucial for developing truly transformative SPFP strategies.

Thirdly, our findings highlight the importance of recognizing and managing synergies and trade-offs within SPFP criteria (Morley 2021; Tregear et al. 2022). A key synergy, identified both in literature (Roque et al. 2022) and this study, is the integration of organic and local food sourcing. This combination yields multiple benefits, including support for sustainable practices, reduced emissions, and enhanced nutritional quality. However, trade-offs emerge, such as budget constraints associated with higher-quality foods, potentially limiting the variety or volume of procured food. To address these challenges, strategic solutions have been developed, including targeted organic food selection, seasonal menu planning, and cost-saving measures like promoting plant-based options (Filippini et al. 2018; Soldi 2018; Molin et al. 2021). By implementing these strategies, policymakers and procurement officers can identify effective starting points for SPFP implementation and design policy frameworks and operational guidelines that minimize trade-offs while maximizing synergies (Stoffel et al. 2019).

5.3. Limitations and further research

Our study presents several limitations that can guide further research in SPFP.

While the study assessed SPFP criteria integration, it did not evaluate how criteria, formulated as AC, are weighted during contract awards. This is critical, as price often outweighs sustainability in contract decisions (EPHA & HCWH Europe 2019; Pernas García & Lazo 2024). Further research is needed to understand how to better prioritize criteria while balancing price and quality considerations.

Even well-crafted purchasing strategies often lack effectiveness due to insufficient enforcement and monitoring, limiting their ability to meet sustainability and nutritional & health goals (Gaitán-Cremaschi & Córdoba 2024). Future research should focus on developing measurable metrics to assess the impact of purchasing strategies during and after contract execution.

Further research should also evaluate synergies and trade-offs among different SPFP criteria within varied purchasing strategies to optimize outcomes, as a one-size-fits-all approach may not work in all contexts.

Lastly, our study was based on 22 initiatives in Spain, which may not capture the full diversity of public food procurement practices. Future studies should examine a larger, more diverse sample across different regions and public food services (e.g., schools, hospitals, universities) and consider factors like contract scopes, organization size, and expenditures to provide a deeper understanding of SPFP implementation. Comparative studies across European countries could further enhance understanding on the factors influencing SPFP success or challenges.

6. Concluding remarks

This study contributes significantly to SPFP by providing a comprehensive analysis of its local implementation, highlighting key challenges, opportunities, and policy gaps in formulation, execution and monitoring.

First, our findings indicate a strong utilization of product quality criteria, particularly organic foods, which is supported by broad policy initiatives and a perceived ease of implementation among procurement officers. However, barriers such as limited policy ambition, market constraints—like the restricted availability of organic products in certain regions, high costs, and underdeveloped supply chains—and knowledge deficits among procurement officers regarding sustainable sourcing practices and agricultural-related issues may impede the attainment of more ambitious procurement targets. This suggests the need for stronger policies alongside capacity-building initiatives for procurement officers, as well as strategies to enhance organic food production and improve supply chains.

Furthermore, we observed a widespread integration of nutritional & health criteria. Yet, the non-mandatory status of these criteria and the variability of regional targets presented challenges to consistent implementation. Additionally, we identified a gap in policy formulation that fails to adequately link nutritional & health goals with environmental sustainability objectives. This highlights the need for integrated policies that effectively promote both healthy eating habits and sustainable dietary practices.

While environmental criteria are less emphasized compared to product quality and nutritional & health criteria, their inclusion reflects the EU's strong commitment to environmental sustainability, as seen in the established EU GPP and the Farm to Fork strategy. Additionally, our findings revealed the underutilization of proximity and social criteria in procurement practices, with proximity constrained by EU procurement principles and social criteria receiving insufficient integration guidance and challenges in monitoring due to the lack of standardized evaluation metrics. Despite these challenges, our study showcased instances of innovative "creative procurement" strategies implemented by committed local governments that effectively overcome regulatory constraints, which could inform future agenda setting and procurement regulations.

At the strategy level, our analysis revealed diverse SPFP purchasing strategies. This diversity underscores the adaptability of SPFP, while underscoring the need for flexible frameworks that can accommodate local variations yet remain aligned with broader regional, national, and EU objectives. Lastly, we stress the importance of evaluating these strategies for their potential to drive meaningful transformation within food systems, acknowledging the synergies and trade-offs that arise across various goals.

A key contribution of this study is the recognition that barriers faced during the implementation stage, particularly in selecting and

integrating criteria into tender documents and designing purchasing strategies, originate from challenges throughout the entire policy cycle. These findings highlight the importance of a holistic approach that addresses both the practical difficulties of implementation and the broader issues in earlier stages of policy development.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work Daniel Gaitán-Cremaschi used ChatGtp-3.5 to enhance editing, readability, and language quality. After using this tool, the author reviewed and edited the content as needed and take full responsibility for the content of the publication.

CRediT authorship contribution statement

Daniel Gaitán-Cremaschi: Writing – review & editing, Writing – original draft, Methodology, Funding acquisition, Formal analysis, Conceptualization. **Diego Valbuena:** Writing – review & editing, Writing – original draft, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.foodpol.2024.102742.

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