

Fostering healthy and sustainable nursery school food systems: the case study of Madrid City

Irene Vidal, Marta Fajó-Pascual, Sara Gutiérrez, Esther López, Bárbara Vázquez, Silvia García, Abel Esteban, Paola Hernández, Julia Diez & Manuel Franco

To cite this article: Irene Vidal, Marta Fajó-Pascual, Sara Gutiérrez, Esther López, Bárbara Vázquez, Silvia García, Abel Esteban, Paola Hernández, Julia Diez & Manuel Franco (19 Sep 2023): Fostering healthy and sustainable nursery school food systems: the case study of Madrid City, *Cities & Health*, DOI: [10.1080/23748834.2023.2244680](https://doi.org/10.1080/23748834.2023.2244680)

To link to this article: <https://doi.org/10.1080/23748834.2023.2244680>



© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 19 Sep 2023.



[Submit your article to this journal](#)



[View related articles](#)



[View Crossmark data](#)

Fostering healthy and sustainable nursery school food systems: the case study of Madrid City

Irene Vidal^a, Marta Fajó-Pascual^b, Sara Gutiérrez^c, Esther López^d, Bárbara Vázquez^d, Silvia García^d, Abel Esteban^e, Paola Hernández^f, Julia Diez^g and Manuel Franco^{a,g}

^aPublic Health and Epidemiology Research Group, School of Medicine and Health Sciences, Universidad de Alcalá, Madrid, Spain; ^bFaculty of Health and Sports Sciences/Aragón Agri-Food Institute-IA2, University of Zaragoza, Huesca, Spain; ^cGeneral Sub-Directorate for International Action, Networks and International Organizations, Madrid City Hall, Madrid, Spain; ^dDepartment of Childhood Education and Other Programs, Madrid City Hall, Madrid, Spain; ^eGARUA, Non-Profit Cooperative, Madrid, Spain; ^fMensa Cívica, Non-Profit Association, Zaragoza, Spain; ^gDepartment of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA

ABSTRACT

City-based initiatives to improve eating habits are being developed. Although there is sufficient evidence of their potential impact, the largest gap lies in the translation of this knowledge into urban food policies and interventions. In this article, we describe the experience of the city of Madrid city healthy and sustainable nursery school food systems. Madrid, the third largest European city, is characterized by large social inequalities. Childhood overweight and obesity affect over 40% of children, with those from low socioeconomic status showing a higher prevalence. In Madrid, the 'Healthy and Sustainable Food Strategies' include collaborations between city officials, NGOs, food producers, and academics. We highlight two important achievements within nursery schools (72 centers covering 8,500 children aged 0-3 years) fostering healthier and more sustainable food systems. First, the development and implementation of health and environmental standards in public food procurement practices. Second, the establishment of collaborative Food Steering Groups between the Madrid Council childhood education department and civil society. Madrid's experience might be of interest to other cities.

ARTICLE HISTORY

Received 15 May 2023
Accepted 1 August 2023

KEYWORDS

Childhood obesity; food systems; school canteens; food policy; healthy diets; health inequalities

Introduction

Eating habits during childhood are key to achieve an adequate health status in adulthood. According to the latest World Obesity Federation report, childhood overweight and obesity rates in Europe are predicted to rise in the coming years to 21% of boys and 14% of girls (*World Obesity Federation, World Obesity Atlas 2023*). At the same time, the social gradient of inadequate childhood nutrition characterises our current populations (*World Obesity Federation, World Obesity Atlas 2023*).

Malnutrition, in the forms of overweight and obesity, disproportionately occurs among vulnerable communities within our countries and cities as for example Madrid (Díaz Olalla *et al.* 2015). An important driver of malnutrition is household food insecurity. The latter is defined as a lack of access to the kinds and amounts of food necessary for each member of a household to lead an active and a healthy lifestyle (Moragues-Faus and Magaña-González 2022). Far from ending, household food insecurity continues increasing in many countries, including Spain, where the situation worsened during the COVID-19 pandemic (Moragues-Faus and Magaña-González 2022). As such, school food systems

play a key role in mitigating the impact of household food insecurity among children and adolescents.

Another relevant concept to understand nutrition in urban settings is the concept of food systems. Population nutrition improvements are currently approached within a food systems framework (HLPE 2017). As described in the FAO High-Level Panel of Experts report, 'a food system gathers all the elements (environment, people, inputs, processes, infrastructures, institutions...etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the output of these activities, including socio-economic and environmental outcomes'. Our current food systems not only influence dietary patterns and the related nutritional and health outcomes but also contribute to the challenge of our planet's sustainability by contributing to greenhouse gas emissions, biodiversity loss and food waste, among other negative effects (Oostindjer *et al.* 2017).

Urban food systems for children and adolescents

A food system reorientation with a child-centered approach is therefore essential to offer and achieve healthy, affordable, and appealing diets (Hawkes

et al. 2020). As children spend many hours per day and years in their educational setting, these have been identified as salient places to improve children's nutrition. Schools are nowadays the only opportunity for many children worldwide to get at least one daily healthy meal (Aguayo and Morris 2020).

The Raza's food systems for children and adolescents' conceptual framework considers external (e.g. school canteens) and personal (e.g. households) food environments as key determinants to improve dietary behaviours (Raza *et al.* 2020). It describes the dynamic and complex linkages between the elements of the food system, highlighting the importance of continuously shaping food systems to deliver nutritious, affordable, and sustainable diets to children. Based on this framework, school canteens have been pointed out as a key entry point for food system transformation. Indeed, they have been proposed as a strategic driving force for improving dietary behaviours and nutritional outcomes in a sustainable way (Oostindjer *et al.* 2017, Hawkes *et al.* 2020, Franco and Fajó-Pascual 2023). Some large European cities, such as Madrid, where childhood obesity prevalence rates are very high (ranging from 33% to 47%) have focused on the school food environment and particularly on school canteens as a prominent setting to prevent and control childhood obesity.

School feeding programs are described as an essential tool for preventing malnutrition, especially in vulnerable communities disproportionately affected by childhood obesity. Several studies have shown that providing at least one full, healthy school meal each school day improves not only health outcomes in children but also reduces food insecurity in families (Guio 2023). School food system interventions contribute to creating a food-related learning environment to tackle current challenges in health and sustainability, by engaging families, educators, and canteen staff (Oostindjer *et al.* 2017).

Under the Milan Urban Food Policy Pact framework, Madrid has designed and implemented different strategies targeting school canteens. The city of Madrid, in collaboration with different NGOs and local researchers, decided to start focusing on nursery schools (NS) canteens since they are the only schools under direct supervision of the city. Children aged 0-3 years are a population group where education is not compulsory. Yet, this is a key population group, as dietary habits are developed early in life potentially tracking into childhood (Luque *et al.* 2021). Very importantly, nursery schools offer an educational environment where parents are normally eager to be involved and the development of nutrition and food-related information sessions or workshops are welcome.

As such, city-based initiatives to improve eating habits have a large potential to improve health and sustainability for millions of urban residents. Currently, there is sufficient evidence in the fields of nutrition epidemiology and food related environmental impact. The largest gap lies on the translation of this knowledge into urban food decisions.

Objective

In this article, we described the case study of Madrid for the transition towards healthy and sustainable nursery school food systems with its milestones and two main achievements: the improvement of food procurement criteria and the establishment of school food steering groups.

Madrid city and its food context

The city of Madrid, Spain's capital, had around 3.300.000 inhabitants in 2022, where 14% are less than 16 years of age and around 100.000, are 0-3 years old. According to a previous study, the prevalence of overweight and obesity among children (aged 3-12) was 41% in 2017. Furthermore, authors observed a wide social gradient, with children from low socioeconomic status showing 5 times higher prevalence rates (Díaz Olalla *et al.* 2015). Moreover, the prevalence of household food insecurity was 18%, which was also associated with presenting overweight or obesity (Díaz Olalla *et al.* 2015).

Enhancing food systems resilience in large and metropolitan cities like Madrid is essential to guarantee accessible, healthy, and sustainable food for all children, especially those who live in low-income neighbourhoods. This, in turn, would help preventing and controlling overweight and obesity among the youngest.

The first significant advancement towards a more resilient and healthy food system occurred with the signature of the Milan Urban Food Policy Pact in 2015. This voluntary agreement commits cities to collaboratively develop sustainable, inclusive, resilient, safe, and diversified food systems to ensure healthy and accessible food for all. In Madrid, at the municipal level, four Government Areas and an autonomous organization (Madrid Salud) currently participate in the Milan Urban Food Policy Pact Follow-up Committee, coordinated by the Government Area of Territorial Coordination and Public-Social Cooperation. This committee aims to review and coordinate municipal policies involving all stakeholders (e.g. NGOs, research groups) within the food system by creating governance spaces (e.g. Milan Pact Follow-up Committee).

In parallel, the city of Madrid developed the Healthy and Sustainable Food Strategy 18-20 (HSFS

18–20), emphasizing the need for a holistic approach to promote a healthy, sustainable, and affordable food system (Ayuntamiento de Madrid 2019). In March 2021, the review process of HSFS 18–20 began. Over the course of one year, a consultation and participation process were carried out. The main objective was to establish a shared vision of the city's food system and propose actions to be implemented over the next four years. Throughout this period, there were various spaces for consultation and discussion involving social, economic, professional, and municipal stakeholders and the general public. As a result, the HSFS 22–25 (Ayuntamiento de Madrid 2022) included several intervention areas that particularly affect the food environment in nursery schools: 1) Regulation and Public Food Procurement, 2) Food Culture, and 3) Right to Food.

The municipal network of nursery schools

In 2016, Madrid City created the municipal network of nursery schools which currently comprises 72 centres, where 8,507 children (roughly 8% of children aged 0–3 years) are enrolled. Nursery schools are spread all over the city. Socioeconomic profile of the families responds to the socioeconomic profile of the neighbourhoods where they are located as children acceptance is based on household income but also on residential closeness to the nursery schools. School lunch is offered as a mandatory rule to all children in nursery schools. The fee that families must pay monthly corresponds to the price of the school lunch, currently 96 euros (they do not pay enrolment fees). There is a policy of scholarships for vulnerable children, based on household income. Out of the 72 nursery schools that are enrolled in the Network, two are directly managed by the city council while the other 70 are indirectly managed by a private entity, one-third of them being social economy entities

(Esteban *et al.* 2020). All except three have their own onsite kitchen, where meals are prepared and served to the children. In those, three without onsite kitchen, food is served by a catering company, which is responsible for preparing the meals off-site and keeping them over 65° C, delivering them to the nursery schools. All but 5 (i.e. 3 schools served by a catering company and 2 schools located in primary school's premises) are legally bound by the Madrid council food tender criteria.

As shown in Figure 1 (see below), since Madrid council nursery schools Network was established, moving towards a healthy and sustainable school food system has been a priority.

Having reviewed both the context of Madrid and municipal nursery schools, we will describe the further development of the last Madrid Food Strategy 22–25 zooming in municipal nursery schools.

Current Madrid city healthy and sustainable food strategy

According to the action plan within the HSFS 22–25, the Network should accomplish:

- (1) As part of the Food Culture action plan, the Network will analyse and evaluate the Healthy and Sustainable School Meals Program in nursery schools, aimed at progressively incorporating organic and/or locally sourced food groups. The expected outcome is to increase the number of days in which legumes and fruits are included in the weekly menu. In addition, the Department of Childhood Education actively encourages, and aids, guidance, and resources related to healthy and sustainable food practices to the newly added nursery schools in the Network. The aim is to ensure that these schools also benefit from the

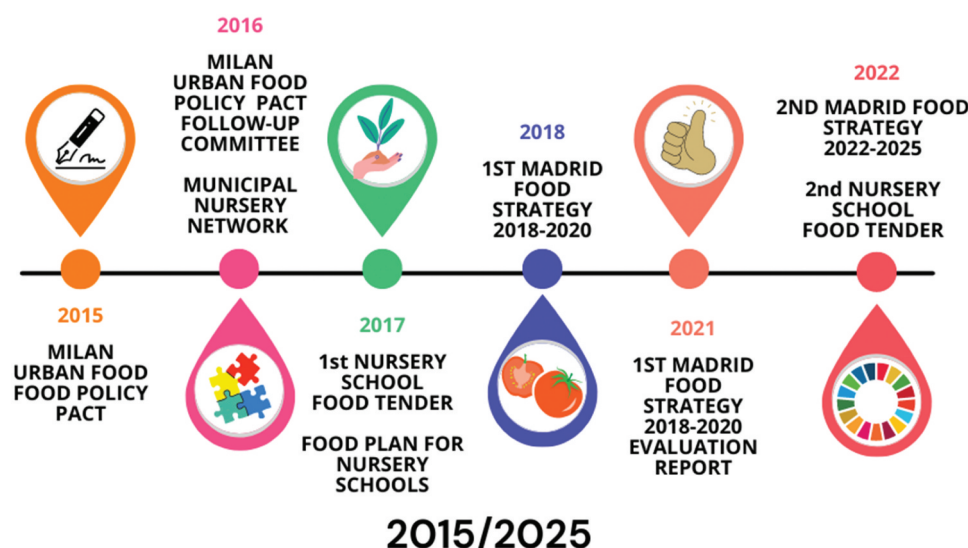


Figure 1. Milestones in the transition towards healthy and sustainable food system in madrid nursery schools.

knowledge and experience of the existing communities of learning and practice and contribute to the overall improvement of healthy and sustainable food practices in the entire network of nursery schools. The expected outcome is that at least five nursery schools will receive support every year.

- (2) As part of the Right to Food action plan within HSFS 22–25, coordinated by Directorate General of Social Services and Social Emergency, the city council of Madrid will guarantee free school meals to children in nursery schools as part of a program developed by the Community of Madrid in which school meals scholarships are given to both children attending nursery schools and those attending compulsory education. The expected outcome is to reach 18,000 girls and boys in the years 2022 and 2023, which will double the initial number of beneficiaries which was 9,000 in the year 2016.
- (3) As part of the Regulation and Public Procurement action plan described in HSFS 22–25 and coordinated by the Directorate General of Contracting and Services, sustainability criteria (e.g. incorporate more fresh and seasonal foods, fair trade, and organic products) and nutritional criteria will be included in the new food contracts for municipal nursery schools. In addition, municipal

responsible staff for food contracts will receive training sessions to communicate the importance and purpose of the incorporated changes.

Actions undertaken towards the improvement of food procurement criteria and the establishment of school food steering groups

Nursery schools have engaged in active collaboration with stakeholders from various sectors of the food system, such as NGOs, research institutions, the school community, school canteen staff, and public health services. Together, they have designed municipal policies and implemented actions with the common goal of building a resilient, healthier, and more sustainable food system for children (see Figure 2).

Next, we present the two main actions undertaken within the framework of the HSFS 22–25 strategy, resulting from the collaborative efforts between nursery schools and different stakeholders from the food system.

Healthy and sustainable food procurement criteria for nursery school menus

The first food strategy (HSFS 18–20) developed under the Milan Food Pact framework highlights the efforts made by school canteens in nursery schools towards the gradual integration of organic and locally sourced food items. The strategy promotes the use of short-

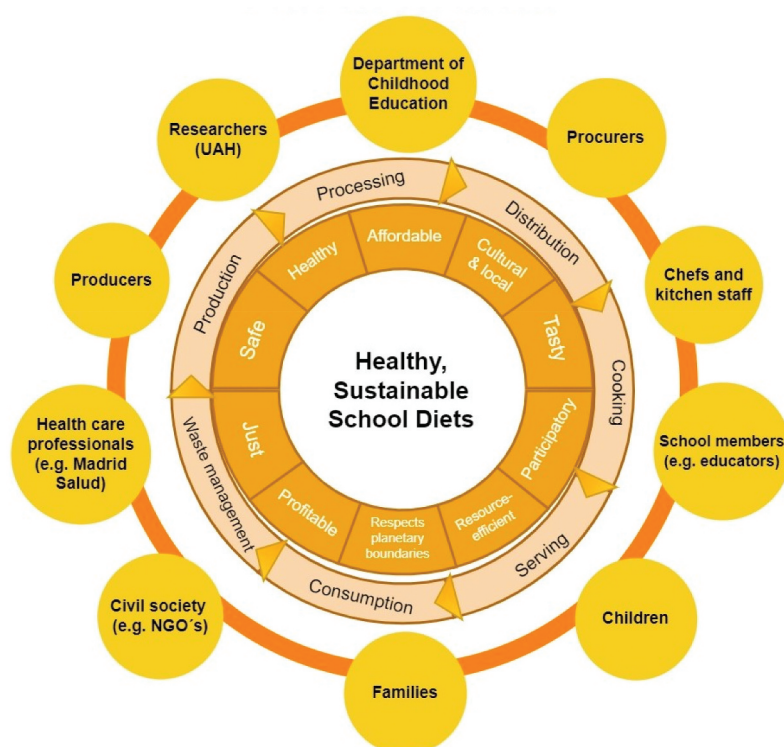


Figure 2. Food system of Madrid city nursery school's network. Adapted from the diagram of school food systems within the SchoolFood4Change project.

food supply chains, ensuring that foods have no more than two intermediaries between their production and consumption in the school canteen (Ayuntamiento de Madrid 2019).

In 2017, the Area of Equity, Social Rights, and Employment took significant steps by implementing innovative criteria in the initial food tendering specifications for indirectly managed schools within the Network, starting from the academic year 2017/18. These innovations included obligatory technical clauses as well as the gradual incorporation of certified organic food and locally sourced products as evaluation criteria. The food tender contracts have been fixed price and they have been awarded on a number of health and environmental quality criteria i.e. scoring higher as more and more extensively quality criteria were met. Starting from the school year 2023/2024, the management contracts for 68 indirectly managed municipal nursery schools will implement updated food procurement criteria as outlined in the Charter of Services for NS (Ayuntamiento de Madrid 2023). This initiative will build upon the progress made in achieving balanced menus by incorporating more organic and locally sourced foods. Moreover, the contracts will introduce significant enhancements, including the mandatory use of fresh and seasonal vegetables and a greater emphasis on consuming legumes, in alignment with the latest Madrid food strategy (HSFS 22–25).

Regarding school food procurement criteria changes, more seasonal, fresh, and plant-based source alternatives have been offered in daily nursery schools meals as well as healthier breakfast and snack options (Esteban *et al.* 2020). All nursery schools in the Network have improved their menus (with different levels of intensity) and are often, well accepted by children (Díaz Olalla *et al.* 2015). Some of the healthy and sustainability criteria for the 2022 food tender process are shown in Table 1 below:

Three additional food procurement criteria with no specific requirements needed:

- Tap water must be accessible to all children during the meals.
- Special food needs should be considered in children with food allergies or intolerances.
- In the menu preparation processes, priority will be given to cooking methods that are suitable based on seasonality, facilities, equipment, and utensils available at the school, as well as the characteristics of the foods themselves. The aim is to preserve the maximum number of potential nutrients by using healthier cooking techniques (e.g. marinating, sautéing, blanching, stir-frying, grilling, steaming, boiling in short cooking broth, baking, stewing, and a lesser extent, frying, and homemade bread)

As an evaluation of the effectiveness of food procurement changes, the University of Alcalá played a leading role as the research institution in the INHERIT project (García de Jalón *et al.* 2019). This project conducted a comprehensive cost-benefit evaluation of the Food Plan implementation during the school year 2018/2019, which involved 40 nursery schools in the Network. The evaluation assessed additional costs for locally sourced and seasonal ingredients for nursery schools menus, educational initiatives (e.g. Healthy and Sustainable Collective Catering training), and the potential benefits of dietary improvements, particularly health-related aspects. Broader socio-sanitary costs (e.g. healthcare, labour) associated with obesity were also considered, along with potential CO₂ emission reductions.

The economic evaluation results showed that the benefits outweighed the costs at a ratio of six to one, indicating long-term effectiveness. Benefits exceeded

Table 1. Madrid municipality food procurement criteria for nursery schools.

Criteria changes	Specific requirements
The percentage of fresh and seasonal fruits and vegetables used in the diet is above 80%*	Bananas must be Protected Designation Origin from Canarias .
The percentage of plant-based protein to animal-based protein in the diet is above 50% .	Legumes must be served as an alternative, at least, two times per week. Plant-based protein source alternative menus will be mandatory, at least, two times per month.
The percentage of organic foods incorporated into the diet is above 50% .	It is mandatory that in the preparation of breakfast, lunch, and snacks at the nursery schools, the total weight (volume in the case of oil and milk) of food groups (e.g. tubers, some vegetables like carrots, milk and yogurt, extra virgin olive oil and some legumes like lentils) needs to be from organic production and sourced locally (short-food supply chain)
It is not allowed to include certain types of fish, fast food or ready-to-eat products, sweetened desserts, and eggs from caged hens .	“Panga”, corresponding to the genus, <i>Pangasianodon hypophthalmus</i> , “Tilapia”, corresponding to the genus <i>Oreochromis</i> , “Nile Perch”, corresponding to the genus <i>Lates niloticus</i> , “Swordfish/Emperor fish” and “Bluefin Tuna”, corresponding to the genus <i>Thunnus thynnus</i> , “Shark” (dogfish, porbeagle, smooth-hound, lesser-spotted dogfish, and blue shark), “Pike”.

*An oriented seasonal calendar is proposed to help food procurers and kitchen purchasing and cooking seasonal vegetables and fruits.

costs from the fifth year onwards. The study concludes that integrating plant-based diets into families and schools can promote healthy eating habits, leading to various health benefits and reduced carbon footprints. To achieve this, shortening food supply chains to reduce transportation emissions is essential (García de Jalón *et al.* 2019).

School-based food steering groups

Beyond the clauses and criteria included in the mentioned specifications for food procurement in nursery schools, the Department of Early Childhood Education developed a Food Plan, which incorporates a set of additional criteria for healthy and sustainable eating, along with a methodological proposal (Esteban *et al.* 2020). Steering groups were created to adapt the Food Plan to the specific needs, characteristics, and starting point of each educational community. These steering groups were formed by representatives from different groups within the educational community (including educators, parent associations, and kitchen staff) with support from an external expert (e.g. NGOs, organic producers and distributors, paediatricians, nutritionists, among others). To facilitate the successful development of the program inter-school groups are established as stable coordination structures in the last Madrid food strategy (HSFS 22–25).

Training and awareness capacity-building actions of the school-based food steering groups

Since the school year 2016/2017, different non-governmental Spanish cooperatives and organizations (e.g. Garua and Cerai, Justicia Alimentaria, Germinando), research institutions (e.g. University of Alcalá), food cooperatives (e.g. La Garbancita Ecológica) and autonomous health organizations (e.g. Madrid Salud) have developed several awareness-



Figure 3. Visit to an organic farm for families of the nursery schools participating in the Garua cooperative and cerai NGO project “sustainable menus, healthy planet”. This farm regularly provides vegetables to several schools. Source: Garua and Cerai.



Figure 4. Seasonal fruits provided in a workshop on healthy breakfasts and snacks for families and children of one of Madrid city nursery schools. Source: “Sustainable Menus, Healthy Planet” project. Garua Cooperative and Cerai NGO.

raising actions for the entire school community as those included as part of the ‘Sustainable Menus, Healthy Planet’ project, led by Garua Cooperative in collaboration with Cerai NGO (Figures 3 and 4). The objectives are to strengthen food education in nursery schools, improve the food culture (health, environment, and society) both in the school and households and enhance the acceptance of the improvements from the Food Plan among educators and families.

As a crucial component of the kitchen staff training program, nursery schools’ cooks underwent comprehensive training in the preparation of healthy and sustainable meals (refer to Figure 5). The initiative involved targeted actions aimed at empowering nursery schools and kitchen staff with essential tools and resources. The latter were designed to enhance their capabilities in crafting nutritious and environmentally friendly menus. Additionally, the training sought to reinforce the pivotal role of cooks in facilitating a positive connection between the food provided and the well-being of the children they serve.



Figure 5. Training in seasonal plant-based protein recipes for the cooks of Madrid city nursery schools. “Sustainable Menus, Healthy Planet” project. Garua Cooperative and Cerai NGO.

A set of tools and resources has been developed as a result of the training and awareness-actions within the steering groups that serve a dual purpose: 1) an essential tool for designing and improving healthy and sustainable nursery schools' menus and 2) to enhance the information provided to school communities. Some examples are described below:

- **Catalogue of organic and local food suppliers in the city of Madrid**, which aims to facilitate schools achieving the commitment to organic and short-food supply chain consumption. This document consists of a list of producers from the Madrid bioregion, divided by food groups. It includes the contact information of the producers, giving priority to those located in the Community of Madrid in food groups with sufficient organic supply (Coop 2019).
- **Recipes and conclusions from activities on organic school canteens**. Along with the main conclusions of the work developed in the steering groups, this document contains several technical resources collectively created by the steering group participants, including recipe books (for healthy breakfasts, snacks, and vegetarian menus), a seasonal calendar, a table of recommended portion sizes for the 0-3 age group, and a basic menu structure that can serve as an example for the preparation of seasonal menu (for cold and warm seasons). The menu structure was validated by specialized nutritionists in children's nutrition, based on the national food and physical activity strategy (NAOS), as well as the national guidelines developed by the Spanish Nutrition Foundation (Ballesteros Arribas *et al.* 2007).
- **Nutritional guidelines** for 0-3-year-old children both for professionals (e.g. educators and kitchen staff) and for families. These guidelines include general knowledge information regarding healthy and sustainable diets for children from 0 to 3 years of age, as well as pedagogical guidelines to accompany mealtime moments and a set of activities and resources for the classroom. Its contents have been developed and agreed upon within a technical group (consisting of paediatricians from Madrid Salud, a nutritionist, an educational technician, and technicians from the Department of Early Childhood Education (Caballero de León 2021)).
- **Healthy and Sustainable Collective Catering Training** aimed at a group of 25 cooks from the Network. Combining theoretical and practical sessions, the training aimed to provide key insights to transition to a more healthy, sustainable, and fair collective catering service. Additionally, the training addressed the participants' need to connect with other cooks (as they

primarily work alongside educators in their schools). Among the outcomes of the training, the recognition of their demanding work and strong motivation stands out, which has led many of them to become leaders in the improvement processes within their schools.

Barriers and challenges establishing food procurement criteria and school food steering groups

- In the current context of increased school management costs (due to the rise in food costs in 2022 and improved salary conditions) it seems very difficult to achieve healthy and sustainable foods for nursery schools' menus. Within the project 'Healthy Menus, Sustainable Planet' framework, an economic feasibility study of the consumption of organic foods in municipal nursery schools in Madrid has been carried out. Some aspects like the official dietary guidelines for children developed by national and international health institutions (e.g. the Spanish Agency for Food Safety and Nutrition (AESAN), Harvard University's Healthy Eating Plate), the total amount of food consumed in a regular nursery school (measured in kg) or a survey of the cost of the most used foods in the menus (updated in September 2022) have been analysed. Surprisingly, even if 100% of foods included in nursery schools' menus were organic there is still room for the food service providers to fulfil their contractual commitments. However, this viability is subject to offering balanced menus (e.g. moderating the consumption of meat and fish) and to good management of purchases, storage, waste, and meal service (Esteban 2022).
- Regarding the steering groups, their efforts during the academic year 2016/17 were primarily centred on the 2 directly managed nursery schools. The main objective was to kickstart the municipal commitment to join the Milan Food Pact, while anticipating the new tender for the other schools within the Network. The support for these steering groups was facilitated by two non-governmental associations, Garúa Cooperative in partnership with the Ecocomedores Madrid Platform, with funding provided from municipal sources. However, it is important to note that in one of the schools, the completion of all planned activities faced challenges due to low motivation among certain staff members and difficulties in municipal personnel management (Esteban 2022).
- Observing the long-term health outcomes, resulting from changing the menu offerings in nursery schools to improve dietary habits, and

demonstrating that the benefits of a healthy and sustainable diet outweigh the costs will require a significant amount of time (Esteban *et al.* 2020).

Future plans in Madrid

As a next development plan within the current HSFS (22–25), healthy and sustainable food tender criteria will be incorporated into the municipal food procurement for another relevant population group, the elderly. Elderly day-care centres directly or indirectly managed by Madrid City Hall provide food for a large population who could benefit from these improvements. The health and sustainability specifications introduced in the food tender documents of nursery schools (e.g. more seasonal, local, and organic food, increased consumption of plant-based protein and reduction of processed foods) will be transferred to the food procurement contract of municipal elderly day-care centres that have on-site kitchens. All actors involved in elderly care will actively participate in the project (e.g. families, health care professionals, cooks, and caregivers . . .). Awareness-raising workshops about the benefits of healthy and sustainable eating, for day-care centre staff will be organized periodically (Ayuntamiento de Madrid 2022).

At a research and innovation European level, the city of Madrid is a replication city of the four-year EU funded project SchoolFood4Change (<https://schoolfood4change.eu/>) which aims to make school meals more enjoyable and healthier both for the children and the planet. One of the replication activities that the city will undertake during the school year 2024/2025 is ‘Canteen Day’. With the support of Mensa Cívica NGO (<https://www.mensacivica.com/>), national lead partner of the project, at least four events will be carried out in the framework of this event in various nursery schools of Madrid with the participation of the whole school community (e.g. educators, cooks, families, and children) and including a Madrid organic food producers open market. The objective will be to promote healthy, sustainable, and culturally adapted school menus with live demonstrations and sampling, to enhance the role of the kitchen staff as key agents for the menu transition, and to propose recipes that could be replicated at home as well as to facilitate the contact of nursery schools with local food producers (farm visits, school-farm twinning). Moreover, different activities for families, school staff, and children such as plant-based recipe acceptability evaluation by children and families will be conducted.

Lessons learned from Madrid

The authors we would like to emphasize three recommendations for the successful implementation of similar strategies in cities around the world. First, to

develop long-term healthy and sustainable urban food strategies (like the two that Madrid has already undergone) involving different city departments under a single cross-sectional theme (e.g. transforming the system to provide healthier and more sustainable food to children and the elderly). Establishing evaluation indicators remains an important challenge. Second, to foster capacity building of school and kitchen staff, in most cases made up of females, empowering them to act as key agents for the transition to healthy and sustainable school food systems. Skilled cooks can adapt menus to local culinary traditions at the same time as taking into consideration children’s preferences which is instrumental in minimizing food waste. Raising the professional profile of those who daily prepare school meals for children will expand the benefits of their work beyond the school (e.g. families, educators) (SchoolFood4Change 2023). Third, to secure one healthy free school meal per day as a fundamental child’s health equity strategy. As explained before, household food insecurity continues increasing in our unequal cities.

Conclusions

We highlighted two important achievements from Madrid’s experience fostering healthy and sustainable school food systems. First, the city has developed two urban policy acts to improve the public food procurement health and sustainability standards of nursery schools’ menus. Second, collaborative strategies between public administration and civil society developing School Food Steering Groups proved to be successful experiences. The jointly designed and executed Madrid strategy promoting healthy and sustainable school food systems might be of interest for other cities.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

EU Funded Project School Food 4 Change Horizon 2020 Grant agreement ID: 101036763, Marta Fajó-Pascual, the corresponding author, was granted a requalification scholarship funded by the Spanish Ministry of Universities and the European Union-NextGenerationEU

Notes on contributor

Irene Vidal, Marta Fajó-Pascual, Julia Diez, and Manuel Franco are members of the Public Health and Epidemiology Research Group at the School of Medicine and Health Sciences, Universidad de Alcalá, located in Madrid, Spain. Their research interests primarily focus on both urban health food systems and sustainable food systems.

Furthermore, they serve as associated partners in the European-funded project SchoolFood4Change. Sara Gutiérrez was the political leader for Madrid city council Healthy and Sustainable Food Strategy while Esther López, Bárbara Vázquez and Silvia García are Department of Childhood Education of Madrid city council officials supervising nursery schools. Abel Esteban is the Project Leader at Garúa Non-Profit Cooperative. He is responsible for the analysis of the public-social collaboration in the design and support of the nursery schools of Madrid city food plans outcomes and innovations. Paola Hernández is the Project Leader at Mensa Cívica Non-Profit Association. She is the National Coordinator Partner in the European Funded Project SchoolFood4Change. She is responsible for coordinating the replication activities in Madrid's nursery schools.

ORCID

Marta Fajó-Pascual  <http://orcid.org/0000-0001-6364-1188>

Julia Diez  <http://orcid.org/0000-0002-5586-1794>

Manuel Franco  <http://orcid.org/0000-0003-1366-9398>

References

- Aguayo, V.M. and Morris, S.S., 2020. Introduction: Food systems for children and adolescents. *Global food security*, 27, 100435. doi:10.1016/j.gfs.2020.100435
- Ayuntamiento de Madrid, 2019. Memoria de la Estrategia de Alimentación Saludable y Sostenible. Available from: <https://transparencia.madrid.es/portales/transparencia/es/Organizacion/Planes-y-memorias/Planes/Estrategia-de-Alimentacion-Saludable-y-Sostenible-del-Ayuntamiento-de-Madrid-para-el-periodo-2018-2020/?vgnnextoid=9a270d9894665610VgnVCM1000001d4a900aRCRD&vgnextchannel=d869508929a56510VgnVCM1000008a4a900aRCRD>.
- Ayuntamiento de Madrid, 2022. Estrategia de Alimentación Saludable y Sostenible 2022-2025. Available from: <https://transparencia.madrid.es/portales/transparencia/es/Organizacion/Planes-y-memorias/Planes/Estrategia-de-Alimentacion-Saludable-y-Sostenible-2022-2025/?vgnnextfmt=default&vgnnextoid=e988ffc3ef5f4810VgnVCM2000001f4a900aRCRD&vgnnextchannel=d869508929a56510VgnVCM1000008a4a900aRCRD>.
- Ayuntamiento de Madrid, 2023. Carta de Servicios de la Red Municipal de Escuelas Infantiles. Available from: <https://transparencia.madrid.es/portales/transparencia/es/Relacion-con-la-ciudadania/Evaluacion-y-sistemas-de-calidad/Cartas-de-Servicios-vigentes/Carta-de-Servicios-de-la-Red-Municipal-de-Escuelas-Infantiles/?vgnnextfmt=default&vgnnextoid=07bb74793f15d710VgnVCM1000001d4a900aRCRD&vgnnextchannel=5e7e92ed4c7eb510VgnVCM2000001f4a900aRCRD>.
- Ballesteros Arribas, J.M., et al., 2007. La estrategia para la nutrición, actividad física y prevención de la obesidad: Estrategia NAOs. *Revista Española de Salud Pública*, 81 (5). doi:10.1590/S1135-57272007000500002.
- Caballero de León, V., 2021. Guía para familias. Available from: <https://cerai.org/guia-para-familias-sobre-alimentacion-sostenible-y-saludable/>.
- Coop, G.S., 2019. Catálogo de proveedores ecológicos y de proximidad en Madrid. *Alimentar el cambio*. Available from: <https://alimentarelcambio.es/catalogo-de-proveedores-ecologicos-y-de-proximidad-en-madrid/>.
- Díaz Olalla, J.M., Junco Torres, I., and Rodríguez Pérez, M., 2015. Estudio de la situación nutricional de la población infantil en la ciudad de Madrid: Estado ponderal y su relación con la seguridad de acceso económico a los alimentos. Available from: https://www.observatoriodelainfancia.es/oia/esp/documentos_ficha.aspx?id=5502.
- Esteban, A., 2022. *Estudio de la viabilidad económica del consumo de alimentos ecológicos en las escuelas de la Red Municipal de Escuelas Infantiles de Madrid*. Cooperativa Garúa. Available from: <https://alimentarelcambio.es/son-viables-economicamente-los-menues-escolares-con-una-mayoria-de-alimentos-ecologicos/>.
- Esteban, A., et al. 2020. Alimentación saludable y sostenible en la Red Municipal de Escuelas Infantiles del Ayuntamiento de Madrid. Available from: <http://www.garuacoop.es/wp-content/uploads/2020/09/Alimentacion-Saludable-y-Sostenible-Red-Municipal-EEII-Madrid.pdf>.
- Franco, M. and Fajó-Pascual, M., 2023. School food systems. In: B. Caballero, ed. *Encyclopedia of Human Nutrition*. 4th ed. Academic Press, 341–349. doi:10.1016/B978-0-12-821848-8.00146-3.
- García de Jalón, S., et al., 2019. Cost-Benefit Analysis of Four INHERIT case studies. Available from: <https://inherit.eu/resources/reports>.
- Guio, A.-C., 2023. Free school meals for all poor children in Europe: An important and affordable target? *Children & society*. doi: 10.1111/chso.12700.
- Hawkes, C., et al., 2020. Child-centered food systems: Reorienting food systems towards healthy diets for children. *Global food security*, 27, 100414. doi:10.1016/j.gfs.2020.100414
- HLPE, 2017. *Nutrition and food systems. A report by the high-level panel of experts on food security and nutrition of the committee on world food security*. Rome. Available from: <https://agritrop.cirad.fr/604475/1/604475.pdf>.
- Luque, V., et al., 2021. Dietary patterns acquired in early life are associated with cardiometabolic markers at school age. *Clinical nutrition*, 40 (7), 4606–4614. doi:10.1016/j.clnu.2021.06.001.
- Moragues-Faus, A. and Magaña-González, C.R., 2022. Alimentando un futuro sostenible: Informe sobre la inseguridad alimentaria en hogares españoles antes y durante la COVID-19. *Universidad de Barcelona, Fundación Daniel y Nina Carasso*. https://www.ub.edu/alimentandounfuturosostenible/documents/informe-alimentacion_una-pag.pdf
- Oostindjer, M., et al., 2017. Are school meals a viable and sustainable tool to improve the healthiness and sustainability of children's diet and food consumption? A cross-national comparative perspective. *Critical reviews in food science and nutrition*, 57 (18), 3942–3958. doi:10.1080/10408398.2016.1197180.
- Raza, A., et al., 2020. Conceptual framework of food systems for children and adolescents. *Global food security*, 27, 100436. doi:10.1016/j.gfs.2020.100436
- SchoolFood4Change, 2023. *Policy-opportunity brief on school meals as a policy area with huge potential*. https://schoolfood4change.eu/wp-content/uploads/2023/06/Policy_Opportunity_Brief_SF4C.pdf
- World Obesity Federation, *World Obesity Atlas*, 2023. Available from: <https://data.worldobesity.org/publications/?cat=19>.