

## TRANSFORMING URBAN FOOD SYSTEMS THROUGH AGROECOLOGY – A REVIEW OF AGROECOLOGICAL PROJECTS IN MADRID IN TERMS OF THE MUFPP FRAMEWORK

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### ABSTRACT

The paper discusses an agroecological approach to an urban food system's transformation. A selection of representative initiatives and projects in Madrid were analysed. The goal of the paper is to review these projects and identify their potential in the context of transforming Madrid's food system into a sustainable one, according to the Milan Urban Food Policy Pact (MUFPP) framework. The following methods were used in the study: (i) desk research – a review of academic papers and press materials provided by the various entities working on the transformation of Madrid's food system; (ii) case studies – field visits, participatory observation, and interviews. Selected indicators from the MUFPP and City Region Food System (CRFS) frameworks were adopted in the study.

**Keywords:** food system, urban farming, agroecology, urban studies

### INTRODUCTION

The current data show that the main residential environment worldwide will be urban agglomerations in the near future. Inhabiting urban areas will rise up to 70% by the year 2050 (Pollalis, 2016). This fact will affect city dwellers, exposing them to negative factors such as low air quality, noise, stress, traffic congestion, inefficient urban infrastructure, anonymity, and social pathologies. Furthermore, currently, cities consume 75% of the world's primary energy capacity (United Nations Environment Programme [UNEP], 2016), emit up to 80% of global greenhouse gases, and are a source of 50% of the world's waste (Munaro, Tavares & Bragança, 2020; Dabaieh, Maguid, Abodeeb & El Mahdy, 2022). This energy consumption, greenhouse gas emissions and waste production will level up in case of

anticipated urban development. Another issue is feeding the urban population. Due to increasing urbanisation, global industrial agriculture, and also climate change – fertile soils and clean water resources are shrinking. Therefore, it is highly important to protect agricultural land in and around cities. The concept within which an attempt has been made to bring food needs together with the regeneration of the environment and the democratisation of food systems is agroecology. Agroecology encompasses various approaches to solving the real challenges of agricultural production. In agroecology, the focus is on production efficiency as well as environmental and social aspects. Moreover, these aspects are taken into account on a long-term basis. This means the selection of such agrarian practices that will positively affect the environment rather than destroy it, and the appropriate (co)management of agriculture that will be

socially inclusive rather than alienating (Simon-Rojo, 2019). The use of the term agroecology can be traced back to the 1930s, when it concerned itself mainly with crop production and conservation aspects. Currently, the term ‘agroecology’ denotes either a scientific discipline, an agricultural practice, or a political or social movement (Wezel et al., 2009; Fig. 1).

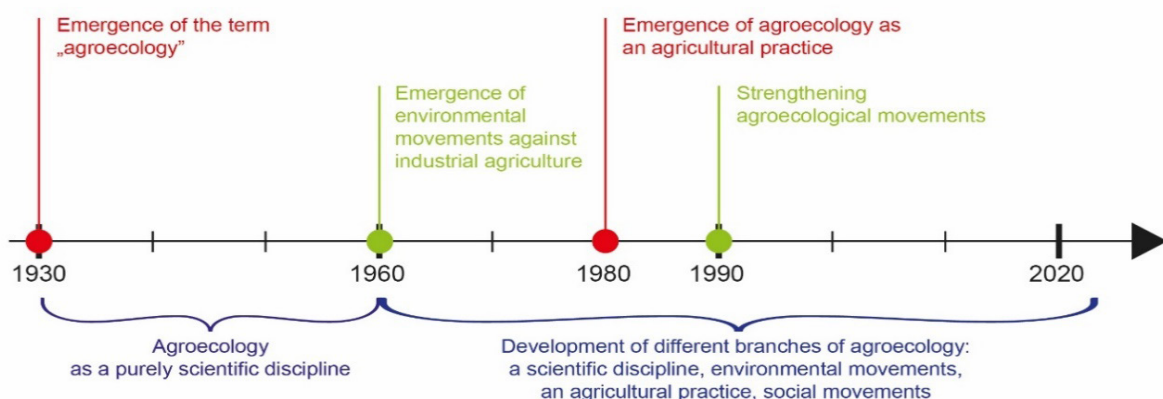
Agroecology is also a method for transforming food systems in a sustainable direction. It is in the agenda of the sustainable food system frameworks developed by FAO and RUAF (Food and Agriculture Organization of the United Nations [FAO], 2023) and then the Milan Urban Food Policy Pact (MUFPP, 2015). Both frameworks were developed as a tool for studying, assessing and redesigning urban (and peri-urban) food systems. The City Region Food System (CRFS) framework consists of 210 indicators – from production through to waste utilisation and food system policy and planning. The CRFS is organised around the following overarching objectives (FAO, 2023):

- Improve health and well-being and increase access to food and nutrition.
- Improve social conditions for workers.
- Build local food culture and heritage.
- Ensure acceptability of food provisions for all city residents.
- Increase local economic growth and generate a diversity of decent jobs and income.

- Strengthen the city region’s food production and supply system.
- Improve protection and management of ecosystems and environmental resources.
- Improve horizontal and vertical governance and planning.
- Reduce vulnerability and increase resilience.

The MUFPP indicator framework has been developed from the longer CRFS indicator framework. It is a product of the Milan Urban Food Policy Pact (MUFPP), whose main goal is “develop sustainable food systems that are inclusive, resilient, safe and diverse, that provide healthy and affordable food to all people in a human rights-based framework, that minimise waste and conserve biodiversity while adapting to and mitigating impacts of climate change” (MUFPP, 2015). The 44 indicators of MUFPP are focused on the city and the urban food system and are organised around the six Milan Pact action categories: Governance, Sustainable Diets and Nutrition, Social and Economic Equity, Food Production, Food Supply and Distribution and Food Waste (MUFPP framework, 2023).

When it comes to food systems assessment, scholars are pointing out the key question: What a factor represents (Spence & Rinaldi, 2014; Blay-Palmer, Conaré, Meter, Battista & Johnston, 2019). Picking out one particular perspective (and following a set of indicators) will promote certain aspects and overlooks



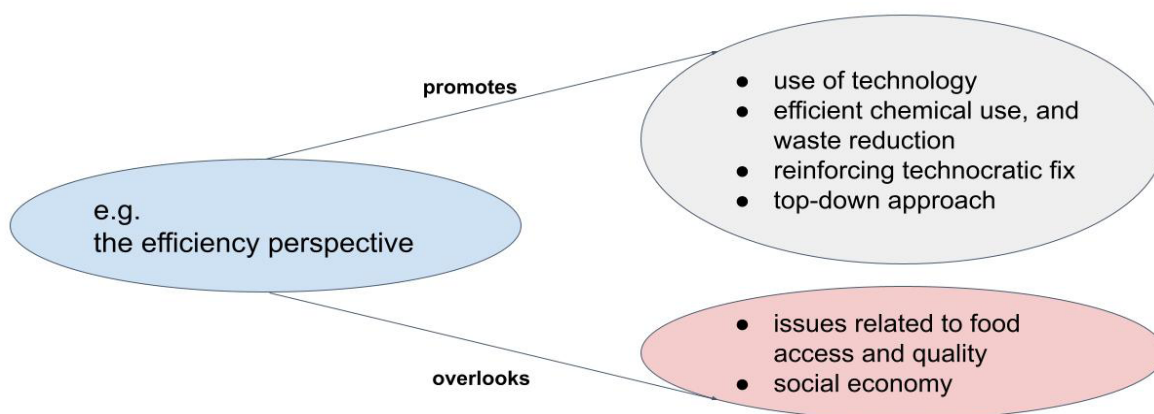
**Fig. 1.** Timeline presenting a development of agroecology

Source: own work based on Wezel et al. (2009).

others (Figs 2–3). Therefore, in both frameworks, sustainability was embedded in the decision-making tool. Moreover, when evaluating and designing, indicators that are the best levers for change at a particular time in a particular place should be selected (Blay-Palmer et al., 2019).

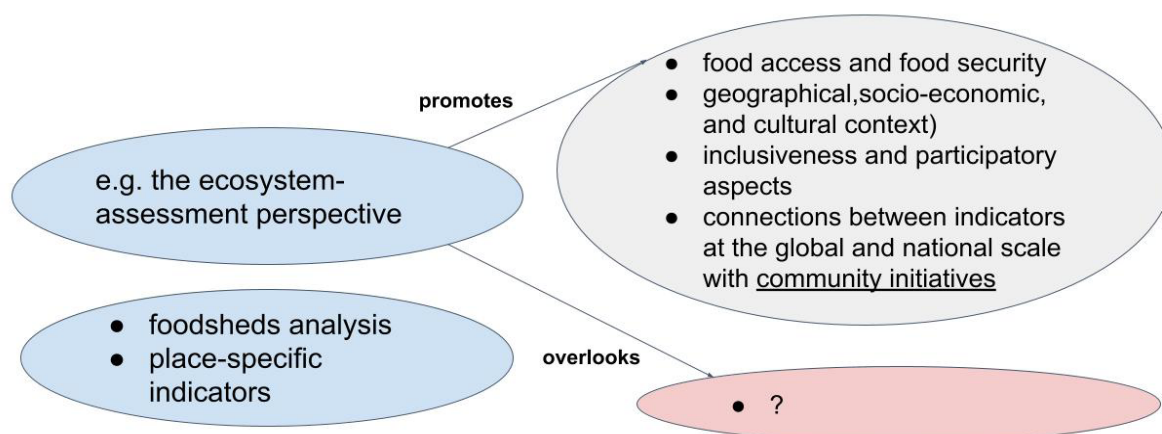
Both the MUFPP and CRFS indicator frameworks have adopted the ecosystem assessment perspective, which is more comprehensive and promotes place-specific indicators in terms of food justice, food security and food sovereignty. Therefore, in the paper herein,

specific elements of these frameworks are used to discuss selected initiatives and projects in Madrid – the city, that in 2015 joined the Milan Urban Food Policy Pact (MUFPP). The goal of the paper is to review these projects and identify their potential in the context of transforming Madrid’s food system into a sustainable one. The following methods were used in the study: (i) desk research – a review of academic papers and press materials provided by the various entities working on the transformation of Madrid’s food system; (ii) case studies – field visits (on urban farms and in



**Fig. 2.** The efficiency perspective on food system evaluation

Source: own work based on Blay-Palmer et al. (2019).



**Fig. 3.** The ecosystem-assessment perspective on food system evaluation

Source: own work based on Blay-Palmer et al. (2019).

community gardens, food hubs, food cooperatives as well as at farmers' markets), participatory observation (working on farms), interviews with people involved in particular food initiatives and projects in Madrid. Moreover, selected indicators from the MUFPP and CRFS frameworks were adopted in the study.

## AGROECOLOGICAL PROJECTS IN MADRID

In 2015, Madrid joined the MUFPP, which is an international agreement of city mayors on sustainable food policies. The pact was preceded by many years of bottom-up organising by the food movement, also linked to the Indignados Movement (named *Movimiento 15-M*). The MUFPP is a declaration as well as a tool for an urban food system shift. After joining this pact, Madrid City Council developed the new Healthy and Sustainable Food Strategy 2022–2025 (EASSM 22-25), which it announced on 28 July 2022. As recommended by the Milan Urban Food Policy, the new strategy aims to foster sustainable food systems that provide access to healthy food for the city population, while supporting local green economies and local production, protecting biodiversity and reducing food waste (Ayuntamiento de Madrid, 2023). There are currently a number of grassroots initiatives for agroecology in Madrid, and a municipality project that has been insisted upon by local activists, but which is also the aftermath of the signed pact and part of the EASSM 22-25, and is gradually being implemented. The selected projects are discussed hereinafter.

Madrid Agroecológico is an initiative that brings together many organisations and informal groups working locally for agroecology. The aim of the movement is to turn a local food system transformation into a sustainable one. Since 2015, a platform has been in place to share knowledge and jointly organise the agroecology movement and it links agroecological farmers, food cooperatives and activist groups (Madrid Agroecológico, 2023). Additionally, the Madrid Agroecológico is constantly mapping agroecological projects in the region with the support of local researchers (Madrid Agroecológico Map, 2023). The area of activity of this initiative is the region of Madrid – the city and nearby agricultural

land. One of their projects is *Labradas Colectivas*, which is a series of meetings between Madrid residents and local agroecological farmers on their farms (Fig. 4). The main goal is to help farmers – the meetings on farms were designed as a tool to carry out work which is time-consuming (especially if compared to industrial agriculture) and makes it difficult for farmers to “compete” with conventional production. During these several-hour weekend visits, city dwellers (consumers) have the opportunity to learn about agroecology, and talk and interact with farmers (producers). Integration and education take place while working together on a farm and having a meal together – a picnic after work. The work lasts about two hours and consists of simple farming activities, such as spreading natural manure. It is a barter – an exchange of agro-ecological education and rural recreation for labour: in two hours, a dozen people did a simple, but also time-consuming job that two farmers would have done for two days. A secondary goal of this project is to educate each other, as well as to create public awareness about food production. The Madrid Agroecológico initiative implements Actions 3, 7, 17–19, 25 and 33 of the MUFPP (Table 1).



**Fig. 4.** The *Labradas Colectivas* project run by the Madrid Agroecológico – a meeting between Madrid residents and local agroecological farmers on their farm called *Huerta Pepines* (near Madrid)

Source: photo by Aleksandra Nowysz, 2023.

**Table 1.** The list of MUFPP actions, which have been implemented by the initiatives discussed in the paper

No	MUFPP Category	MUFPP Action No	MUFPP Action	Initiative that implements the action
1	Governance	Action 1	Facilitate collaboration across city agencies and departments and seek alignment of policies and programmes that impact the food system across multiple sectors and administrative levels, adopting and mainstreaming a rights-based approach.	EASSM 22-25
2	Governance	Action 3	Identify, map and evaluate local initiatives and civil society food movements in order to transform best practices into relevant programmes and policies, with the support of local research or academic institutions.	Madrid Agroecologico
3	Governance	Action 4	Develop or revise urban food policies and plans and ensure allocation of appropriate resources within city administration regarding food-related policies and programmes; review, harmonise and strengthen municipal regulations; build up strategic capacities for a more sustainable, healthy and equitable food system balancing urban and rural interests.	EASSM 22-25 Barrios Productores
4	Sustainable Diets and Nutrition	Action 7	Promote sustainable diets (healthy, safe, culturally appropriate, environmentally friendly and rights-based) through relevant education, health promotion and communication programmes, with special attention to schools, care centres, markets and the media.	EASSM 22-25 Madrid Agroecologico La Osa
5	Social and economic Equity	Action 16	Promote decent employment for all, within the agricultural food sector, with the full inclusion of women.	CSA Vega De Jarama La Osa
6	Social and economic Equity	Action 17	Encourage and support social and solidarity economy activities, that support sustainable livelihoods in the food chain and facilitate access to safe and healthy foods.	Madrid Agroecologico CSA Vega De Jarama La Osa
7	Social and economic Equity	Action 18	Promote networks and support grassroots activities that create social inclusion and provide food to marginalised individuals.	Madrid Agroecologico
8	Social and economic Equity	Action 19	Promote participatory education, training and research in strengthening local food system action to increase social and economic equity, promote rights-based approaches, alleviate poverty and facilitate access to adequate and nutritious foods.	Madrid Agroecologico Barrios Productores
9	Food Production	Action 20	Promote and strengthen urban and peri-urban food production and processing based on sustainable approaches and integrate urban and peri-urban agriculture into city resilience plans.	EASSM 22-25 Barrios Productores
10	Food Production	Action 22	Apply an ecosystem approach to guide holistic and integrated land use planning and management in collaboration with both urban and rural authorities and other natural resource managers by combining landscape features, for example with risk-minimising strategies to enhance opportunities for agroecological production, conservation of biodiversity and farmland, climate change adaptation, tourism, leisure and other ecosystem services.	Barrios Productores

**Table 1** (cont.)

No	MUFPP Category	MUFPP Action No	MUFPP Action	Initiative that implements the action
11	Food Production	Action 23	Protect and enable secure access and tenure to land for sustainable food production in urban and peri-urban areas, including land for community gardeners and smallholder producers, for example through land banks or community land trusts; provide access to municipal land for local agricultural production and promote integration with land use and city development plans and programmes.	Barrios Productores
12	Food Production	Action 24	Help provide services to food producers in and around cities, including technical training and financial assistance (credit, technology, food safety, market access, etc.) to build a multi-generational and economically viable food system with inputs such as compost from food waste, grey water from post-consumer use, and energy from waste etc. while ensuring that these do not compete with human consumption.	Barrios Productores
13	Food Production	Action 25	Support short food chains, producer organisations, producer-to-consumer networks and platforms, and other market systems that integrate the social and economic infrastructure of the urban food system that links urban and rural areas. This could include civil society-led social and solidarity economy initiatives and alternative market systems.	Madrid Agroecologico CSA Vega De Jarama La Osa Barrios Productores
14	Food Waste	Action 33	Acknowledge the informal sector's contribution to urban food systems (in terms of food supply, job creation, promotion of local diets and environment management) and provide appropriate support and training in areas such as food safety, sustainable diets, waste prevention and management.	Madrid Agroecologico La Osa Barrios Productores

Source: own work based on MUFPP Indicator 1, MUFPP Indicator 3, MUFPP Indicator 4, MUFPP Indicator 8, MUFPP Indicator 21, MUFPP Indicator 24, MUFPP Indicator 25, MUFPP Indicator 27, MUFPP Indicator 30, MUFPP Indicator 31, MUFPP Indicator 40 (2023).

The main problem for agroecological farms is competing with large agribusiness, both in terms of selling their products and access to land. Therefore, raising public awareness of organic food production and the healthy diet associated with it is key, as this influences changes in eating habits and consumer decisions. People who are aware of the dangers of industrially produced food will be more likely to reach for locally and organically produced food. In addition to raising consumer awareness, it is important for producers to organise themselves and find alternative ways to promote and market their products. Agroecological farmers sell their products to restaurants and food cooperatives, or at farmermarkets in the city, as well as directly to consumers, such as in vegetable box schemes or the community-supported agriculture (CSA) model.

The CSA offers an alternative and unconventional exchange model that involves pre-paying for a “share” of produce, typically for a season or year, which usually takes the form of a weekly basket of vegetables (Schnell, 2013). Therefore, CSA members agree to a certain degree of unreliability and unpredictability, regarding both the quantity and quality of the food they receive. Such an arrangement reverses the conventional structure of market exchange – consumers and producers share the “risks and rewards” of food production (Watson, 2020). A situation in which consumer freedom has been replaced by a share of responsibility for the harvest may seem unattractive at first glance. However, in the long run, it is about insuring the farmer, who has the knowledge and resources to produce the food. In a circumstance where a com-



munity would lose a worker producing organic food for them (e.g., due to bankruptcy), they would also lose the products of their labour in future. Thus, the social security of the farmer is important for the entire community. Nowadays, only the farmer has relevant knowledge of food production, and in the CSA model, their knowledge, skills and work are valued. Members of the community also work a few hours a month on a farm, if possible, which is also an opportunity for them to gain knowledge and gardening skills. Such a model has been adopted in some agroecological farms near Madrid, including the CSA Vega De Jarama (Fig. 5). The farm covers an area of 3 ha, of which 1 ha is cultivated in a three-field system. Weekly 50 baskets of food are produced (about 10 kg of vegetables and fruits per basket in summer and about 3 kg in winter). Community members are also obliged to work 3–4 hours per month on the farm in the form of a Saturday duty. Nevertheless, this is also a time for spending time together and recreation. The CSA model also aims to break the alienation of work and build a community around such a fundamental thing as food. In addition, producers benefit from a guaranteed market for their products, and consumers can receive large quantities of products when the harvest is good (Watson, 2020). The CSA Vega De Jarama contribute to the implementation of the following MUFPP Actions: 16, 17 and 25 (Table 1).



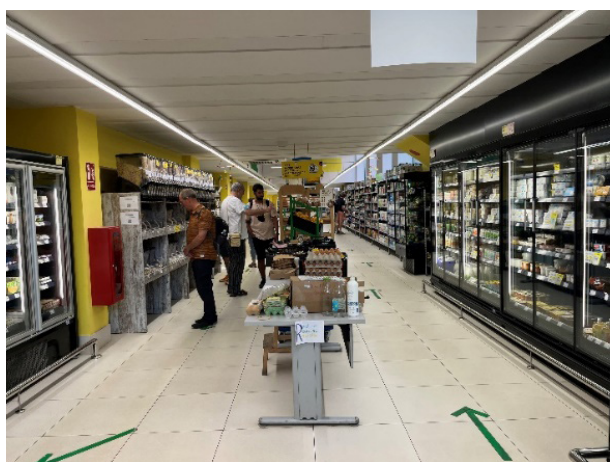
**Fig. 5.** The CSA Vega De Jarama near Madrid

Source: photo by Aleksandra Nowysz 2022.

Another way to shorten supply chains is to establish food cooperatives. The main reasons for forming cooperatives of consumers are relatively cheap access to ethically, ecologically produced food, community building, and practising alternative economics as a counter to neoliberal economic entities focused on expanding profit. In Madrid, for example, the La Osa food co-op is thriving in the Tetuan district. In 2020, the cooperative reached several hundred members. This success precedes 10 years of creating and operating different models of shared economy enterprise in a smaller founding core group. First, it managed Consumer Group and then a small vegetable store, 2decologico. Eventually, there were enough members to turn into a co-op model and open an 800 m<sup>2</sup> supermarket which operates now (Fig. 6).

Currently, the cooperative has more than 1,300 members. The supermarket opened in premises owned by the municipality, which is rented on preferential terms – for an entity working for the development of the local community. La Osa is a non-profit entity – connecting local producers with consumers and creating a community around the topic of food. The main goals of La Osa are defined in the jointly developed manifesto and these are: (1) to provide its members access to quality food at affordable prices; (2) to promote and support responsible consumption as well as to promote and secure food that provides well-being to people; (3) to revitalise a relatively deprived neighbourhood in the north of the city of Madrid socially and economically; (4) to promote and practice a participatory and cooperative management model; (5) to guarantee democratic decision-making and transparency in the exercise of its tasks; (6) to include all people in their wide diversity in their community and facilitate their accessibility; (7) to take care that local farmers and producers can live with dignity from their work; (8) to commit to non-profit commercial activity and guarantee that its profits are reinvested to improve the project; (9) to follow sustainability models and implements the necessary tools and resources to reduce the environmental impact of its activities; (10) to support the transition towards a fairer agri-food system and towards food sovereignty in its territory (La Osa Manifesto, 2023).

Only members of the cooperative can shop at the supermarket. To become a member, the following is required: (1) participating for 3 hours every 4 weeks in supermarket shifts; (2) a single contribution of €100 to the share capital; (3) a 3-month trial. All members can participate in the cooperative financing, governance and operation. Decisions about the management of the cooperative are collective and each cooperative member has one vote (La Osa, 2023). Currently, about half of the members are involved in the management of the cooperative, while the rest are mainly consumers and purchase food in the store. Two people are permanently employed in the cooperative to coordinate the project, and a hired accountant handles financial issues. In addition, a special software application has been launched to support the management process. La Osa also cooperates with other cooperatives, including an energy cooperative and bicycle deliverers. La Osa co-op implements Actions 7, 16, 17, 25 and 33 of the MUFPP (Table 1).



**Fig. 6.** The supermarket run by La Osa co-op in Madrid  
Source: photo by Aleksandra Nowysz 2022.

Agroecological projects are focused on social-ecological development, solidarity and sustainable economics. They have a real impact locally; however, being non-profit and aiming at systemic change, they face a number of difficulties in staying in business. Another association, Madrid Km 0, which was a logistics centre supporting more than 40 agroecolog-

ical projects in the Madrid region, recently collapsed. Madrid Km 0 was creating coherence between the city and nearby rural food production, processing and distribution, focusing on smallholder producers and family farmers.

These types of projects should be supported in various ways by a local government. The problem is that, as economic entities, they have to be treated on an equal footing with other companies that are mainly profit-oriented and have incomparably more capital and do not necessarily have a positive impact on a local economy when socio-ecological factors are taken into account. The question remains to what extent this competition is equal. Therefore, local governments should develop a number of projects and tools to support agroecological initiatives. In Madrid, following pressure from local activists, the Urban Development Government Area of the Madrid City Council recently launched a project called Barrios Productores, which seeks to promote a green economy and employment through urban agriculture in its neighbourhoods (Barrios Productores, 2023). The project is one of the EASSM 22-25 strategy measures mentioned before.

The goal of the Barrios Productores initiative is to reclaim vacant public urban land, of which there is relatively little in Madrid, and convert it into food production sites. It is an action aimed at using land with agricultural potential in the city. The project offers substantive and legislative support in the form of consultation and professional training, as well as a plot of land for a farm through a competition. In addition, the project aims to promote the development of agricultural activities in the city, as well as healthy diets among its residents. Currently, the project is conducting a vocational course on agroecological farming (Fig. 7). The course is held at the training farm “Huerto El Pozo”, and a dozen people of different ages, genders and professions are taking part. After completing the course, each participant can apply with their original projects to develop, in terms of agroecology, one of nine selected public plots assigned to host facilities or green areas, but which remain vacant. The projects have not been developed yet. These activities will contribute to the regeneration of neighbourhoods, transforming vacant or degraded spaces into multifunctional productive venues that make seasonal,



healthy, local food available to neighbours through urban agriculture (Barrios Productores, 2023).

The Barrios Productores initiative is a part of, among others (including Madrid Agroecológico), an active municipal interdepartmental government body for advisory and decision-making of food policies and programmes, which indicates the following MUFPP Actions: 4, 19, 20, 22–25 and 33 (Table 1).



**Fig. 7.** The Barrios Productores project – the vocational course on the training farm “Huerto El Pozo” in Madrid

Source: photo by Aleksandra Nowysz 2023.

The initiatives described belong to either the private sector (CSA Vega De Jarama, La Osa) or the public sector (EASSM 22-25, Barrios Productores), as well as the so-called third sector (Madrid Agroecológico), which in this case comes from the strong agroecology movement. The public sector has received a great deal of pressure from both grassroots activists in favour of agroecology, as well as top-down pressure in the form of the MUFPP pact. From the actions outlined in this pact, the key issue is cross-sectoral cooperation between different actors. Thus, the agroecology map that Madrid Agroecológico has already been creating for years could be successfully used by Madrid City Council in implementing the current strategy (EASSM 22-25) and when planning the next ones. Moreover, the course in the Barrios Productores project, would be worth expanding and combining with work on

agroecological farms already in operation, as is done at Labradas Colectivas meetings. The potential synergy of food cooperatives and farms in the CSA model also seems fruitful – such exchanges would bring urban consumers even closer to farmers.

Missing from this whole network of regional agroecology is the link that was the cooperative distribution centre – Madrid Km 0, which connected agroecological farmers with markets and organic food stores, but also with cooperatives and other less organised consumer groups. At the level of ideas, the link is the Madrid Agroecológico initiative, and at the level of policy, the EASSM 22-25 strategy. However, there is no institution, initiative or enterprise linking the various actors in the practical dimension.

## CONCLUSIONS

The agroecological initiatives discussed in the paper practice entrepreneurship and local development within the green economy, which should be supported by the Madrid City Council. The development of urban farms (the Barrios Productores project) as part of a green infrastructure will help reduce the city’s ecological footprint and mitigate the effects of climate change and the heat island effect, which is particularly an issue in Madrid. Supporting agro-ecological initiatives and urban agriculture is particularly important in the coming water and, consequently, food crisis, especially in Spain.

Agroecology is a comprehensive approach to food systems that takes into account both social needs and ecological constraints, as well as local context (place-specific indicators). Agroecological initiatives implement a range of actions of the MUFPP framework, which is the ecosystem-assessment perspective on food system evaluation and design. The ecosystem-assessment perspective is more useful than the efficiency perspective, which overlooks issues related to food access and quality and, likewise, the social economy.

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## Authors' contributions

Conceptualisation: A.N. and M.S.R.; methodology: A.N. and M.S.R.; validation: M.S.R.; formal analysis: A.N.; investigation: A.N.; resources: M.S.R.; data curation: A.N.; writing – original draft preparation: A.N.; writing – review and editing: M.S.R.; visualisation: A.N.; supervision: M.S.R.; project administration: A.N.; funding acquisition: A.N.

All authors have read and agreed to the published version of the manuscript.

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## **AGROEKOLOGICZNE PRZEKSZTAŁCANIE MIEJSKICH SYSTEMÓW ŻYWNOŚCIOWYCH – PRZEGLĄD MADRYCKICH PROJEKTÓW AGROEKOLOGICZNYCH POD KĄTEM ZAŁOŻEŃ MUFPP**

### **STRESZCZENIE**

W artykule omówiono podejście agroekologiczne w transformacji miejskiego systemu żywnościowego. Przedstawiono wybrane inicjatywy i projekty realizowane w Madrycie. Celem artykułu jest dokonanie przeglądu tych projektów i określenie ich potencjału w kontekście przekształcania madryckiego systemu żywnościowego w system zrównoważony zgodnie z założeniami Milan Urban Food Policy Pact (MUFPP). W opracowaniu zastosowano następujące metody: (a) przegląd prac naukowych oraz materiałów prasowych dostarczonych przez różne podmioty działające na rzecz transformacji madryckiego systemu żywnościowego; (b) studia przypadków – wizyty terenowe, obserwacja uczestnicząca i wywiady. W opracowaniu przyjęto wybrane elementy ewaluacji MUFPP i City Region Food System (CRFS).

**Słowa kluczowe:** system żywnościowy, rolnictwo miejskie, agroekologia, studia miejskie