

Research Article

Roadmaps to Foster Urban Food System Transitions: Multi-level Implementations in Nilüfer, Turkey

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Abstract

The ongoing crisis has shown that incumbent food system has been facing challenges. For a resilient and sustainable food system, transitions which shift towards sustainability, attention to public health and wellbeing as well as inclusiveness is compulsory. To overcome these challenges, driving a stepwise policy transformation, responsive and adaptive policy mixes and addressing citizens to drive sustainability are pivotal. This article represents two roadmaps which are designated for Nilüfer, Bursa. The roadmaps aim at including policy headlines/priorities as well as local needs and plural variations of collectivity to ensure a sustainable food system transition. The roadmaps are composed of two scalar levels one of which is macro-level; Nilüfer Food Policy Roadmap while the other is micro-level; Nilüfer Living Lab Roadmap.

Keywords: Urban Food System Transitions, Roadmaps for Food System Transitions, Technology Road Mapping (TRM), Urban Food Planning, Sustainable Urban Food System, Nilüfer

1. Introduction

The ongoing crisis has shown that the incumbent food system has been facing challenges such as climate change, ecological destruction, problems of nutrition and public health, biodiversity loss, soil degradation, hyper-urbanisation and de-ruralization recognised as

key components of resilient and sustainable development, food from nowhere, food safety, food security and food sovereignty, food waste and food poverty [11, 14]. These problems and challenges also contribute to lack of consumer trust for the food consumed and has caused civil society, local governments, and citizens to seek ways to achieve a more sustainable urban food system. For a resilient and sustainable food system, a food system transition which shift towards sustainability, increased attention to public health and wellbeing as well as inclusiveness is compulsory. The COVID-19 pandemic has also shed light on the ongoing crisis which has been triggered by human activities of which a noteworthy part is related to the agro-food system.

Although food and agriculture sector are mostly seen as a rural phenomenon, the demand for food and agricultural products are urban. Nowadays, 79% of all food produced is destined for consumption in cities and 90% of citizens in urban slums are food insecure [5]. Demand for food is expected to increase between 59 to 98 % by 2050 [6]. The global population is expected to grow to 10 billion by the year 2050. The expectations for population living in urban areas show an increase up to 60% by 2030 and 68% by 2050 [13]. In this respect, feeding the rapidly growing cities and their peri-urban interface in a sustainable manner is a key challenge and is dependent on the ability of our food systems to transform to a more resilient and adaptive mode. Rural linkages are also the key point that a city region approach to integrate urban, peri urban and rural with all processes of food production, processing, packaging, procurement, consumption, and waste are required. Many transnational organizations, supranational organizations and international organizations offer programmes to develop solutions for a more sustainable city-region food system.

To overcome these challenges, as recommended by European Council (EC) FOOD 2030 strategy and Farm to Fork Strategy, driving a stepwise policy for transformation, responsive and adaptive policy mixes and addressing citizens to drive sustainability are pivotal. This article represents a roadmap model which is designated for Nilüfer district of Bursa city in Turkey as a part of a H2020 project. The roadmaps aim at including recommended policy headlines by EC as well as including local needs, requirements, and plural variations of collectivity to ensure sustainable food system transitions. To do so, the roadmap is composed of two scalar level one of which is macro- level Nilüfer Food Policy Roadmap while the other is micro- level Nilüfer Living Lab Roadmap and are composed of five pillars which are governance, production, consumption, distribution, and waste. In this article, we present the process, strategy for a participatory design of the roadmaps as well as some participatory results from Nilüfer. Communicative methods are used during the roadmap formulation process and the final products, that is roadmaps, are developing ways for a multi-actor approach.

1.1. The Background: FUSILLI Project and Nilüfer's Agro- Food System Transitions

The roadmaps, in which we focus on in this article, are designed and prepared as a task in the scope of FUSILLI (Fostering Urban Food System Transformation through Innovative Living Labs) Project which is funded by European Council Horizon 2020 program.

FUSILLI puts together 12 European cities to address the challenges of the food system transformation. The main objective of the project is to empower cities to create innovation ecosystems that strengthen their capacities to develop and deploy integrated and holistic policies and actions. As an urban food planning project, FUSILLI intends to reach a transition towards healthy, sustainable, secure, inclusive, equitable and cost-efficient city region food systems, through urban food policies. The local specificities and strengthening urban-rural linkages in line with FOOD 2030 priorities, making use of urban living labs.

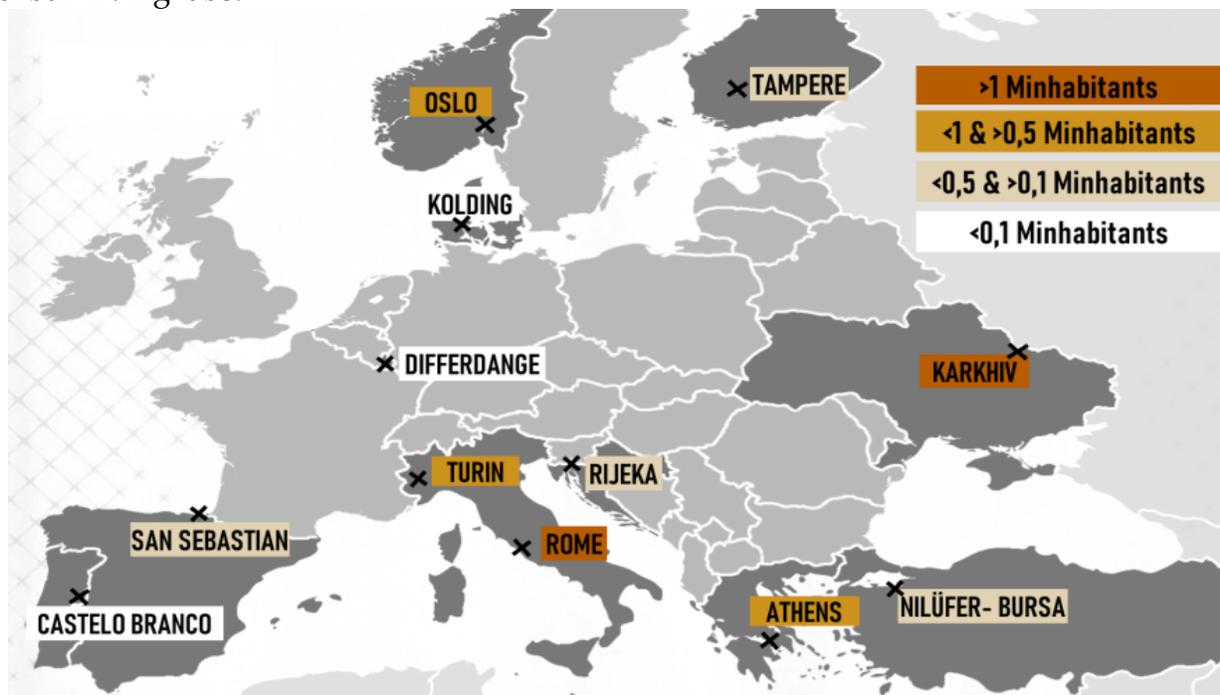


Figure 1 FUSILLI Cities (Source: FUSILLI, 2021)

12 City Councils are involved in FUSILLI consortium, strongly committed to co-develop policies and actions in urban, rural and peri-urban areas. Nilüfer-Bursa (Turkey), San Sebastian (Spain), Oslo (Norway), Kolding (Denmark), Turin (Italy), Castelo Branco (Portugal), Differdange (Luxemburg), Rijeka (Croatia), Kharkiv (Ukraine), Tampere (Finland), Athens (Greece) and Rome (Italy) represent a wide geographical, climate, social-economic and cultural coverage of most of the situations and conditions in Europe (figure 1).

ACTIONS		CITIES INVOLVED											
CODE	POLICIES AND ACTIONS	SAN SEB	NILUFER	OSLO	KOLDING	TURIN	KHARKIV	DIFFE.	TAMPERE	RJEKA	CAST BR	ATHENS	ROME
CIA1	Education of children for production and consumption of healthy food	●	●	●	●	●	●	●	●	●	●	●	●
CIA2	Establishment of city-region Producer/Consumer/Prosumer Coops (part of	●	●	●	●	●	●	●	●	●	●	●	●
CIA3	Neighbourhoods / Virtual Food Community	●	●	●	●	●	●	●	●	●	●	●	●
CIA4	Local Community Food Watch (for Public Health and Well-being)	●	●	●	●	●	●	●	●	●	●	●	●
CIA5	Food Living Labs	●	●	●	●	●	●	●	●	●	●	●	●
CIA6	Food Hubs	●	●	●	●	●	●	●	●	●	●	●	●
CIA7	Food card / Social Food Services	●	●	●	●	●	●	●	●	●	●	●	●
CIA8	Promote sustainable consumption among citizens	●	●	●	●	●	●	●	●	●	●	●	●
CIA9	Agri-art to promote citizen-based urban food production	●	●	●	●	●	●	●	●	●	●	●	●
CIA10	Educational workshops with local chefs to develop recipes with local food	●	●	●	●	●	●	●	●	●	●	●	●
CIA11	Educational tool to support children and their families	●	●	●	●	●	●	●	●	●	●	●	●
DIA1	Farmers' markets	●	●	●	●	●	●	●	●	●	●	●	●
DIA2	Short supply chain (Local Stores)	●	●	●	●	●	●	●	●	●	●	●	●
DIA3	Optimisation of food plastic packaging	●	●	●	●	●	●	●	●	●	●	●	●
DIA4	Data-based solution to shorten food system	●	●	●	●	●	●	●	●	●	●	●	●
DIA5	Data-based solution to increase quality in food and nutrition systems	●	●	●	●	●	●	●	●	●	●	●	●
DIA6	Food festivals	●	●	●	●	●	●	●	●	●	●	●	●
DIA7	Food outlets	●	●	●	●	●	●	●	●	●	●	●	●
DIA8	Gastronomy chain and fair-trade events	●	●	●	●	●	●	●	●	●	●	●	●
DIA9	Municipal Procurement from city-region Farms	●	●	●	●	●	●	●	●	●	●	●	●
DIA10	Producer and Consumer Coops Business Models	●	●	●	●	●	●	●	●	●	●	●	●
DIA11	Fairtrade Municipal Procurement	●	●	●	●	●	●	●	●	●	●	●	●
DIA12	Promotion of Local Foods and New Buying Options	●	●	●	●	●	●	●	●	●	●	●	●
DIA13	Zero km Agriculture	●	●	●	●	●	●	●	●	●	●	●	●
DIA14	Catalogue of city-region producers	●	●	●	●	●	●	●	●	●	●	●	●
DIA15	Vending machines	●	●	●	●	●	●	●	●	●	●	●	●
GIA1	Food Policy Council	●	●	●	●	●	●	●	●	●	●	●	●
GIA2	Food Charter	●	●	●	●	●	●	●	●	●	●	●	●
GIA3	Municipal Food Commission	●	●	●	●	●	●	●	●	●	●	●	●
GIA4	Urban Planning & Zoning	●	●	●	●	●	●	●	●	●	●	●	●
GIA5	Agriculture (water-soil-food relation) related policies	●	●	●	●	●	●	●	●	●	●	●	●
GIA6	Environment (+ energy) related policies	●	●	●	●	●	●	●	●	●	●	●	●
GIA7	Health-food related policies	●	●	●	●	●	●	●	●	●	●	●	●
GIA8	Education related policies	●	●	●	●	●	●	●	●	●	●	●	●
GIA9	Decision making AI tool	●	●	●	●	●	●	●	●	●	●	●	●
GIA10	Sign an international network (MUFPP, Iclei, Eurocities...)	●	●	●	●	●	●	●	●	●	●	●	●
GIA11	Digital tool for public procurement	●	●	●	●	●	●	●	●	●	●	●	●
PIA1	School food gardens	●	●	●	●	●	●	●	●	●	●	●	●
PIA2	Vertical urban farming	●	●	●	●	●	●	●	●	●	●	●	●
PIA3	Aquaponics	●	●	●	●	●	●	●	●	●	●	●	●
PIA4	Seed library	●	●	●	●	●	●	●	●	●	●	●	●
PIA5	Roof-top gardening	●	●	●	●	●	●	●	●	●	●	●	●
PIA6	School meals from local production	●	●	●	●	●	●	●	●	●	●	●	●
PIA7	Smart precision farming to reduce agricultural inputs	●	●	●	●	●	●	●	●	●	●	●	●
PIA8	Community kitchens	●	●	●	●	●	●	●	●	●	●	●	●
PIA9	Urban garden allotments / community gardens	●	●	●	●	●	●	●	●	●	●	●	●
PIA10	Community supported agriculture	●	●	●	●	●	●	●	●	●	●	●	●
PIA11	Integrate refugees in agro-food production in cities	●	●	●	●	●	●	●	●	●	●	●	●
PIA12	Multi-functional farming	●	●	●	●	●	●	●	●	●	●	●	●
PIA13	Soil analysis & Restoration of degraded soil & Development of Smart Soils	●	●	●	●	●	●	●	●	●	●	●	●
PIA14	Food Quality Training activities for producers / distributors / consumers	●	●	●	●	●	●	●	●	●	●	●	●
PIA15	Traceability QR-based app	●	●	●	●	●	●	●	●	●	●	●	●
PIA16	Water analysis & water treatment	●	●	●	●	●	●	●	●	●	●	●	●
PIA17	Biodiversity conservation	●	●	●	●	●	●	●	●	●	●	●	●
PIA18	GHG mitigation	●	●	●	●	●	●	●	●	●	●	●	●
PIA19	Increase resistance to "emergence situations" (droughts and floods)	●	●	●	●	●	●	●	●	●	●	●	●
PIA20	Pest management	●	●	●	●	●	●	●	●	●	●	●	●
PIA21	Increase resource efficiency and circularity (land, water, energy, soil, fertilizers,	●	●	●	●	●	●	●	●	●	●	●	●
PIA22	Reuse of fodder for enhancing soil organic matter and reducing soil erosion	●	●	●	●	●	●	●	●	●	●	●	●
PIA23	Health training activities for food producers	●	●	●	●	●	●	●	●	●	●	●	●
PIA24	Product development with local produce	●	●	●	●	●	●	●	●	●	●	●	●
PIA25	Health benefit from new product with local produce	●	●	●	●	●	●	●	●	●	●	●	●
WIA1	Reduce food waste / Food Rescue	●	●	●	●	●	●	●	●	●	●	●	●
WIA2	Waste management in canteens	●	●	●	●	●	●	●	●	●	●	●	●
WIA3	Reducing food waste among providers and consumers	●	●	●	●	●	●	●	●	●	●	●	●
WIA4	Organic waste collection and de-centralized green bin composting	●	●	●	●	●	●	●	●	●	●	●	●
WIA5	Green Logistics for waste	●	●	●	●	●	●	●	●	●	●	●	●
WIA6	food waste as bio-products	●	●	●	●	●	●	●	●	●	●	●	●
WIA7	Biofertilisers	●	●	●	●	●	●	●	●	●	●	●	●
WIA8	Guide for restaurants to reduce food waste	●	●	●	●	●	●	●	●	●	●	●	●

Figure 2 FUSILLI Cities' actions in five pillars. Actions to be implemented in each city (Green already experienced, Yellow on course and Grey foreseen to be implemented during FUSILLI, (Source: FUSILLI, 2021)

There are five groups of actions to be implemented in the project as follows (see figure 2);

1. Governance Innovative Actions (GIA):
2. Production and Processing Innovative Actions (PIA)
3. Distribution Innovation Actions (DIA)
4. Consumer Innovative Actions (CIA)
5. Food Waste Innovative Actions (WIA)

The macro- level Nilüfer Food Policy Roadmap is a part of GIA, while the micro- level Nilüfer Living Lab Road Map is linked to all actions as a coordination unit, testbed, and niche provider.

2. Materials and Methods

The technology road mapping (TRM) is identified as a flexible planning and assessment tool to support strategic settings, which Berner et al. [1] propose to utilize for developing strategic and long-term planning in organizational settings in which both small scale enterprises, large-scale government policy projects and all initiative projects included. Departing from TRM methodology, we designed the method of Nilüfer's road mapping in this manner.

We based our methodologic approach on technology road mapping (TRM). TRM is a flexible planning and assessment method that has been used to support strategic and long-term planning in organizational settings reaching from small-scale enterprises to large-scale government policy projects.

The material of this article is twofold. The designation of roadmaps depend primarily on the FUSILLI projects deliverables. On the other hand, roadmap formulation is unique in each of the cities, so, Nilüfer's roadmaps are designed in a participatory way the researchers of this study are also a part of. Therefore, the process itself offers quantitative data which has tacit knowledge and in-depth information.

Consequently, the method for roadmap preparation process depends on the methodology designated in the scope of FUSILLI project. The data used for the evaluation primarily depends on qualitative data gathered during roadmap formulation. The specific methodologies used in FUSILLI Project are;

Food 2030 Living Labs: the framework for open and responsible innovation, intrinsically participatory and established to define and put in practice experimental governance to adopt innovative solutions and make cities the agents of food system transformation.

Knowledge Community: method by which to do organizational or process innovation, suitable to introduce change in the food system identifying, creating, representing, and distributing data, information, and knowledge in and via a community of cities and stakeholders.

- Policies and actions planning
- Policies and actions implementation and validation

- Upscaling and replication strategy
- Participatory processes

The macro- level roadmap formulation is based on this framework. The micro- level roadmap formulation for Nilüfer Living Lab consists of;

1. Establishment of the citizen engagement strategy at local level, ensuring strong participation of producers, consumers, civic associations, and any other relevant social collectives
2. Roadmap development for Food 2030 Living Lab activities mainly focused on stakeholders and citizens participation by means of workshops, information events, surveys, etc.
3. Identification of suitable scenarios for piloting innovative policies and actions and the procedure for impact assessment of potential actions early deployed
4. Creation of the European network of Food 2030 Living Labs and coordination with other similar networks already existing or created in the framework of similar projects.

3. The Roadmaps of Nilüfer; Process, Progress and Participation

This part represents two roadmaps prepared for macro- level and micro- level urban food system actions with which aim at a transition for sustainability in Nilüfer's urban food system. The macro- level Food Policy Roadmap formulation primarily depends on a set of analysis, vision and strategies building, establishment of new organs for urban food system governance and creating higher scale policy. In this four-step process, each process change is publicized for open discussion of all local stakeholders with an emphasis on citizens.

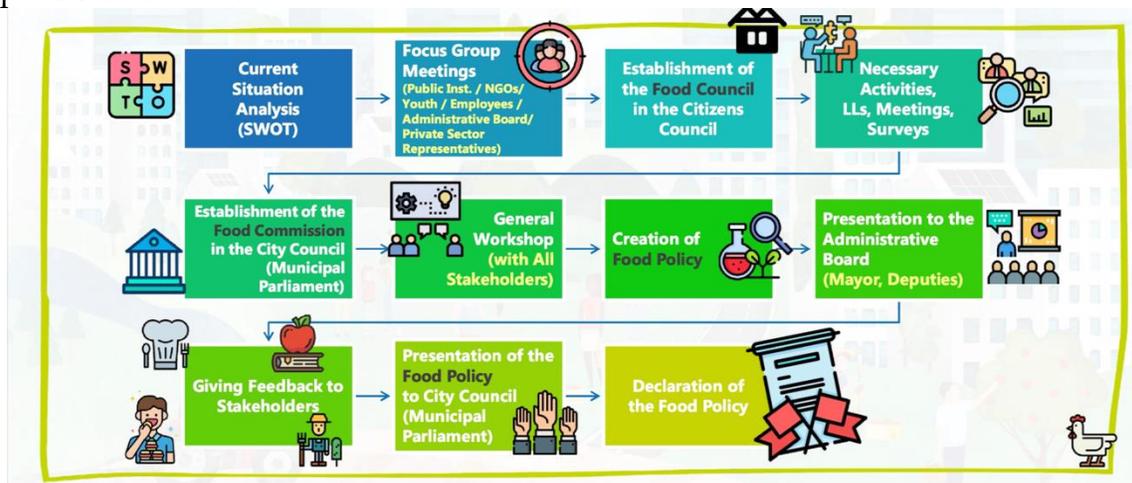


Figure 3 Nilüfer macro- level roadmap: Food Policy Roadmap (Source: Produced by the authors)

As it is seen in figure 3, the first step aims at understanding the current situation. Starting with a SWOT analysis which documents strengths, weaknesses, opportunities, and threats for current situation of Nilüfer's agro-food system. The analysis is developed with

in-depth information gathering through focus group meetings in which a variety of stakeholders are included (see figure 6). Further, this step has a critical attribute both for being a niche for local governments in Turkey and for the stepwise FUSILLI actions. Establishment of the Food Council within the Citizens' Council has the importance for forming a new governance model, a novel sub-council as a consultative organ for the Municipality and has the function for supporting participatory processes. Similarly, the establishment of the Food Commission as another organ of City Council (Municipal Parliament in Turkey context), supports the niche triggered with the establishment of Food Council.

The general structure of Nilüfer Food Policy depends primarily on developing an action and receiving feedback from a variety of stakeholders. All phases of stakeholder participation also contribute to the next step. The food policy document preparation, which is the last step in the process, has a vital role for transitioning the urban food system and for the formulation of a participatory model.

According to Bilali [2], policies are crucial in sustainable food system transitions by shaping food practices and the system as well. The role of cities in sustainability transitions of agro- food systems is also vital [4] that pioneer cities lay down a path for other cities to follow [3]. There is growing evidence that cities provide protected spaces where niche experiments have been able to emerge for changing agro- food system [11]. In the perspective of city actors, the role of policymakers can play indirect roles by mobilizing their locality and incorporating them into developing visions to address sustainability transitions [15]. Also, Paddock [12] declares that policy makers are key actors to promote change towards sustainability transitions. Taking the Nilüfer urban food policy into consideration, it triggers sustainability transitions as a city-level policy innovation, lays down a path for Turkish city actors that are concerned with the urban agro- food system and creates a niche and a sheltered space in the context of its direct relation with Nilüfer Living Lab implementation. As it can be seen in figure 3, the roadmap process itself creates novel organs and mobilizes these organs in the same process for formulation of the food policy.

Innovation in the agro- food system and in agriculture requires the involvement of multi-actor approaches, multi-task programming and multi-scalar policy formulation [8]. To do so, the emergent literature gives evidence for the importance and evolving attention of living labs, for a sustainable agro-food system [10]. As a public sector agro-food living lab, Nilüfer Living Lab has a pre-determined actions and implementations programme which has been formulated within the application process to H2020 programme for FUSILLI Project. Within multi-scalar policy formulation, Nilüfer Living Lab plays different roles in different implementation programmes. It has functions for coordinating, driving participation, transitioning production, consumption, distribution,

participatory model includes both regime actors and initiatives which have confrontational character, exist together in a horizontal organizational structure. It has character of a collaborative governance [9] includes civic food initiatives and alternative food networks at national scale [7].

STAKEHOLDER TYPE	ORGANIZATION NAME (Abbreviations & Acronyms)	ORGANIZATIONAL ATTRIBUTE	ACTIVE IN	CONTRIBUTE IN
Cooperatives	Nilüfer Agricultural Development Cooperative (NILKOOP)	Cooperative	Production and Processing	Local product processing and distribution organization
Community	Nilüfer Citizens Council (NKK)	City Organization	Governance	Increasing participation in decision making, Food Policy Council, Food Charter, Lls
Community	Neighborhood Committees	City Organization	Governance	Participation platform for the dissemination of the healthy food ecosystem
Community	Nilüfer Food Community	Initiative	Consumption	Participation platform for the dissemination of the healthy food ecosystem
City Organization	Nilüfer Social Entrepreneurship Center (SGM)	City Organization	Governance	Social Business Model for Healthy and Secure Food
City Organization	Nilüfer Innovation Center (NIM)	Association	Governance	Participation platform for the dissemination of the healthy food ecosystem
Professional Chambers	Nilüfer Chamber of Agriculture (NZO)	Association	Production and Processing	Industry professionals sharing knowledge and experience and taking part in actions
Professional Chambers	Chamber of Food Engineers, Bursa Branch (GMO)	Association	Production and Processing	Industry professionals sharing knowledge and experience and taking part in actions
Academic	Bursa Uludağ University	Academic	Production and Processing	Academic support for analyzes
Ministries	Nilüfer District Directorate of National Education (MEB)	Public Authority	Governance	School garden and education curriculum approvals (Ministry of National Education)
Ministries	Nilüfer District Directorate of Agriculture and Forestry	Public Authority	Governance	Arable lands, agricultural inputs (Ministry of Agriculture and Forestry)
Institutions	Agriculture and Rural Development Support Institution, Bursa Provincial Coordinator (TKDK)	Public Authority	Governance	Agricultural support for producers
Associations	Ecologic Life Assoc. (EKODER)	Association	Governance	Association for Urban Healthy Food
Associations	Food Rescue Assoc.	Association	Food Waste	Developing a food rescue model
Unions	Bursa Provincial Livestock Development Association (HAGEL)	Union	Production and Processing	Breeding support for producers
Women's Solidarity Associations	Yolçatı Producing Women Assoc.	Association	Production and Processing	Increasing women's employment and contributing local healthy food production
	Misi Village Women's Solidarity Assoc.	Association	Production and Processing	Increasing women's employment and contributing local healthy food production
	Ürünlü Women Solidarity, Development and Culture Assoc.	Association	Production and Processing	Increasing women's employment and contributing local healthy food production
	Atlas Village Women's Solidarity Assoc.	Association	Production and Processing	Increasing women's employment and contributing local healthy food production
	Kayapa Women Solidarity, Development and Culture Assoc.	Association	Production and Processing	Increasing women's employment and contributing local healthy food production

Figure 6 Participant Map for Nilüfer Living Lab Project (Source: Produced by the authors)

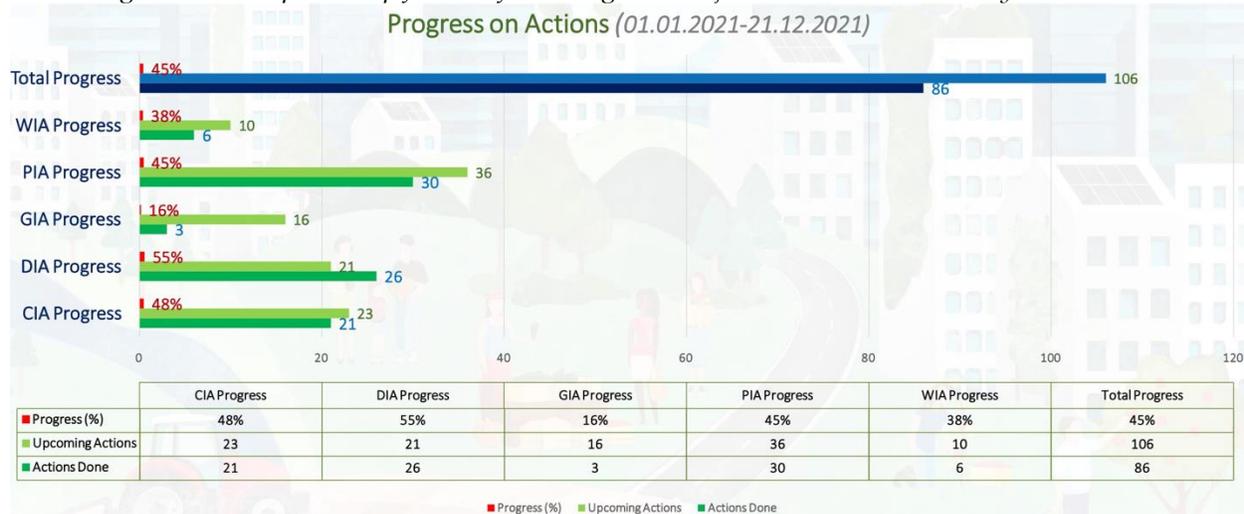


Figure 7 Nilüfer Living Lab Progress in Actions in the first year of FUSILLI Project (Source: Produced by the authors)

4. Discussion and Conclusion

The paper has focused on the interim results and processes in one of the demo sites of the FUSILLI Project; Nilüfer in Bursa, Turkey, pertaining to the road mapping of policy processes at macro-level; Food Policy and micro-level; Food Living Lab.

A great diversity of approaches marks the FUSILLI cities policy processes and the Nilüfer case stands out through the centrality of local government ownership of the urban food

transition processes. The municipality had a head start with many activities by declaring 2021 as the year of food. Starting with the Mayor, all relevant decision makers prioritized food in their policy agenda, brought together the citizens and local food system actors with activities that foster food system transformation in the city.

The already existing consultatory and participative local governance approaches in Nilüfer, the existence of the widely accepted, trusted and active Citizens Council; as a consultative organ of the local government, that came into being as an extension of Agenda 21 strategies, and its critical role in the bringing together local stakeholders of the urban food transition. Identified stakeholders, action by action, consist of people already involved in many participatory processes of the Municipality that facilitates stakeholder engagement strategies for the action implementation.

The strong supportive bonds that the local government has established with its rural hinterland (which is under constant pressure of an unplanned urban sprawl, pauperizing small farmers), attempting to stabilize farmer incomes and information gaps. Socio-economic development in rural neighborhoods and continuity of agricultural activities supports conservation of agricultural lands, rural identity, cultural landscape, and natural resources while generating a buffer zone for urban sprawl. It is crucial for enabling local food supply and establishing short supply chains which gain better understanding in shocks such as Covid-19 pandemics.

The numerous economic and social solidarity actions generated by the Project Living Lab actions in diverse categories that introduce trust and stability for more transformative Policy actions.

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