cities2030

D1.3. All WP IMA Report

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Abstract	*This report outlines the process of developing and testing an impact assessment strategy for the Cities2030 project, aimed at facilitating the transition of city-region food systems in line with the goals of the Food2030 policy. The strategy seeks to promote sustainable urban food systems that contribute to food security, environmental sustainability, and public health, aligning with the broader European Union objectives. A key component of the research is the yearly survey conducted within Cities2030 partner cities, which measures the tangible impact created throughout the project's*

[1] R: document, report (excluding the periodic and final reports); DEM: Demonstrator, pilot, prototype, plan designs; DEC: websites, patents filing, press & media actions, videos, etc.; OTHER: software, technical diagram, etc.

	implementation. These surveys provide valuable data on the progression of city-region food systems, capturing changes in stakeholder engagement, policy effectiveness, and the overall sustainability of food practices. *The report also examines how the gathered data contributes to refining the impact assessment framework, ensuring that it remains adaptable and relevant across diverse urban contexts. By integrating this annual feedback into the design process, the strategy evolves to better address local needs and challenges, fostering more resilient food systems. The research further highlights the importance of longitudinal assessment in tracking the long-term effects of the Cities2030 interventions, offering insights into the successes, challenges, and areas requiring improvement. Ultimately, the findings underscore the critical role of continuous evaluation, co-creation, and inclusivity in designing policies that effectively support sustainable city-region food systems and align with the ambitious targets of the Food2030 agenda.*
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1. EXECUTIVE SUMMARY

This report presents a comprehensive account of the development and testing of an impact assessment strategy for the Cities2030 project, which is aimed at facilitating the transformation of city-region food systems in line with the objectives of the Food2030 policy. The project addresses critical aspects of food security, sustainability, and public health, aligned with the broader European Union agenda to create resilient and sustainable urban food ecosystems. The report is organized into four main sections to provide a detailed narrative of the research process and outcomes.

The first section, Background, contextualizes the importance of transitioning towards sustainable food systems in urban regions. It highlights the growing challenges faced by cities in terms of food security, environmental sustainability, and public health, and frames these challenges within the goals of the EU's Food2030 policy. This section also explores the need for robust, adaptable strategies to assess the impact of interventions aimed at transforming food systems, setting the foundation for the Cities2030 project's approach.

The second section, Methodology Creation and First Test Results, outlines the design and development of the impact assessment framework, focusing on the use of a design-thinking approach. The process of co-creation with stakeholders, iterative design cycles, and cross-sectoral collaboration is emphasized as a key component in shaping a flexible and context-sensitive assessment tool. Initial testing of the methodology within Cities2030 partner cities is discussed, including insights into stakeholder engagement, the adaptability of the framework, and preliminary results that informed further refinement of the strategy.

The third section, Final Results, provides an in-depth analysis of the outcomes derived from yearly surveys conducted within Cities2030 partner cities. These surveys were designed to capture the tangible impact of the project over time, measuring changes in key areas such as stakeholder participation, policy implementation, and the sustainability of food system practices. The results are analyzed to identify best practices and common challenges faced by cities during the transition. This section also evaluates the effectiveness of the impact assessment framework in fostering collaboration across sectors and in adapting to the diverse needs of different urban regions.

The final section, Summary, synthesizes the key findings of the report and offers reflections on the overall success of the Cities2030 project's impact assessment strategy. It emphasizes the importance of continuous evaluation, stakeholder inclusivity, and co-creation in designing flexible and adaptive policies for sustainable urban food systems. The report concludes by underscoring the need for long-term, adaptive strategies that can respond to the evolving challenges of food system transitions, advocating for the continued use of the impact assessment framework as a tool to guide future urban food policy development.

This report provides valuable insights into the processes, methodologies, and outcomes of the Cities2030 project.

2. INTRODUCTION

2.1. Introduction to the Cities2030 Project and Its Goals

The Cities2030 project is a comprehensive initiative aimed at addressing the global challenges facing urban food systems through the sustainable transition of City Region Food Systems (CRFS). With a global population exceeding 7.7 billion and expected to reach 9 billion, coupled with rapid urbanization, climate change, resource scarcity, and increasing food insecurity, there is an urgent need for transformative solutions to create more resilient and sustainable food systems. The project highlights the importance of placing consumers at the heart of this transition, advocating for policies and solutions that prioritize inclusivity and active citizen engagement.

In the absence of action, environmental degradation will continue to undermine the world's ability to produce high-quality food, exacerbating issues like food insecurity and diminishing access to food for many. Recognizing this, Cities2030 is addressing these global challenges at both local and regional levels by creating systemic, practical, and sustainable solutions aimed at restructuring food production, supply chains, transportation, recycling, and reuse systems. Through collaboration with a wide array of partners, including consumers, businesses, civil society organizations, innovators, universities, and research institutions, the project envisions a cohesive network to promote short food supply chains and resilient urban food systems.

The Cities2030 initiative is a cross-sector, multi-stakeholder effort with the primary objective of fostering innovative solutions to support the sustainable transition of City Region Food Systems (CRFS). Its core goal is to cultivate a resilient framework that allows cities and regions to create adaptable and sustainable food systems while addressing key challenges such as food insecurity, environmental degradation, and resource scarcity. Through collaborative knowledge sharing and co-creation, project partners are actively working towards advancing policies, practices, and evidence-based solutions that target strategic areas of intervention (see in Figure 2.1.).

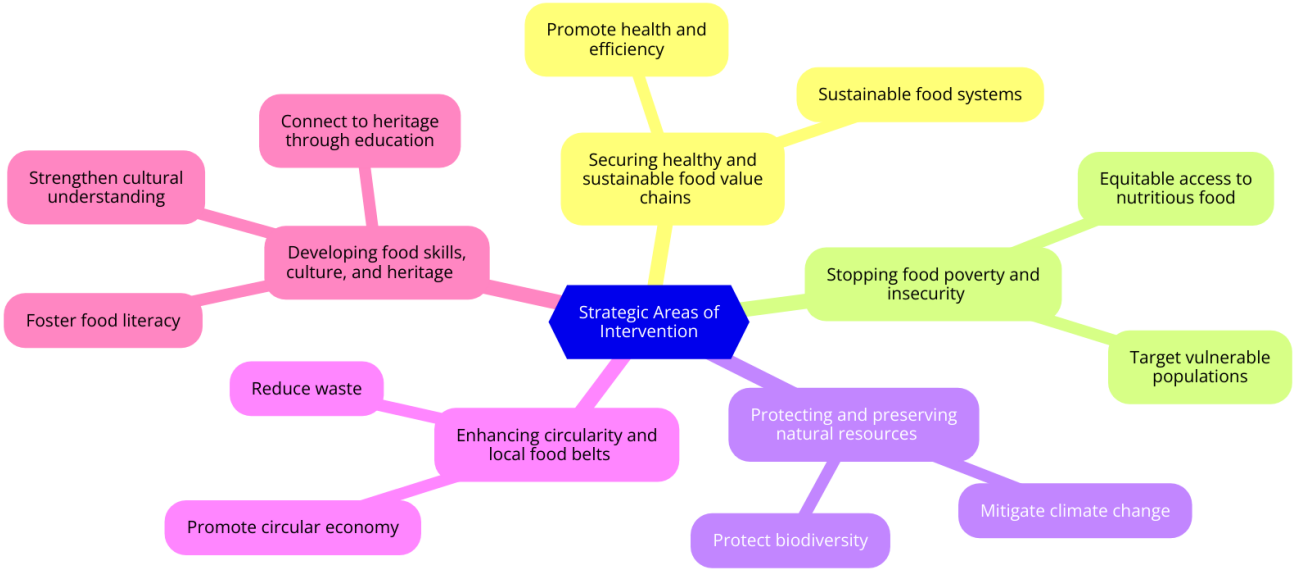


Figure 2.1. Strategic Areas of Intervention

Strategic Areas of Intervention:

- Securing healthy and sustainable food value chains: Ensuring that food systems are designed to promote health, sustainability, and efficiency from production to consumption.
- Stopping food poverty and insecurity: Guaranteeing equitable access to nutritious food, particularly for vulnerable populations, to eradicate food poverty.
- Protecting and preserving natural resources: Safeguarding the environment by promoting practices that protect biodiversity, conserve resources, and mitigate the impacts of climate change.
- Enhancing circularity and local food belts: Encouraging the development of local food systems that reduce waste and promote circular economy practices.
- Developing food skills, culture, and heritage: Fostering food literacy, cultural understanding, and a deep connection to heritage through education and community engagement.

To achieve its objectives, Cities2030 has committed to several key initiatives (see Figure 2.2):

- Building the Cities2030 CRFS Alliance: Establishing a robust community of experts, organizations and stakeholders to collaborate on developing resilient and sustainable food systems. This alliance will serve as a hub for knowledge sharing, capacity building, and cross-sectoral cooperation.
- Developing a roadmap for better city-region food systems: The project will publish Whitepapers and Action Plans to guide cities and regions in developing sustainable and inclusive CRFS. These resources will emphasize both the ethical and aesthetic dimensions of food system transformation.
- Creating a knowledge framework for better food systems and actions: Gathering data, insights and best practices to support decision-makers in implementing sustainable food policies. This framework will provide city stakeholders with the evidence needed to make informed choices and ensure the effectiveness of new practices.
- Setting up CRFS Policy and Living Labs in cities: Starting with 12 Pilot Cities and Regions, the project will establish Living Labs to serve as collaborative spaces where experts, policy-makers, and citizens can co-create food policies and practices tailored to each city's specific needs.
- Creating a Data-Driven Platform for collaboration: A blockchain-based data platform will be developed to enable real-time monitoring and decision-making within the food supply chain. This platform will empower both citizens and decision-makers with the information necessary to take intelligent and coordinated actions to enhance food system resilience and sustainability.
- Raising awareness and funds for long-lasting impact: The project will launch awareness campaigns and seek public and private sector funding to ensure long-term sustainability and scalability of its outcomes. By mobilizing resources, Cities2030 aims to leave a lasting impact on city policies and foster the widespread adoption of sustainable urban food systems.

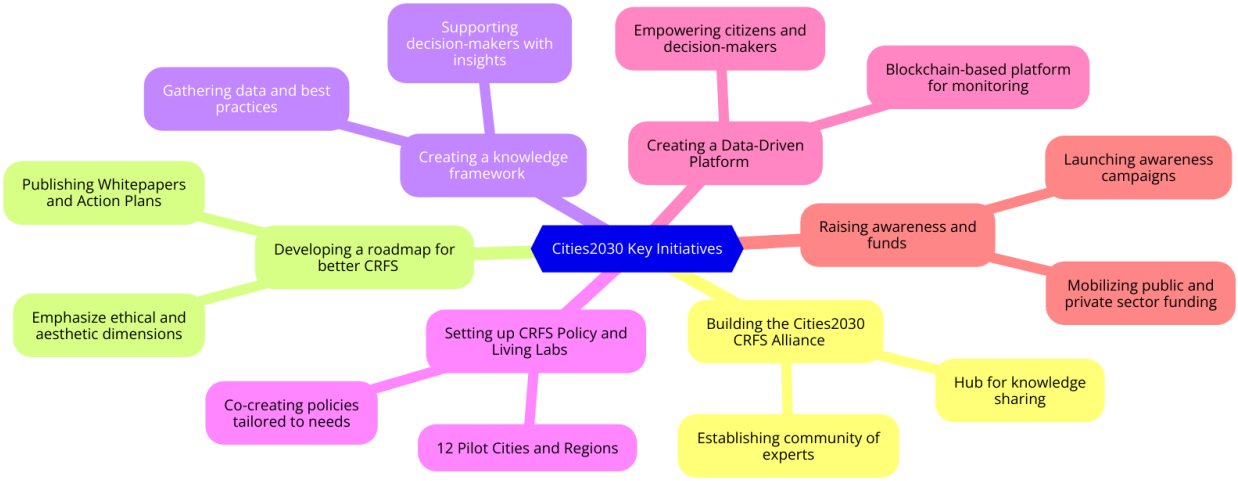


Figure 2.2. Key Initiatives

Through its innovative approach, Cities2030 seeks to reshape city-region food systems by prioritizing sustainability, resilience, and inclusivity. By engaging a diverse array of stakeholders, advancing evidence-based policies, and utilizing cutting-edge data platforms, the project is positioned to drive systemic change across Europe and beyond. Ultimately, Cities2030 is committed to empowering cities, regions, and citizens to take ownership of their food systems and create a more equitable, sustainable, and food-secure future.

2.2. WP and main responsibilities about IMA report

WP Leader: P39 RTU
WP Co-Leader: P25 LLF

WP1 scope
WP1 aims at securing the project's effective impact action which is to effectively transform UFSE towards sustainable CRFS which meet the EU-U11NUA. Activities under WP1 delivers the impact action strategy to secure effective food system transformation, allow to adjust, foster, and improve actions developed under WP2, 3, 4, 5, 6 and 7 via impact monitoring and assessment (IMA) of the aforementioned action's effectiveness to make change. WP1 secures alignment between operations, methodologies and anticipated results, incorporating a risk and change plans. In addition, WP1 forecast and characterise additional outcomes not planned initially and examine their feasibility without additional resources. Likely WP2 to 6, WP1 foster synergies with comparable IMA processes from other sources (e.g. EU-funded projects, etc.). All in all, WP1 secures all activities effectively meet each of the 7 call's expected impact (CEI) with a continued, systemic and digital-based impact monitoring and assessment (IMA) process that generates CRFS/FNS indicators and city/region fact-sheet instruments.

In this report P39 implements Task 1.3 – All WP-specific impact monitoring and assessment implementation.

List of deliverables supported by this document

TITLE	RESP	Contributors
D1.3 IMA Report	**P39 RTU**	P5 IAAD, P25,LLF P27,AGFT P30, ITC

2.3. Importance of addressing urban food systems and ecosystems (CRFS)

Urban food systems and ecosystems, particularly City Region Food Systems (CRFS), play a critical role in addressing some of the most pressing global challenges today. As the world rapidly urbanizes—with the majority of the global population projected to live in cities by 2050—the demand for sustainable, resilient, and equitable food systems is becoming increasingly urgent. Urban areas are at the forefront of issues related to food security, environmental degradation, resource scarcity, and health crises such as obesity and malnutrition. CRFS offer a pathway to tackle these challenges by creating food systems that are more localized, circular, and sustainable.

1. Ensuring Food Security and Access

With a growing urban population, ensuring access to healthy, affordable, and nutritious food is a top priority. Many urban regions are already facing high levels of food insecurity, with large segments of the population unable to consistently access sufficient food. The rise in food poverty has been exacerbated by global supply chain disruptions, climate change, and economic inequality. By strengthening CRFS, cities can reduce their dependence on external food sources and create more reliable, localized supply chains that are resilient to shocks. This can help mitigate the risks of food shortages and increase food access for urban residents, particularly vulnerable populations.

2. Promoting Sustainable and Circular Food Practices

CRFS are crucial for promoting sustainable food production and consumption practices. Conventional food systems, often reliant on long-distance transportation and industrial agriculture, contribute significantly to environmental degradation, deforestation, water scarcity, and greenhouse gas emissions. By focusing on local food production, CRFS can reduce carbon footprints, support the conservation of natural resources, and enhance biodiversity within urban ecosystems. Furthermore, CRFS encourage the adoption of circular economy principles—such as reducing food waste, promoting recycling and reuse, and minimizing resource use—which are essential for creating environmentally sustainable food systems.

3. Supporting Local Economies and Livelihoods

Addressing urban food systems through CRFS also brings significant economic benefits. Localized food systems can create new job opportunities and stimulate local economies by supporting small-scale farmers, food entrepreneurs, and local food businesses. By developing local food belts and enhancing urban agriculture, cities can generate economic growth while reducing dependence on global supply chains. Additionally, CRFS can contribute to the preservation of food heritage and

culture, supporting traditional food practices and local knowledge systems that are often lost in globalized food markets.

4. Enhancing Resilience to Climate Change

Urban food systems are highly vulnerable to the impacts of climate change, including extreme weather events, shifts in growing seasons, and resource shortages. CRFS can enhance the resilience of food systems by promoting adaptive and context-specific solutions. For example, localized food production, urban agriculture, and innovative food technologies can reduce the dependence of cities on external food supplies, making them less vulnerable to climate-related disruptions. Furthermore, by integrating ecosystem services—such as green infrastructure, sustainable land use, and water conservation—CRFS can help cities mitigate the impacts of climate change while strengthening food system resilience.

5. Addressing Public Health Challenges

Urban food systems are intricately linked to public health outcomes. On one hand, poor dietary choices and the proliferation of processed, unhealthy foods in cities contribute to rising rates of obesity, diabetes, and other non-communicable diseases. On the other hand, food insecurity and malnutrition continue to affect millions of urban residents. CRFS offer an opportunity to improve public health by promoting access to healthy, fresh, and locally-sourced food. By encouraging sustainable food practices and supporting nutrition education, CRFS can contribute to healthier diets and improved well-being for urban populations.

6. Fostering Social Inclusion and Community Engagement

CRFS have the potential to foster greater social inclusion by involving citizens in the design, implementation, and management of their local food systems. Community-supported agriculture, urban farms, and food cooperatives are examples of how CRFS can empower citizens to take an active role in shaping their food environment. By promoting co-creation and collaboration among diverse stakeholders—including consumers, local governments, businesses, and civil society—CRFS can create inclusive and participatory food systems that reflect the needs and preferences of the entire community.

7. Strengthening Urban-Rural Linkages

CRFS serve as a bridge between urban and rural areas, promoting stronger connections between cities and the surrounding regions that produce food. These linkages are vital for fostering food system resilience and ensuring that both urban and rural areas benefit from sustainable development. By supporting local farmers and producers, CRFS can contribute to rural development and poverty alleviation while ensuring a steady supply of food to urban populations. This interconnectedness between urban and rural areas is crucial for creating integrated and equitable food systems.

In light of the significant challenges posed by urbanization, climate change, food insecurity, and public health crises, addressing urban food systems and ecosystems through CRFS is not just an option but a necessity. CRFS provide a holistic approach to building food systems that are

sustainable, resilient, and equitable. By localizing food production, enhancing circular economy practices, supporting local economies, and promoting social inclusion, CRFS offer a pathway to transform urban food systems and ensure a sustainable future for all. Cities2030 plays a pivotal role in advancing this transition by providing innovative solutions, fostering cross-sector collaboration, and creating the infrastructure needed for cities and regions to build more resilient and sustainable food systems. See summary in Figure 2.3.

Figure 2.3. Importance of addressing urban food systems and ecosystems (CRFS)

2.4. Trends

City Region Food Systems (CRFS) have emerged as a vital response to the growing challenges associated with global food production, consumption, and sustainability in urban areas. In recent years, several key trends have shaped the development and transformation of CRFS, driven by technological innovations, shifting consumer preferences, environmental concerns, and the need for more resilient and equitable food systems. These trends reflect the ongoing evolution of urban food systems and highlight the increasing importance of localized, sustainable, and inclusive approaches to food production, distribution, and consumption.

1. Localization and Short Food Supply Chains

One of the most prominent trends in CRFS is the shift toward localization of food systems. As urban populations continue to grow, cities are increasingly looking to shorten food supply chains by sourcing food locally and supporting regional agriculture. Short food supply chains reduce the reliance on global food markets, minimize transportation costs, and lower the environmental impact of food distribution, particularly in terms of carbon emissions. This trend promotes stronger connections between urban consumers and local farmers, fostering a sense of community and transparency in the food system. Localization also supports local economies by providing opportunities for small-scale producers and urban farmers to sell directly to consumers.

2. Urban Agriculture and Vertical Farming

The rise of urban agriculture is another key trend shaping CRFS. Urban farms, community gardens, and rooftop gardens have become increasingly popular in cities around the world as a means of producing food closer to where it is consumed. Urban agriculture enhances food security by providing access to fresh produce in urban environments, particularly in food deserts where access to healthy food is limited. Moreover, urban farming contributes to environmental sustainability by utilizing unused urban spaces and reducing the ecological footprint of food production.

Vertical farming, a more recent development in urban agriculture, leverages cutting-edge technology to grow food in stacked layers within controlled environments. Vertical farms can produce food year-round with minimal land use and water consumption, making them an efficient and sustainable solution for urban food production. This trend is expected to grow as cities seek innovative ways to meet the demand for fresh, local food while reducing the environmental impact of traditional farming practices.

3. Circular Economy and Food Waste Reduction

The circular economy model, which focuses on resource efficiency and waste minimization, is gaining traction in CRFS as cities strive to create more sustainable food systems. A key aspect of this trend is the reduction of food waste throughout the entire food supply chain, from production to consumption. Cities are implementing policies and initiatives to prevent food waste, recover surplus food, and repurpose organic waste into valuable resources like compost or bioenergy.

Innovative technologies, such as food-sharing apps and blockchain-based traceability systems, are also being used to tackle food waste at various stages. Additionally, cities are promoting food circularity by encouraging businesses to adopt sustainable packaging, reduce resource consumption, and find ways to recycle food waste back into the system. This trend not only reduces the environmental impact of food systems but also enhances food security by ensuring that more food reaches those in need.

4. Technological Innovation and Smart Food Systems

Technological advancements are rapidly transforming CRFS, leading to the development of smart food systems that integrate digital technologies, data analytics, and automation to enhance the efficiency, transparency, and resilience of urban food systems. Blockchain technology, for example, is being used to create transparent supply chains by tracking food from farm to table, ensuring food safety, and building trust between producers and consumers.

Other technologies, such as precision agriculture and Internet of Things (IoT) sensors, allow farmers to monitor crop conditions in real-time, optimize water and nutrient use, and reduce the environmental impact of food production. Big data is also being harnessed to analyze consumption patterns, forecast demand, and improve supply chain logistics. These smart technologies not only increase the efficiency of food systems, but also empower consumers and policy-makers with the information needed to make more informed decisions about food production and consumption.

5. Health-Conscious and Sustainable Consumption

As awareness of the links between diet, health, and sustainability grows, there has been a significant shift in consumer preferences toward health-conscious and sustainable consumption. Urban

consumers are increasingly seeking out fresh, organic, and locally-sourced foods, as well as plant-based alternatives to meat. This trend is driven by a desire to improve personal health, reduce the environmental impact of food choices, and support ethical food production practices.

In response to this growing demand, many cities are promoting sustainable food procurement policies, supporting local and organic producers, and encouraging the consumption of healthier diets. Public awareness campaigns, nutrition education programs, and incentives for sustainable food choices are becoming common features of CRFS. As consumers become more informed and engaged in food systems, they are playing a larger role in shaping the future of urban food systems through their purchasing decisions and advocacy for sustainable practices.

6. Food Justice and Social Equity

The trend toward food justice and social equity is gaining momentum within CRFS, as cities increasingly recognize the importance of creating equitable food systems that ensure all residents have access to affordable, nutritious food. Food insecurity remains a significant challenge in many urban areas, particularly among marginalized and low-income communities. In response, cities are implementing policies and programs aimed at reducing food inequality, such as food assistance programs, community food hubs, and urban food cooperatives.

There is also a growing focus on inclusive food governance, which seeks to engage diverse stakeholders—such as community organizations, policy-makers, farmers, and consumers—in the design and implementation of food policies. By prioritizing the needs of vulnerable populations and promoting inclusivity in decision-making, CRFS can help address systemic inequalities in access to food and create more just and resilient urban food systems.

7. Resilience and Climate Adaptation

As climate change continues to impact food production, cities are increasingly focused on building resilience into their food systems. CRFS are seen as a key strategy for climate adaptation as they promote local food production that is less vulnerable to global supply chain disruptions and extreme weather events. Cities are adopting climate-smart agriculture practices, such as agroecology, regenerative farming, and permaculture, to enhance the resilience of local food systems while reducing greenhouse gas emissions and conserving resources.

Additionally, CRFS are being designed to enhance urban resilience by integrating food systems with other urban infrastructure, such as green spaces, water management systems, and energy production. By building food systems that are adaptable to changing environmental conditions, cities can mitigate the risks posed by climate change while ensuring long-term food security for their residents.

The transformation of City Region Food Systems is being shaped by several key trends that reflect the growing need for localized, resilient, and sustainable food systems. From the rise of urban agriculture and circular economy practices to the increasing demand for health-conscious and sustainable food, these trends highlight the potential of CRFS to address global challenges such as food insecurity, environmental degradation, and climate change. By embracing technological innovations, promoting social equity, and fostering resilience, cities are at the forefront of creating

food systems that can meet the needs of their populations while ensuring a sustainable future for generations to come.

3. METHODOLOGY AND TESTING OF IMA

Abstract: This research paper investigates the process of developing and testing an impact assessment strategy for the Cities2030 project, which is centered around the transition of city-region food systems towards the goals set forth by the Food2030 policy. The study contextualizes the importance of sustainable food systems within urban regions, aligning with the broader European Union agenda for food security, sustainability and health. Using a design-thinking approach, the paper explores the methodology behind co-creation, stakeholder engagement, and the iterative design process to create a holistic and adaptable impact assessment framework. The research draws on case study within Cities2030 partner cities to identify best practices and challenges encountered during implementation. Key findings include the effectiveness of design thinking in fostering cross-sectoral collaboration, enhancing stakeholder participation, and refining impact assessment tools that can be tailored to diverse city-region contexts. The study concludes by emphasizing the need for flexible, adaptive strategies in assessing the long-term impacts of food system transitions, as well as the critical role of inclusivity and co-creation in designing policies that support sustainable urban food ecosystems.

1. Introduction

In the context of increasing global urbanization and the pressing need to address climate change, city-region food systems (CRFS) have become a focal point for sustainable development efforts. These systems are central to achieving several Sustainable Development Goals (SDGs), particularly those related to food security, public health, environmental protection, and economic resilience [1]. Urban areas are projected to house 68% of the world's population by 2050, making it imperative that cities transition towards more sustainable and resilient food systems that address not only the needs of urban populations, but also the environmental and social challenges posed by industrialized food production and distribution [2,3]. Strategic urban design interventions have been shown to significantly impact health and well-being, particularly when holistic [4] and localized [5] methodologies are employed. The European Union's Food2030 policy underscores this urgency, framing food systems as integral to the health of both people and the planet. Effective sustainable food systems are also key to the success of Positive Energy Districts [6]. The policy advocates for transforming food systems to become more sustainable, inclusive, resilient, and innovative, aligning with broader EU goals such as the European Green Deal and the Farm to Fork Strategy [7].

However, assessing the impact of such food system transitions poses significant challenges. Traditional impact assessment frameworks often struggle to account for the complex interconnections between food, environment, and socio-economic factors within diverse urban contexts [8]. Existing tools for impact measurement tend to be rigid, focusing on

a limited set of indicators and failing to capture the dynamic and evolving nature of food systems. Moreover, they often lack the capacity to incorporate the perspectives of diverse stakeholders, including policy-makers, businesses, civil society organizations, and local communities [9]. Given the unique nature of each city-region, the need for more adaptable, inclusive, and context-specific assessment methods has become increasingly apparent [10-11].

In recent years, the design-thinking approach has emerged as a promising framework for addressing these challenges. Originating from product design and innovation fields, design thinking emphasizes human-centered solutions, iterative development, and collaborative problem-solving, making it particularly suited for complex, multi-stakeholder environments such as city-region food systems [12]. Design thinking encourages co-creation, co-designing sustainability frameworks and active engagement with stakeholders [13] at every stage of the process, from identifying needs and challenges to prototyping and refining solutions. This approach allows for the development of more flexible and adaptive impact assessment frameworks that can be tailored to the specific needs and realities of different city-regions [14,15]. By engaging with stakeholders from the outset, design thinking helps ensure that impact assessments are not only more relevant, but also more likely to be adopted and supported by those involved in the food system transition process.

Despite its promise, applying design thinking to impact assessment in food systems is still a relatively new endeavour, and several challenges remain. One major challenge is balancing the diverse interests and priorities of different stakeholders while maintaining a coherent and actionable assessment framework [16]. Another challenge is ensuring the scalability and transferability of solutions across different city-regions, given the unique cultural, economic, and environmental contexts of each region [17]. For example, it is necessary to characterize sustainability in a manner that captures the complexity of these environments [18]. Moreover, assessing long-term impacts requires addressing uncertainties inherent in system transitions, such as changing climate conditions, shifts in political priorities, and emerging technologies in food production [19] and distribution [20-21] as well as land and biodiversity impacts [22-24]. Diverging hypotheses also exist regarding the best metrics and indicators for assessing food system sustainability, with some experts advocating for a focus on environmental outcomes, while others prioritize social and economic factors [23, 25].

This paper seeks to address these gaps by analyzing the development and testing of an impact assessment strategy within the Cities2030 project, a European initiative aimed at guiding city-region food systems towards the Food2030 policy goals. Cities2030 brings

together a network of cities, researchers, and practitioners to co-create innovative solutions for sustainable food system transitions. The main objective of this research is to explore how design thinking can be used to create a more effective, adaptable, and inclusive impact assessment framework for city-region food systems. Through case studies from partner cities, including their real-world testing of the assessment framework, this study identifies best practices and highlights the challenges encountered during implementation. Ultimately, this research contributes to the growing body of knowledge on food system transitions by offering insights into how design thinking can enhance the assessment of impacts across diverse urban contexts, supporting the broader goal of building sustainable urban food ecosystems [26].

Main hypothesis:

Hypothesis 1: The design-thinking approach can lead to the development of flexible, adaptable, and effective impact assessment frameworks for urban food systems.

Theoretical background for Hypothesis 1 is rooted in the principles of design thinking, which is a human-centered approach to problem-solving that fosters innovation through iterative processes and active stakeholder engagement. Design thinking has been increasingly applied in fields beyond product design, including policy development, social innovation, and complex urban systems like food systems.

Brown (2009) argues that design thinking enables organizations to navigate complex challenges by promoting creativity, empathy, and prototyping, making it particularly suited to multi-stakeholder environments where adaptability and flexibility are crucial [27]. The iterative nature of design thinking ensures that solutions evolve with stakeholder input, allowing for continuous refinement, which is critical for developing impact assessment frameworks that must remain responsive to dynamic urban environments.

Additionally, Kolko (2015) highlights that design thinking's emphasis on collaboration and co-creation enables the development of frameworks that are not only innovative but also inclusive, ensuring that the diverse needs of stakeholders are addressed [14]. This flexibility is especially important in urban food systems, where external factors such as policy changes, environmental conditions, and social dynamics continuously shift, requiring impact assessment tools that can adapt over time [28].

In this context, design thinking is seen as a key method for developing adaptable and effective frameworks that can respond to the unique and evolving needs of city-region food systems [14, 27].

Hypothesis 2: A holistic, multi-dimensional approach to impact assessment is more effective in capturing the complex dynamics of city-region food systems.

Theoretical foundations for Hypothesis 2 stem from research on multi-dimensional impact assessments and their effectiveness in evaluating complex systems like urban food systems. Traditional single-dimensional assessments often fall short of capturing the interplay between social, environmental, and economic factors that define urban food systems. Researchers like Kremen and Miles (2012) argue that a holistic, multi-dimensional approach is essential for understanding the broader impacts of sustainability initiatives, particularly in systems as interconnected as food systems [25].

Multi-dimensional frameworks consider a wide range of indicators, from environmental sustainability and resource management to social equity and economic resilience. This approach aligns with the Competing Values Model and the Goal Attained Model, which have been used in organizational theory to evaluate performance across multiple dimensions. These models suggest that by incorporating a broad set of variables, ranging from operational efficiency to stakeholder satisfaction, organizations can gain a more comprehensive understanding of their performance.

In urban food systems, a multi-dimensional approach allows for the simultaneous assessment of key factors such as food security, public health, environmental impact, and economic viability. Sonnino et al. (2019) argue that such an approach is particularly important in urban environments, where food systems are influenced by a variety of external forces, including policy shifts, climate change, and demographic trends [10]. Incorporating considerations of urban green spaces into these assessments is crucial, as they significantly contribute to public health and overall environmental sustainability in urban areas [29]. This theoretical perspective supports the hypothesis that a holistic, multi-dimensional impact assessment is more effective in capturing the complex dynamics of city-region food systems than a single-dimensional approach.

2. Background of Case Study and Methodology

In this subsection, the background of the Cities2030 project is provided to offer a comprehensive understanding of the context and significance of the case study. Cities2030 is a European initiative aimed at fostering sustainable, resilient, and inclusive city-region food systems in alignment with the European Union's Food2030 policy objectives. The project emphasizes innovation, co-creation, and stakeholder engagement as key strategies for transitioning food systems to meet sustainability, food security, and public health goals. By bringing together policy-makers, food producers, researchers, and community organizations, Cities2030 supports the development of integrated food systems that are responsive to urban and regional challenges. To explore the development of an impact assessment strategy within this context, a

single case study methodology was applied, allowing for an in-depth analysis of the co-creation process. The methodology is described in sub-section 2.2.

2.1. Study Background: Cities2030 Project

The Cities2030 project is a large-scale, transdisciplinary initiative funded by the European Union's Horizon 2020 research and innovation program. It is focused on reimagining and co-creating sustainable, resilient, and inclusive city-region food systems (CRFS). The project's vision aligns closely with the European Union's Food2030 policy, which aims to secure healthy, sustainable food systems that can address present and future challenges. These challenges include climate change, urbanization, food insecurity, and public health concerns. Cities2030 promotes the transformation of urban and peri-urban food systems into circular and localized networks that prioritize sustainability, food security, and resilience.

At the heart of Cities2030 is a broad consortium composed of 41 partners from multiple sectors, including universities, research institutes, municipalities, regional authorities, development agencies, non-governmental organizations, and private enterprises. These partners bring together diverse expertise in areas such as food policy, sustainability, technology, innovation, and social equity. By fostering cross-sectoral collaboration, Cities2030 aims to create integrated food systems that are capable of addressing the complexities of urban food supply, distribution, and waste management. The initiative emphasizes innovation and seeks to empower local communities by involving them in the decision-making processes that shape food systems.

One of the key strategies of the project is the creation of Policy and Living Labs, which serve as experimental hubs for innovation in food system policies and practices. These labs provide a platform for diverse stakeholders—ranging from policy-makers to food producers and consumers—to come together to co-create, test, and refine solutions tailored to the specific needs and conditions of their respective regions. By working within real-world urban and peri-urban settings, these labs can pilot new ideas and practices, such as the development of sustainable food procurement policies, the reduction of food waste, the promotion of healthier eating habits, and the integration of locally produced organic foods into public institutions like schools and hospitals. This practical, on-the-ground approach ensures that solutions are adaptable and can be scaled to different urban contexts.

Another cornerstone of the Cities2030 project is its emphasis on technology-driven decision-making. The project has developed the Single Click CRFS Platform (S2CP), a comprehensive digital tool designed to support data collection, analysis, and visualization for food systems across various regions. This platform enables stakeholders to monitor

key metrics, such as food production, distribution efficiency, and environmental impact. By centralizing data, the S2CP platform allows cities and regions to make evidence-based decisions that can improve the resilience and sustainability of their food systems. The platform also fosters greater transparency and accountability by allowing citizens to access and understand the data driving food system policies.

Cities2030 also places a strong emphasis on building knowledge and capacity within local communities. The project seeks to empower citizens, policy-makers, and food system actors by providing them with the tools, knowledge, and skills necessary to design and implement sustainable food policies. Through workshops, educational campaigns, and public awareness efforts, Cities2030 encourages a shift towards more sustainable food cultures and practices that honour local food heritage while addressing contemporary challenges. Additionally, the project emphasizes the importance of fostering inclusive food systems that address social inequalities, such as food poverty and lack of access to nutritious food, by ensuring that vulnerable populations are considered in the development of food policies.

Ultimately, the Cities2030 project aims to deliver long-term, systemic change in urban food systems by providing a model that can be adapted and replicated across Europe and beyond. Its holistic approach, which combines technological innovation, community engagement, and policy development, is designed to build resilient food systems that can withstand future shocks, whether environmental, economic, or social. By integrating food systems more deeply into urban planning and policy, Cities2030 is setting the foundation for cities to become hubs of sustainable food production and consumption, contributing to the broader goals of climate resilience, social equity, and public health. So creation of holistic impact assessment was an important part of the project.

2.2. Case Study Method

This research utilizes a single case study method to explore the development and testing of an impact assessment. Urban areas are projected for city-region food systems within the Cities2030 project. The case study approach was chosen because it allows for a deep and comprehensive exploration of the design-thinking process used in the creation of the impact assessment framework. By focusing on a single instance, the method provides rich, context-specific insights into the dynamics of co-creation and the challenges involved in transitioning food systems toward sustainability.

Case studies, as Yin (2018) highlights, are particularly valuable for examining contemporary events within real-life contexts, enabling a nuanced understanding of the processes, challenges, and outcomes associated with transitioning food systems toward sustainability [30].

This methodological choice aligns with the project's goal of investigating the dynamics of co-creation and stakeholder engagement, offering rich, empirical insights into how urban food systems can be assessed and improved through participatory methods.

The case study focused on the co-creation process, central to the Cities2030 framework, which involved active collaboration between multiple stakeholders, including policy-makers, urban planners, community representatives, and technology innovators. Data were collected through a combination of qualitative methods (focus group design thinking workshops), ensuring a robust exploration of the diverse perspectives and interactions that shaped the impact assessment tool. These methods included participant focus groups during workshops and document analysis of project-related materials. The use of multiple qualitative data sources is consistent with best practices in case study research, which aim to provide a comprehensive understanding of the subject matter [31].

The collection of qualitative data through focus groups allowed for in-depth exploration of stakeholder experiences and perceptions. Focus groups, as described by Krueger and Casey (2015), are an effective method for capturing group dynamics and generating discussions that can reveal collective insights and areas of consensus or disagreement [32]. In the Cities2030 case study, these discussions provided valuable insights into the challenges and opportunities encountered during the co-creation process, such as differences in stakeholder priorities or varying levels of expertise in sustainable food systems.

Thematic coding, as described by Braun and Clarke (2006), was employed to analyze the qualitative data, enabling the identification of key themes and patterns across the different data sources [33]. Thematic coding is a widely recognized method in qualitative research for organizing and interpreting data, particularly in exploratory case studies where the aim is to uncover underlying patterns in stakeholder contributions. In the Cities2030 study, thematic analysis revealed recurring themes such as the importance of flexibility in the design-thinking process, the challenges of integrating diverse stakeholder perspectives, and the role of co-creation in fostering innovation.

To enhance the validity and reliability of the findings, triangulation was employed by cross-referencing data from different sources. Denzin (1978) emphasizes that triangulation is a key technique in qualitative research for ensuring that findings are robust and not the result of a single data source or methodological bias [34]. In the Cities2030 case study, data from focus groups, interviews, and document analysis were triangulated to confirm the consistency of the findings and to provide a more comprehensive view of the co-creation process.

While the focus of the study was primarily qualitative, quantitative data were integrated where relevant to complement the qualitative

insights. Quantitative data is important for the overall understanding of sustainability [35]. For example, specific indicators related to food security, sustainability, and urban resilience were included in the assessment to quantify the impact of the interventions developed through the co-creation process. Ingram, Ericksen, and Liverman (2010) emphasize the critical role that food security plays in understanding the broader impacts of environmental change on sustainability, highlighting the need to incorporate these indicators into comprehensive assessments [36]. The integration of both qualitative and quantitative data is consistent with the mixed-methods approach, which Creswell and Plano Clark (2017) argue can enrich the depth and breadth of a study's findings by providing multiple lenses through which the research problem can be assessed [37].

The Cities2030 case study represents a novel application of design thinking within the context of impact assessment for city-region food systems, offering valuable lessons that can be replicated in other contexts. The study provides a detailed account of the design-thinking process, from the initial stages of stakeholder engagement to the final development of the assessment framework, with a focus on ensuring that the framework is both flexible and adaptable. By documenting these processes in detail, the study contributes to the growing body of knowledge on design thinking and co-creation in sustainability initiatives, offering a replicable model for future research and practice.

3. Results

In this subsection, we will analyze the key elements of the development and testing process for the Cities2030 impact assessment tool, focusing on how iterative design and collaboration contributed to the tool's refinement. The process began with an extensive theoretical analysis, synthesizing insights from 133 sources to create a strategy and framework for impact assessment. This was followed by the creation and testing of multiple tool versions, including feedback from 136 partner representatives and 5 extended reviews. The design thinking workshop played a crucial role in co-creating impact criteria, involving 65 stakeholders in the selection process. After several iterations, Tool Version 3 was finalized and tested through simulations, leading into the full-scale data collection during the 2023 test year. In addition to analyzing these processes, we will highlight the initial results collected, which show significant social, environmental, economic, and technological impacts, including the creation of 296 new partnerships, the engagement of over 11,000 community members, and numerous activities aimed at enhancing circularity and sustainability in city-region food systems. These early results demonstrate the effectiveness of the collaborative and iterative approach taken to develop the impact assessment tool.

3.1. Development Process of Impact Assessment Approach

In the background authors have characterized the first steps to create impact assessment. The first steps are described in Figure 3.1.

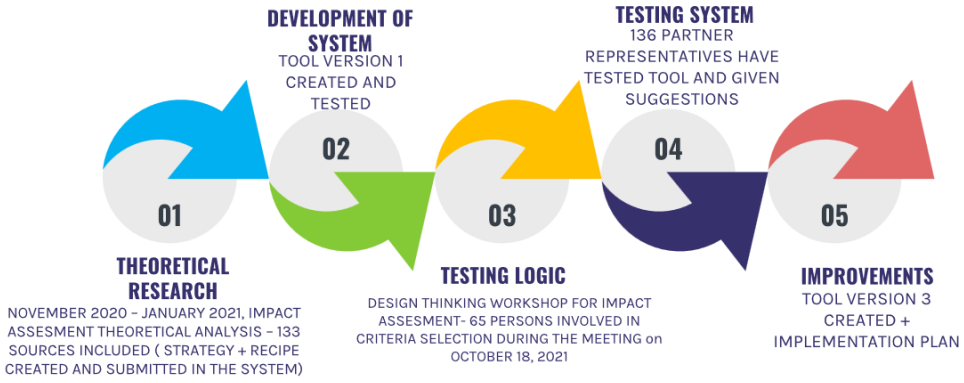


Figure 3.1. Development Process of Impact Assessment Approach

3.1.1. Impact Assessment Theoretical Analysis and Strategy Development

The Cities2030 project embarked on a thorough theoretical analysis to shape its impact assessment framework, which involved reviewing and synthesizing 133 sources from various scientific publications, policy documents, and strategic proposals. This extensive literature review was conducted between November 2021 and January 2022 and focused on identifying effective impact assessment criteria. The aim was to create a holistic and adaptable "strategy and recipe" for assessing the project's impact on city-region food systems (CRFS). The reviewed materials covered a wide range of topics, including sustainability metrics, social and economic impact indicators, and environmental performance measures. The resulting strategy provided a comprehensive guide for the project's impact assessment tool, ensuring it was grounded in evidence and best practices. The strategy and recipe were subsequently submitted to the system for use across the project's partner network.

3.1.2. Tool Version 1: Creation and Initial Testing

Based on the insights gained from the theoretical analysis, Tool Version 1 was developed and designed to facilitate the project's impact assessment process. This first iteration of the tool was constructed to reflect the theoretical framework and strategies developed during the literature review phase. The tool underwent an initial round of testing in early 2022 to evaluate its functionality and relevance in real-world scenarios.

3.1.3. Design Thinking Workshop: Criteria Selection

To further refine the tool, a Design Thinking Workshop was held on October 18, 2022, involving 65 participants representing various stakeholders, including policy-makers, food system experts, and community organizations. The goal of this workshop was to co-create and select the most relevant impact assessment criteria that could be used across the Cities2030 project. During the meeting, participants engaged in collaborative discussions and brainstorming sessions, using design-thinking methodologies to identify key criteria that would ensure the tool's effectiveness in diverse urban food system contexts. These criteria were integral to shaping the next iteration of the tool, aligning it more closely with the needs and expectations of the stakeholders involved.

3.1.4. Tool Version 2: Creation and Testing

Following the design thinking workshop, the feedback and ideas generated were incorporated into the development of Tool Version 2. This updated version of the tool reflected the collaborative input from the workshop participants and aimed to address the initial shortcomings identified in the first version. The tool was tested more broadly by 136 partner representatives, who provided detailed feedback on its performance and usability. Their suggestions were documented and formed the basis for further refinement of the tool.

3.1.5. Partner Feedback: Extended Reviews and Practical Documents

In addition to the testing process, 5 extended reviews were submitted by partners via email, offering in-depth insights and recommendations for improving the tool. These reviews were particularly valuable for making more nuanced adjustments to the tool's design and functionality. Alongside the feedback, 20 practical impact assessment documents were collected as examples to inform the development of the tool. These documents provided real-world examples of impact assessment methods, ensuring that the tool would be relevant and applicable in various city-region food system contexts.

3.1.6. Tool Version 3: Creation and Implementation Plan

Based on the extensive feedback from partners and the practical examples, Tool Version 3 was developed. This version included more refined criteria and features based on iterative testing and real-world feedback. Alongside the tool's release, an implementation plan was created to guide partners through its use, ensuring that they could effectively integrate it into their local impact assessment processes.

3.1.7. Test Simulation: May 17, 2022

To validate the effectiveness of Tool Version 3, a test simulation was conducted on May 17, 2022. This simulation allowed partners to trial the

tool in a controlled environment, simulating the data collection and impact assessment processes they would encounter in real-life applications. The simulation provided valuable insights into how the tool performed under practical conditions and allowed the project team to make final adjustments before rolling it out for broader use.

3.1.8. Data Collection: Test Year 2023

The year 2023 was designated as the test year for the full implementation of the tool. During this period, partners were tasked with using the tool to collect data on their local food systems, applying the impact assessment criteria established through the earlier phases of the project. The data collection process was closely monitored to ensure consistency and accuracy across the different regions and partners involved in the Cities2030 project. The results from this test year would be analysed to further refine the tool and enhance its ability to assess the impact of CRFS interventions across multiple dimensions, including social, environmental, economic, and technological aspects. In summary, the iterative development of the Cities2030 impact assessment tool—shaped by theoretical research, design thinking workshops, partner feedback, and practical testing—demonstrates a commitment to creating a robust, adaptable, and collaborative framework for assessing the impact of urban food systems transformation.

3.2. Theoretical Research to Create Basic Logic of Impact Assessment

The purpose of theoretical research was to develop the project's impact action strategy by synthesizing insights from a comprehensive review of literature, the project proposal and strategic reports. The approach includes a detailed examination of 130 scientific publications spanning the last 47 years, along with the Cities2030 project proposal and relevant strategic materials. This thorough review led to the creation of the Project Impact Action Strategy (PIAS). However, the research is limited to the collection of literature from seven databases and the reliance on specific project-related documents such as the Cities2030 proposal. Despite these limitations, the resulting Project Impact Action Strategy (PIAS) provides valuable insights and guidance for assessing the project's impact.

Research tasks:

1. to manage research in scientific databases to explore literature about impact and effectiveness;
2. to gather all information about impact from project proposal;
3. analyse impact indicators from strategical documents mentioned in project proposal;
4. create measurement lists and their application;

5. describe strategy verification methodology;
6. create conclusions and suggestions for future researches.

Approach: the research is based on literature review, project proposal and strategical document review. This detailed literature review has considered 130 scientific publications on the effectiveness and impact over the last 47 years, CITIES2030 project proposal on the impact measurements up to December 2020, and strategical documents related with the project focus. 133 literature sources were analysed, see Table 1.

Table 1. Count of the literature sources in stages

	Stage 1- in article title or/and keyword s mentioned terms:	**Stage 2- directly about (full tex t available):**	**Stage 3- uniq ources:**
Scopus	16592	36	
ScienceDirect	78381	24	133
Google Schola r	23700	15	
Sage Journals	54575	34	
Ebsco	832645	33	
Emerald	23456	25	
Web of Scienc e	52	8	
Sum:	1029401	175	

The literature review was conducted in four distinct research stages: (1) searching seven scientific databases for publications mentioning the terms "impact" and "effectiveness"; (2) selecting literature specifically focused on these terms; (3) removing duplicate entries; and (4) analyzing the final set of selected literature. In the first stage, 1,029,401 literature sources were identified. During the second stage, relevant sources were filtered, and duplicates were excluded. Ultimately, 133 sources advanced past the third stage.

Main findings: Project Impact Action Strategy (PIAS) created. Goal attained model was selected, comparison between alternatives see below in Figure 3.2.

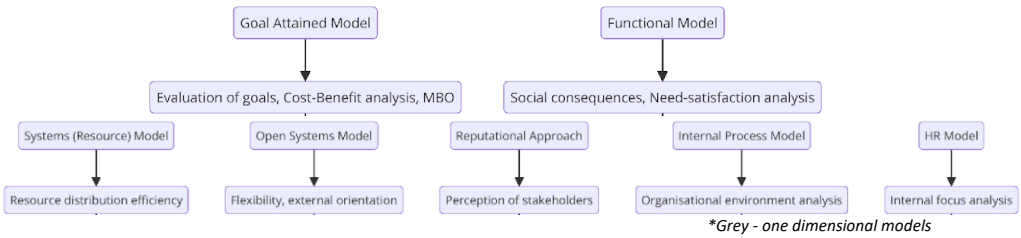


Figure 3.2. Model

The authors reviewed and categorized literature and theoretical frameworks to understand the foundational sources related to impact

and effectiveness. They found that the majority of the scientific knowledge (98%) is concentrated in business and management literature, though there are also contributions from fields such as engineering, medicine and psychology. Commonly referenced theories and approaches include classical theory [31], social capital theory [32-33], human relations, culture-excellence approaches, contingency theory [31], and organizational theory [34].

Additionally, the literature explores various aspects related to impact and effectiveness, such as creativity [37], job satisfaction [38-39], employee engagement [34; 40], knowledge management [41-44], organizational commitment [45-46], organizational affective commitment subscale [47], organizational culture [43, 48- 50], and organizational citizenship behaviour [51-52]. Information culture [53], leadership [54-55], and non-profit organizational effectiveness [56-63] also feature prominently.

Despite extensive research, there remains no consensus on how to define or measure impact and effectiveness, leading to the development of various models. Among the most frequently applied are the Goal Attained Model and the Competing Values Model. However, the most widely used approach is the multi-dimensional approach, which acknowledges the complexity of effectiveness (e.g., [15, 38; 47; 51; 64-73]. Other models mentioned in the literature include the Structural Functional Model, which examines a system's ability to prevent harmful external actions [74], the Organizational Development Model, which focuses on problem-solving and renewal [74], and contingency models [75]. There are numerous models, but the dimensions that can be used as indicators are even more varied. Researchers generally agree that impact is inherently multi-dimensional and varies widely. In summary, impact is a broad concept that encompasses a wide range of dimensions, and this multi-dimensionality has made it challenging to reach a consensus on precise measurement. This research concludes that over 199 dimensions are possible. These dimensions have been analyzed by several factors: (1) whether they are subjective (such as employee satisfaction or organizational climate, which are not directly measurable) or objective (such as profit or production rate, which are quantifiable), (2) whether they focus on internal factors (such as the development of the organization's people and activities) or external factors (such as the organization's interaction with the larger environment) , (3) whether they are financial or non-financial, and (4) whether they are universally applicable. The research shows that the most common dimensions are subjective and internal, with fewer external dimensions. In terms of financial versus non-financial indicators, 74% of the dimensions are non-financial, with only 36 financial indicators and 21 mixed indicators. Additionally, 40% of the dimensions are considered universal, while 58%

are only applicable in certain contexts, and the universality of 4 dimensions depends on their application.

In conclusion, dimensions can be subjective or objective, internal or external, financial or non-financial, and either universal or context-specific. However, the most frequently observed dimensions are subjective, internal, non-financial, and context-dependent. This indicates that impact evaluation is often closely tied to the specific context of an organization. Based on the research, the authors propose that impact should be defined as a multi-dimensional measure, encompassing financial/non-financial, internal/external, and subjective/objective dimensions that reflect the achievements, while recognizing that the relevant dimensions may vary depending on the context. The 199 dimensions and their classification into subjective/objective and internal/external categories and all were clustered in 6 main groups: Social, Environmental, Economical, Legal, Security and Policy, Culture and Values, and Technological. These dimensions were given to project partners for selection for most appropriate ones and the process is described in next sub-chapter.

3.3. Adaptation of Impact Assessment Logic with Design Thinking to Cities2030 Context

Implementation of an impact assessment strategy enables partners to analyse changes in their urban food system and also the impact created at different levels, in a way that both reflects Cities2030 recommendations and is tailored to the city's and partner's own particular context.

Helps partners to:

- Assess the current status and performance of a city region food system following a whole-system approach
- Establish baselines and monitor changes resulting from (future) policy and programme implementation.

3.3.2. Design Thinking Process

3.3.2.1. Categorization of Impact Areas (Framework Development)

This step is crucial for developing a structured framework that organizes the criteria into distinct impact categories. It ensures that each aspect is evaluated comprehensively across various dimensions like social, environmental, economic, legal, security, culture, and technological impacts. Here is a detailed breakdown of how this process was executed.

Objective: to break down the criteria into distinct impact categories, ensuring that each criterion is allocated to its appropriate category based on its nature and relevance. The goal is to classify the numerous criteria

under broad categories such as Social, Environmental, Economical, Legal, Security, Policy, Culture and Values, and Technological, with each category having a specific number of criteria that will guide the evaluation process.

Process: Framework Development

1. Initial Planning and Alignment. Objective: define the scope and purpose of the categorization with stakeholders (65 persons).

Approach:

- Design thinking workshops: Organize initial workshops or alignment meetings to bring together key stakeholders. In these sessions, communicate the importance of categorization and ensure all participants understand the categories to be developed.
- Define Categories: Present the pre-defined categories (Social, Environmental, etc.) to the participants and ensure consensus on their definitions and relevance. Allow input from stakeholders on any additional categories that might be necessary or modifications to existing ones.
- Set Goals: Clarify the purpose of categorization—whether it is to evaluate performance, impact, or compliance—and set clear goals for how the categorization will drive the assessment.

2. Collaborative Workshops to Define Criteria (Social, Environmental, etc.)

Objective: Collaboratively define the specific criteria within each category. Use a participatory approach to ensure input from all relevant stakeholders.

Approach:

Breakout Groups: Divide the participants (65 persons) into smaller working groups based on expertise or interest. Assign each group to a specific category (e.g. Social, Environmental, Economic, etc.).

Facilitated Brainstorming: Each group will brainstorm potential criteria for their assigned category.

Criteria Refinement: After initial brainstorming, refine the list of criteria through group discussions. Eliminate overlapping or redundant criteria, merge similar ones, and prioritize the most critical metrics. This stage involves reaching consensus within each group on the final criteria.

Group Presentations: Each group presents their finalized criteria to the larger group. This allows for feedback, questions, and suggestions from other groups, promoting cross-category alignment and ensuring that the criteria are coherent and comprehensive across all categories.

The first 2 steps were implemented with help of a MIRO board. See Figure 3.3.

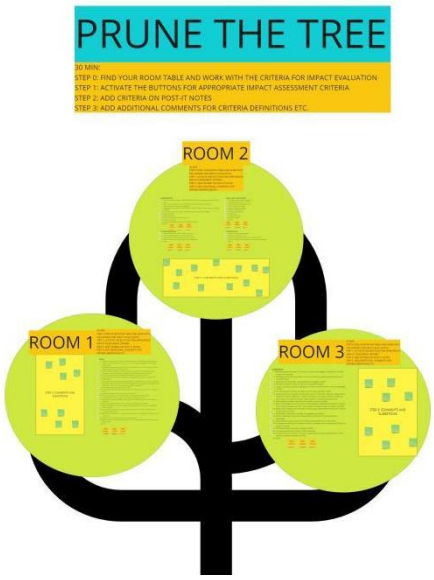


Figure 3.3. Step 1 and 2 in MIRO

3. Consensus Building and Criteria Finalization

Objective: Build consensus on the final list of criteria for each category, ensuring that they are clear, measurable, and relevant.

Approach:

Voting/Ranking Process: Utilize a voting or ranking process to prioritize the criteria within each category. See voting in Figure 3.4.

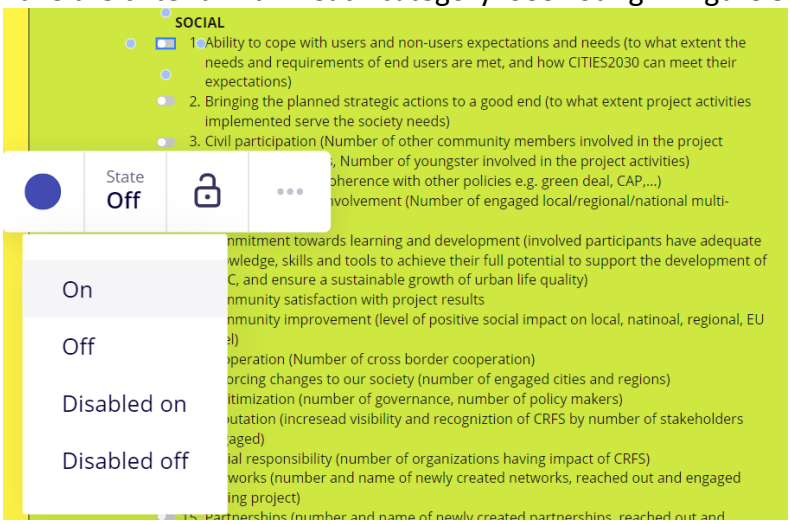


Figure 3.4. Step 3 in MIRO: voting (if 'on' then appropriate according to the focus group)

Refinement Based on Feedback: Incorporate feedback from all stakeholders to make necessary adjustments to the criteria. Some criteria were redefined, clarified, or even split into multiple sub-criteria to ensure precision and clarity.

Group Agreement: The finalized set of criteria was shared across all teams for final approval. Achieving consensus here is critical, as it

ensures that everyone agrees with the impact areas and the criteria defined within them.

4. Documentation and Standardization

Objective: Clearly document and standardize the impact categories and their corresponding criteria for future use and evaluation.

Approach:

- 136 partner representatives have tested the tool and given suggestions with included criteria.
- 5 extended reviews from partners about the tool (in email form).
- 20 practical impact assessment documents taken as examples.
- Agreed-upon framework that categorizes the impact criteria under the following areas:

1. Social (13 Criteria)
2. Environmental (9 Criteria)
3. Economical (16 Criteria)
4. Legal, Security, Policy (8 Criteria)
5. Culture and Values (4 Criteria)
6. Technological (4 Criteria)

Level of impact collection was selected: work package level. See Figure 3.5.

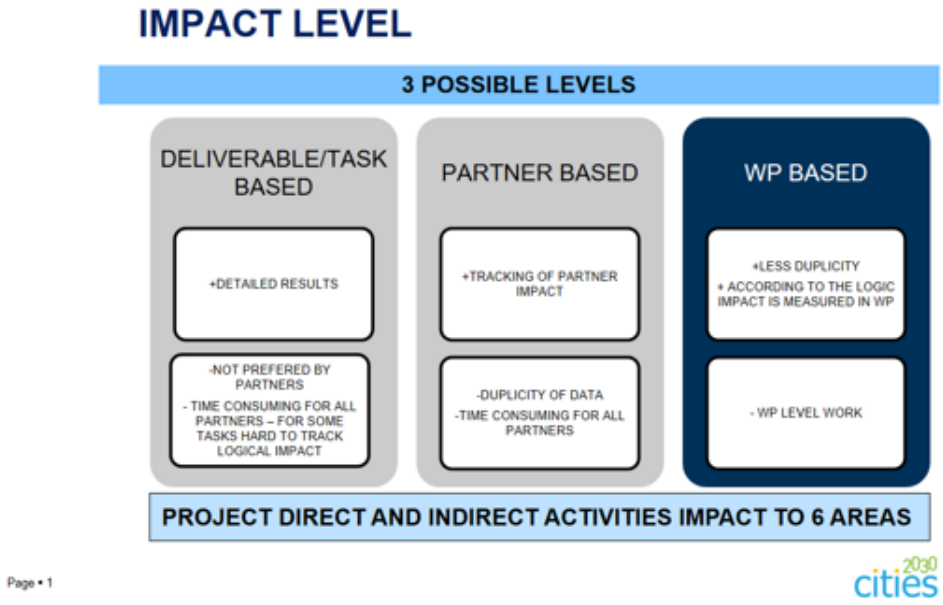


Figure 3.5. Impact Collection Level

Impact evaluation methods were selected 2: verification and measurements. To verify: Progress related with Cities2030 scope, Determine the impact level of themes. To measure: variables of impact in 6 areas.

Social impact selected indicators:

- Number of new partnerships and networks created in the Cities2030
- Number of external partner and crowd-initiated ideas
- Number of other community members involved in the project city/region activities
- Number of youngsters involved in the project activities
- Number of food system experts involved
- Ability to cope with users' and non-users' expectations and needs (to what extent the needs and requirements of end users are met, and how CITIES2030 can meet their expectations) (evaluate in scale of 100%)
- Project coherence with other policies e.g. green deal, CAP, etc. (evaluate in 100%)
- Commitment towards learning and development (participants involved have adequate knowledge, skills and tools to achieve their full potential to support the development of SFSC, and ensure a sustainable growth of urban life quality (evaluate in 100% scale)

Environmental:

- Increased visibility and recognition of CRFS by number of stakeholders engaged (involved)
- Number of stakeholders that put out carbon or sustainability reports, limits harmful pollutants and chemicals or seeks to lower greenhouse gas emissions
- Number of stakeholders that adapt lean principles in CRSF
- Number of cities and regions involved in CRFS (in Cities2030 activities)
- Number of activities to enhance circularity and local food belts
- Number of events to reduce CO2 emission, transport emissions by all actors in the chain at different stages
- Number of events to stop food poverty, generation of surpluses and waste
- Number of activities related to sustainable food
- Number of optimized food delivery chains
- Number of protected and preserved nature resources

Economical:

- Number of product innovations (new products or services)
- Number of innovated processes (new production or delivery methods)
- Improved existing products or services
- Number of companies consulted about CRFS
- Number of new employees involved (from partner companies) in CRFS
- Number of saved financial resources due to CRFS (EUR)

- Incomes generated for stakeholders from CRFS activities (EUR)
- Number of financial resources attracted (the amount of investment) to CRFS (EUR)
- Number of food producers engaged in SFSC
- Number of new consumers engaged in SFSC
- Number of structured investment capital plans
- Number of investors contacted
- Number of meetings with investors
- Number of investors Memorandum of Understanding signed
- Number of events for companies to increase expertise (the level of CRFS expertise
- Number of activities to increase salaries, expertise, competencies of employees at CRFS due to project activities
- Number of and assimilated events
- Number of good practices (generated)
- Number of business plans for innovations

Technological:

- Number of new technologies created in project or partnerships
- Number of technologies improved in the project or partnerships
- Number of research projects that could be a base for new technologies
- Number of developing transportable units with new technologies, for farmers and schools to teach STEM
- Number of digital learning platform

Legal, Political, Security:

- Number of CRFS-PL (policy labs involved, or developed)
- Number of CRFS-LL (living labs activated and or involved)
- Number of urban food deserts : distances home/sustainable food retail points
- Number of public policies documents mentioning food stakes
- Number of action in schools, education
- Number of cities engaged in MUFPT activated and or involved
- Number of activities related with implementation of EU policies > FOOD2030, UN's NUA and SDD-11, and consorts
- Number of scientific papers related to Cities2030 legal, policy or security aspects
- Number of practices (examined) in WP field
- Number of interviews realised in WP field
- Number of new policy documents in progress
- Number of new policy documents in action
- Number of governance, policy-makers involved

Cultural and Values:

- Number of citizens touched by Cities2030 activities (culture and value impact)
- Number of events organised or participated in (culture and value impact)
- Urban/rural food consumers' perception on SFSC (number of new consumers engaged in SFSC)
- Number of activities related to culturally-appropriate food available in neighbourhoods, in schools, in the workplace, etc.
- Number of Food Systems Dialogues (FSD) and assimilated events
- Number of cross-border cooperation sessions

Final testing was conducted according to the process described below in Figure 3.6. When simulative submission of data for imaginative case was submitted in the tool.

Figure 3.6. Tool Testing with Simulative Case

3.3.2. Created Data Collection Approach

Partners used a created survey form to enter data about the impact created. For quantitative indicators partners describe the results with numbers, but in qualitative section present the current situation as briefly and accurately as possible with proofs about quantitative indicator results. If data were collected specifically for this report, describe the methods chosen and how they were applied in a practical context, as well as data structure, categories and variables. For data collection authors have introduced a manual. Steps of filling basic info, see Figure3. 7.

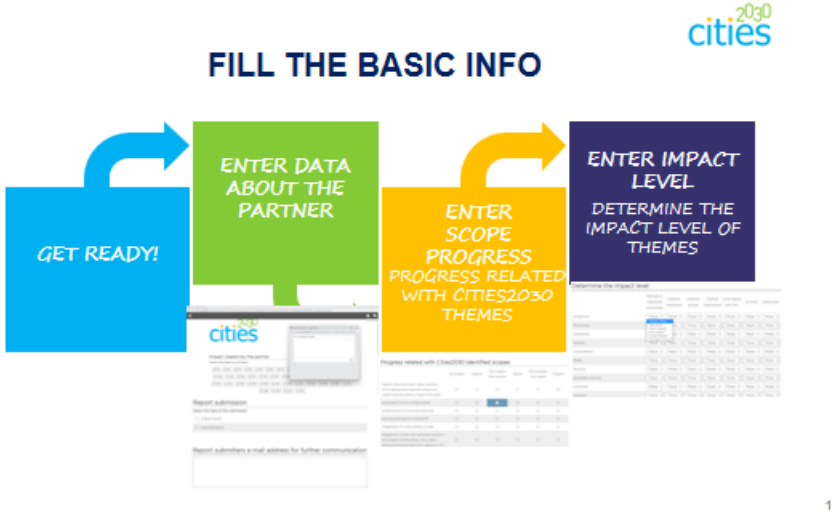


Figure 3. 7. Filling the Basic Info

First steps included basic info submission about partner, work package, scope of progress with Cities2030 themes and impact level at different levels. In Figure 3.8 see submission process of criteria in 6 areas (quantitative and qualitative submissions) and MUFPP criteria. MUFPP criteria could be selected by each partner according to their work packages.

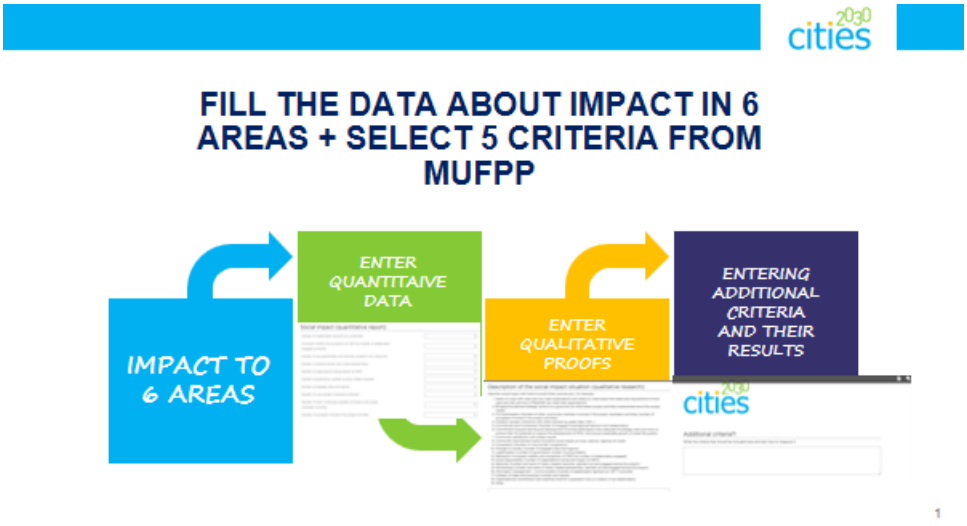


Figure 3.8. Impact in 6 Areas and 5 MUFPP Criteria

3.4. Impact Achievements in the First Reporting Period (2023)

During the first reporting period of Cities2030, several notable accomplishments were recorded across multiple areas of social, environmental, economic, technological, legal, and cultural impact.

These results highlight the project's commitment to transforming city-region food systems (CRFS) through collaboration, innovation, and sustainable practices.

According to the general data, all Cities2030 scope elements were impacted, especially Support cities and their peri-urban interfaces (CPUI), which develop and implement urban food systems policies (UFSP) to meet FOOD 2030 and Establishment of FOOD 2030 living labs. See Figure 3.9.

Question: Progress related with Cities2030 identified scopes (self- evaluation)

"Not related - partner is not involved in the activities related with the scope "Regress - activities behind the scheldue "More regress than progress - activities behind the scheldue but planned to implement in the next reporting period (in the next year) "Neutral- no acitivities planned or implemented in the reported period related with the scope "More progress than regress - activities planned but not implemented in the reported period related with the scope "Progress - activities implemented in the reported period related with the scope

Type:311 - Standard matrix 1

QUESTION:	NOT RELATED (1)	REGRESS (2)	MORE REGRESS THAN PROGRESS (3)	NEUTRAL (4)	MORE PROGRESS THAN REGRESS (5)	PROGRESS (6)	TOTAL	AVERAGE VALUE	MISSING* A	MISSING* B
v_947: Support cities and its peri- urban interfaces (CPUI) develop and implement urban food systems policies (UFSP) to meet FOOD 2030	17.65% (9)	1.96% (1)	0.00% (0)	19.61% (10)	37.25% (19)	23.53% (12)	51	4.27	0	68
v_948: Deployment of CPUI concrete actions	16.67% (8)	2.08% (1)	0.00% (0)	29.17% (14)	27.08% (13)	25.00% (12)	48	4.23	0	71
v_949: Establishment of FOOD 2030 living labs	17.65% (9)	1.96% (1)	5.88% (3)	5.88% (3)	25.49% (13)	43.14% (22)	51	4.49	0	68
v_950: Draw key learnings from the MUFPP	21.28% (10)	0.00% (0)	6.38% (3)	25.53% (12)	23.40% (11)	23.40% (11)	47	4.00	0	72
v_951: Engagement of a wide diversity of cities	19.57% (9)	6.52% (3)	4.35% (2)	21.74% (10)	23.91% (11)	23.91% (11)	46	3.96	0	73
v_952: Engagement of cities with 'good track record' in food systems transformation (FST), others aiming at prioritizing their policy agenda on FST	36.17% (17)	0.00% (0)	2.13% (1)	17.02% (8)	21.28% (10)	23.40% (11)	47	3.57	0	72
v_953: Urban participatory policy processes to meet RRI/gender engaging actors of the whole food system	31.91% (15)	6.38% (3)	2.13% (1)	21.28% (10)	17.02% (8)	21.28% (10)	47	3.49	0	72
v_954: Generate political commitment and institutionalising food policy for long-term deployment	16.67% (8)	2.08% (1)	2.08% (1)	22.92% (11)	33.33% (16)	22.92% (11)	48	4.23	0	71
v_955: Deploy a compelling communication and dissemination strategy	2.13% (1)	4.26% (2)	0.00% (0)	14.89% (7)	44.68% (21)	34.04% (16)	47	4.98	0	72
v_956: Resources to attract investments/opportunities for long-term sustainability	24.44% (11)	2.22% (1)	0.00% (0)	24.44% (11)	31.11% (14)	17.78% (8)	45	3.89	0	74
v_957: Strong centralized professional coordination	17.02% (8)	6.38% (3)	0.00% (0)	23.40% (11)	21.28% (10)	31.91% (15)	47	4.21	0	72
v_958: Synergies (other EU funded projects) to align with the FOOD 2030 framing	6.52% (3)	0.00% (0)	0.00% (0)	30.43% (14)	17.39% (8)	45.65% (21)	46	4.89	0	73

Figure 9. Progress related to Cities2030 scopes

The greatest impact internally in Cities2030 partnership are made in themes: production and processing. See detailed data below.

Question: Determine the impact level to Cities2030 themes (self-evaluation)

"Very poor impact - no impact created"Poor impact - minimal indirect impact through activivities implemented by other partners "Fair impact - indirect impact through activivities implemented by other partners but results will occure after the time"Good impact - direct impact created with your WP partners but clear results will occure after the time"Excellent impact - direct impact with some results in the reporting period

Type:361 - Drop-down matrix

scale: Internally in Cities2030 partnership

	VERY POOR (1)	POOR IMPACT (2)	FAIR IMPACT (3)	GOOD IMPACT (4)	EXCELLENT IMPACT (5)	TOTAL	AVERAGE VALUE	MISSING* A	MISSING* B
v_959: Production	7.32% (3)	14.63% (6)	43.90% (18)	31.71% (13)	2.44% (1)	41	3.07	0	78
v_963: Processing	16.67% (6)	8.33% (3)	50.00% (18)	19.44% (7)	5.56% (2)	36	2.89	0	83
v_967: Distribution	21.21% (7)	12.12% (4)	27.27% (9)	27.27% (9)	12.12% (4)	33	2.97	0	86
v_971: Markets	22.58% (7)	6.45% (2)	32.26% (10)	25.81% (8)	12.90% (4)	31	3.00	0	88
v_977: Consumption	11.76% (4)	5.88% (2)	38.24% (13)	32.35% (11)	11.76% (4)	34	3.26	0	85
v_991: Waste	19.35% (6)	9.68% (3)	32.26% (10)	25.81% (8)	12.90% (4)	31	3.03	0	88
v_1009: Security	29.03% (9)	9.68% (3)	32.26% (10)	16.13% (5)	12.90% (4)	31	2.74	0	88
v_1027: Ecosystem services	12.50% (4)	6.25% (2)	37.50% (12)	34.38% (11)	9.38% (3)	32	3.22	0	87
v_1045: Live hood	9.38% (3)	9.38% (3)	43.75% (14)	31.25% (10)	6.25% (2)	32	3.16	0	87
v_1061: Inclusion	6.06% (2)	15.15% (5)	27.27% (9)	39.39% (13)	12.12% (4)	33	3.36	0	86

Figure 3.10. Impact internally in Cities2030 partnership

The greatest impact on local regions and cities was made in themes: production and processing. See detailed data below.

scale: Local regions and cities

	VERY POOR IMPACT (1)	POOR IMPACT (2)	FAIR IMPACT (3)	GOOD IMPACT (4)	EXCELLENT IMPACT (5)	TOTAL	AVERAGE VALUE
v_960: Production	14.63% (6)	9.76% (4)	48.78% (20)	24.39% (10)	2.44% (1)	41	2.90
v_964: Processing	22.22% (8)	5.56% (2)	44.44% (16)	22.22% (8)	5.56% (2)	36	2.83
v_968: Distribution	15.15% (5)	12.12% (4)	36.36% (12)	21.21% (7)	15.15% (5)	33	3.09
v_972: Markets	22.58% (7)	6.45% (2)	35.48% (11)	25.81% (8)	9.68% (3)	31	2.94
v_979: Consumption	8.33% (3)	5.56% (2)	41.67% (15)	33.33% (12)	11.11% (4)	36	3.33
v_996: Waste	15.15% (5)	9.09% (3)	33.33% (11)	30.30% (10)	12.12% (4)	33	3.15
v_1012: Security	28.12% (9)	9.38% (3)	37.50% (12)	12.50% (4)	12.50% (4)	32	2.72
v_1032: Ecosystem services	15.15% (5)	9.09% (3)	39.39% (13)	24.24% (8)	12.12% (4)	33	3.09
v_1049: Live hood	11.76% (4)	11.76% (4)	41.18% (14)	29.41% (10)	5.88% (2)	34	3.06
v_1064: Inclusion	5.71% (2)	14.29% (5)	28.57% (10)	37.14% (13)	14.29% (5)	35	3.40

Figure 3.11. Impact on local regions and cities

The greatest impact at EU level was made in themes: production and processing. See detailed data below.

	VERY POOR IMPACT (1)	POOR IMPACT (2)	FAIR IMPACT (3)	GOOD IMPACT (4)	EXCELLENT IMPACT (5)	TOTAL	AVERAGE VALUE
v_961: Production	29.73% (11)	8.11% (3)	43.24% (16)	16.22% (6)	2.70% (1)	37	2.54
v_965: Processing	29.41% (10)	2.94% (1)	52.94% (18)	11.76% (4)	2.94% (1)	34	2.56
v_969: Distribution	37.50% (12)	6.25% (2)	25.00% (8)	21.88% (7)	9.38% (3)	32	2.59
v_973: Markets	33.33% (10)	6.67% (2)	33.33% (10)	23.33% (7)	3.33% (1)	30	2.57
v_983: Consumption	32.26% (10)	6.45% (2)	41.94% (13)	12.90% (4)	6.45% (2)	31	2.55
v_1000: Waste	32.26% (10)	9.68% (3)	35.48% (11)	12.90% (4)	9.68% (3)	31	2.58
v_1017: Security	32.26% (10)	9.68% (3)	35.48% (11)	9.68% (3)	12.90% (4)	31	2.61
v_1037: Ecosystem services	26.67% (8)	10.00% (3)	40.00% (12)	13.33% (4)	10.00% (3)	30	2.70
v_1053: Live hood	31.03% (9)	10.34% (3)	37.93% (11)	13.79% (4)	6.90% (2)	29	2.55
v_1068: Inclusion	26.67% (8)	6.67% (2)	43.33% (13)	13.33% (4)	10.00% (3)	30	2.73

Figure 3.12. Impact at EU level

The greatest impact at global level was made in themes: production and processing. See detailed data below.

scale: Global level

	VERY POOR IMPACT (1)	POOR IMPACT (2)	FAIR IMPACT (3)	GOOD IMPACT (4)	EXCELLENT IMPACT (5)	TOTAL	AVERAGE VALUE
:_962: Production	33.33% (12)	16.67% (6)	36.11% (13)	8.33% (3)	5.56% (2)	36	2.36
:_966: Processing	33.33% (11)	6.06% (2)	51.52% (17)	6.06% (2)	3.03% (1)	33	2.39
:_970: Distribution	41.94% (13)	6.45% (2)	35.48% (11)	9.68% (3)	6.45% (2)	31	2.32
:_975: Markets	39.29% (11)	7.14% (2)	35.71% (10)	14.29% (4)	3.57% (1)	28	2.36
:_986: Consumption	35.48% (11)	12.90% (4)	38.71% (12)	6.45% (2)	6.45% (2)	31	2.35
:_1005: Waste	46.67% (14)	6.67% (2)	30.00% (9)	10.00% (3)	6.67% (2)	30	2.23
:_1022: Security	40.00% (12)	6.67% (2)	40.00% (12)	0.00% (0)	13.33% (4)	30	2.40
:_1041: Ecosystem services	40.00% (12)	10.00% (3)	36.67% (11)	6.67% (2)	6.67% (2)	30	2.30
:_1057: Live hood	36.67% (11)	10.00% (3)	43.33% (13)	3.33% (1)	6.67% (2)	30	2.33
:_1074: Inclusion	41.94% (13)	12.90% (4)	25.81% (8)	9.68% (3)	9.68% (3)	31	2.32

Figure 3.13. Impact at global level

Social Impact:

- The project successfully established 296 new partnerships and networks, fostering collaboration within and beyond the CRFS.
- 249 external partner and crowd-initiated ideas were contributed, showing strong external engagement.
- 11,704 community members participated in city and regional activities, with a significant involvement of 3,774 young people.
- 352 food system experts were engaged to provide expertise and guidance.
- The project achieved an average score of 61.6% in meeting user and non-user expectations.
- Project coherence with other policies such as the Green Deal and CAP was rated at 64%.
- Participants' commitment to learning and development, crucial for supporting sustainable food systems, was rated at 58%.

Environmental Impact:

- 1,356 stakeholders were involved, raising visibility and recognition of CRFS.
- 43 stakeholders initiated carbon or sustainability reports and efforts to reduce harmful emissions.
- 60 stakeholders adopted lean principles in CRFS to enhance efficiency.
- The project expanded its reach to 119 cities and regions.
- 79 activities were conducted to enhance circularity and local food systems, while 35 events aimed to stop food poverty and reduce waste.
- 440 activities focused on sustainable food practices, with 17 natural resources protected or preserved through project actions.

Economic Impact:

- 48 product innovations and 11 process innovations were introduced as part of the project.
- 18 existing products or services were improved, supporting economic growth within CRFS.
- 156 companies were consulted about CRFS, resulting in 20 new employees engaged in these food systems.
- 157 food producers and 7,719 new consumers were engaged in short food supply chains (SFSC), supporting localized food systems.
- The project facilitated 10 meetings with investors and organized 46 events to increase CRFS expertise among companies.

Technological Impact:

- 29 new technologies were created, while another 29 technologies were improved through project partnerships.
- 17 research projects were identified as potential foundations for future technology development.

Legal, Policy, Security, and Management Impact:

- The project identified 10 urban food deserts and worked towards improving access to sustainable food retail points.
- 40 public policy documents now mention food-related issues, reflecting the growing importance of food systems in urban governance.
- 222 actions were taken in schools to promote sustainable food education.
- 11 cities were engaged in the Milan Urban Food Policy Pact (MUFPP), demonstrating commitment to sustainable urban food policies.
- The project led 513 activities focused on implementing EU policies, including FOOD2030, UN's New Urban Agenda, and Sustainable Development Goals.
- 90 governance and policy-makers were involved in CRFS governance, with 45 practices examined and 3 policy documents in progress.

Cultural and Value Impact:

- The project touched the lives of 25,540 citizens through various cultural and value-related activities.
- 110 events were organized or participated in, aimed at promoting culturally appropriate food systems.
- 526 activities focused on making culturally-appropriate food available in schools, workplaces, and neighborhoods.
- 91 Food Systems Dialogues (FSD) were held, fostering discussions on the future of food systems.
- Additionally, 21 cross-border cooperation sessions were conducted to share knowledge and collaborate on food system innovations across different regions.

These results demonstrate the broad and diverse impact Cities2030 has had on building resilient and sustainable food systems, fostering collaboration, and engaging communities across Europe.

4. Discussion

The Cities2030 project has yielded significant results that offer valuable insights into the potential of urban food system transitions, which can be interpreted in the light of existing research and the project's working hypotheses. The project aimed to transform city-region food systems (CRFS) to align with the broader Food2030 and European Green Deal policies, focusing on sustainability, resilience, and inclusivity. This section discusses the findings, their relevance to prior research, and possible directions for future studies.

4.1. Interpretation in the Context of Previous Studies

Design Thinking for Impact Assessment

Previous research has suggested that traditional impact assessment tools often lack the flexibility to address the complex and interconnected

nature of urban systems. For instance, Sonnino et al. (2019) argue that rigid, predefined frameworks fail to capture the nuanced dynamics of food systems in urban contexts [10]. Similarly, Godfray et al. (2010) highlight the limitations of conventional tools in adapting to evolving environmental and socio-economic conditions [12]. This paper has addressed these gaps by employing a design-thinking approach, which fosters adaptability through co-creation, stakeholder engagement, and iterative refinement. This approach proved to be particularly effective in creating a flexible impact assessment framework that could evolve in response to real-time feedback, as evidenced by continuous refinements made throughout the project. These findings align with Kolko (2015) and Brown (2009), who emphasize that design thinking can facilitate innovation in complex, multi-stakeholder environments by centering human needs and promoting continuous iteration [14, 27]. Thus, Cities2030's design thinking-based impact assessment supports the argument that such an approach can foster innovation and ensure more effective adaptation to dynamic urban food system challenges.

Multi-dimensional Impact Measurement

The Cities2030 project's holistic evaluation of impacts across six dimensions—social, environmental, economic, legal/security, cultural, and technological—aligns with the multi-dimensional frameworks advocated by Kremen and Miles (2012), who emphasize the importance of considering a wide range of factors in sustainability assessments [25]. The Goal Attained Model and the Competing Values Model were central to Cities2030's impact assessment strategy, reflecting a growing recognition in the literature that multidimensional models are essential for capturing the full scope of sustainability and resilience outcomes in city-region food systems [38, 64]. Cities2030 operationalized these frameworks by incorporating indicators that measure the interplay of social, environmental, and economic factors, extending beyond theoretical constructs to practical applications in urban settings. These findings not only corroborate the effectiveness of multi-dimensional models in sustainability research, but also demonstrate their applicability in real-world city-region contexts.

Community Engagement and Co-Creation

Research on sustainable development frequently emphasizes the critical role of community engagement and co-creation in successfully implementing sustainability initiatives. Scoones (2016) and Benton et al. (2021) highlight that involving diverse stakeholders in decision-making processes leads to more equitable and effective outcomes [19, 23]. The Cities2030 project's emphasis on co-creation, involving over 11,000 community members and establishing 296 new partnerships, demonstrates the transformative potential of this approach. The project successfully engaged a wide array of stakeholders, fostering ownership and commitment to the food system transformation. These findings are

consistent with Marsden and Morley (2014), who argue that inclusive governance is key to achieving sustainability in food systems [17]. By actively involving stakeholders, Cities2030 not only enhanced participation but also achieved tangible results, such as reductions in food poverty and improvements in circular food systems.

Technological Innovation in Urban Food Systems

The creation of 29 new technologies and the improvement of 29 others within the Cities2030 project underscores the importance of technological innovation in advancing sustainable food systems. Ingram (2011) argues that technological advancements, especially those that enhance food security, are critical to addressing global environmental challenges [9]. The success of Cities2030 in fostering technology-driven solutions reflects the growing importance of integrating digital tools, artificial intelligence, and data analytics into urban food systems to improve their efficiency and resilience. This aligns with trends observed in the agritech and foodtech sectors, where technological innovations are increasingly seen as essential for advancing sustainability goals in complex urban environments.

4.2. Working Hypotheses Revisited

Hypothesis 1: The design-thinking approach can lead to the development of flexible, adaptable, and effective impact assessment frameworks for urban food systems.

Supported by Findings: The project's success in creating a framework that can be tailored to diverse city-region contexts, while continuously evolving through stakeholder feedback, validates this hypothesis.

Cities2030 project applied a design-thinking approach, which emphasizes adaptability through iterative refinement, continuous stakeholder engagement, and co-creation. This approach proved essential in developing an impact assessment framework that was both flexible and adaptable to the diverse and dynamic needs of city-region food systems. The project's success in evolving the framework based on real-time feedback from stakeholders underscores the validity of this hypothesis.

Kolko (2015) and Brown (2009) have shown that design thinking fosters innovation by promoting collaboration across different disciplines and continuously refining solutions based on iterative cycles of prototyping and feedback [12, 14]. The Cities2030 project demonstrated this iterative process, adapting its assessment framework to different city-region contexts, showing that design thinking enabled the framework to respond effectively to varying challenges. These findings corroborate the assertions of Buchanan (1992), who argued that design thinking is particularly useful in addressing complex, "wicked"

problems like those found in urban food systems, where predefined solutions often fail to capture the intricacies of the system [76].

Thus, the project's ability to tailor the framework to different contexts while keeping it effective and evolving based on stakeholder feedback validates Hypothesis 1. This adaptability is critical in urban food systems, which are subject to rapid changes in environmental, social, and economic conditions.

Hypothesis 2: A holistic, multi-dimensional approach to impact assessment is more effective in capturing the complex dynamics of city-region food systems.

Supported by Findings: The project's multi-dimensional impact assessment tool successfully evaluated diverse impacts across social, environmental, and economic dimensions, among others, validating the hypothesis.

The Cities2030 project adopted a holistic, multi-dimensional approach to impact assessment, evaluating outcomes across social, environmental, economic, legal, and technological dimensions. This approach proved effective in capturing the full complexity of city-region food systems, validating Hypothesis 3.

Kremen and Miles (2012) emphasize the need for multi-dimensional assessment tools in sustainability science, arguing that single-dimensional models often overlook important interconnections between different aspects of sustainability [25]. The Cities2030 project's assessment framework successfully integrated indicators across various domains, such as food security, community resilience, environmental sustainability, and economic growth. This approach aligns with the Goal Attained Model and Competing Values Model, which are both designed to evaluate performance across multiple dimensions, as noted by Doherty and Horne (2002) [77].

Moreover, Sonnino et al. (2019) argue that urban food governance requires evaluation tools that can address the complexities of city-region food systems, which are shaped by various social, economic, and environmental factors [10]. By operationalizing these multi-dimensional frameworks in real-world contexts, Cities2030 provided a comprehensive understanding of the impacts of its interventions, further validating the hypothesis that a holistic approach is more effective.

4.3. Implications in the Broader Context

The findings have broad implications for urban sustainability initiatives worldwide. The success of a flexible, co-created impact assessment tool highlights the need for governance frameworks that prioritize adaptability and inclusivity. The results demonstrate that achieving sustainability in food systems requires not just top-down policy directives but active, grassroots involvement in the co-creation of solutions.

In terms of policy, the framework aligns with broader EU objectives such as the Farm to Fork Strategy, which emphasizes sustainable food systems, climate action, and public health. The project's alignment with these goals shows that localized actions can effectively contribute to global sustainability agendas, provided they are supported by comprehensive impact assessment tools that address the complexities of urban environments.

The creation of new technologies and innovations within the project also signals that technological advancements will continue to play a critical role in the future of urban food systems. Policy-makers and urban planners must invest in technology-driven solutions to enhance food security and sustainability in cities.

4.4. Future Research Directions

Long-Term Impact Assessment

Future research should focus on the long-term impacts of the Cities2030 interventions, particularly in terms of sustainability and resilience. Longitudinal studies could assess how the project's innovations and policies evolve over time and how they contribute to broader environmental and socio-economic outcomes.

Scalability and Transferability

Research is needed to explore the scalability of the Cities2030 impact assessment framework. Investigating how the tool can be adapted to different global regions with varying cultural, economic, and environmental contexts will help assess its transferability and broader applicability.

Technological Integration

As technological innovation continues to advance, future studies should explore how emerging technologies, such as blockchain, AI, and IoT (Internet of Things), can be further integrated into food system governance and impact assessment tools. This will help cities enhance the efficiency, transparency, and sustainability of their food systems.

Cross-Sectoral Policy Integration

Further research could investigate how impact assessment tools like those developed in Cities2030 can be applied to other sectors beyond food systems, such as energy, waste management, and water systems. This would support the creation of integrated urban sustainability policies that address multiple sectors simultaneously.

Conclusions

Effectiveness of the Design-Thinking Approach

The use of a design-thinking approach in the Cities2030 project was highly effective in fostering cross-sectoral collaboration, enhancing stakeholder participation, and refining impact assessment tools. The iterative process ensured that the framework could be adapted to diverse city-region contexts, making it both flexible and inclusive.

Co-Creation and Stakeholder Engagement

A significant strength of the process was the active involvement of 65 stakeholders, which facilitated co-creation and alignment on the most relevant criteria for impact assessment. This participatory approach ensured that the criteria reflected the needs and realities of various partners involved in city-region food systems.

Iterative Tool Development

The impact assessment tool underwent several iterations, reflecting input from extensive theoretical analysis, feedback from 136 partner representatives, and practical testing in simulations. This process ensured that the tool was thoroughly vetted and could be effectively applied in real-world scenarios.

Impact Across Multiple Dimensions

The assessment framework successfully evaluated impacts across six distinct dimensions: Social, Environmental, Economic, Legal, Security and Policy, Culture and Values, and Technological. Each dimension was carefully crafted to ensure a comprehensive evaluation of the city's food systems.

Significant Early Impact

Initial results demonstrated considerable social, environmental, economic, and technological impacts. Highlights included the establishment of 296 new partnerships, engagement of over 11,000 community members, introduction of 48 product innovations, and the creation of 29 new technologies. These results underscore the broad impact of the project in supporting sustainable food system transitions.

Adaptability and Flexibility

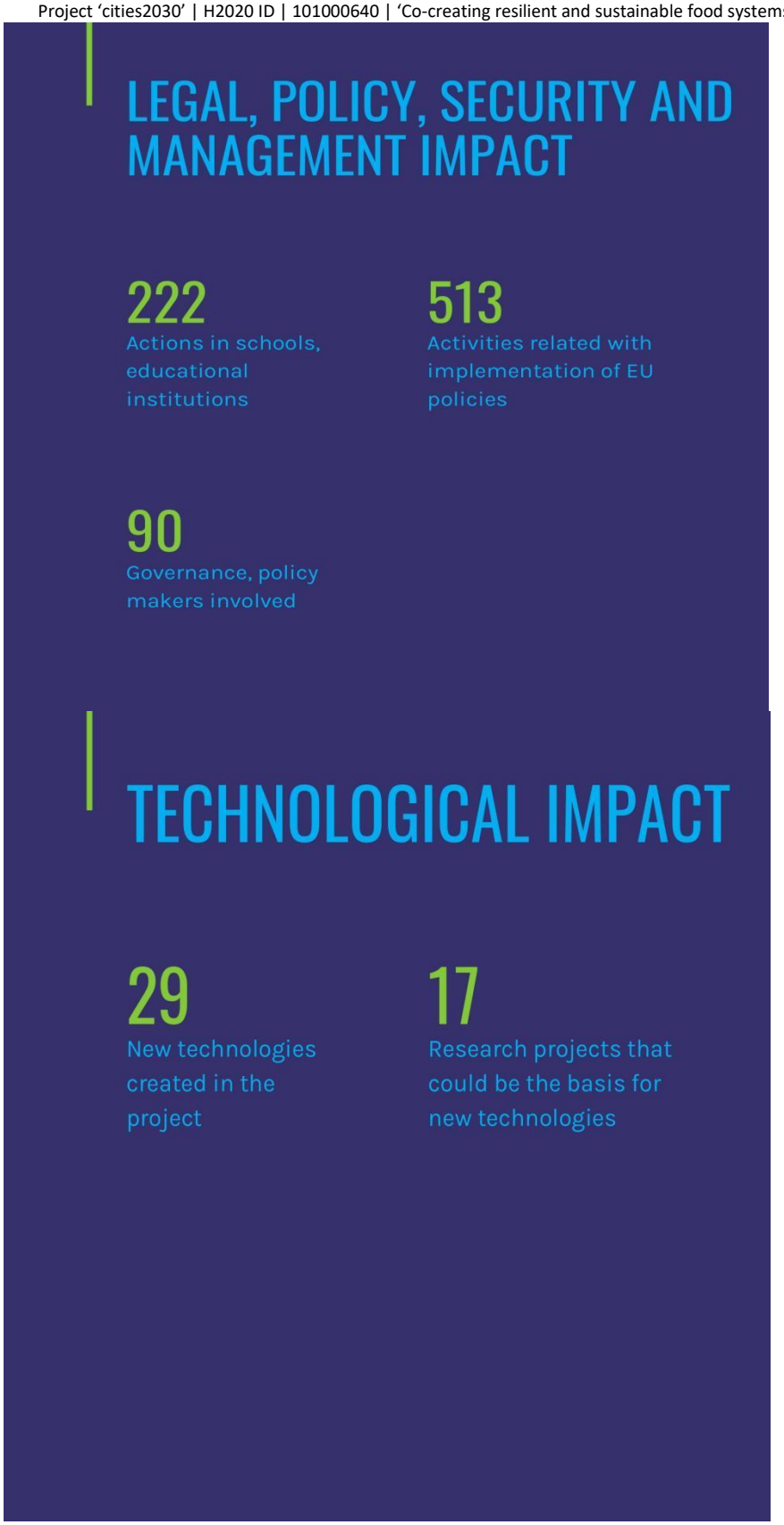
The framework's adaptability was a key outcome. By creating a system that could be tailored to the specific contexts of different city-regions, the tool allowed for localized solutions while maintaining alignment with broader European policies like FOOD2030 and the Green Deal.

Future Considerations

While the tool has proven effective, challenges remain, particularly in ensuring that the framework can be scaled and transferred across different regions with varying cultural, economic, and environmental contexts. Ongoing iteration and refinement of the impact assessment tool will be necessary to address these challenges and to further enhance its applicability.

These conclusions highlight the success of the Cities2030 project in using a collaborative and innovative approach to develop a robust, adaptable impact assessment framework. This framework is already making significant strides forward in transforming city-region food systems toward sustainability, inclusivity, and resilience.

Visual summary of results of 2023


LEGAL, POLICY, SECURITY AND MANAGEMENT IMPACT
222
Actions in schools, educational institutions
513
Activities related with implementation of EU policies
90
Governance, policy makers involved
TECHNOLOGICAL IMPACT
29
New technologies created in the project
17
Research projects that could be the basis for new technologies


ECONOMIC IMPACT
48
Product innovations
11
Process innovations
157
Food producers engaged in SFSC
7 719
New consumers engaged in SFSC
ENVIRONMENTAL IMPACT
1 356
Stakeholders engaged
119
Cities and regions involved
440
Activities related with sustainable food
79
Activities to enhance circularity and local food belts


SOCIAL IMPACT
296
New partnerships and networks created
249
External partner and crowd initiated ideas
11 704
Other community members involved in the project city/region activities
3 774
Youngsters involved in the project activities
352
Food system experts involved
cities2030
CO-CREATING RESILIENT AND SUSTAINABLE FOOD SYSTEMS TOWARDS FOOD2030
PROJECT IMPACT ASSESSMENT REPORT
Vol. 1.
RIGA TECHNICAL UNIVERSITY
RTU SCIENCE AND INNOVATION CENTRE

4.ACHIEVEMENTS AND IMPACT

4.1. Progress related with Cities2030 identified scopes

In this subchapter researchers have calculated the average progress related with Cities 2030 identified scopes. See in Figure 4.1.

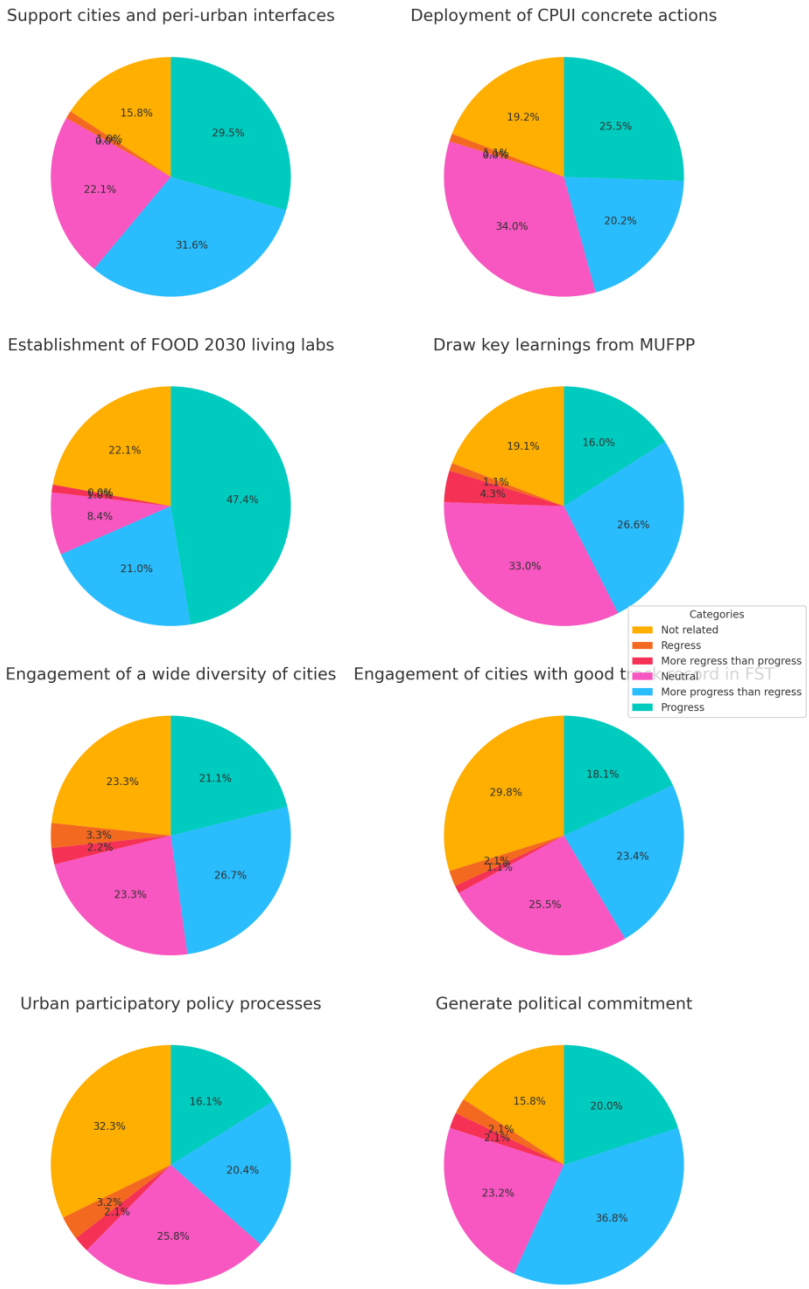


Figure 4.1. Progress related with Cities2030 identified scopes

Support for CPUI and UFSP to meet FOOD 2030:

1. **Progress**: 31.58% responded with "More progress than regress," while 29.47% marked "Progress." The combined positive progression-related responses total 61.05%.
2. **Neutral**: 22.11% remained neutral.
3. **Average value**: 4.41, indicating a strong lean toward positive development for this initiative.

Deployment of CPUI concrete actions:

1. **Neutral**: The largest group of responses, with 34.04%, fell under "Neutral."
2. **Progress**: 45.74% responded with "More progress than regress" or "Progress," suggesting moderate satisfaction with implementation.
3. **Average value**: 4.12, slightly lower than the first initiative.

Establishment of FOOD 2030 living labs:

1. **Progress**: The most successful initiative, with 47.37% reporting "Progress" and 21.05% marking "More progress than regress" (a total of 68.42%).
2. **Average value**: 4.48, the highest in the table, reflecting significant success in this area.

Draw key learnings from the MUFPP:

1. **Neutral**: 32.98% responded with neutrality, with 42.56% indicating some level of progress.
2. **Average value**: 3.95, showing mixed results in capturing learnings from the MUFPP.

Engagement of a wide diversity of cities:

1. **Progress**: 26.67% selected "Progress," while a significant 23.33% were neutral.
2. **Average value**: 3.9, indicating moderate progress, though some room for improvement.

Engagement of cities with a good track record in FST:

1. **Mixed Results**: This initiative has a relatively high percentage of respondents who selected "Neutral" (25.53%), with fewer responses indicating progress (23.40%).

2. **Average value**: 3.65, suggesting this is one of the weaker areas for positive feedback.

Urban participatory policy processes:

1. **Not related**: 32.26% responded with "Not related," the highest in this column, which might suggest that many respondents don't see this as relevant to their context.
2. **Progress**: Only 16.13% responded with "Progress," indicating a weak outcome for this policy.
3. **Average value**: 3.47, the lowest score, highlighting challenges in this area.

Generate political commitment and institutionalizing food policy:

1. **Progress**: 36.84% responded with "More progress than regress," which is one of the higher percentages across all initiatives.
2. **Average value**: 4.23, a strong result, indicating success in building political commitment and institutionalizing food policy.

Key Trends and Observations:

- The **Establishment of FOOD 2030 living labs** has the highest average value (4.48), showing it is the most successful initiative.
- **Urban participatory policy processes to meet RRI/gender** is the least successful with an average score of 3.47, with many respondents either feeling this initiative is not related or lacking progress.
- Most initiatives tend to gather a moderate to high level of support in the "More progress than regress" and "Progress" categories, with fewer responses in the "Regress" category, which suggests overall positive momentum.
- **Neutral responses** are quite significant, especially for initiatives like the **Deployment of CPUI concrete actions** (34.04%) and **Drawing key learnings from the MUFPP** (32.98%).

Conclusion: overall, most initiatives have seen more positive progress than regress, with **Establishment of FOOD 2030 living labs** being particularly successful. However, there are areas such as **Urban participatory policy processes** and **Engagement of cities with a good track record in FST** where progress is either slow or perceived as irrelevant by some participants. Focusing on these areas could help improve overall performance.

4.2. Impact to Cities2030 themes

4.2.1. Internally

Overview of categories internally in partnership, see Figure 4.2.

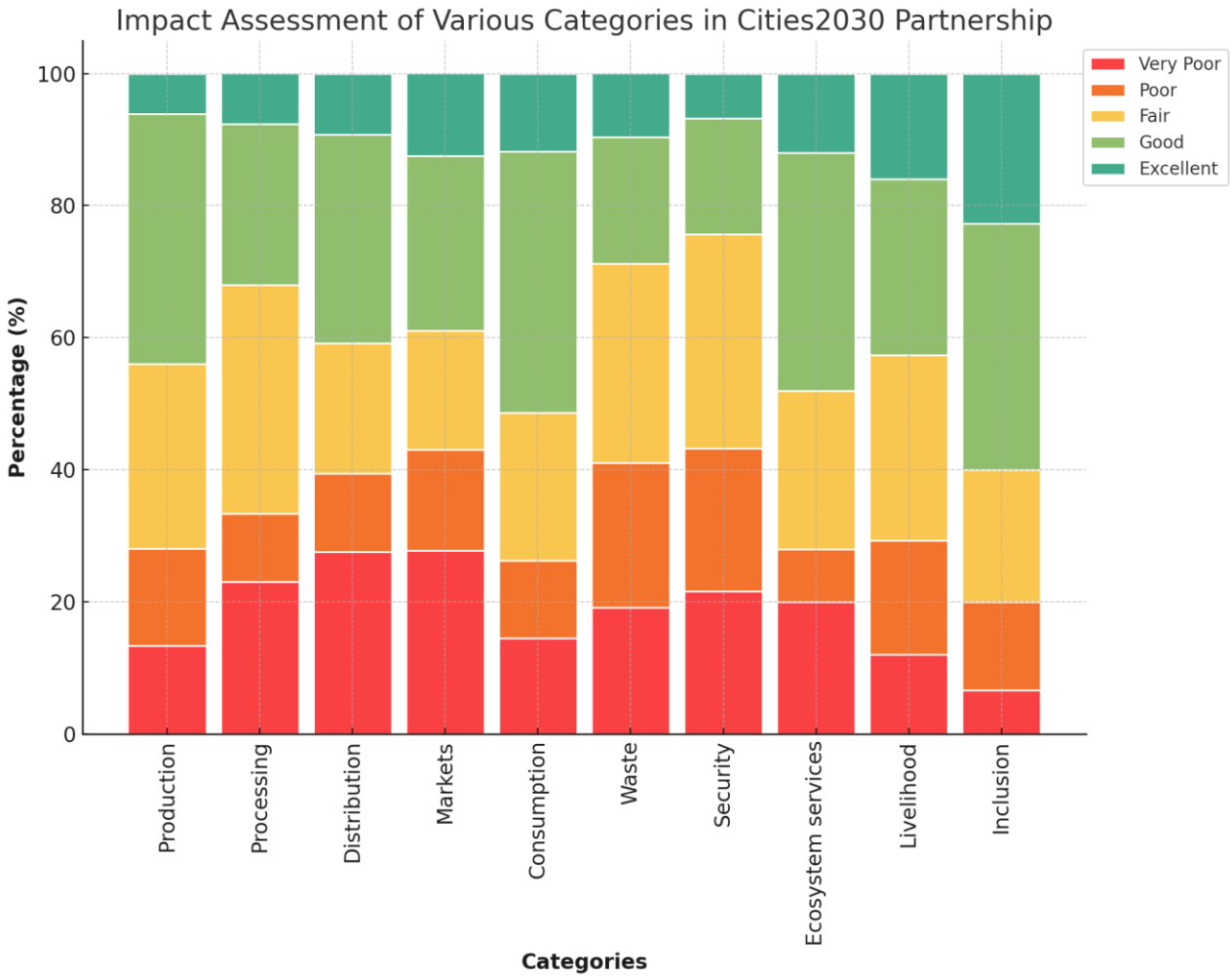


Figure 4.2. Impact to Cities2030 themes internally in project partnership

Production

1. **Good impact (4)**: The highest percentage of responses (37.80%) indicates that production has had a good impact.
2. **Very poor and Poor impacts (1 and 2)**: Combined, these make up 28.04% of responses, showing that some respondents see room for significant improvement.
3. **Average value**: 3.09, which is above the mid-point but not outstanding.

Processing

1. **Fair impact (3)**: The most common response (34.62%), which is slightly positive but indicates that there is room for improvement.
2. **Very poor (1)**: 23.08% see this area as having a very poor impact, the highest negative percentage in the entire dataset.

3. **Average value**: 2.83, suggesting a generally lower level of satisfaction compared to other areas.

Distribution

1. **Good impact (4)**: The most common response (31.58%) points to a relatively positive view of distribution.
2. **Very poor (1)**: 27.63% see distribution as having a very poor impact, which is quite significant.
3. **Average value**: 2.83, the same as processing, meaning this area also faces challenges.

Markets

1. **Very poor (1)**: 27.78% see markets as having a very poor impact, another high negative perception.
2. **Good and Excellent impacts (4 and 5)**: Combined, these account for around 38.89% of responses, suggesting moderate success.
3. **Average value**: 2.81, one of the lower scores in the table, indicating mixed feedback.

Consumption

1. **Good impact (4)**: 39.47% of respondents rate consumption with a good impact, the highest rating for this category.
2. **Very poor and Poor impacts (1 and 2)**: These responses are lower here (14.47% and 11.84%, respectively), showing this category is less problematic compared to others.
3. **Average value**: 3.22, one of the highest in the dataset, indicating relatively positive feedback.

Waste

1. **Fair impact (3)**: 30.14% of respondents rate the impact of waste management as fair.
2. **Poor impact (2)**: 21.92% of responses fall under poor, showing significant dissatisfaction in this area.
3. **Average value**: 2.78, one of the lower ratings, showing waste management needs improvement.

Security

1. **Fair impact (3)**: The most common rating (32.43%), indicating security is neither particularly good nor poor.
2. **Very poor and Poor impacts (1 and 2)**: Combined, these responses make up 43.24%, showing that many believe security has been ineffective.
3. **Average value**: 2.66, the second-lowest score, indicating that security is a major area of concern.

Ecosystem services

1. **Good and Excellent impacts (4 and 5)**: Together, these account for 48% of responses, showing relatively positive feedback for ecosystem services.
2. **Average value**: 3.12, reflecting moderately positive feedback compared to other areas.

Live hood (possibly a typo for "Livelihood")

1. **Good and Excellent impacts (4 and 5)**: These combined account for 42.67% of responses, indicating relative success in livelihood impact.
2. **Average value**: 3.17, again showing moderately positive feedback.

Inclusion

1. **Good and Excellent impacts (4 and 5)**: Combined, these make up 60%, the highest combined positive feedback in the table.
2. **Average value**: 3.56, the highest in the dataset, showing strong performance in the area of inclusion.

Key Insights:

Best Performing Categories:

- **Inclusion** (average value 3.56): This area received the most positive feedback, with 60% of responses rating the impact as either good or excellent.
- **Consumption** (average value 3.22): Another high-performing area, with the majority of responses falling under good impact (39.47%).
- **Ecosystem services** and **Livelihood** also performed moderately well, with relatively high percentages of good and excellent impacts.

Areas for Improvement:

- **Security** (average value 2.66): This category received the second-lowest score, with a large number of responses indicating very poor or poor impacts.

- **Waste** (average value 2.78) and **Markets** (average value 2.81) are also problematic areas, with significant percentages of respondents giving poor or very poor ratings.
- **Processing** and **Distribution** both have high percentages of "Very poor" ratings and lower average values, indicating dissatisfaction.

Conclusion:
Overall, **Inclusion** and **Consumption** are perceived as having the most positive impacts, while **Security**, **Waste**, and **Markets** appear to be the areas needing the most attention. There is a significant spread of responses across categories, with some areas showing high dissatisfaction (e.g., **Processing**, **Distribution**, and **Markets**) while others (e.g., **Ecosystem services** and **Livelihood**) have more positive impacts but still room for improvement.

4.2.2. Local regions and cities

Overview of categories in local regions and cities, see Figure 4.3.

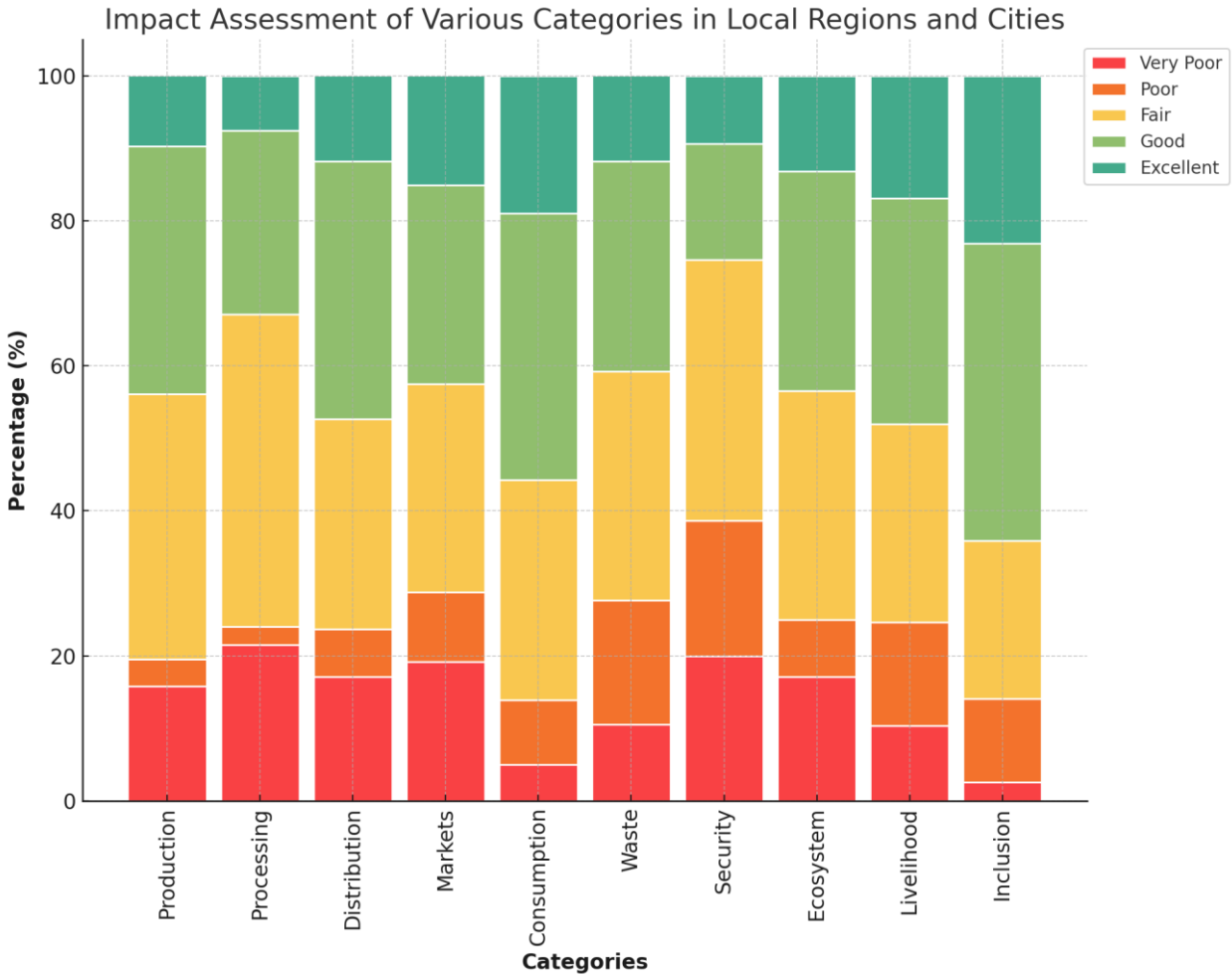


Figure 4.3. Impact to Cities2030 themes internally in local regions and cities

*1. **Production***

- **Fair impact (3)**: The highest percentage (36.59%) indicates that production is perceived as fair.
- **Good and Excellent impacts (4 and 5)**: Together, these account for 43.91% of the responses, showing moderate positive feedback.
- **Average value**: 3.18, indicating an overall balanced but slightly above-average perception of production.

2. Processing

- **Fair impact (3)**: A significant 43.04% see processing as fair.
- **Very poor (1)**: A high percentage (21.52%) indicates dissatisfaction with processing, making it one of the areas with the most negative feedback.
- **Average value**: 2.95, one of the lower scores, showing that improvements are needed in processing.

3. Distribution

- **Good impact (4)**: The most common response (35.53%) is good, suggesting positive feedback on distribution.
- **Very poor (1)**: 17.11% of respondents rate this area poorly, indicating some dissatisfaction.
- **Average value**: 3.18, showing generally favourable perceptions but with room for improvement.

4. Markets

- **Good impact (4)**: 27.40% of respondents rate markets as good, but the spread across other categories shows mixed results.
- **Very poor (1)**: 19.18% gave this category a very poor score, indicating a significant amount of dissatisfaction.
- **Average value**: 3.1, reflecting a slightly above-average perception.

5. Consumption

- **Good and Excellent impacts (4 and 5)**: Combined, these make up 55.70% of responses, showing positive feedback for consumption.
- **Very poor and Poor impacts (1 and 2)**: These responses make up a smaller proportion (13.92%), suggesting consumption is a well-received category.
- **Average value**: 3.56, the highest in the table, showing strong performance and satisfaction.

6. Waste

- **Fair impact (3)**: The most common response (31.58%), with a fairly balanced distribution across other categories.

- **Poor impact (2)**: 17.11% of responses fall under poor, indicating that waste management has some challenges.
- **Average value**: 3.14, a moderate rating that indicates room for improvement.

7. Security

- **Very poor and Poor impacts (1 and 2)**: Together, these account for 38.67% of responses, suggesting significant dissatisfaction in this area.
- **Fair impact (3)**: The highest percentage (36%) indicates that security is considered to be fair but lacks positive feedback.
- **Average value**: 2.76, the lowest in the table, indicating that security is the most concerning area.

8. Ecosystem services

- **Good and Excellent impacts (4 and 5)**: Together, these account for 43.42% of responses, indicating moderate positive feedback.
- **Very poor (1)**: 17.11% gave this category a very poor rating, showing room for improvement.
- **Average value**: 3.14, reflecting moderate satisfaction with ecosystem services.

9. Livelihood

- **Good and Excellent impacts (4 and 5)**: Combined, these account for 48.05% of responses, indicating positive feedback.
- **Very poor and Poor impacts (1 and 2)**: Together, these responses make up 24.68%, showing that some dissatisfaction remains.
- **Average value**: 3.3, indicating a fairly strong performance in this category.

10. Inclusion

- **Good and Excellent impacts (4 and 5)**: A substantial 64.11% of respondents gave this category a positive score, making it the best-performing area in the table.
- **Very poor (1)**: Only 2.56% rated inclusion as very poor, the lowest negative score in the dataset.
- **Average value**: 3.71, the highest in the table, showing strong performance and satisfaction with inclusion efforts.

Summary of Key Findings:

Best Performing Categories:

- **Inclusion** (average value 3.71) is the highest-rated category, with a strong majority of responses indicating positive impacts.

- **Consumption** (average value 3.56) also received highly positive feedback, with a majority of respondents rating it as having good or excellent impacts.
- **Livelihood** and **Ecosystem services** also performed relatively well, with average values above 3.0.

Areas for Improvement:

- **Security** (average value 2.76) is the lowest-rated category, with high percentages of very poor and poor responses.
- **Processing** (average value 2.95) and **Waste** (average value 3.14) also received lower scores, suggesting that these areas need attention to improve their impact.

Cities/Regions with Specific Impact:

- Arganda, Quart de Poblet
- Seinäjoki city region, Finland
- Lahti, Finland
- Vidzeme region
- City of Bruges
- Velika Gorica
- Iceland Capital Region (Reykjavik & adjacent cities)
- Vejle municipality
- Bremerhaven
- Marseille
- City of Murska Sobota - Pomurje region
- Vicenza (Italy)
- IASI, Romania
- Coimbra
- Valmiera, Sigulda, and Cesis
- Lagoon of Venice
- Cilento Region

4.2.3. EU level

Overview of categories to EU level, see Figure 4.4.

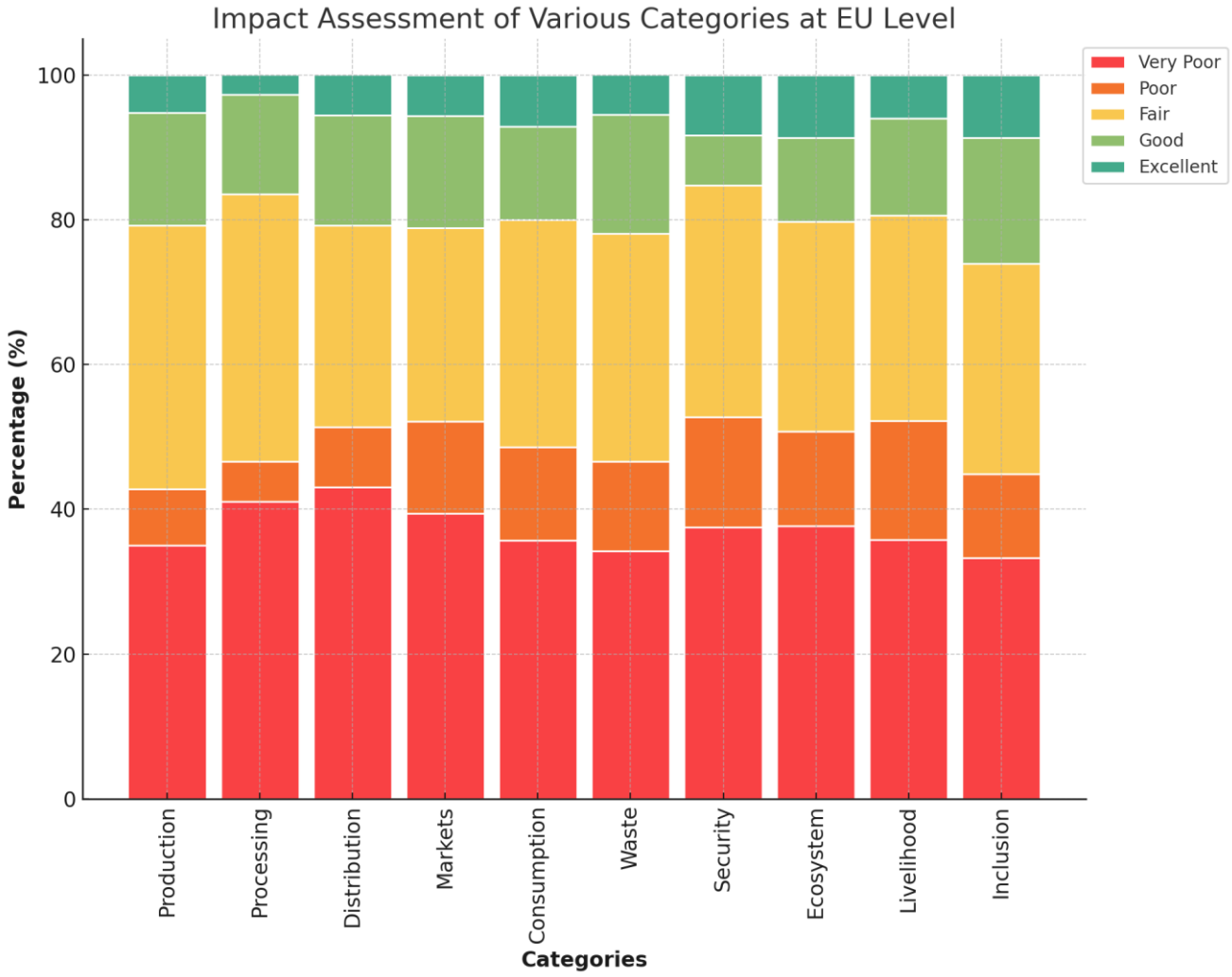


Figure 4.4. Impact to Cities2030 themes to EU level

This dataset evaluates the impacts of various categories at the **EU level** across a scale from "Very poor" to "Excellent."

1. Production

- **Fair impact (3)**: The highest percentage (36.36%) shows that production is mostly rated as fair.
- **Very poor (1)**: A significant 35.06% of respondents rated production as very poor, indicating substantial dissatisfaction in this area.
- **Average value**: 2.48, indicating below-average perceptions overall.

2. Processing

- **Very poor (1)**: The highest percentage (41.10%) shows that processing is perceived very negatively.

- **Fair impact (3)**: 36.99% rated processing as fair, showing a mixed perception of this category.
- **Average value**: 2.32, one of the lowest scores, showing that processing is a significant concern.

3. Distribution

- **Very poor (1)**: 43.06% gave distribution the lowest score, making this one of the most negatively perceived categories.
- **Fair impact (3)**: 27.78% of respondents found the distribution to have a fair impact.
- **Average value**: 2.32, tying with processing for the lowest score in the dataset.

4. Markets

- **Very poor (1)**: 39.44% rated markets very poorly, another high level of dissatisfaction.
- **Good and Excellent impacts (4 and 5)**: Combined, only 21.12% rated markets as having a good or excellent impact.
- **Average value**: 2.35, indicating overall poor performance.

5. Consumption

- **Fair impact (3)**: 31.43% rated consumption as fair, but a significant percentage (35.71%) rated it as very poor.
- **Good and Excellent impacts (4 and 5)**: Combined, only 20% gave consumption a positive score.
- **Average value**: 2.43, showing moderate dissatisfaction.

6. Waste

- **Fair impact (3)**: 31.51% rated waste management as fair.
- **Very poor (1)**: 34.25% rated waste management very poorly.
- **Average value**: 2.47, a below-average score.

7. Security

- **Very poor (1)**: A significant 37.50% rated security very poorly.
- **Good and Excellent impacts (4 and 5)**: Only 15.27% rated security positively, indicating substantial dissatisfaction.
- **Average value**: 2.33, among the lowest in the dataset.

8. Ecosystem services

- **Fair impact (3)**: 28.99% rated ecosystem services as fair.
- **Very poor (1)**: 37.68% gave the lowest rating, showing dissatisfaction in this area as well.

- **Average value**: 2.41, indicating another area in need of improvement.

9. Livelihood

- **Very poor (1)**: 35.82% of respondents rated the impact on livelihoods as very poor.
- **Good and Excellent impacts (4 and 5)**: 19.40% of respondents rated livelihoods as having a good or excellent impact, which is low.
- **Average value**: 2.37, a below-average score indicating dissatisfaction.

10. Inclusion

- **Very poor (1)**: 33.33% rated inclusion very poorly.
- **Good and Excellent impacts (4 and 5)**: Combined, 26.09% rated inclusion as having a good or excellent impact.
- **Average value**: 2.57, which is the highest in the dataset, but still reflects dissatisfaction.

  Most Concerning Categories:

  - **Distribution** and **Processing** are the most negatively rated categories, with very poor average values (2.32).
  - **Security** and **Ecosystem services** also received highly negative feedback, showing dissatisfaction in these areas.
  - **Livelihood** and **Waste** have similarly low scores, indicating areas where respondents see significant problems.

  Best Performing Category:

  - **Inclusion** (average value 2.57) is the highest-rated category in this dataset, though it still has a relatively low score overall, indicating that even the better-performing categories at the EU level face challenges.

4.2.3.Global level

Overview of categories ito global level, see Figure 4.5.

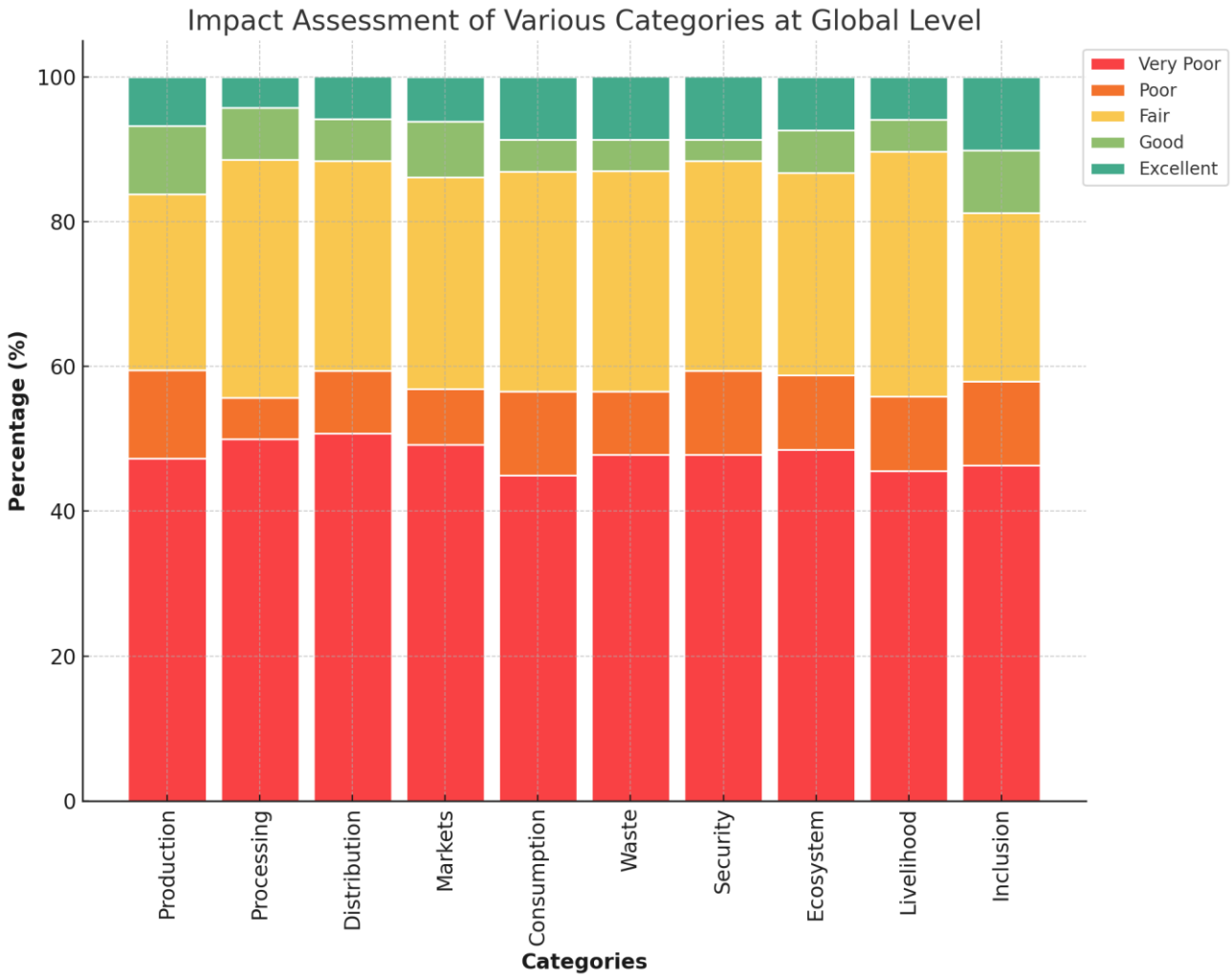


Figure 4.5. Impact to Cities2030 themes to global level

1. Production

- **Very poor (1)**: 47.30% rated production very poorly, indicating strong dissatisfaction globally.
- **Fair impact (3)**: 24.32% of respondents rated the impact as fair.
- **Average value**: 2.16, showing a generally negative perception of production.

2. Processing

- **Very poor (1)**: A significant 50.00% of respondents gave processing the lowest rating.
- **Fair impact (3)**: 32.86% of respondents rated the processing as fair.
- **Average value**: 2.10, making this one of the lowest-rated categories.

3. Distribution

- **Very poor (1)**: 50.72% rated distribution very poorly, the highest "very poor" rating in this dataset.
- **Fair impact (3)**: 28.99% rated it as fair.
- **Average value**: 2.07, the lowest average score in the dataset, showing substantial dissatisfaction.

4. Markets

- **Very poor (1)**: 49.23% rated markets very poorly, indicating another area of major concern.
- **Fair impact (3)**: 29.23% found the impact of markets to be fair.
- **Average value**: 2.14, reflecting general dissatisfaction.

5. Consumption

- **Very poor (1)**: 44.93% rated consumption very poorly, but a notable 8.70% gave it an excellent rating.
- **Fair impact (3)**: 30.43% rated it as fair.
- **Average value**: 2.20, slightly higher than the other categories but still quite low.

6. Waste

- **Very poor (1)**: 47.83% of respondents rated waste management very poorly, showing major dissatisfaction.
- **Fair impact (3)**: 30.43% rated it as fair.
- **Average value**: 2.17, showing waste management is another area requiring significant attention.

7. Security

- **Very poor (1)**: 47.83% of respondents gave security a very poor rating.
- **Fair impact (3)**: 28.99% rated it as fair.
- **Average value**: 2.13, indicating security is another problematic category at the global level.

8. Ecosystem Services

- **Very poor (1)**: 48.53% rated ecosystem services very poorly, making this a concerning area globally.
- **Fair impact (3)**: 27.94% rated it as fair.
- **Average value**: 2.13, reflecting dissatisfaction.

9. Livelihood

- **Fair impact (3)**: 33.82% rated livelihoods as fair, the highest "fair" rating in the dataset.
- **Very poor (1)**: 45.59% gave it a very poor rating.

- **Average value**: 2.15, showing a global concern for livelihoods.

10. Inclusion

- **Very poor (1)**: 46.38% rated inclusion very poorly, but it has the highest "excellent" rating in this dataset (10.14%).
- **Fair impact (3)**: 23.19% rated inclusion as fair.
- **Average value**: 2.25, the highest in this dataset, but still reflects dissatisfaction.

Most Concerning Categories:

- **Processing**, **Distribution**, and **Markets** have the lowest scores, with high percentages of respondents rating these categories as very poor.
- **Security** and **Ecosystem services** also show substantial dissatisfaction at the global level.

Best Performing Category:

- **Inclusion** (average value 2.25) has the highest average score in this dataset, but it still falls into the range of general dissatisfaction, despite having the highest "excellent" rating (10.14%).

4.2.5.Comparishon between levels

Overview of comparishon see in Figure 4.6.

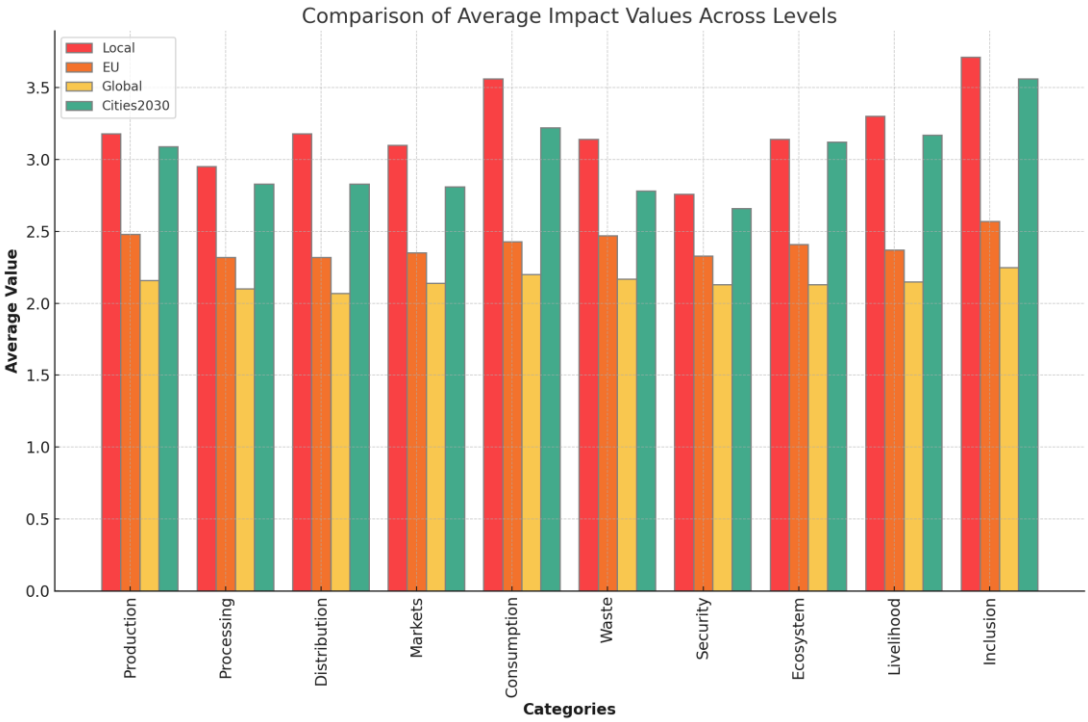


Figure 4.6.Comparison

Here is the multi-bar chart that compares the average impact values across four different datasets: Local, EU, Global, and Cities2030 partnership.

Key Observations:

- Local levels (red) generally have higher average values compared to the EU and Global levels, indicating less dissatisfaction in these regions.
- Global levels (yellow) consistently show the lowest average values, especially in categories like Processing, Distribution, and Markets, reflecting the highest dissatisfaction.
- Inclusion and Consumption tend to perform better across all levels, with relatively higher average values, particularly for Local and Cities2030.
- Cities2030 (green) performs relatively well, with higher averages compared to EU and Global levels across most categories.

4.3. Social impact

Overview of social impact, see Figure 4.7.

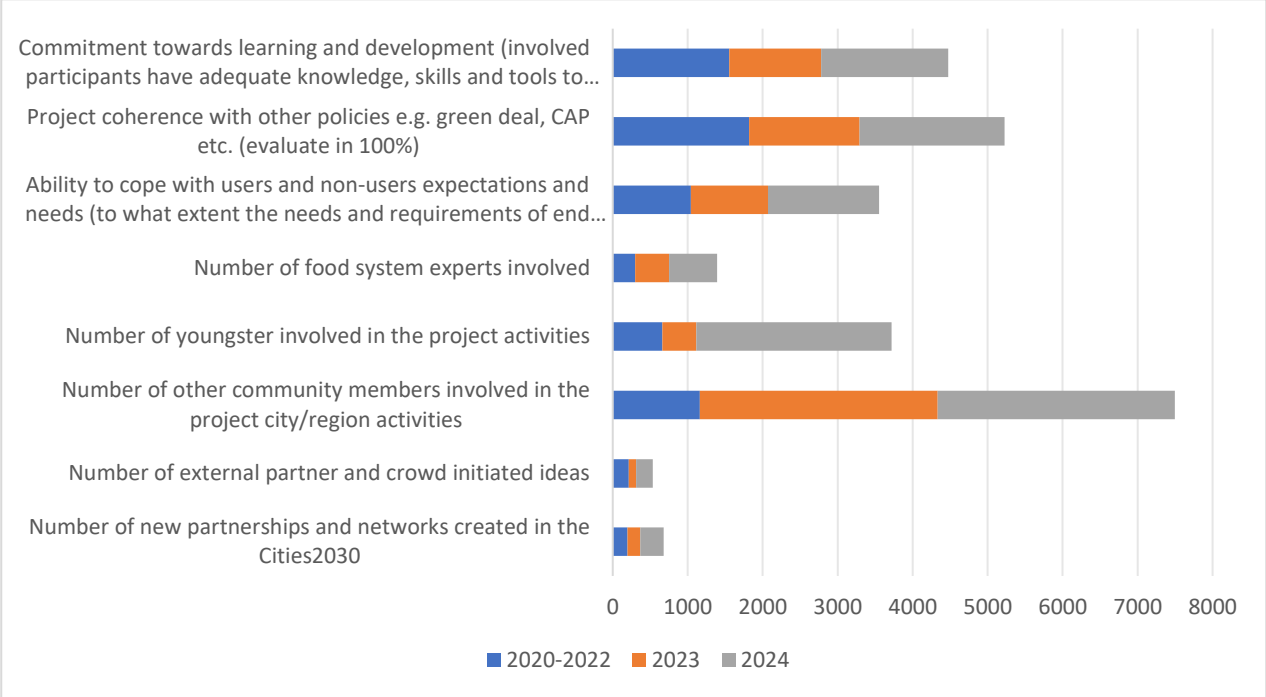


Figure 4.7. Social impact

The Cities2030 initiative has had a significant social impact, fostering partnerships, community involvement, youth engagement, and the integration of food system experts into its activities. This chapter explores the various social metrics that reflect the project's outreach, capacity-building efforts, and the extent to which it aligns with other policy frameworks. Through an analysis of these trends, we can gain a deeper understanding of the social transformations driven by Cities2030 from 2020 to 2024, particularly in relation to stakeholder engagement, community-building, and learning development.

1. Number of New Partnerships and Networks Created in Cities2030

Partnerships and networks are crucial for expanding the social reach and impact of Cities2030, enabling collaboration and knowledge exchange among different stakeholders.

- **2020–2022:** 195 partnerships
- **2023:** 173 partnerships
- **2024:** 311 partnerships
- **Total:** 679 partnerships across 2020–2024

Trend Analysis:
The number of new partnerships and networks created showed steady growth, particularly in 2024, when the figure surged to 311. While there was a slight dip in 2023, the overall trend demonstrates Cities2030's success in fostering collaboration. The total of 679 partnerships formed over the four-year period highlights the initiative's role in building a robust network of stakeholders committed to advancing sustainable food systems. The increase in partnerships in 2024 suggests a renewed focus on expanding social networks, which are essential for long-term sustainability.

2. Number of External Partner and Crowd-Initiated Ideas

The number of ideas initiated by external partners and crowds reflects Cities2030's openness to innovation and community-driven solutions in food systems.

- **2020–2022:** 214 ideas
- **2023:** 96 ideas
- **2024:** 226 ideas
- **Total:** 536 ideas across 2020–2024

Trend Analysis:
The trend in crowd-initiated ideas saw a decline in 2023, dropping to 96 from 214 in the previous period. However, the number rebounded strongly in 2024, reaching 226 ideas. This fluctuation suggests that while the initiative may have faced challenges in engaging external partners in 2023, Cities2030 regained momentum in fostering external innovation by 2024. The total of 536 ideas demonstrates that the project has effectively encouraged stakeholders outside of the core project team to contribute creative solutions, enriching the initiative's social impact.

3. Number of Other Community Members Involved in the Project's City/Region Activities

Engaging community members is central to Cities2030's social strategy, ensuring that local populations are actively involved in shaping the future of their food systems.

- **2020–2022:** 1,160 community members
- **2023:** 3,174 community members
- **2024:** 3,163 community members
- **Total:** 7,497 community members across 2020–2024

Trend Analysis:
There was a dramatic increase in the number of community members involved in 2023, with over 3,000 people participating, compared to 1,160 in the initial period. This high level of engagement continued in 2024, with 3,163 participants. The total of 7,497 community members engaged in Cities2030 activities reflects the initiative's success in mobilizing local communities, fostering a sense of ownership and involvement in the transformation of their food systems. The sustained high participation levels in 2023 and 2024 suggest that Cities2030 has been effective in maintaining community interest and participation.

4. Number of Youngsters Involved in Project Activities

Youth engagement is vital for ensuring the long-term sustainability of Cities2030's social impact, as young people represent the next generation of food system leaders.

- **2020–2022:** 662 youngsters
- **2023:** 452 youngsters
- **2024:** 2,603 youngsters
- **Total:** 3,717 youngsters across 2020–2024

Trend Analysis:
The number of young people involved in Cities2030 activities saw a substantial increase in 2024, rising from 452 in 2023 to 2,603. This significant growth highlights the project's renewed focus on engaging youngsters in its later stages, recognizing the importance of fostering interest and participation among younger generations. The total of 3,717 youngsters involved demonstrates the project's strong commitment to youth engagement, which is essential for ensuring the long-term sustainability of food systems.

5. Number of Food System Experts Involved

Involving food system experts is crucial for ensuring that the project is informed by the latest knowledge and best practices in sustainable food systems.

- **2020–2022:** 300 experts
- **2023:** 450 experts
- **2024:** 640 experts
- **Total:** 1,390 experts across 2020–2024

Trend Analysis:
The involvement of food system experts grew consistently throughout the project, with 300 experts engaged in the initial period, rising to 450 in 2023, and reaching 640 in 2024. This upward trend reflects Cities2030's commitment to ensuring that its activities are guided by expert knowledge and insights. The total of 1,390 experts involved over the four years highlights the project's success in integrating specialized knowledge into its social and technical initiatives, contributing to more informed and effective decision-making.

6. Ability to Cope with Users' and Non-Users' Expectations and Needs

This metric evaluates how well Cities2030 has managed to meet the needs and expectations of both users and non-users of its services and solutions, assessed on a scale of 100%.

- **2020–2022:** 1,040 points
- **2023:** 1,030 points
- **2024:** 1,480 points
- **Total:** 3,550 points across 2020–2024

Trend Analysis:
The ability to meet user and non-user expectations remained stable in the early years, with similar scores in 2020–2022 and 2023. However, there was a notable improvement in 2024, with the score increasing to 1,480 points. This suggests that Cities2030 made significant strides forward in addressing user needs and expectations as the project progressed. The total of 3,550 points indicates that the initiative has generally been successful in balancing the diverse needs of its stakeholders, with marked improvements in its later stages.

7. Project Coherence with Other Policies (e.g., Green Deal, CAP)

This metric assesses how well Cities2030 aligns with other key policy frameworks, such as the EU Green Deal and the Common Agricultural Policy (CAP), on a scale of 100%.

- **2020–2022:** 1,820 points
- **2023:** 1,470 points
- **2024:** 1,935 points
- **Total:** 5,225 points across 2020–2024

Trend Analysis:
The coherence of Cities2030 with other policies fluctuated slightly, with a dip in 2023 to 1,470 points, followed by a recovery to 1,935 in 2024. The total of 5,225 points reflects the project's consistent efforts to align with broader policy frameworks, ensuring that its activities are integrated into larger sustainability and agricultural strategies. The improvement in 2024 suggests that Cities2030 increasingly focused on ensuring that its initiatives complemented existing policies, reinforcing its impact on sustainable food systems.

8. Commitment Toward Learning and Development

This metric evaluates how well Cities2030 has supported participants in gaining the knowledge, skills, and tools necessary to foster sustainable growth in food systems, on a scale of 100%.

- **2020–2022:** 1,555 points
- **2023:** 1,225 points
- **2024:** 1,695 points
- **Total:** 4,475 points across 2020–2024

Trend Analysis:

The commitment to learning and development showed a slight decline in 2023 but rebounded in 2024, with the score increasing to 1,695 points. The total of 4,475 points across the four years demonstrates that Cities2030 has consistently provided participants with the knowledge, skills, and tools necessary for supporting the development of sustainable food systems. The upward trend in 2024 indicates that the project renewed its focus on capacity building in its later stages, ensuring that participants were well-equipped to contribute to the project's goals.

Conclusion

The social impact of Cities2030 has been substantial, with several key trends emerging from the analysis of social metrics from 2020 to 2024:

Growth in Partnerships and Networks: The number of new partnerships and networks grew significantly, particularly in 2024, reflecting Cities2030's success in building a broad base of collaboration. These partnerships are crucial for fostering sustainable food systems and ensuring the long-term impact of the initiative.

Increased Community and Youth Engagement: The dramatic rise in community and youth engagement highlights the project's effectiveness in mobilizing local populations and young people. These groups are essential for creating lasting social change, and Cities2030 has demonstrated its ability to attract and involve diverse participants.

Expert Involvement and Policy Coherence: The steady increase in food system expert involvement shows that Cities2030 is well-informed by specialized knowledge, ensuring that its initiatives are based on best practices. Additionally, the project's alignment with broader policy frameworks, such as the EU Green Deal and CAP, has remained strong, further reinforcing its impact.

Improved Capacity to Meet Expectations: Cities2030's ability to meet the expectations of both users and non-users improved over time, reflecting the project's responsiveness to stakeholder needs. Similarly, its commitment to learning and development, particularly in 2024, highlights the importance of equipping participants with the skills necessary to support sustainable food systems. See Table 4.1.

Table 4.1.

Social impact				
Number of new partnerships and networks created in the Cities2030	195	173	311	679
Number of external partner and crowd initiated ideas	214	96	226	536
Number of other community members involved in the project city/region activities	1160	3174	3163	7497
Number of youngsters involved in the project activities	662	452	2603	3717
Number of food system experts involved	300	450	640	1390
Ability to cope with users' and non-users' expectations and needs (to what extent the needs and requirements of end users are met, and how CITIES2030 can meet their expectations) (evaluate in scale of 100%)	1040	1030	1480	3550
Project coherence with other policies e.g. green deal, CAP, etc. (evaluate in 100%)	1820	1470	1935	5225

Commitment towards learning and development (involved participants have adequate knowledge, skills and tools to achieve their full potential to support the development of SFSC, and ensure a sustainable growth of urban life quality (evaluate in 100% scale)	1555	1225	1695	4475

4.3.1. Qualitative Social Impact of Cities2030 up to 2022

The Cities2030 project has had a broad and meaningful qualitative social impact in several areas, including partnership creation, stakeholder engagement, and the implementation of new initiatives in the food system. While quantitative metrics have been thoroughly tracked, qualitative insights reveal how community improvement, cooperation, and social responsibility have emerged as key drivers of change in urban food systems.

Key Exploitable Results (KERs) and Social Innovation

As part of task T5.3, the project has focused on collecting qualitative data on the most exploitable ideas and practices that have emerged. These Key Exploitable Results (KERs) go beyond the final research results, often embodying parts of the methodology itself that hold potential to significantly innovate the entire research area. By properly identifying these KERs, the project can assess their ability to deliver tangible social impact and work towards ensuring that these results reach the intended users effectively.

For example, the use of community platforms such as the Cities2030 website enabled participants to share insights and co-create solutions that aligned with user expectations. This approach has shown promise, even if users and non-users sometimes did not initially recognize their own needs, particularly in areas such as healthier eating, school lunch environments, and food education for children.

Community Cooperation and Partnerships

The project has fostered strong cooperation between different sectors, especially between organizations that had previously never collaborated. The cooperation with P12 Into Seinäjoki and local stakeholders highlights how cities can work together to promote public health and nutrition, such as in the Healthy Kids of Seinäjoki initiative. Through this cooperation, public arenas became key spaces for involving the community, with initiatives such as healthy snack kiosks in sports facilities serving as platforms for promoting better food choices. This cooperation also saw the participation of local food industry companies, reinforcing the idea that cross-sector collaboration is essential for scalable, positive outcomes.

New partnerships have also been a significant outcome. Many organizations found it easy to cooperate in regions where they hadn't worked together before, leading to fruitful collaborations that supported the overall goals of the project. This collaborative spirit, seen in multiple Cities2030 regions, ensures that pilot actions are not only successfully planned, but effectively implemented.

Social Responsibility and Youth Engagement

Social responsibility is a core focus of the Cities2030 project, with a special emphasis on children and teenagers. The target group of youngsters represents a critical demographic that can be empowered with the tools for a healthy food life. For example, the Food Business Club offered

poorer children the opportunity to earn pocket money while participating in food-related activities. Public projects like this contribute to social inclusion by ensuring that even the most vulnerable have access to opportunities that allow them to engage with the food system.
The partnership-driven activities for youngsters, particularly those tied to food education, contribute to long-term social impact by fostering healthy lifestyle choices early on. Events and campaigns have been held in collaboration with schools, where children and youngsters were introduced to healthier eating habits through educational programs and practical engagements such as kiosks, festivals, and food-related events.

Leveraging Digital Platforms for Community Engagement
The Cities2030 project has effectively utilized digital platforms to amplify its reach and gather feedback from the community. These platforms have served as a medium for ongoing community cooperation, allowing stakeholders to collaborate and share their insights on topics like food waste reduction, local food networks, and solidarity exchanges.
This continuous digital engagement reflects the project's ability to meet users' and non-users' expectations. The Cities2030 forums and websites have helped establish important connections between project participants and new stakeholders, expanding the community involved in discussions on City Region Food Systems (CRFS).

Building Awareness and Expanding Reach
The project also worked on awareness-raising through video content and promotional materials that introduced the wider public to the goals and impacts of Cities2030. Video campaigns not only targeted specific regions, but also worked to involve the broader community, providing transparency on how the project supports sustainable urban food systems.

Additionally, regular surveys, like the one conducted in Quart de Poblet with 189 participants, collected qualitative data on consumption patterns to inform local food policy. These surveys are crucial for understanding community needs and ensuring that Cities2030's activities resonate with the public's evolving expectations.

4.3.2.Qualitative Social Impact in 2023
Throughout 2023, the Cities2030 project has continued to make significant strides forward in improving City Region Food Systems (CRFS) through dynamic initiatives, community engagement, and innovative experiments. The project expanded its outreach by focusing on integrating key EU policy priorities, strengthening partnerships, and implementing new approaches to food sustainability. Various Living Labs and activities contributed to the project's social impact, influencing the food systems of several regions.

1. Lahti Living Lab Experiments
The Lahti Living Lab spearheaded two notable experiments aimed at addressing EU policy priorities, promoting research and innovation, and strengthening the uptake of sustainability practices in society.

Bokashi Food Waste Bio-Composting: This experiment involved 27 core participants, who were stakeholders from the Lahti community. Through their networks, the initiative reached over 100 people, educating them about bokashi composting techniques.
Visibility: Social media engagement from this experiment generated at least 1,000 likes and 12,000 post views.
Social Impact: The experiment fostered community-led practices around food waste management, encouraging residents to adopt sustainable waste practices at home.
IoT-Equipped Bio-Composter: This innovative experiment involved 27 stakeholders, 18 of whom were women. By employing a smart, Internet of Things (IoT)-equipped composter, the experiment demonstrated how technology can enhance waste management systems.
Visibility: It attracted 100 likes and over 8,000 views on social media.
Social Impact: The experiment contributed to the development of scalable waste solutions and introduced a best practice framework for multi-actor engagement in food waste reuse.
Both experiments made positive contributions to reducing food waste and improving sustainability in the region. They also underscored the importance of social responsibility in sustainable waste management.

2. Vejle Community Initiatives
In Vejle, the Cities2030 project implemented a series of events that engaged the local community and promoted food sustainability:

- Gastro Days and the Vejle Food Festival raised awareness about local food production through debates, workshops, and culinary competitions like the Hotdog Championship and Potato Sprout Challenge.
- Youth Engagement: Workshops with local schools educated students on conscious food choices and sustainable food systems. These events aimed to equip the next generation with the tools to make more responsible food decisions.
- By focusing on food education and talent development among young chefs, the Vejle initiatives fostered a more engaged and informed community, contributing to a deeper understanding of food sustainability.

3. CITAG Marseille: Urban Agriculture and Community Involvement
The CITAG initiative in Marseille played a pivotal role in engaging local communities through urban agriculture and participatory approaches:

- Participatory Cartography: This initiative invited residents to contribute their experiences and knowledge to help map agricultural and green spaces in Marseille. This approach ensured that the community's insights informed decisions about land use and sustainability.
- Cortege Event: Held in some of Marseille's poorest neighborhoods, this event engaged local residents in discussions about agri-food issues. It reached 1,500 people via networks and media, fostering social inclusion and raising awareness about urban food challenges.
- CITAG also collaborated with local policy-makers, NGOs, and community organizations to address food deserts and promote urban agriculture. The initiative directly impacted over 1,300 people at events and more than 12 media outlets reported on these activities.

4. Bruges Food Lab: Culinary and Intergenerational Engagement

The Bruges Food Lab focused on strengthening the connection between local food systems and the community through various culinary initiatives:

- Plant-Based Protein Experiment: Food system experts collaborated with community members to enhance plant-based meals, contributing to the region's food sustainability goals.
- Intergenerational Cooking Sessions: These sessions brought together young people and senior citizens in collaboration with local care centres. Participants cooked meals together, fostering intergenerational learning and improving food education in the community.
- The Bruges Food Lab also collaborated with external partners, including (H)eerlijk Brugge and Mosquito in the Room, to organize food system dialogues and workshops. These collaborations helped broaden the impact of the lab and supported the development of local food systems.

5. Vidzemes Initiatives and Stakeholder Engagement

In Latvia, the Cities2030 project engaged diverse stakeholders, including local governments, farmers, and procurement specialists, to improve food systems:

- Round table Discussions: Vidzeme region held round tables involving over 70 stakeholders, including local governments, caterers, and farmers. The discussions facilitated stronger dialogue between these groups, helping to address procurement challenges and support local food producers.
- Study Visits and Training: The region's public authorities participated in a study visit to Finland and Estonia to explore sustainable food systems and green public procurement. This visit inspired new actions to shorten food supply chains and integrate sustainable practices into local policies.
- Green Procurement Training: Training sessions were conducted for 35 specialists from local municipalities, equipping them with the skills to conduct successful green public procurements for food and catering services.
- The efforts in Vidzeme created a collaborative environment that helped local authorities and food system actors align their practices with sustainability goals.

6. Waterford Community Engagement

In Waterford, a public survey focused on understanding local opinions about food choices, sustainability, and future food systems:

- Survey and Exhibition: The survey, which was linked to a private Green Party Bill promoting urban gardening and allotments, received high visibility through exhibitions at the Waterford City Library. This allowed over 500 visitors to engage with the survey and learn about the Cities2030 project.
- This engagement not only strengthened ties with local stakeholders but also promoted the project's mission to foster sustainable urban food systems by gathering insights directly from the community.

7. Paideia Campus in Cilento: Regenerative Agriculture and Sustainable Tourism

The Paideia Campus focused on regenerative agriculture and sustainable tourism in the Cilento region:

- Sustainable Farming Visits: Visitors to the Paideia Campus learned about regenerative farming techniques through tours of local farms. This exchange of knowledge promoted sustainable agriculture as a viable approach to food production.
- Cross-Cultural Exchange: The campus also collaborated with the Oki Island Geopark in Japan to develop an exchange program for young students, fostering environmental education and cross-cultural learning around sustainable food practices.
- The Paideia Campus successfully integrated sustainable agriculture, tourism, and food system education, making a positive impact at local, regional, and international levels.

4.3.3. Qualitative Social Impact Created in 2024

The year 2024 witnessed significant advancements in the Cities2030 project, especially in terms of qualitative social impact. This period was marked by deeper community engagement, co-creation with target groups, and innovative experiments aimed at enhancing food system sustainability. The project's various living labs and cross-sector partnerships worked in unison to promote sustainable practices, empower communities, and align with broader EU policies such as the Green Deal. Below are the key areas of social impact achieved during 2024.

1. Co-Creation and Innovation in Sustainable Food Production

As a lighthouse initiative, Cities2030 in 2024 focused on demonstrating how co-creation with target groups could drive innovative solutions in sustainable food production. Research centres involved in the project emphasized reducing the use of harmful materials like peat and explored alternative sources of heat and CO2 from non-fossil sources. These initiatives, which were part of projects such as EIP reduveen and Interreg NWE Re-Greenhouse, addressed sustainability issues directly in line with the Green Deal goals.

Through workshops and co-creation techniques, stakeholders and end-users actively participated in designing solutions that are tailored to the local context, ensuring better adoption within the sector. The high level of cooperation between short food supply chains and local companies resulted in actions to reduce food waste and integrate traceability into regional supply chains. This approach not only demonstrated environmental benefits, but also fostered community ownership and responsibility in the region's food ecosystem.

2. Community Engagement in Living Labs

Living labs, particularly in cities like Bruges, played a crucial role in creating social impact by involving community members in food system experiments. One notable activity was the plant-based protein experiment, where food system experts and community members collaborated to improve meal offerings, particularly for vulnerable groups. The initiative also included intergenerational cooking sessions, which connected senior citizens and young people, fostering a sense of community while promoting healthier, sustainable eating habits.

Culinary enhancements were implemented on-site at community centres, where dining spaces were transformed into restaurant-like environments. This upgrade not only improved the

atmosphere but also encouraged more social interaction among community members at risk of isolation. These projects contributed to a stronger, more connected community, especially among senior citizens and vulnerable populations.
Additionally, the living lab in Bruges collaborated with external partners to facilitate dialogues on food system transformations and social inclusion. Policy discussions with cities such as Bruges and Ostend led to new collaborations aimed at making local food systems more resilient and inclusive.

3. Promotion of Circular Economy and Local Partnerships
The Cities2030 initiative in Lahti, Finland, was a major contributor to promoting the circular economy in food systems. Local and regional stakeholders participated in experiments focused on enhancing sustainability through circular economy principles. Citizen participation was high, with involvement in workshops, training sessions, and public conferences.
By focusing on waste reduction, the region worked with partners like Biolan and Salpakierto to foster partnerships that resulted in actionable outcomes. These efforts demonstrated how co-creation and local collaboration can yield practical solutions, such as alternative composting systems, contributing to overall community improvement and environmental sustainability.

4. Community Participation in Sustainable Food Practices
Several Cities2030 partners across Europe emphasized increasing civil participation by encouraging community members to take ownership of sustainable food practices. In Quart de Poblet, more than 200 children participated in activities promoting healthy, sustainable food. Initiatives such as urban gardens aimed at engaging the general public also made a positive impact, involving over 60 local farmers and community members.
Workshops and community engagement activities provided education on topics like sustainable food value chains and local cuisine, ensuring that citizens were more aware and involved in shaping their local food ecosystems. These activities also helped in fostering a greater appreciation for traditional, local food culture.

5. Policy and Cross-Border Collaboration
Cross-border collaboration continued to play an important role in 2024. The Cities2030 project supported international partnerships, which were particularly evident in the cooperation between cities like Tartu and Seinäjoki. The exchange of best practices on public procurement and sustainable school catering contributed to significant social improvements in the respective regions.
Workshops aimed at public procurement specialists and local government stakeholders ensured that policies surrounding sustainable food systems were being adapted to local needs. For instance, cities in Latvia adopted green public procurement practices that aligned with the overarching goals of Cities2030 and the EU's Green Deal.

6. Addressing Community Needs and Reducing Food Waste
Several regions under Cities2030 implemented strategic actions to address pressing community needs, particularly those surrounding food waste. Surveys and workshops with stakeholders revealed that citizens were concerned about sustainability and food systems. In Waterford,

Ireland, for example, the community survey identified key areas where policy intervention was needed, such as promoting community gardening and reviving traditional foraging practices. Educational events and workshops further enhanced civil participation, enabling more people to engage with sustainable food systems and climate action. Stakeholders from various sectors, including policy-makers, researchers, and community leaders, were actively involved in driving these changes.

7. Social Responsibility and Inclusivity
Cities2030 in 2024 continued to focus on inclusivity and social responsibility, particularly through activities that engaged socially vulnerable groups. Projects like the 'buddy moments' in Bruges brought community members together to tackle social isolation, while other initiatives focused on reducing food waste and improving food security.
The emphasis on creating opportunities for diverse groups, from senior citizens to children and farmers, showcased the project's commitment to ensuring that every segment of society benefited from the initiatives.

8. Learning, Development, and Reputation Building
The 2024 Cities2030 initiatives significantly contributed to learning and capacity building within communities. Through a variety of events, workshops, and policy dialogues, participants were equipped with the knowledge and skills necessary to support the development of short food supply chains (SFSC) and ensure the sustainability of urban food ecosystems.
The project's visibility and reputation grew considerably as a result of its extensive participation in conferences and public events. Partnerships with local government bodies, NGOs, and international organizations enhanced the credibility of Cities2030 and led to more robust networks for future collaborations.

4.4. Environmental impact

Overview of environmental impact, see Figure 4.8.

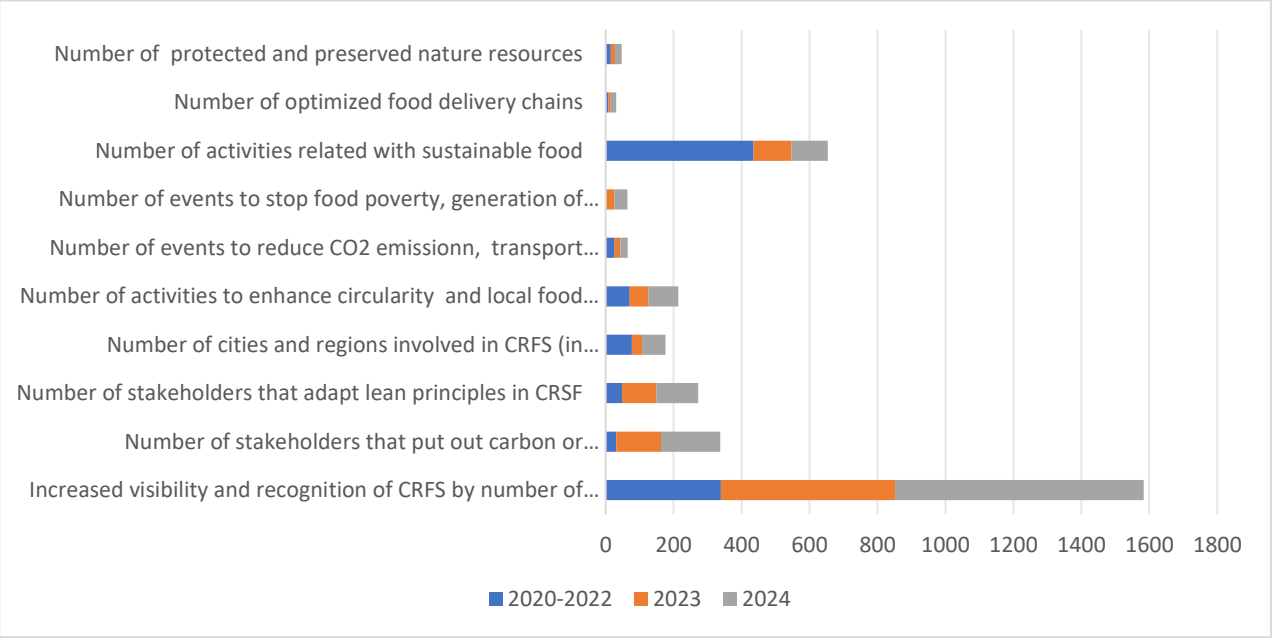


Figure 4.8. Environmental impact

The Cities2030 initiative has placed a significant emphasis on reducing environmental impacts through sustainable practices in food systems. This chapter explores the key metrics that demonstrate the project's environmental impact, focusing on stakeholder engagement, sustainability practices, lean principles, circular economy initiatives, and efforts to reduce emissions and waste. By analyzing trends from 2020 to 2024, we can assess the effectiveness of Cities2030 in driving environmental improvements in food systems and identify areas for continued focus.

1. Increased Visibility and Recognition of CRFS by Number of Stakeholders Engaged

The visibility and recognition of City Region Food Systems (CRFS) among stakeholders is critical for driving environmental action and fostering sustainable practices.

- **2020–2022:** 339 stakeholders engaged
- **2023:** 513 stakeholders engaged
- **2024:** 732 stakeholders engaged
- **Total:** 1,584 stakeholders engaged across 2020–2024

Trend Analysis:

The number of stakeholders engaged in CRFS activities increased steadily each year, reflecting growing awareness and recognition of the importance of sustainable food systems. From 339 stakeholders in 2020–2022 to 732 in 2024, this upward trend shows Cities2030's success in attracting diverse stakeholders, including businesses, municipalities, and organizations, to the CRFS framework. The cumulative total of 1,584 stakeholders involved underscores the project's broad environmental outreach and its ability to influence a wide range of actors in food systems.

2. Number of Stakeholders that Put Out Carbon or Sustainability Reports, Limit Harmful Pollutants, or Seek to Lower Greenhouse Gas Emissions

This metric tracks the number of stakeholders actively working to reduce their environmental footprint by publishing sustainability reports, limiting pollutants, or reducing greenhouse gas emissions.

- **2020–2022:** 31 stakeholders
- **2023:** 132 stakeholders
- **2024:** 174 stakeholders
- **Total:** 337 stakeholders across 2020–2024

Trend Analysis:
There was a sharp increase in the number of stakeholders engaging in carbon or sustainability reporting and seeking to reduce their environmental impact. The number jumped from 31 stakeholders in 2020–2022 to 132 in 2023, and further to 174 in 2024. This significant growth reflects a strong commitment to environmental accountability within the Cities2030 network. By promoting sustainability reporting and the reduction of harmful pollutants, Cities2030 has encouraged stakeholders to take concrete actions to reduce their ecological footprint.

3. Number of Stakeholders that Adapt Lean Principles in CRFS

Lean principles, which focus on efficiency, waste reduction, and resource optimization, are increasingly being applied within the CRFS framework to enhance environmental sustainability.

- **2020–2022:** 48 stakeholders
- **2023:** 101 stakeholders
- **2024:** 123 stakeholders
- **Total:** 272 stakeholders across 2020–2024

Trend Analysis:
The adoption of lean principles within CRFS saw continuous growth throughout the project, with 48 stakeholders implementing these principles in 2020–2022, rising to 123 by 2024. This trend highlights the increasing awareness and application of resource-efficient practices in food systems. The adoption of lean principles not only contributes to environmental sustainability by reducing waste and optimizing processes but also improves the economic resilience of stakeholders by lowering costs and improving operational efficiency.

4. Number of Cities and Regions Involved in CRFS (in Cities2030 Activities)

The involvement of cities and regions is essential for implementing environmental initiatives at a local level, allowing for the adaptation of sustainable practices within specific geographic contexts.

- **2020–2022:** 77 cities/regions
- **2023:** 30 cities/regions

- **2024:** 69 cities/regions
- **Total:** 176 cities/regions across 2020–2024

Trend Analysis:
The number of cities and regions involved in CRFS activities fluctuated throughout the project, peaking at 77 in the 2020–2022 period, dropping to 30 in 2023, and rising again to 69 in 2024. While there was a temporary decline in 2023, the total number of 176 cities and regions involved shows substantial engagement in environmental and sustainability efforts across different areas. This engagement reflects the initiative's broad geographic reach and its ability to influence regional and local food systems.

5. Number of Activities to Enhance Circularity and Local Food Belts

Circularity in food systems focuses on reducing waste and ensuring that resources are reused and recycled within local systems, while local food belts strengthen regional food production.

- **2020–2022:** 71 activities
- **2023:** 54 activities
- **2024:** 89 activities
- **Total:** 214 activities across 2020–2024

Trend Analysis:
Activities aimed at enhancing circularity and promoting local food belts followed a generally positive trend, with a notable increase in 2024. After an initial 71 activities during 2020–2022, the number dipped to 54 in 2023, before rising significantly to 89 in 2024. This rebound in activity suggests that the project intensified its focus on circular food systems in the later stages, recognizing the importance of reducing waste and strengthening local food networks for environmental sustainability.

6. Number of Events to Reduce CO2 Emissions and Transport Emissions Across the Supply Chain

Reducing emissions is a core component of environmental sustainability, particularly in food supply chains where transport can significantly contribute to greenhouse gas emissions.

- **2020–2022:** 26 events
- **2023:** 17 events
- **2024:** 22 events
- **Total:** 65 events across 2020–2024

Trend Analysis:
The number of events focused on reducing CO2 and transport emissions fluctuated, with 26 events held during the initial period, a dip to 17 in 2023, and a rise to 22 in 2024. The total of 65 events demonstrates the initiative's ongoing efforts to address transport-related emissions in food systems. While the dip in 2023 may reflect a shift in focus or resources, the recovery in 2024

indicates renewed efforts to lower the carbon footprint of food transportation across different stages of the supply chain.

7. Number of Events to Address Food Poverty, Surpluses, and Waste

Food poverty and food waste are critical issues in food systems, with significant environmental and social consequences. Reducing food waste and surpluses while addressing food poverty is central to achieving sustainability goals.

- **2020–2022:** 1 event
- **2023:** 24 events
- **2024:** 39 events
- **Total:** 64 events across 2020–2024

Trend Analysis:

There was a dramatic increase in the number of events aimed at addressing food poverty and reducing food waste, from just 1 event in 2020–2022 to 24 in 2023 and 39 in 2024. This sharp rise reflects Cities2030's growing focus on tackling food poverty and waste as part of its environmental agenda. The total of 64 events highlights the importance of reducing food surpluses and ensuring that food is distributed more equitably, with a minimal environmental impact.

8. Number of Activities Related to Sustainable Food

Sustainable food activities include initiatives that promote environmentally-friendly food production and consumption practices.

- **2020–2022:** 435 activities
- **2023:** 111 activities
- **2024:** 108 activities
- **Total:** 654 activities across 2020–2024

Trend Analysis:

The number of sustainable food activities was highest in the 2020–2022 period, with 435 activities recorded. However, this number decreased significantly in 2023 and 2024, with 111 and 108 activities, respectively. Despite the decline, the total of 654 activities across four years indicates sustained efforts to promote sustainability in food systems. The decrease may reflect a shift toward more targeted initiatives as the project matured, focusing on specific areas with greater impact rather than broad-based activities.

9. Number of Optimized Food Delivery Chains

Optimizing food delivery chains is essential for reducing the environmental impact of transporting food, improving efficiency, and lowering emissions.

- **2020–2022:** 7 optimized chains
- **2023:** 6 optimized chains

- **2024:** 18 optimized chains
- **Total:** 31 optimized chains across 2020–2024

Trend Analysis:
The optimization of food delivery chains followed a positive trend, with a substantial increase in 2024. After optimizing 7 chains during 2020–2022 and 6 in 2023, the project saw a significant rise to 18 optimized chains in 2024. This growth reflects Cities2030's commitment to improving the efficiency of food distribution systems, thereby reducing emissions and waste. The total of 31 optimized chains underscores the project's contribution to making food delivery systems more sustainable.

10. Number of Protected and Preserved Natural Resources

The protection and preservation of natural resources, such as water, soil, and biodiversity, are vital for maintaining healthy ecosystems and ensuring the sustainability of food systems.

- **2020–2022:** 15 resources protected
- **2023:** 12 resources protected
- **2024:** 20 resources protected
- **Total:** 47 resources protected across 2020–2024

Trend Analysis:
The number of protected and preserved natural resources increased over time, with 15 resources protected in the initial period, 12 in 2023, and 20 in 2024. This positive trend reflects Cities2030's ongoing commitment to safeguarding the natural environment as part of its broader sustainability goals. The protection of 47 resources across four years highlights the initiative's role in promoting environmental stewardship and ensuring the long-term health of ecosystems that support food production.

Conclusion

The environmental impact of Cities2030 has been significant, with several key trends emerging from the analysis of activities from 2020 to 2024:

Increased Stakeholder Engagement: The steady growth in the number of stakeholders engaged in CRFS activities and those adopting sustainability reporting demonstrates Cities2030's ability to raise awareness and foster environmental action. The project has succeeded in bringing diverse actors together to work toward common environmental goals.

Rising Adoption of Lean Principles: The growing number of stakeholders implementing lean principles within CRFS highlights the project's focus on promoting efficiency and reducing waste. This trend suggests that Cities2030 has had a lasting influence on how stakeholders manage resources and optimize processes.

Focus on Circularity and Local Food Systems: The consistent number of activities promoting circularity and local food belts shows that Cities2030 has made significant

strides forward in building more sustainable, localized food systems that reduce waste and strengthen regional food networks.

Efforts to Reduce Emissions and Waste: Events aimed at reducing CO2 emissions and addressing food waste increased significantly over the years, reflecting Cities2030's commitment to tackling the environmental impacts of food production and distribution. The increase in optimized food delivery chains and preserved natural resources further highlights the project's environmental focus.

Protection of Natural Resources: The steady increase in the number of protected natural resources shows the project's long-term commitment to environmental preservation. Protecting ecosystems is critical for sustaining food production, biodiversity, and overall environmental health. See Table 4.2.

Table 4.2.

Environmental impact

	2020-2022	2023	2024	SUM
Increased visibility and recognition of CRFS by number of stakeholders engaged (involved)	339	513	732	1584
Number of stakeholders that put out carbon or sustainability reports, limits harmful pollutants and chemicals or seeks to lower greenhouse gas emissions	31	132	174	337
Number of stakeholders that adapt lean principles in CRSF	48	101	123	272
Number of cities and regions involved in CRFS (in Cities2030 activities)	77	306	696	1776
Number of activities to enhance circularity and local food belts	71	54	89	214
Number of events to reduce CO2 emissio n, transport emissions by all actors in the chain at different stages	26	17	22	65
Number of events to stop food poverty, generation of surpluses and waste	1	24	39	64
Number of activities related with sustainable food	435	111	108	654
Number of optimized food delivery chains	7	61	184	314
Number of protected and preserved nature resources	15	12	20	47

4.4.1. Qualitative Environmental Impact of Cities2030 up to 2022

The Cities2030 project has aimed to drive sustainable transitions in urban food systems, with particular attention to reducing environmental impact. Through its various Living Labs and collaborative initiatives, Cities2030 has promoted circularity, food waste reduction, and sustainable food production practices, although formal environmental research has yet to be fully completed. Below are key areas where the project has made qualitative environmental impact by 2022.

1. Sustainability in Food Production and Circularity Initiatives

Several initiatives within Cities2030 are geared toward sustainable food production, with a focus on reducing waste and adopting regenerative agricultural practices. For instance, the Food Business Club for youngsters plans to use food at risk of being wasted, such as second-class tomatoes, to reduce food loss while providing learning opportunities about sustainable consumption. Additionally, the Pikkuprovinssi kids' festival promotes food education, aiming to influence the behaviour of the younger audience towards more sustainable choices.

2. Bokashi Food Waste Composting and IoT Composting Solutions
In the Lahti Living Lab, experiments such as Bokashi Food Waste Bio-Composting and the use of IoT-equipped bio-composters demonstrated how innovative technologies and traditional methods could be integrated into local food systems. These experiments involved engaging local stakeholders and resulted in increased awareness of waste reduction methods. The social impact was significant, with hundreds of community members learning about composting, which also had positive environmental implications in reducing local food waste.

3. Circular Economy and Sustainable Food in Vidzeme
In Vidzeme, Latvia, the Food Innovation Hackathon hosted as part of the CRFS Living Lab activities focused on addressing key challenges in food production through a circular economy lens. Two of the guiding principles—waste management and sustainable food production—were integral to the challenges presented during the 24-hour marathon. The hackathon produced innovative solutions, such as the creation of banana peel chips, showcasing the project's commitment to advancing environmentally sustainable food production methods and waste reduction.

4. Collaborations for Sustainable Agriculture
In the Cilento region, the Paideia Campus worked with local and European stakeholders, including the Cilento Biodistrict (the first European biodistrict) and EIT Food Test Farms, to promote regenerative and precision agriculture. The Living Lab connected eight innovative startups with local farms, providing a platform for experimenting with sustainable agriculture technologies, CO2 reduction methods, and promoting food waste management through workshops and educational programs. These efforts contributed to fostering sustainable farming techniques that help increase CO2 absorption and preserve local ecosystems.

5. Efforts to Reduce Environmental Footprint in Wine Production
One of the key areas of focus for Cities2030 has been the reduction of the environmental impact of food and beverage production. In Iași, Romania, the project supported initiatives aimed at improving the sustainability of wine production, although the exact quantifiable impact is still under investigation. These efforts reflect the overall objective of promoting local mechanisms for sustainable food production and consumption, particularly in traditional industries like wine.

6. Local Food Networks and Waste Management in Vejle
The city of Vejle has made significant strides toward improving waste management and promoting circularity within its food system. Plans to launch a social supermarket are in progress, which will have measurable results in terms of families helped, food saved from waste, and partnerships

formed. Furthermore, ongoing discussions with city services on waste management are expected to positively influence the city's overall environmental sustainability, reflecting the broader Cities2030 agenda of fostering circular economies.

7. Educational Initiatives and Capacity Building
One of the key elements of Cities2030's environmental impact is the focus on education and capacity building. The Paideia Campus, through its RegenerAction Boot Camps and workshops, teaches participants about circularity, CO2 reduction, and regenerative agriculture. Participants also learned about fermentation techniques as a sustainable method to preserve food, emphasizing both environmental and economic sustainability.

8. Mobile Grocery Store for Circular and Sustainable Food Supply
CITAG, as part of the Cities2030 initiative, developed plans for a mobile grocery store, which will focus on selling sustainable, and eventually locally produced, food. This mobile store is designed to address issues of food poverty while simultaneously promoting circularity and sustainable consumption in underserved areas.

9. Addressing Food Waste and Sustainable Practices in Reykjavik
The project has initiated discussions with local policy-makers in Reykjavik to create a coordinated approach to food policies, focusing on reducing food waste and enhancing sustainability within the city's food systems. The planned round tables with adjacent communities are intended to foster regional cooperation in implementing sustainable food strategies.

10. Promoting Healthy and Sustainable Diets
Cities2030's outreach efforts, such as fairs and educational events, focused on promoting healthy and sustainable eating habits among children and adults. These events disseminated information about the environmental benefits of local food production and sustainable diets, aiming to shift public behaviour towards more environmentally-responsible food choices.

Up until 2022, the Cities2030 project had laid a solid foundation for creating environmental impact through its initiatives focused on circularity, food waste reduction, and sustainable agricultural practices. Although more formal environmental impact assessments are still in development, the project's activities have already demonstrated qualitative benefits through increased awareness, community engagement, and the adoption of more sustainable food system practices across various regions.

4.4.2. Qualitative Environmental Impact of Cities2030 in 2023

In 2023, the Cities2030 project continued to emphasize environmental sustainability through various initiatives across its partner regions. Key environmental goals were related to reducing emissions, enhancing circular economy practices, promoting sustainable food systems, and fostering community engagement in environmentally friendly behaviours. The environmental impacts of the project in 2023 are summarized as follows:

1. Emissions Reduction and Waste Management in Lahti

The Lahti region, which had reported emissions of 1188 ktCO2e in 2020, saw positive contributions from Cities2030 in waste management and emissions reduction. Key impacts included:

- Waste Management: The municipal waste recycling rate in 2020 was 43%, with a goal to reach 60% by 2030. The project's initiatives contributed to this goal through enhanced recycling and waste management systems.
- Food Self-Sufficiency: Food self-sufficiency in Finland in 2022 was 80%, and the project promoted further progress toward this goal by fostering sustainable local food production and reducing food-related emissions.

2. Technological Support in Venice Lagoon Policy Lab

While not directly involved in field activities, the project's technical partner contributed indirectly to the environmental impact by providing data on how tourism affects the ecosystem of the Venice Lagoon. This work informed policy discussions aimed at reducing the environmental footprint of tourism-related activities.

3. Sustainable Food Systems in Bruges

Several initiatives in Bruges highlighted the project's focus on reducing emissions and food waste through local food systems:

- Intergenerational Cooking Project: This project, integrated into neighbourhood centres, contributed to food waste reduction by using precise cooking techniques to match demand, thus minimizing food excess.
- Food System Dialogues: Events like (H)eerlijk Brugge and the "Tasteful Transformation: from Farm to Table" dialogues emphasized the importance of shorter food supply chains, reducing carbon emissions from transportation.
- Culinary Upgrades: By investing in shorter supply chains and culinary upgrades, the region further reduced food waste and optimized the use of local products, contributing to a reduction in emissions and a more sustainable food ecosystem.

4. Sustainability Initiatives in Vejle

In Vejle, Cities2030's initiatives in 2023 made substantial environmental contributions:

- Public Kitchen Reforms: Gastro Days introduced more sustainable practices, such as the use of seasonal produce and reducing food waste in public kitchens. This initiative helped minimize the environmental footprint of food preparation.
- Food Festival and Competitions: The Vejle Food Festival encouraged local producers to adopt shorter supply chains, reducing the carbon footprint of food transport. Competitions like the HotDog Championship and Potato Award fostered innovation in sustainable food production and consumption.
- School Workshops: Through workshops with local schools, the project educated future generations about the environmental impacts of food choices, empowering them to make informed and sustainable decisions.

5. Circular Economy and Waste Management in Marseille

In Marseille, the Cities2030 project focused on enhancing local food systems through circular economy principles:

- Food System Dialogue on Waste and Composting: The project engaged four cities in discussions on food waste and composting, which led to a broader focus on circular food delivery chains. Initiatives like the Epicerie Mobile and summer markets for urban agriculture helped to strengthen local food belts and reduce the environmental impact of food transportation.
- Local Food Events: Events such as the 48H Cortège and Sols Vivants collective events focused on improving circulation in local food systems and promoting sustainable agricultural practices.

6. Digital Tools for Sustainable Agriculture in Setesdal

The Setesdal project implemented several sustainability-focused actions, including:

- Digital Awareness for Farms: Farmers were introduced to digital tools and infrastructure that could make their operations more sustainable. By integrating lean principles and digital marketing strategies, the project helped farmers improve their online presence and reduce the environmental impact of their supply chains.
- Circularity in Food Production: Discussions with local stakeholders on sustainable food and delivery chains led to new practices in food production, particularly with fresh and unprocessed products, fostering a more sustainable approach to food sourcing and distribution.

7. Youth Engagement in Sustainable Food Practices

Cities2030 continued to focus on engaging youngsters in sustainable food education, particularly through the Mahtikiska experiment and other local initiatives:

- Food Waste Campaigns: Youngsters were involved in food waste reduction campaigns and learned about reusing school food in kiosk-based foods, fostering an understanding of sustainability from a young age.
- Sustainable Food Education: Educational programs and activities, such as the Future Food Academy's workshops, focused on topics like regenerative agriculture, biodiversity, carbon sequestration, and circularity. These programs helped train the next generation of leaders in sustainable food systems.

8. Collaborations and New Projects for Circular Solutions

Cities2030 also initiated new projects in 2023 that integrated circular economy principles into various sectors:

- Ce4Re Project (Interreg CB): This project aimed to promote resource conservation and waste reduction in the Central Baltic Sea region's restaurant sector. By incorporating circular economy practices into food procurement, preparation, and presentation, the project sought to significantly reduce waste and enhance sustainability in catering.

- KISMET Project (Interreg BSR): The KISMET project focused on transforming food systems in the Baltic Sea region by educating target groups on sustainable food practices and promoting the demand for environmentally-friendly food options.

The Cities2030 project made notable progress in 2023 in reducing environmental impact across multiple regions. From waste management improvements in Lahti to fostering local, sustainable food systems in Vejle and Bruges, the project effectively integrated circular economy practices, reduced emissions, and engaged communities in sustainability education. By promoting shorter food supply chains, reducing food waste, and fostering a culture of eco-friendly consumption, Cities2030 continued to support the European Green Deal and broader environmental goals across the food sector.

4.4.3. Qualitative Environmental Impact of Cities2030 in 2024

In 2024, the Cities2030 project made considerable strides forward in reducing environmental impact through a wide range of initiatives across multiple regions. These activities centered on reducing CO2 emissions, promoting sustainable food systems, enhancing circularity, and fostering collaboration between local communities and stakeholders. Below is a detailed overview of the environmental impact achieved in 2024.

1. Energy Transition in Greenhouse Horticulture

One of the key environmental initiatives was the "Clear as Glass" events, where stakeholders from various sectors, including farmers, government officials, researchers, and industry leaders, gathered to discuss ways to transition greenhouse horticulture towards fossil-free energy sources. By focusing on improving energy efficiency and reducing reliance on fossil fuels, this initiative aimed to minimize the environmental impact of food production in controlled environments such as greenhouses. Additionally, the events also discussed Integrated Pest Management (IPM) techniques, encouraging farmers to reduce their dependence on chemical pesticides by adopting more environmentally-friendly alternatives.

2. Optimizing the Regional Food Supply Chain

In Slovenia, the Zelena Točka living lab played a pivotal role in reducing the CO2 emissions of the regional food supply chain by working directly with farmers to optimize production and logistics. Regular meetings with stakeholders helped introduce new technologies and methods to improve efficiency, showcasing how even traditional sectors like agriculture could adopt innovative practices for a more sustainable future. Furthermore, cooperation between companies such as HUDO DOBRO and Zelena Točka led to surplus food being repurposed into new products, reducing food waste and enhancing the circular economy.

3. Sustainable Food and Food Waste Reduction

Sustainability was a key focus in the Bruges region, where multiple initiatives aimed to reduce food waste and optimize local food systems. For example, the intergenerational cooking project, which involved both older and younger community members, promoted the use of locally-sourced ingredients and ensured that cooking was tailored to the exact number of consumers. This not

only minimized food waste, but also fostered a stronger connection between local food producers and consumers.

Additionally, new developments such as a vehicle-sharing platform and the introduction of cargo bikes in Bruges aimed to reduce transportation-related emissions. These projects helped promote shorter food supply chains, contributing to a lower carbon footprint while ensuring efficient delivery of local products.

4. Food Waste Management in Haarlem
In Haarlem, the collaboration with Haarlem Food Future and WeCup made significant contributions to reducing food waste and promoting sustainable practices. The project helped save an average of 10,000 meals per month by redistributing surplus food from supermarkets to social initiatives. This initiative not only combated food waste but also addressed food poverty, providing meals to those in need. The city's focus on sustainability was further extended through the widespread use of reusable coffee cups, highlighting the city's commitment to reducing waste in all sectors.

5. Circular Economy and Carbon Footprint Reduction
In Skopje, Cities2030 supported initiatives focused on reducing agriculture's carbon footprint. A Stakeholder Dialogue on Reducing Agriculture's Carbon Footprint was organized to explore ways to implement more sustainable agricultural practices. Additionally, the Ce4Re project promoted circular solutions in the restaurant sector, incorporating the efficient use of water and energy resources and fostering circularity in food production and consumption.

6. Urban Agriculture and Sustainable Food Systems
Several Cities2030 regions promoted urban agriculture and sustainable food practices. In Marseille, over 50 events were organized as part of the 48H of Urban Agriculture, addressing themes such as sustainable food, food waste management, and food poverty. These events involved diverse stakeholders, from local producers to urban gardeners, and encouraged the community to adopt environmentally-friendly food practices.

In Quart de Poblet, efforts to enhance local food systems included the restoration of the Natural Park of Turia River and the establishment of urban gardens. These gardens allowed the community to grow food locally, reducing reliance on long food supply chains and fostering environmental stewardship among residents. The approval of municipal regulations concerning urban gardens further demonstrated the city's commitment to sustainable food practices and resource management.

7. Food Waste Reduction in Zagreb
The City of Zagreb took substantial steps to address food waste by signing an agreement to reduce food waste by 30% by 2028. Cooperation with the Ministry of Agriculture and surrounding cities enhanced the city's ability to implement waste-reduction measures effectively. A plan of action is

currently being prepared, aiming to meet this ambitious goal through a combination of community engagement and the promotion of circular food systems.

8. Innovations in the Venice Lagoon
The Cities2030 activities within the Venice Lagoon helped consolidate a multi-actor network focused on protecting the lagoon's ecosystem. This initiative emphasized sustainable food production activities by small farmers and fishermen, who are considered the guardians of the lagoon's unique ecosystem. The project promoted the circularity of the food system through activities like the Circular City Studio course at the Iuav University of Venice, fostering new ideas around sustainable food and circular economy principles.

9. Blockchain for Reducing Emissions and Optimized Delivery Chains
The Cities2030 project also explored the use of blockchain technology to reduce CO2 emissions and optimize delivery chains. By providing real-time, transparent data on food production and transportation, blockchain technology can help reduce inefficiencies, minimize transportation distances, and avoid redundant routes, thus lowering the overall carbon footprint of food systems. Blockchain's traceability feature also promoted sustainable agricultural practices, encouraging stakeholders to make environmentally-responsible decisions based on data transparency.

10. Leanness and Efficiency in Waterford
The "Grow and Monitor" project in Waterford highlighted how technology could be leveraged to promote sustainable home gardening and resource efficiency. This project used plant sensors to optimize water, light, and nutrient use, minimizing waste and enhancing resource efficiency. The project also supported sustainable food systems by encouraging home and community gardening, aligning with lean principles to promote more efficient use of resources.

11. Reducing CO2 Emissions through Efficient Resource Use
Several initiatives in 2024 aimed at reducing CO2 emissions by promoting more efficient resource use. In Setesdal, for example, a collaboration between local farms and restaurants focused on short-travel products to reduce transportation distances. Meetings with stakeholders helped bring awareness to the digital tools and infrastructure needed to make food systems more efficient, further contributing to the reduction of CO2 emissions.

The environmental impact of Cities2030 in 2024 was substantial, with a focus on optimizing food systems, reducing waste, and fostering sustainable practices. From greenhouse horticulture energy transitions to blockchain for optimized delivery chains, the project's diverse initiatives demonstrated how innovation, collaboration, and education could work together to drive meaningful environmental change. Through partnerships with local stakeholders, the Cities2030 project continues to make important contributions toward creating more sustainable urban food systems and reducing environmental impacts across Europe.

4.5. Economical impact

Overview of economical impact, see Figure 4.9.

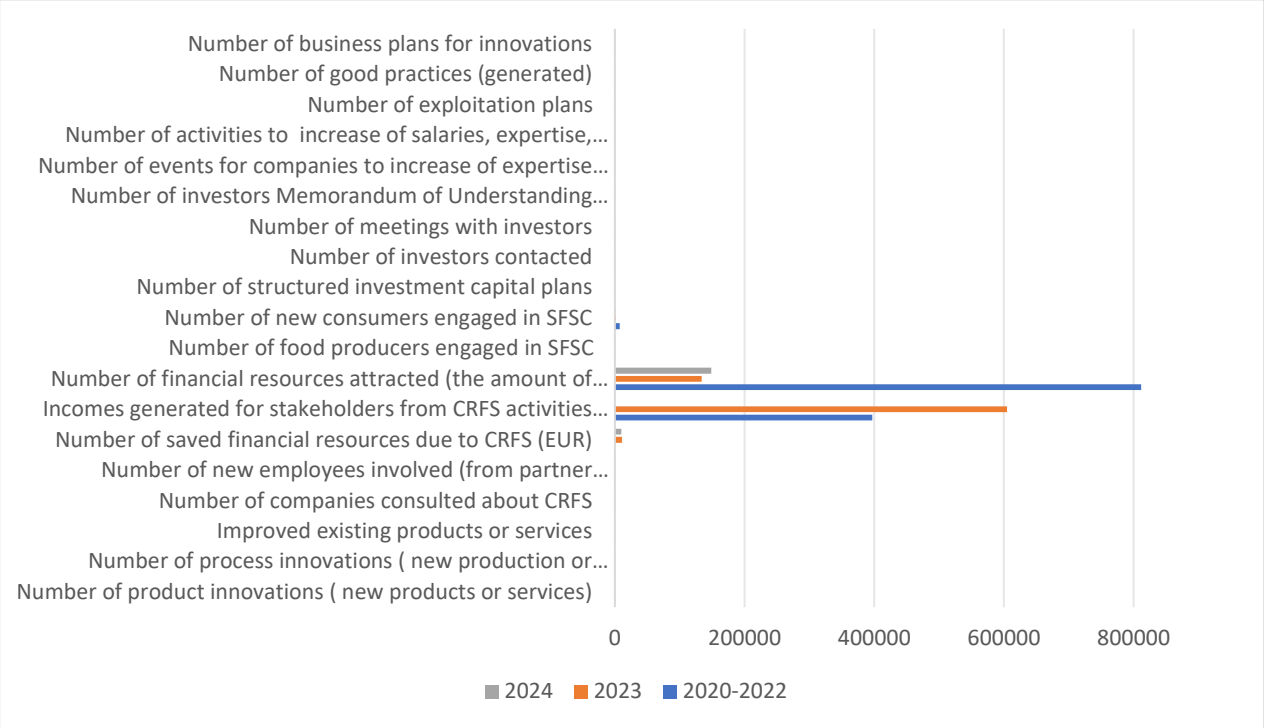


Figure 4.9. Economical impact

The Cities2030 initiative has had a significant economic impact on the food systems it seeks to transform. Through product and process innovations, consultation with companies, and fostering short food supply chains (SFSC), the project has created economic opportunities for stakeholders, generated income, attracted investments, and improved the expertise of companies and employees engaged in food systems. This chapter provides an analysis of key economic metrics, highlighting the trends in innovations, financial resources, stakeholder engagement, and investment activities from 2020 to 2024. By examining these trends, we can better understand how Cities2030 has contributed to the economic sustainability of food systems.

1. Number of Product Innovations (New Products or Services)

Product innovation has been a central focus of Cities2030, with the introduction of new products and services being a critical driver of economic growth in food systems.

- **2020–2022:** 40 product innovations
- **2023:** 24 product innovations
- **2024:** 17 product innovations
- **Total:** 81 product innovations across 2020–2024

Trend Analysis:

The number of new product innovations saw a steady decline over the years, from 40 in 2020–2022 to 24 in 2023 and 17 in 2024. While the initial phase of the project was marked by a surge in innovation, the drop in the following years suggests that much of the foundational work was front-

loaded. However, the total of 81 new product innovations over four years indicates substantial progress, demonstrating the initiative's success in stimulating the creation of novel food products and services in the early phases.

2. Number of Process Innovations (New Production or Delivery Methods)

Process innovation, which includes new methods of production or delivery, is essential for improving efficiency and reducing costs within food systems.

- **2020–2022:** 7 process innovations
- **2023:** 4 process innovations
- **2024:** 17 process innovations
- **Total:** 28 process innovations across 2020–2024

Trend Analysis:

Unlike product innovations, process innovations followed a different trend. While there were only 7 innovations during the 2020–2022 period and 4 in 2023, this figure jumped to 17 in 2024. This sharp increase suggests that the project shifted focus towards optimizing production and delivery methods as it matured. The total of 28 process innovations reflects a growing emphasis on efficiency improvements, particularly in the later stages of the project.

3. Number of Improved Existing Products or Services

Improving existing products or services is a key strategy for increasing competitiveness and enhancing the value proposition of food systems.

- **2020–2022:** 15 improvements
- **2023:** 18 improvements
- **2024:** 22 improvements
- **Total:** 55 improvements across 2020–2024

Trend Analysis:

The number of improved products or services showed a positive trend, increasing each year from 15 in 2020–2022 to 18 in 2023 and 22 in 2024. This consistent growth highlights Cities2030's commitment to continuous improvement, ensuring that existing food products and services evolve to meet changing consumer needs and market demands. The total of 55 improvements underscores the initiative's impact on refining and enhancing the food products and services already available within the system.

4. Number of Companies Consulted About CRFS (City Region Food Systems)

Consulting companies about City Region Food Systems (CRFS) is crucial for engaging private sector stakeholders and aligning them with the goals of sustainable food systems.

- **2020–2022:** 132 companies consulted
- **2023:** 60 companies consulted

- **2024:** 120 companies consulted
- **Total:** 312 companies consulted across 2020–2024

Trend Analysis:
The number of companies consulted followed a fluctuating trend. After consulting 132 companies during the 2020–2022 period, the figure dropped to 60 in 2023 but rebounded to 120 in 2024. This suggests that while engagement with companies dipped in the middle phase, the initiative renewed its focus on private sector engagement towards the end of the project. The total of 312 companies consulted indicates broad private sector involvement in the transformation of regional food systems, a critical factor in ensuring long-term economic sustainability.

5. Number of New Employees Involved (from Partner Companies) in CRFS

The involvement of new employees from partner companies in CRFS activities demonstrates the initiative's ability to generate employment opportunities.

- **2020–2022:** 15 employees
- **2023:** 9 employees
- **2024:** 16 employees
- **Total:** 40 employees across 2020–2024

Trend Analysis:
The number of new employees involved in CRFS activities remained relatively stable, with minor fluctuations. After involving 15 employees in the initial period, the number dipped to 9 in 2023 before rising again to 16 in 2024. This moderate growth suggests a steady, though not rapid, creation of employment opportunities as a result of Cities2030's activities. The total of 40 new employees reflects the project's contribution to job creation within the context of partner companies.

6. Number of Saved Financial Resources Due to CRFS (EUR)

Cities2030 aimed to help stakeholders save financial resources through more efficient and sustainable food systems.

- **2020–2022:** €0
- **2023:** €11,200
- **2024:** €10,000
- **Total:** €21,200 saved across 2020–2024

Trend Analysis:
There were no recorded financial savings in the 2020–2022 period, but by 2023 and 2024 the initiative had contributed to saving €11,200 and €10,000, respectively. The growing amount of saved financial resources indicates that Cities2030's interventions started delivering tangible economic benefits in the form of cost savings for stakeholders. The total of €21,200 saved

highlights the project's potential to reduce financial burdens through more efficient food production and distribution practices.

7. Incomes Generated for Stakeholders from CRFS Activities (EUR)

Income generation is a key indicator of the economic success of the initiative's activities.

- **2020–2022:** €397,000
- **2023:** €605,000
- **2024:** €0
- **Total:** €1,002,000 generated across 2020–2024

Trend Analysis:
Income generation showed a significant spike in 2023, rising from €397,000 in the initial period to €605,000. However, there were no recorded incomes generated in 2024, which suggests that some income-generating activities may have concluded or that the project had shifted focus. Despite this, the total income generated for stakeholders (€1,002,000) over four years underscores Cities2030's ability to create economic opportunities and value for its participants.

8. Number of Financial Resources Attracted (Investment) to CRFS (EUR)

Attracting financial investment to CRFS is a crucial aspect of ensuring the sustainability of food system innovations.

- **2020–2022:** €811,730
- **2023:** €134,000
- **2024:** €148,800
- **Total:** €1,094,530 attracted across 2020–2024

Trend Analysis:
The amount of financial resources attracted to CRFS decreased after 2020–2022, when €811,730 was secured. However, the initiative still managed to attract €134,000 in 2023 and €148,800 in 2024. The total of over €1 million in investment over four years reflects Cities2030's success in bringing external financial support to its projects, ensuring that the innovations developed within the initiative have the resources needed to grow and thrive.

9. Number of Food Producers Engaged in SFSC (Short Food Supply Chains)

The engagement of food producers in SFSC is key to strengthening local food economies and reducing reliance on long supply chains.

- **2020–2022:** 154 producers
- **2023:** 292 producers
- **2024:** 249 producers
- **Total:** 695 producers engaged across 2020–2024

Trend Analysis:
The number of food producers engaged in SFSC saw a significant increase in 2023, rising to 292 from 154 in the earlier period. Although this number decreased slightly in 2024 to 249, the total of 695 producers engaged shows Cities2030's substantial impact on integrating local food producers into shorter, more sustainable supply chains. This engagement is crucial for building resilient food systems that prioritize local economies and reduce environmental impacts.

10. Number of New Consumers Engaged in SFSC
Engaging consumers in SFSC is critical for building demand for local, sustainable food products.

- **2020–2022:** 7,719 consumers
- **2023:** 1,615 consumers
- **2024:** 1,148 consumers
- **Total:** 10,482 consumers engaged across 2020–2024

Trend Analysis:
Consumer engagement was strongest in the 2020–2022 period, with 7,719 consumers involved. This number dropped sharply to 1,615 in 2023 and 1,148 in 2024. The decline could reflect a shift in project focus or challenges in scaling consumer engagement. However, the total of 10,482 consumers over four years still demonstrates significant outreach efforts to encourage consumers to support short food supply chains.

11. Number of Structured Investment Capital Plans
Investment capital plans are essential for securing funding and supporting the growth of food system innovations.

- **2020–2022:** 1 plan
- **2023:** 1 plan
- **2024:** 1 plan
- **Total:** 3 plans across 2020–2024

Trend Analysis:
The number of structured investment capital plans remained stable, with one plan developed each year. Although the total number of plans is low, these plans likely played a critical role in securing the necessary financial resources to support innovations developed within the initiative.

12. Number of Investors Contacted and Meetings with Investors
Engaging investors is key to securing financial support for innovations.

- **2020–2022:** 16 investors contacted, 26 meetings
- **2023:** 10 investors contacted, 16 meetings
- **2024:** 21 investors contacted, 10 meetings
- **Total:** 47 investors contacted, 52 meetings across 2020–2024

Trend Analysis:
The number of investors contacted and meetings held with investors fluctuated across the years. The total of 47 investors contacted and 52 meetings held reflects steady investor engagement, although the focus appears to have shifted more towards contacting investors in 2024 rather than conducting meetings. This outreach is crucial for securing long-term financial backing for Cities2030's innovations.

13. Number of Memorandums of Understanding (MoU) Signed with Investors

Signing MoUs with investors solidifies partnerships and secures funding commitments.

- **2020–2022:** 0 MoUs signed
- **2023:** 1 MoU signed
- **2024:** 1 MoU signed
- **Total:** 2 MoUs signed across 2020–2024

Trend Analysis:
The first MoU with an investor was signed in 2023, followed by another in 2024. Although the number of signed agreements is low, each MoU represents a crucial commitment from investors to support Cities2030's initiatives financially. These agreements lay the foundation for future investments and partnerships that can support the project's continued growth.

14. Number of Events for Companies to Increase CRFS Expertise

Events that aim to increase companies' expertise in CRFS are important for building knowledge and capacity within the private sector.

- **2020–2022:** 40 events
- **2023:** 14 events
- **2024:** 23 events
- **Total:** 77 events across 2020–2024

Trend Analysis:
The number of events peaked during 2020–2022, with 40 events held. After a drop to 14 in 2023, the figure rose again to 23 in 2024. The total of 77 events reflects consistent efforts to engage companies and improve their expertise in City Region Food Systems, helping to strengthen their role in sustainable food systems.

15. Number of Activities to Increase Salaries, Expertise, and Competencies of Employees

Improving the salaries, expertise, and competencies of employees involved in CRFS activities is critical for workforce development.

- **2020–2022:** 4 activities
- **2023:** 6 activities
- **2024:** 4 activities

- **Total:** 14 activities across 2020–2024

Trend Analysis:
The number of activities aimed at increasing salaries and expertise remained relatively stable, with slight variations between 4 and 6 activities per year. The total of 14 activities highlights Cities2030's focus on human capital development, although more efforts could be made to scale these activities to reach more employees.

16. Number of Exploitation Plans

Exploitation plans are developed to ensure that innovations can be successfully implemented and commercialized.

- **2020–2022:** 24 plans
- **2023:** 12 plans
- **2024:** 17 plans
- **Total:** 53 exploitation plans across 2020–2024

Trend Analysis:
The number of exploitation plans fluctuated, with 24 plans in the initial period, dropping to 12 in 2023 before rising to 17 in 2024. The total of 53 plans indicates steady efforts to ensure that innovations are commercially viable and can be scaled for broader impact.

17. Number of Good Practices Generated

Good practices provide examples of successful approaches that can be replicated or adapted to other contexts.

- **2020–2022:** 22 good practices
- **2023:** 29 good practices
- **2024:** 39 good practices
- **Total:** 90 good practices across 2020–2024

Trend Analysis:
The number of good practices generated increased steadily over the years, reflecting Cities2030's continuous efforts to identify and document effective strategies. The total of 90 good practices provides a rich repository of knowledge that can be shared and adopted by other stakeholders, helping to spread the impact of the project.

18. Number of Business Plans for Innovation

Business plans are essential for ensuring the commercial success of innovations developed within the project.

- **2020–2022:** 13 business plans
- **2023:** 6 business plans
- **2024:** 57 business plans
- **Total:** 76 business plans across 2020–2024

Trend Analysis:

The number of business plans developed for innovations saw a dramatic increase in 2024, rising from just 6 in 2023 to 57 in 2024. This surge suggests a concerted effort to ensure that the innovations created within Cities2030 are commercially viable and ready for market entry. The total of 76 business plans demonstrates the project's strong focus on ensuring that its innovations have a clear path to commercialization.

Conclusion

The economic impact of Cities2030 has been substantial, with a focus on innovation, investment, and stakeholder engagement. Key trends that emerged from the analysis include:

Innovation and Improvement: Cities2030 fostered both product and process innovations, with a strong emphasis on improving existing products and services over time. While the pace of product innovations declined, process innovations saw a notable increase in the later stages of the project.

Investment and Financial Impact: The project attracted over €1 million in investments and generated substantial income for stakeholders, though income generation ceased in 2024. Efforts to secure financial resources and investment capital remained strong, with structured investment plans and investor engagement playing a key role in the project's sustainability.

Private Sector Engagement: Consultation with companies and food producers, as well as events to improve CRFS expertise, demonstrated Cities2030's commitment to engaging the private sector. The fluctuating number of consultations and engagements suggests that private sector involvement remained an area of focus, particularly in the later stages of the project.

Commercial Viability: The dramatic increase in business plans developed in 2024 indicates a strong push towards commercialization and scaling of innovations, ensuring that Cities2030's technological and process innovations can be successfully brought to market.

As Cities2030 moves forward, maintaining a focus on investment attraction, scaling innovations, and ensuring continued engagement with private sector stakeholders will be critical for sustaining the economic impact achieved thus far. See Table 4.3.

Table 4.3.

Economical impact

	2020-2022	2023	2024	SUM
Number of product innovations (new products or services)	**40**	**24**	**17**	81
Number of process innovations (new production or delivery methods)	**7**	**4**	**17**	28
Improved existing products or services	**15**	**18**	**22**	55
Number of companies consulted about CRFS	**132**	**60**	**120**	312
Number of new employees involved (from partner companies) in CRFS	**15**	**9**	**16**	40
Number of saved financial resources due to CRFS (EUR)	**0**	**1120 0**	**1000 0**	21200
Incomes generated for stakeholders from CRFS activities (EUR)	**397000**	**6050 00**	**0**	10020 00

Number of financial resources attracted (the amount of investment)s to CRFS (EUR)	**811730**	**1340 00**	**1488 00**	10945 30
Number of food producers engaged in SFSC	**154**	**292**	**249**	695
Number of new consumers engaged in SFSC	**7719**	**1615**	**1148**	10482
Number of structured investment capital plans	**1**	**1**	**1**	3
Number of investors contacted	**16**	**10**	**21**	47
Number of meetings with investors	**26**	**16**	**10**	52
Number of investors Memorandum of Understanding signed	**0**	**1**	**1**	2
Number of events for companies to increase expertise (the level of CRFS expertise	**40**	**14**	**23**	77
Number of activities to increase salaries, expertise, competencies of employees at CRFS due to project activities	**4**	**6**	**4**	14
Number of exploitation plans	**24**	**12**	**17**	53
Number of good practices (generated)	**22**	**29**	**39**	90
Number of business plans for innovations	**13**	**6**	**57**	76

4.5.1. Qualitative Economical Impact of Cities2030 up to 2022

The Cities2030 project aimed to create sustainable and resilient food systems while generating significant economic impacts for its stakeholders. By integrating technological innovation, fostering partnerships, and supporting startups, the project addressed various economic challenges in the food supply chain. Here is an overview of the key economic impacts realized through the project's activities up to 2022:

1. Capacity Building Through Exploitation Workshops

Exploitation workshops were a critical tool within the Cities2030 project, focused on helping partners create economic value from research and innovation. The workshops covered essential topics such as business modeling, risk assessment, market evaluation, and intellectual property management (IPR). These capacity-building sessions empowered partners to exploit project results for business opportunities, further supporting the development of sustainable food supply chains (SFSC).

2. Development of Economic Tools

- The project developed five key tools to contribute to economic growth in City Region Food Systems (CRFS):
- Cities2030 Community: A network platform to connect stakeholders, fostering collaboration and knowledge sharing.
- CRFS Good Practices: A repository of best practices in food supply chains for stakeholders to replicate successful strategies.
- Geospatial CRFS Web Services: Tools to visualize and manage food systems at a regional level, optimizing logistics.
- Cities2030 Repository: A central hub for accessing project data and research findings.
- Blockchain Tools for Private Communications: Technologies designed to improve transparency and efficiency in the food supply chain, reducing costs and waste through data sharing.

- These tools helped stakeholders improve their business operations, adopt sustainable practices, and fostered economic resilience in local food supply chains.

3. Innovation in Product and Business Development
Several innovative initiatives were introduced, including the development of the Food Business Club, a hobby product aimed at young people to teach them about sustainable food systems. The Pikkuprovinssi Festival also incorporated new approaches to food production, emphasizing sustainability and innovation, further stimulating local economic growth.
In terms of employee and community well-being, the project helped create more comfortable environments in schools and workplaces, contributing to long-term economic sustainability by improving the well-being and productivity of those involved.

4. Collaborations with Startups and Businesses
The project actively collaborated with innovative startups like GreenBytes in Iceland, which developed an AI-based management system to reduce food waste in restaurants. The system was tested in larger communal kitchens, such as schools and kindergartens, potentially bringing economic benefits through waste reduction and cost savings.
Additionally, companies such as Danone and Certified Origins participated in consultations with the Cities2030 project, improving their sustainability practices and optimizing their business operations. In Cilento, 10 women entrepreneurs were trained to develop their startups, strengthening local economies by supporting innovation in the food sector.

5. Support for Social Supermarkets
The Cities2030 project promoted investment in social supermarkets, particularly in Zagreb, where private retailers were expected to contribute through donations. This initiative aimed to reduce food waste while creating economic value by repurposing surplus food and supporting SFSC activities. The project helped attract private investment and donations, which bolstered the economic viability of social supermarkets.

6. Guidance for New Business Models in Schools
In Lahti, Finland, the project provided guidance for the development of innovative snack canteens in schools, including concept design, cost calculations, and business planning. These efforts encouraged entrepreneurship and innovation among students while fostering a culture of sustainability and healthy food habits, leading to potential future economic benefits.

7. Hackathons and Innovation Solutions
In Vidzeme, Latvia, the project organized a Food Innovation Hackathon that brought together local entrepreneurs, researchers, and other stakeholders to explore sustainable solutions for food systems. Four innovative solutions were initiated to address challenges such as waste management and the intelligent reuse of by-products. This innovation-oriented approach fostered a collaborative ecosystem for small businesses to enhance their competitiveness and improve their economic performance.

8. Attracting Investments and Grants
The project successfully attracted substantial financial resources from regional, national, and EU grants. This was particularly evident in regions like Cilento, where the tourism industry benefitted from the influx of funds generated through the Living Lab's activities. The region calculated the financial impact of the project, considering local accommodation and restaurants that benefited from increased awareness around the Mediterranean diet and traditional food practices.

9. Public Procurement and Green Business
One of the major economic achievements of the Cities2030 project was the involvement of 32 companies in research focused on local government food purchases. The project promoted awareness of green public procurement, which enabled local businesses to become more competitive in bidding for public contracts. This boosted business growth and promoted sustainable practices within the regional economy.

10. Economic Value Through Technology
The project explored technology solutions like blockchain to create economic value by improving traceability in the food supply chain. The blockchain not only optimized the logistics and transparency of food products, but also introduced cost-saving opportunities by minimizing delays, improving inventory management and reducing transportation costs.

11. Innovation Capabilities
The Vidzeme region also highlighted the innovation capabilities fostered through the project. Entrepreneurs in the area were encouraged to explore sustainable solutions for food production and waste management. The hackathon that took place identified innovative business ideas such as transforming by-products into marketable products, thus improving economic outcomes for small businesses and food producers.

The economic impact of Cities2030 up to 2022 was marked by the development of new tools, innovation in food systems, the fostering of entrepreneurship, and the attraction of external investments. Through collaborations with businesses, startups, and local authorities, the project not only enhanced sustainability, but also created new economic opportunities. By focusing on training, technology adoption, and capacity building, Cities2030 helped position regions for long-term economic resilience in the face of environmental and market challenges.

4.5.2. Qualitative Economical Impact of Cities2030 in 2023

The Cities2030 project continued to generate significant economic impacts throughout 2023 by fostering innovation, improving local food systems, and enhancing business opportunities across multiple regions. Here's an overview of the qualitative economic impacts observed during this period:

1. Innovations and Technological Advancements
In 2023, the Cities2030 project expanded its technological innovations with the development of the SMARTY IoT-equipped bio composter. This innovation allowed for more efficient waste

management, contributing to cost savings and resource optimization. The implementation of best practices for promoting food waste reuse and circulation helped to reduce waste while stimulating local economies by reintroducing unused food resources back into the supply chain.
Improvements were also made to the open database and PowerBi web solutions, which allowed for better data visualization and analysis. These tools were made available on Finnish open data platforms, enhancing transparency and decision-making for regional stakeholders. The Bokashi composting initiative in Lahti expanded, engaging 10 local experts to provide guidance to newcomers, promoting sustainability and economic benefits in the region.

2. Economic Impact of Tourism and Agriculture
Although direct economic impacts were not always evident in certain regions, the Cities2030 project helped attract attention to the economic potential of sectors like tourism and agriculture. For example, within the Venice Lagoon Policy Lab, the project provided data on the economic effects of tourism on local agriculture and food distribution, contributing to informed decision-making that could shape future economic development.

3. Vehicle Sharing and Sustainable Transportation
Several innovative experiments in 2023 aimed to reduce costs and improve logistics for local businesses. One such initiative was the Vehicle Sharing Platform, which utilized battery-operated refrigerated vans for food transportation. This not only reduced transportation costs, but also minimized environmental impacts by decreasing the reliance on traditional delivery methods. Another notable project was the introduction of cargo bikes for meal delivery, which further reduced operational costs while improving delivery efficiency. This shift toward sustainable, cost-effective logistics solutions had direct economic benefits for businesses and communities.

4. Supporting Local Food Systems and Small Producers
In regions like Vejle, the Cities2030 project had a profound impact on local economies by supporting small-scale food producers through events such as the Vejle Food Festival. These initiatives boosted visibility and sales for local businesses, creating a significant economic boost for small food producers and startups. Other projects, such as the Gastronomic Underground and a new talent program for school students, highlighted the intersection between education, local food production, and economic growth.
In other regions, innovations such as the Epicerie Mobile reached over 40 consumers, resulting in cost savings of more than €1,200 for customers. Similarly, the Malezi Pepper Processing Project introduced a local pepper paste product that generated over €2,000 in additional income for partners.

5. Promoting Sustainable Food Supply Chains
The project emphasized the importance of short food supply chains (SFSCs) in fostering economic sustainability. Through collaboration with local farmers and food producers, initiatives such as the urban agriculture summer markets attracted over 100 tourists, contributing to increased revenue for local businesses and enhancing economic resilience in rural and urban areas.

The Superbasket Tool, added to the online shopping platform, facilitated smoother and more efficient transactions for local producers. In collaboration with local stakeholders, including taxis and NGOs, the tool improved the distribution of local goods, contributing to €10,000 in sales. The Norwegian Research Council's investment of €20,000 further supported the growth of SFSCs, enabling 20 farmers to increase their reach and customer base, even expanding into international markets like the US for honey producers.

6. Workshops, Forums, and Hackathons

The Cities2030 project organized several key events to engage stakeholders and foster collaboration. In Latvia, round table discussions brought together 75 participants, including 16 food producers, to explore economic impacts and potential for innovation in green public procurement. This collaborative approach helped strengthen local food systems while boosting the competitiveness of small businesses.

Another impactful event was the Vidzeme Food Innovation Hackathon, which brought together entrepreneurs and stakeholders to develop solutions for waste reduction and sustainable food systems. Four innovative solutions were initiated during the hackathon, focusing on market competitiveness, resource reduction, and added value for businesses. These initiatives had a direct impact on business growth and innovation potential.

7. Women Entrepreneurs and Startup Support

Cities2030 played an instrumental role in empowering women entrepreneurs. In 2023, the project provided specialized training to 10 women, helping them launch and develop their businesses. The project also facilitated startups to test their agricultural innovations alongside farmers, supporting more sustainable agricultural practices. This not only fostered entrepreneurship but also attracted regional, national, and European grants, providing additional financial support for businesses in regions like Cilento.

The Living Lab's efforts in promoting traditional food production techniques further boosted the local economy. By preserving and promoting the Mediterranean diet, the region experienced financial benefits from the influx of tourists, generating additional revenue for local accommodations and restaurants. Furthermore, educational opportunities such as English courses and sommelier training helped increase skills and employment opportunities within the local community.

8. Public Procurement and Green Business Development

The project also made advances in improving public procurement processes, helping local businesses capitalize on green public procurement opportunities. Three round table discussions with more than 70 stakeholders, including 15 entrepreneurs, focused on finding solutions to improve competitiveness and economic performance within the local food supply chain.

This effort also extended to the Gauja National Park Forum, where 30 entrepreneurs shared their insights on improving short food supply chains and enhancing access to knowledge networks. By fostering these collaborations, Cities2030 helped local businesses strengthen their economic sustainability and market presence.

9. Sustainable Food Products and Market Expansion
The Mahtikiska concept, piloted in 2023, introduced new food products through school kiosks, expanding the range of healthy and sustainable snacks available to students. This initiative not only encouraged healthier food habits, but also provided new market opportunities for local food producers.
In addition, the project attracted corporations like Mars and Nestlé, which were engaged in refining their operational practices in alignment with the project's goals. This collaboration resulted in economic growth for the region and helped businesses adopt more sustainable and profitable practices.

In 2023, the Cities2030 project continued to deliver qualitative economic impacts through innovation, collaboration, and sustainable practices. By supporting local businesses, fostering entrepreneurship, and encouraging the adoption of new technologies, the project contributed to the economic growth and sustainability of regional food systems. Through workshops, forums, and partnerships, the project facilitated the sharing of knowledge and resources, ultimately driving economic resilience in participating communities.

4.5.3. Qualitative Economical Impact of Cities2030 in 2024
2024 witnessed further economic impacts driven by the Cities2030 project, with multiple initiatives and innovations aimed at improving sustainability, fostering local economies, and encouraging the use of new technologies in food supply chains. Here is a detailed breakdown of the qualitative economic impact in 2024:

1. Zelena Točka and Short Food Supply Chain Innovations
Zelena Točka, a short food supply chain operator, made significant strides forward by implementing a traceability solution for food products developed within the Cities2030 project. This solution, which integrates blockchain technology, enhances the transparency and efficiency of food systems. Notably, 20 farmers in the regional short food supply chain adopted the solution, improving the traceability and quality assurance of local products. This adoption has created two new jobs within Zelena Točka's operation and opened new economic avenues through participation in the EU-funded TRUSTFOOD project, which aims to showcase the benefits of blockchain in food supply chains. The project includes training programs to help other stakeholders in the sector benefit from this innovation.

2. Development of Business Models and New Services
While the project continued to explore the economic impact of its various experiments, a number of promising business models were being developed. The intergenerational cooking project indirectly contributed to economic well-being by improving the health and social lives of older generations, which could reduce healthcare costs and increase overall societal well-being.
In addition, the culinary upgrade on the spot experiment addressed social isolation by encouraging frequent visits to neighborhood centres, reducing mental health risks and potentially lowering public health costs.

The project also introduced innovative services such as a vehicle-sharing platform and cargo bikes for meal deliveries, which contributed to cost savings by reducing the reliance on cars and traditional delivery systems. These projects supported the transition to more sustainable and cost-effective logistics solutions for food distribution, with positive impacts on local businesses.

3. Supporting Circular and Sustainable Food Systems

The Cities2030 project in 2024 continued to encourage local businesses and entrepreneurs to support sustainable food systems through the short food supply chain (SFSC). The project provided incentives and orders to entrepreneurs working on circular food systems, promoting sustainable entrepreneurship. Although the financial investments in SFSC were not significant, there was substantial interest in developing a subsidy scheme to encourage circular entrepreneurship, with planned grants of around €10,000 per entrepreneur or initiative. This would support small businesses and startups, fostering innovation in the circular economy.

4. Business Results and Company Engagement

The Cities2030 project engaged numerous companies in the development of innovative solutions for food systems. By incubating 37 projects, in collaboration with institutions like Kedge Business School, the project developed good practices and methodologies for incubating agri-food projects. This led to the creation of training modules that will disseminate the project's legacy and foster future business growth within regional food systems.

In addition, local businesses in cities like Quart de Poblet benefited from the creation of 60 urban gardens on previously unused land, addressing both local food needs and promoting healthy, sustainable eating habits. This initiative provided opportunities for residents and local associations to engage in agricultural activities, which, in turn, stimulated the local economy by supporting zero-kilometer food production and consumption.

5. Legitimization and Policy Support

The project gained legitimacy through its engagement with local governments and policy-makers. In Zagreb, cooperation between Zagreb County and the City of Zagreb led to the joint planning of a support program for farmers. This collaboration is expected to drive significant economic impact by fostering private-sector innovation in food production and distribution. Similar initiatives were undertaken in other regions, including policy advocacy and support for local food systems.

6. Technology and Innovation Impact

The Superbasket tool added to the online shop improved payment systems for local farmers, making it easier to sell products through digital platforms. This helped streamline local sales processes and supported the involvement of stakeholders who do not usually deliver, such as taxi drivers, further broadening the ecosystem for food logistics.

Furthermore, the Norwegian Research Council invested €20,000 in SFSC innovation, involving 20 farmers in developing new products and opening up markets for items such as honey, which found buyers in international markets like the US.

7. Blockchain-Based Technologies

The Cities2030 project also introduced multiple blockchain-based technologies, including decentralized tracking systems and smart contract applications for food safety and quality assurance. These innovations enhanced consumer trust in short food supply chains by providing end-to-end visibility and transparency in food production. Urban and rural consumers became more engaged in SFSC due to the improved assurance of food quality, origin, and sustainable practices enabled by blockchain.

8. Economic Impacts of Urban Agriculture
The project supported the legitimization of land access for urban agriculture, involving policy-makers and cooperative groups in discussions about the economic impact of urban food production. The mobile grocery store was one notable innovation developed in 2024, which helped improve the economic viability of urban agriculture by reducing food surpluses and connecting producers directly with consumers.

9. Educational and Financial Support
Training modules and workshops held through various Cities2030 activities provided local farmers and entrepreneurs with the skills necessary to succeed in a more competitive, sustainable market. Financial support, such as the €300,000 from EU funding, further supported the development of city-region food systems. Additionally, the Grow and Monitor project showcased the potential for community gardening and other sustainable food practices to generate economic benefits by promoting local food production and reducing dependency on external food supplies.

The Cities2030 project in 2024 played a pivotal role in fostering innovation, supporting local food systems, and encouraging the adoption of new technologies. Through initiatives like blockchain-based traceability, vehicle sharing, and community gardening, the project generated a significant qualitative economic impact by improving the efficiency of food supply chains, creating jobs, and enhancing local business opportunities. With continued support for urban agriculture and sustainable food practices, Cities2030 is well-positioned to drive long-term economic growth in participating regions.

4.6. Technological impact

Overview of technological impact, see Figure 4.10.

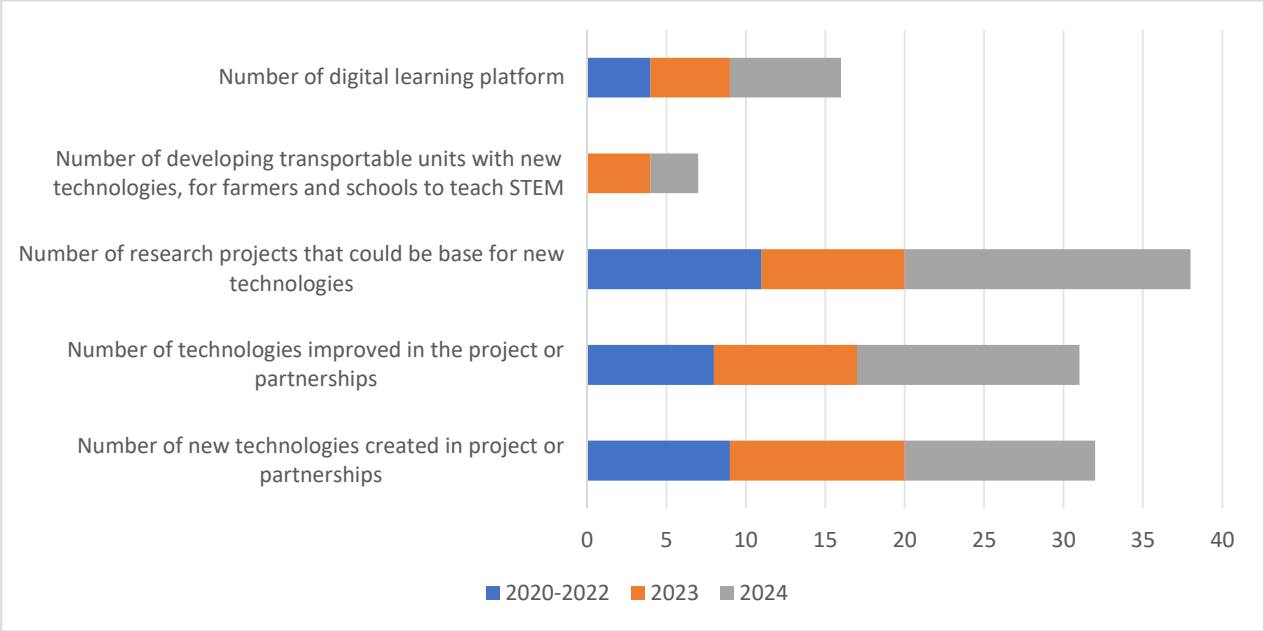


Figure 4.10. Technological impact

The technological dimension of Cities2030 has played a pivotal role in advancing the food systems transformation agenda. As the project unfolded from 2020 to 2024, technology became an essential tool for improving food systems, fostering innovation, and enhancing educational outreach. This chapter highlights key technological advancements achieved through the development of new technologies, improvement of existing ones, support for research projects, and the integration of digital platforms in education. By examining trends in technology creation, improvement, and application in real-world contexts such as schools and farms, we gain a comprehensive understanding of the technological impact of Cities2030.

1. Number of New Technologies Created in Project or Partnerships

One of the most significant indicators of the project's success has been the creation of new technologies through Cities2030 initiatives and partnerships. These technologies are intended to address various challenges in urban and rural food systems, helping to build more resilient, sustainable, and efficient processes.

- **2020–2022:** 9 new technologies
- **2023:** 11 new technologies
- **2024:** 12 new technologies
- **Total:** 32 new technologies created across 2020–2024

Trend Analysis:

The steady rise in the number of new technologies created demonstrates consistent innovation and technological advancement within the Cities2030 initiative. Beginning with 9 new technologies during the 2020–2022 period, the project saw an increase to 11 new creations in 2023 and 12 in 2024. This upward trend reflects the increasing emphasis on technology as a

solution to food system challenges, showcasing the project's commitment to continually develop innovative tools and solutions that respond to evolving needs in food production, distribution, and sustainability.

2. Number of Technologies Improved in the Project or Partnerships

In addition to creating new technologies, Cities2030 has focused on improving existing ones. These improvements are aimed at enhancing the efficiency, effectiveness, and scalability of technologies that are already in use within food systems, either by refining their functionality or expanding their potential applications.

- **2020–2022:** 8 technologies improved
- **2023:** 9 technologies improved
- **2024:** 14 technologies improved
- **Total:** 31 technologies improved across 2020–2024

Trend Analysis:

The trend in the number of technologies improved mirrors the project's emphasis on continuous refinement and optimization. After improving 8 technologies during 2020–2022, this number increased to 9 in 2023, before jumping significantly to 14 in 2024. This suggests that Cities2030 not only prioritizes innovation through new technologies but also recognizes the importance of optimizing existing technologies to ensure they meet evolving demands and challenges. By improving nearly as many technologies as it creates, the project ensures that technological tools are adaptable and up-to-date with the latest advancements.

3. Number of Research Projects as a Base for New Technologies

Research forms the backbone of technological advancement, and Cities2030 has supported numerous research projects with the potential to lay the foundation for new technologies. These projects aim to explore new possibilities, solve existing problems, and provide the knowledge necessary for future innovations.

- **2020–2022:** 11 research projects
- **2023:** 9 research projects
- **2024:** 18 research projects
- **Total:** 38 research projects across 2020–2024

Trend Analysis:

The number of research projects that could serve as the basis for new technologies has varied over the years, with a noticeable increase in 2024. While there were 11 projects in the initial 2020–2022 period, this number decreased slightly to 9 in 2023. However, 2024 saw a surge to 18 projects, highlighting a renewed focus on research-driven innovation. This sharp rise may indicate an increased allocation of resources toward research as Cities2030 recognizes the critical role of scientific inquiry in driving future technological breakthroughs. The cumulative total of 38 projects over four years reflects the initiative's ongoing commitment to fostering research that informs technological progress.

4. Number of Developing Transportable Units with New Technologies for Farmers and Schools

Transportable units equipped with new technologies have been developed as part of Cities2030's commitment to education and practical learning. These units serve as mobile hubs for teaching STEM (Science, Technology, Engineering, and Mathematics) subjects, particularly to farmers and students, thereby bridging the gap between technology, education, and hands-on experience.

- **2020–2022:** 0 units
- **2023:** 4 units
- **2024:** 3 units
- **Total:** 7 units developed across 2020–2024

Trend Analysis:

The development of transportable units started in 2023, reflecting a new phase in the project's educational outreach. The introduction of 4 units in 2023 and the addition of 3 more in 2024 signifies growing recognition of the value of mobile technology platforms in enhancing STEM education. These units are especially impactful for rural and under-resourced communities, where access to cutting-edge technologies may be limited. While the total number of units developed (7) is relatively modest, their strategic deployment could have a significant influence on education and technology adoption, providing a replicable model for future initiatives.

5. Number of Digital Learning Platforms

The rise of digital learning platforms has been another critical area of technological impact. These platforms offer accessible, scalable education solutions, particularly useful for remote learning and continuous professional development in the field of sustainable food systems.

- **2020–2022:** 4 platforms
- **2023:** 5 platforms
- **2024:** 7 platforms
- **Total:** 16 platforms across 2020–2024

Trend Analysis:

The number of digital learning platforms developed has steadily increased, from 4 in 2020–2022 to 5 in 2023 and 7 in 2024. This reflects a growing emphasis on e-learning as a tool for disseminating knowledge about food systems and technology. These platforms are likely targeted at a broad audience, including students, professionals, and community members, making technology-driven education more accessible and scalable. The increasing number of platforms also suggests a continuous effort to expand the project's digital footprint, providing diverse learning opportunities tailored to different audiences and needs.

Overall Technological Impact and Future Considerations

The technological impact of Cities2030 from 2020 to 2024 has been substantial, with clear progress made across several key areas:

Innovation and Creation: The consistent creation of new technologies, combined with significant improvements to existing ones, demonstrates Cities2030's role as a driving force for innovation in food systems. By steadily increasing both the number of technologies created and improved, the initiative has shown adaptability and foresight in addressing evolving food system challenges.

Research and Development: The growing number of research projects that could serve as the basis for new technologies highlights the importance Cities2030 places on research-driven innovation. The surge in research activity in 2024 indicates that the project is building a strong foundation for future technological advancements.

Educational Outreach: The development of transportable units for farmers and schools, as well as digital learning platforms, underscores Cities2030's commitment to education. These technologies are not only tools for innovation but also serve as means to educate and empower communities, particularly in STEM fields. The mobile nature of transportable units is especially promising, offering flexibility in reaching remote or under-resourced areas.

In conclusion, the technological impact of Cities2030 has been one of steady growth, innovation, and educational outreach. As the project continues, its focus on research, development, and practical application will be critical to ensuring that these technologies contribute meaningfully to the transformation of food systems. By empowering communities with cutting-edge tools and knowledge, Cities2030 is well-positioned to shape the future of food sustainability in Europe and beyond. See Table 4.4.

Table 4.4.

Technilogical Impact

	2020-2022	2023	2024	SUM
Number of new technologies created in project or partnerships	**9**	**11**	**12**	32
Number of technologies improved in the project or partnerships	**8**	**9**	**14**	31
Number of research projects that could be base for new technologies	**11**	**9**	**18**	38
Number of developing transportable units with new technologies, for farmers and schools to teach STEM	**0**	**4**	**3**	7
Number of digital learning platforms	**4**	**5**	**7**	16

4.6.1. Qualitative Technological Impact of Cities2030 up to 2022

The Cities2030 project made significant advances in technological innovation by focusing on the development and implementation of digital platforms, IoT tools, blockchain technologies, and smart systems that foster transparency, traceability, and sustainability in food systems. The following is an overview of the qualitative technological impacts achieved by the project up to 2022:

1. Technological Risk Management and Readiness

Within the context of the project, technological risk management was an integral part of ensuring the success of technological innovations. P27, as the task leader, focused on gathering data related to the Technology Readiness Level (TRL) development for the project's key exploitable

outcomes. This approach ensured that technological and technical risks were continuously monitored and mitigated. Exploitation leaders worked alongside project partners to actively engage in this risk management process, highlighting potential risks and ensuring upward escalation when necessary.

2. Development of the S2CP Technological Framework

One of the key technological contributions of the Cities2030 project was the development of the Single Click CRFS Platform (S2CP), which integrates five technological components developed by UPM. This platform is intended to provide stakeholders with tools to optimize City Region Food Systems (CRFS), offering functionalities such as good practices, real-time information, geospatial web services, and private communication tools. The development of this framework adhered to the Combined Development Methodology (CDM) to ensure a structured and scalable system.

3. IoT-Equipped Bio-Composters and Waste Management

As part of the Lahti Living Lab, the IoT-equipped bio-composter (SMARTY) was introduced as a technological solution to help cities manage food waste more efficiently. This composter is equipped with sensors that monitor the composting process in real-time, providing critical data that enables users to optimize their composting efforts. The technology was not only used by residents but also shared with other follower cities, allowing them to implement similar waste management solutions in their own contexts.

The Bokashi food waste bio-composting system, another technology-driven solution tested in the project, allowed citizens to reuse food waste in innovative ways, further reducing environmental impact while promoting sustainable practices.

4. Blockchain Technology for Food Traceability

A significant technological innovation in the project was the use of blockchain technology to ensure the traceability of food products. The implementation of blockchain technologies helped regional short food supply chains, such as those operated by Zelena Točka, to verify the origin and quality of food products. Blockchain enables stakeholders to access real-time data on the supply chain, ensuring greater transparency and trust between producers, distributors, and consumers. By 2022, the traceability solution had been adopted by 20 farmers, providing them with the ability to trace food products from farm to fork. This solution contributed not only to increased trust in local food systems, but also helped reduce food surpluses by improving supply chain efficiency.

5. Digital Learning Platforms

The project placed a strong emphasis on educational tools to support technological advancements. The Digital Learning Platform, developed by P28 IASI in partnership with P29 ARFI (Romanian Academy Iasi branch), was created to enhance the learning experience of participants in the Living Labs. This platform provided resources on sustainable practices and innovations, thus contributing to the educational aspect of the Cities2030 project.

Additionally, the digital platform created for the Boot Camp attendees on Notion helped disseminate information related to sustainable practices and technological innovations, encouraging collaboration and knowledge-sharing among participants.

6. Demonstrators and Blockchain for Food Chain Transparency
The project was in preparation to develop blockchain demonstrators that would showcase the technology's readiness for food supply chains. These demonstrators were set to allow Living Labs and Food Labs to access sentiment analysis data, which would help stakeholders better understand consumer attitudes toward food system innovations. By using blockchain in this context, the project aimed to enhance the overall transparency and efficiency of food distribution.

7. Earth Observation Techniques for Agriculture
Another key technological innovation was the integration of Earth Observation techniques within the S2CP platform. These techniques provided producers with crucial data on crop conditions, such as grape maturation, helping them optimize their agricultural processes. This approach not only contributed to more efficient agricultural practices, but also supported the project's sustainability goals.

8. MAA Tool Development
The Multi-Actor Approach (MAA) Tool was improved and tested as part of the Cities2030 project. This tool was designed to support collaboration between various stakeholders in the food system, allowing them to share insights, innovations, and strategies for improving CRFS. The tool played a crucial role in fostering multi-actor engagement and collaboration, driving technological and operational improvements in food systems across the participating regions.

By 2022, the Cities2030 project had made substantial technological contributions to improving City Region Food Systems. Through innovations such as the S2CP platform, IoT-enabled composters, blockchain traceability solutions, and digital learning platforms, the project fostered greater transparency, sustainability, and collaboration among stakeholders in the food supply chain. These technologies not only supported better waste management and agricultural practices, but also helped lay the foundation for future technological advancements within the Cities2030 framework.

4.6.2. Qualitative Technological Impact of Cities2030 in 2023
The Cities2030 project continued to expand its technological influence in 2023 by introducing new tools, improving existing ones, and promoting sustainable practices through innovative platforms. Below is an overview of the qualitative technological impacts achieved during this period:

1. Innovations: SMARTY – IoT-Equipped Bio-Composter
One of the notable innovations in 2023 was the development and deployment of SMARTY, an IoT-equipped bio-composter. This advanced composter played a significant role in promoting sustainable waste management practices by allowing real-time monitoring of composting processes. The use of sensors provided critical data, which enabled users to optimize waste management activities. This technology contributed to more efficient recycling and reuse of organic materials in urban and regional contexts.

2. Technological Tools for CRFS Readiness

As a technological partner mainly active in WP3, Cities2030 focused on developing tools not directly related to food production but critical for assessing the City Region Food System (CRFS) readiness of cities and local communities. These tools were part of the broader Cities2030 Observatory, which gathered content, knowledge, and resources necessary for researching CRFS policies and literature. The observatory offered self-assessment capabilities for cities, providing a platform for better understanding CRFS readiness, gaps, and opportunities.

3. Digital Learning Platforms

The technological impact extended into educational initiatives. While no direct technological tools were developed as part of the project, a new Erasmus+ initiative called 'Prochef' emerged as a result of the project's outcomes. This project aimed to develop a digital learning platform for chefs to acquire practical skills related to plant-based protein cooking. Although external, this platform reflects the indirect technological influence of Cities2030 and highlights the ongoing educational and digital developments inspired by the project's innovations.

4. C2CP Components – Platform and Tools

Several new and improved technologies were integrated into the Cities2030 project under the C2CP framework, including:

- Communities Platform: A digital tool facilitating interaction and knowledge-sharing among stakeholders in food systems.
- Good Practices Repository: A platform to collect, share, and disseminate best practices related to sustainable CRFS.
- Real-Time Information: Technologies enabling real-time data flow and communication, critical for optimizing food systems at the regional level.
- Private Communication Systems: Secure communication channels among stakeholders to ensure privacy and collaboration across regions.

5. Superbasket and Digital Payment Systems

One of the key technological breakthroughs in 2023 was the introduction of the Superbasket system. This tool allowed farmers to sell their products through multiple stores and complete transactions in a single checkout process. The money was then redistributed to the farmers' accounts, without any middlemen, creating a direct-to-farmer model. This redistribution of financial power to the farmers was critical in empowering local producers and fostering greater trust in the Cities2030 platform. Improvements to payment systems and search engine optimization also enhanced user experience, making the platform more accessible and efficient.

Additionally, a user experience study was conducted to gather feedback from farmers using the platform. Based on their insights, improvements were continuously made to the system, showcasing an iterative approach to technological development.

6. MAA Tool Improvements

The Multi-Actor Approach (MAA) Tool, a key component of the Cities2030 initiative, was continuously improved and tested during the course of the project. The tool aimed to enhance collaboration between multiple actors in the food system, including policy makers, producers, consumers, and businesses. The technology facilitated smoother interaction and decision-making across different sectors, driving the successful implementation of CRFS solutions.

7. Digital Platforms for Educational Programs
A digital platform on Notion was created to support educational programs organized by Cities2030. Participants from these programs could access information about innovations and sustainable practices. This platform allowed for continuous learning and resource-sharing among program attendees, fostering a community of innovators and change-makers.

8. Indoor Farming with Tower Gardens
In line with promoting sustainable food practices, Cities2030 introduced tower gardens in the Living Labs for students and community members. These indoor farming solutions offered a hands-on learning experience, helping participants understand the benefits of urban agriculture and indoor farming techniques. To complement this initiative, the project developed a playbook on how to use tower gardens, ensuring that participants had the resources to implement these technologies in their own environments.

The technological impact of Cities2030 in 2023 was characterized by innovations in waste management, digital learning platforms, and the introduction of tools that empowered local food producers and enhanced collaboration. Technologies like SMARTY, the Superbasket payment system, and tower gardens demonstrated the project's commitment to fostering technological solutions that promote sustainability, collaboration, and empowerment across City Region Food Systems. These technological advancements have laid the groundwork for further innovation and broader adoption of sustainable practices in the coming years.

4.6.3. Qualitative Technological impact of Cities2030 in 2024

In 2024, the Cities2030 project made significant strides forward in advancing technological innovations aimed at improving food systems, environmental sustainability, and public engagement through immersive experiences. These technological developments not only enhanced supply chain management and urban agriculture but, also created new tools for educating and engaging communities in sustainable practices.

1. New Technological Projects in Sustainable Horticulture
In 2024, several innovative projects aimed at enhancing sustainability in horticulture were introduced:

- Reduveen: Focused on developing alternative base materials to replace peat in growing blocks for plants, supporting eco-friendly horticultural practices.
- DigiKas: Utilized sensor and data technology to make horticulture more sustainable at the farm level, enabling farmers to make data-driven decisions to optimize water and energy use.

- OptiWaie: Investigated alternative water sources, both internal and external, for greenhouse horticulture to improve sustainability and reduce reliance on traditional water supplies.
- PlantGoed: Integrated vertical farming into strawberry production, enabling year-round growth and ensuring a consistent supply of fresh produce.
- Tomato Farming Project: Collaborated with local tomato farmers to explore growing tomato plants without rockwool substrate, minimizing waste and promoting more sustainable agricultural practices.

2. Blockchain Technology and Traceability Solutions

The traceability solution developed by ITC, based on blockchain technology, continued to be a core advancement in 2024. This technology:

- Allowed farmers and stakeholders within the food supply chain to track products more effectively, ensuring transparency from farm to table.
- Supported the TRUSTFOOD initiative, which aimed to extend blockchain-based traceability solutions to other stakeholders, providing training and promoting adoption of the technology across the sector. This has also led to two new employees being hired to manage these advanced services.

3. Digital Learning Platform – PROchef

An important outcome of the project in 2024 was the further development of the PROchef digital learning platform. This Erasmus+ initiative focused on:

- Providing chefs with knowledge and practical skills on incorporating plant-based proteins into their culinary practices.
- Leveraging digital tools to deliver education on sustainable food systems, ensuring chefs are better equipped to promote sustainability in food preparation.

4. IoT-Equipped Bio-Composter – SMARTY

Building on previous years, the SMARTY IoT-equipped bio composter was deployed as a key technology for managing food waste. This composter uses sensors and IoT (Internet of Things) technology to monitor the composting process, ensuring optimal conditions for organic waste conversion into compost. This innovation contributed to reducing food waste in local communities and promoting sustainable waste management practices.

5. Development and Deployment of the Single Click CRFS Platform

The Single Click CRFS Platform was launched in 2024, offering a comprehensive data-driven tool designed for City-Region Food Systems (CRFS). This platform integrated various technological components:

- Blockchain technology for transparency and trust in food supply chains.
- Geospatial services for mapping and analyzing food systems.
- Sentiment analysis for understanding public opinion and social media trends related to food systems and sustainability.

- This platform was a significant technological advancement, as it allowed stakeholders to make informed decisions based on real-time data, fostering a more resilient and sustainable urban food system.

6. Virtual Reality for Environmental Awareness

In 2024, Cities2030 expanded its technological impact through the use of Virtual Reality (VR) to promote environmental awareness and sustainable behaviours. Key highlights include:

- A VR pilot project at the Environ Conference 2024 and Waterford City Library, where participants engaged in immersive experiences that highlighted the importance of sustainable practices and environmental protection.
- The success of the VR pilot indicated that this technology could be used in broader applications, including public education, environmental research dissemination, and raising awareness about the complexities of urban food systems.
- The project also opened dialogue with Waterford City Library to explore further use of VR kits for public engagement, demonstrating the potential of this technology for routine installations in public spaces.

7. Advanced Supply Chain Technologies

Blockchain technology was further integrated into existing supply chain management systems to:

- Enhance traceability, ensuring end-to-end visibility of food products from production to consumption.
- Improve transparency and accountability within short food supply chains, promoting trust among consumers and reducing fraud.
- Blockchain technology was also combined with IoT devices to monitor environmental conditions along the food supply chain, such as temperature and humidity, helping stakeholders ensure food quality and reduce spoilage during transportation.

8. Research and Data Analytics for Future Technologies

The Cities2030 project invested in research that could serve as the foundation for new technological developments:

- Blockchain and IoT Integration: Research focused on using blockchain and IoT for real-time monitoring of food supply chains, leading to more accurate data collection and improved management of perishable goods.
- Machine Learning Models: By analyzing data stored on blockchain, the project explored the development of machine learning models to predict supply chain disruptions, optimize inventory, and forecast demand, which could be used to enhance future food systems.

9. Transportable Units and VR Kits

While no physical transportable units were developed, the success of the VR pilot showed potential for creating portable VR kits. These kits could be used in libraries, schools and public events to promote environmental education and engage communities in sustainability initiatives.

10. Geospatial CRFS Web Services

The Cities2030 project also developed Geospatial CRFS Web Services, which allowed cities to visualize their food system data in a spatial context. This technology provided urban planners and decision-makers with critical insights into local food systems, enabling more effective planning for sustainability and resilience.

The technological impact of Cities2030 in 2024 was characterized by significant advancements in blockchain, IoT, VR, and geospatial services, all aimed at enhancing sustainability and transparency in food systems. These technologies not only improved existing systems, but also laid the groundwork for future innovations that could transform urban food systems and promote environmental stewardship at a global level. The integration of immersive experiences through VR and the successful deployment of blockchain for supply chain management underscore the project's commitment to using cutting-edge technology for sustainable development.

4.7. Legal, policy, security and management impact

Overview of legal, policy, security and management impact, see Figure 4.11.

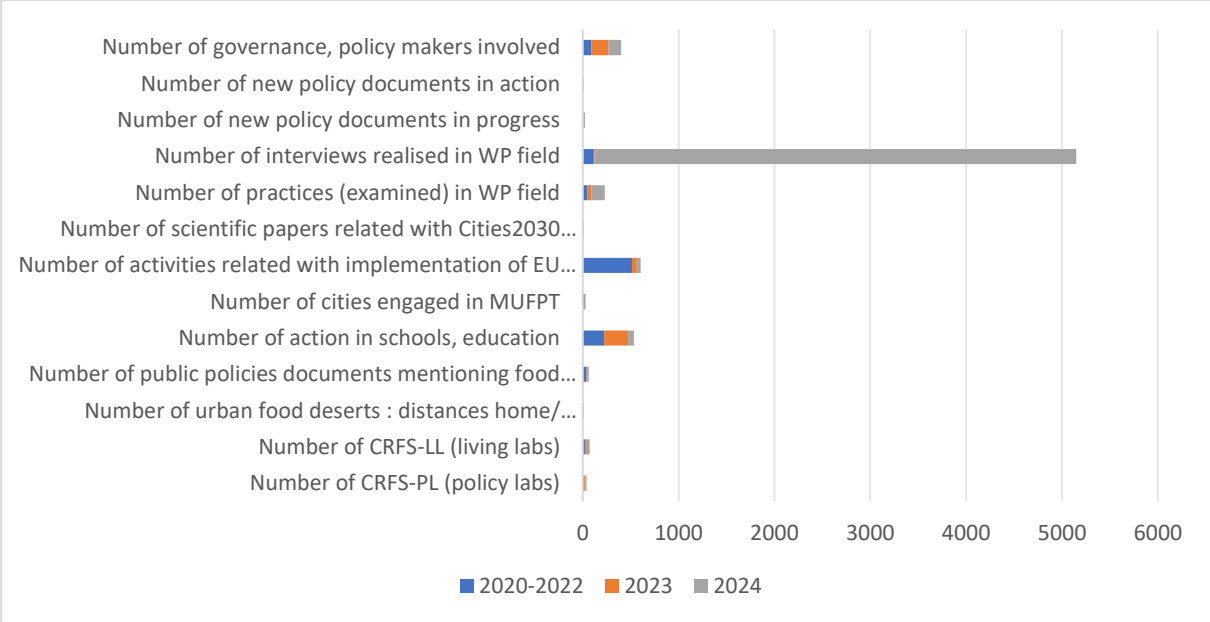


Figure 4.11. Legal, policy, security and management impact

The Cities2030 initiative has made a profound impact on shaping legal, policy, security, and management frameworks around food systems between 2020 and 2024. The initiative has employed a combination of policy and living labs, policy documents, educational actions, and governance involvement to achieve its goals. This chapter explores the trends across these areas, including policy creation and implementation, engagement with food system stakeholders, the reduction of food deserts, and efforts to align with international policy frameworks like FOOD2030 and the UN's New Urban Agenda (NUA). By analyzing these trends, we can better understand how Cities2030 is transforming the governance of food systems.

1. ***Number of CRFS-PL (Policy Labs)***

Policy labs (CRFS-PL) are designed to foster innovation in food system governance by testing and developing new approaches to policy within Cities2030.

- **2020–2022:** 17 policy labs
- **2023:** 11 policy labs
- **2024:** 13 policy labs
- **Total:** 41 policy labs across 2020–2024

Trend Analysis:
The number of policy labs saw a decline from 17 in 2020–2022 to 11 in 2023, followed by a slight recovery to 13 in 2024. Despite the dip in 2023, the overall establishment of 41 policy labs across four years demonstrates the project's commitment to fostering policy innovation. These labs likely played a crucial role in testing new approaches to food systems governance and addressing emerging issues, though the decline suggests the need to assess and optimize the scale or focus of such labs moving forward.

2. Number of CRFS-LL (Living Labs)

Living labs (CRFS-LL) provide real-world environments where food system policies and technologies are tested in collaboration with multiple stakeholders, including communities and industries.

- **2020–2022:** 23 living labs
- **2023:** 20 living labs
- **2024:** 31 living labs
- **Total:** 74 living labs across 2020–2024

Trend Analysis:
Unlike policy labs, the number of living labs remained relatively stable before increasing significantly in 2024. The rise from 20 in 2023 to 31 in 2024 indicates a growing interest in, and commitment to, practical experimentation and community-based solutions in food systems. Living labs are vital for developing scalable solutions, and this growth reflects the success of participatory, real-world trials to address complex food system challenges.

3. Number of Urban Food Deserts: Distance to Home / Sustainable Food Retail Points

The identification and monitoring of urban food deserts—areas where access to affordable and nutritious food is limited—are critical to addressing food system inequalities.

- **2020–2022:** 2 instances
- **2023:** 8 instances
- **2024:** 3 instances
- **Total:** 13 instances across 2020–2024

Trend Analysis:
The number of identified urban food deserts spiked in 2023, rising from 2 in the previous period to 8, before falling to 3 in 2024. This fluctuation suggests that 2023 marked a peak in awareness and investigation of food deserts, potentially as a result of increased efforts to map and understand food access inequalities. The subsequent decline in 2024 could be due to targeted interventions that addressed some of the identified food deserts, or shifts in the project's focus toward other pressing issues.

4. Number of Public Policy Documents Mentioning Food Stakes

This metric tracks the number of public policy documents that address key issues related to food systems, reflecting the integration of food security and sustainability into governance agendas.

- **2020–2022:** 40 documents
- **2023:** 7 documents
- **2024:** 17 documents
- **Total:** 64 documents across 2020–2024

Trend Analysis:
The number of public policy documents mentioning food stakes dipped in 2023, with only 7 documents published, down from 40 in 2020–2022. However, by 2024, the figure had recovered to 17. This fluctuation may reflect changing political priorities or a period of policy consolidation before renewed focus on food system governance in 2024. The total of 64 documents over the period indicates a strong overall integration of food system issues into public policy, though sustained focus will be required to maintain momentum.

5. Number of Actions in Schools and Education

Educational initiatives are a cornerstone of Cities2030's approach to transforming food systems, aiming to raise awareness and drive behaviour change among younger generations.

- **2020–2022:** 222 actions
- **2023:** 251 actions
- **2024:** 62 actions
- **Total:** 535 actions across 2020–2024

Trend Analysis:
The number of actions in schools and educational settings peaked in 2023 with 251 initiatives but dropped significantly to 62 in 2024. This drop may suggest a shift from quantity to quality, where fewer but more targeted educational programs were implemented. Despite the decline, the total number of actions (535) over four years reflects Cities2030's substantial investment in integrating food system knowledge into education. The high levels of engagement in schools are likely to have long-term impacts on fostering sustainable food practices among future generations.

6. Number of Cities Engaged in MUFPT (Municipal Urban Food Policy Taskforces)

Municipal engagement is essential for localized food system governance, and the establishment of Municipal Urban Food Policy Taskforces (MUFPT) enables cities to take an active role in shaping their food environments.

- **2020–2022:** 11 cities
- **2023:** 3 cities
- **2024:** 17 cities
- **Total:** 31 cities across 2020–2024

Trend Analysis:
City engagement in food policy taskforces dropped significantly in 2023, with only 3 cities involved compared to 11 in the previous period. However, there was a strong rebound in 2024, with 17 cities engaged, suggesting renewed efforts to decentralize food system governance and empower municipalities. The total of 31 cities involved by 2024 demonstrates the growing recognition of the role local governments play in transforming food systems through localized policies and taskforces.

7. Number of Activities Related to the Implementation of EU Policies (FOOD2030, UN's NUA, SDG-11)

Cities2030's alignment with major international policies such as the EU's FOOD2030, the UN's New Urban Agenda, and Sustainable Development Goal 11 is critical for advancing food systems at multiple governance levels.

- **2020–2022:** 512 activities
- **2023:** 51 activities
- **2024:** 41 activities
- **Total:** 604 activities across 2020–2024

Trend Analysis:
There was a significant drop in the number of activities related to the implementation of EU and UN policies after 2022, from 512 activities down to 51 in 2023 and 41 in 2024. This decline suggests that much of the initial alignment work was front-loaded during the early years of the project. However, the total of 604 activities across four years indicates that Cities2030 has had a substantial impact in ensuring that its initiatives align with broader international frameworks, even as fewer new activities have emerged in recent years.

8. Number of Scientific Papers Related to Legal, Policy, or Security Aspects

Academic research on legal, policy, and security issues forms a critical component of Cities2030's evidence base, helping to shape future policy directions.

- **2020–2022:** 4 papers
- **2023:** 2 papers
- **2024:** 6 papers

- **Total:** 12 papers across 2020–2024

Trend Analysis:
The number of scientific papers published each year has remained relatively low, though there was a slight increase in 2024. From 4 papers in 2020–2022 to 2 in 2023 and 6 in 2024, the data suggests that while there is consistent academic output, there may be room for expanding research efforts in this area. Nonetheless, the 12 papers produced over four years represent an important contribution to the legal, policy, and security discussions surrounding food systems.

9. Number of Practices Examined in the WP Field

The number of practices examined in Work Package (WP) fields represents Cities2030's commitment to understanding and improving practices related to food systems through in-depth analysis.

- **2020–2022:** 45 practices
- **2023:** 43 practices
- **2024:** 142 practices
- **Total:** 230 practices examined across 2020–2024

Trend Analysis:
There was a dramatic increase in the number of practices examined in 2024, rising from 43 in 2023 to 142. This surge reflects a growing focus on practical, evidence-based approaches to improving food systems. The total of 230 practices examined over the four years shows a deep commitment to understanding the challenges and opportunities within food systems, and the sharp rise in 2024 suggests that Cities2030 has ramped up efforts to analyze and refine best practices in the field.

10. Number of Interviews Realized in the WP Field

Interviews provide qualitative insights from stakeholders across food systems and are a critical tool for informing policy and practice.

- **2020–2022:** 117 interviews
- **2023:** 6 interviews
- **2024:** 5,025 interviews
- **Total:** 5,148 interviews across 2020–2024

Trend Analysis:
The number of interviews conducted in WP fields skyrocketed in 2024, from just 6 in 2023 to over 5,000. This extraordinary increase suggests that Cities2030 undertook a large-scale participatory research initiative, likely involving surveys or interviews with a wide range of stakeholders. The extensive data collected through these interviews will provide invaluable insights for future policy development and strategy refinement.

11. Number of New Policy Documents in Progress

New policy documents reflect the ongoing development of governance frameworks that address the challenges of food systems.

- **2020–2022:** 3 documents
- **2023:** 5 documents
- **2024:** 16 documents
- **Total:** 24 documents in progress across 2020–2024

Trend Analysis:
The number of new policy documents in progress increased significantly in 2024, indicating a renewed focus on developing legal and policy frameworks. From 3 documents in the initial period, the number grew to 5 in 2023 and jumped to 16 in 2024. This upward trend suggests that Cities2030 is making significant advances in translating its insights and research into actionable policies.

12. Number of New Policy Documents in Action

Policy documents in action represent the policies that have moved beyond development and are now being implemented in food systems governance.

- **2020–2022:** 4 documents
- **2023:** 1 document
- **2024:** 4 documents
- **Total:** 9 documents across 2020–2024

Trend Analysis:
The number of policy documents in action remained relatively stable, with only 1 new document implemented in 2023 and 4 in 2024. Although this metric shows limited growth, the implementation of these policies is critical for driving real-world change. The relatively low numbers suggest that while the development of new policies is robust, more focus may be needed on ensuring that policies are successfully enacted.

13. Number of Governance and Policy-Makers Involved

Engagement with policy-makers is key to ensuring that food systems governance is inclusive and responsive to the needs of all stakeholders.

- **2020–2022:** 90 policy-makers
- **2023:** 179 policy-makers
- **2024:** 130 policy-makers
- **Total:** 399 policy-makers involved across 2020–2024

Trend Analysis:
The number of governance and policy-makers involved peaked in 2023, with 179 individuals engaged, before slightly declining to 130 in 2024. The total of 399 policy-makers involved by 2024

reflects significant engagement with decision-makers, ensuring that Cities2030's initiatives are aligned with governmental and institutional priorities. This broad engagement is critical for the long-term sustainability of food systems governance.

The legal, policy, security, and management impact of Cities2030 has been substantial over the years 2020–2024, with several key trends emerging:

Growth in Living Labs and Policy Development: The steady rise in living labs and new policy documents in progress reflects Cities2030's commitment to creating real-world solutions and continuously refining governance frameworks.

Significant Increase in Stakeholder Engagement: The remarkable rise in interviews and engagement with policy-makers demonstrates that Cities2030 is prioritizing inclusive, participatory governance, ensuring that diverse voices are heard in shaping food systems policy.

Challenges in Policy Implementation: While many new policies are being developed, the number of policy documents in action remains low, suggesting that more focus is needed on ensuring successful policy enactment.

Strong Educational and Municipal Engagement: The high number of actions in schools and cities involved in food policy taskforces indicates that Cities2030 has successfully mobilized local communities and municipalities in food systems governance. See Table 4.5.

Table 4.5.

Legal, policy, security and management impact

	2020-2022	2023	2024	SUM
Number of CRFS-PL (policy labs)	**17**	**11**	**13**	41
Number of CRFS-LL (living labs)	**23**	**20**	**31**	74
Number of urban food deserts : distances home/ sustainable food retail points	**2**	**8**	**3**	13
Number of public policy documents mentioning food stakes	**40**	**7**	**17**	64
Number of actions in schools, education	**222**	**251**	**62**	535
Number of cities engaged in MUFPT	**11**	**3**	**17**	31
Number of activities related with implementation of EU policies > FOOD2030, UN's NUA and SDD-11, and consorts	**512**	**51**	**41**	604
Number of scientific papers related with Cities2030 legal, policy or security aspects	**4**	**2**	**6**	12
Number of practices (examined) in WP field	**45**	**43**	**142**	230
			502	514
Number of interviews realised in WP field	**117**	**6**	**5**	8
Number of new policy documents in progress	**3**	**5**	**16**	24
Number of new policy documents in action	**4**	**1**	**4**	9
Number of governance, policy-makers involved	**90**	**179**	**130**	399

4.7.1. Qualitative Legal, Policy, Security and Management Impact of Cities2030 up to 2022

The Cities2030 project, dedicated to creating resilient and sustainable City-Region Food Systems (CRFS), had significant impacts on the legal, policy, security, and management frameworks of various regions by 2022. Through collaboration with local governments, policy-makers, and

communities, several actions were taken to establish new regulations, policies, and initiatives that foster food security, sustainability, and technological innovation in food systems.

1. Food Policy and Security Discussions
The project facilitated discussions between stakeholders responsible for food policies across different cities. Notably, Reykjavik's representatives expressed interest in joining the Milan Urban Food Policy Pact (MUFPP). These discussions set the groundwork for coordinated food policies, with round table meetings planned for 2023 to integrate food strategies among neighbouring cities and communities.

2. Planning for Policy Changes in Finland
The project began planning efforts to influence the Hobby Model Rules under Finland's Ministry of Culture and Education, aligning with national and regional food security strategies. Finland's policies were recognized for their strong food security measures, supported by the Province of South Ostrobothnia's regional plan and Seinäjoki's Smart Green Growth strategy. Through these efforts, food security remained one of the highest globally.
Additionally, the City of Seinäjoki provided free food delivery stations for the poor, reflecting the project's social and economic impact on vulnerable populations.

3. Vejle Municipality's Climate Plan
The project supported the implementation of Vejle Municipality's Climate Plan, which included political goals related to food services, educational institutions, and agricultural practices. This plan served as a model for embedding sustainability into municipal policy frameworks across various sectors, such as agriculture and education.

4. Nutrition and Food Security in Children
Through collaboration with local stakeholders and government authorities, Cities2030 contributed to policies that improved nutrition security among children and teenagers. These policies ensured better access to healthy and sustainable food in schools and other public institutions, emphasizing the long-term goal of creating healthier food systems.

5. New Regulations for Food Waste Management
A key impact of Cities2030 was the introduction of new regulations requiring households to separate food waste. The project's actions, particularly in the Lahti Living Lab, promoted sustainable practices by encouraging households to compost food waste using bio-composters. The separation of food waste was a major step toward achieving circular food systems, reducing waste, and promoting sustainability at the household level.

6. Technological Security and Blockchain for Food Supply Chains
The project demonstrated the potential of blockchain technology for ensuring food supply chain security. Blockchain provided a secure and transparent means of tracking food products from production to consumption, enhancing trust and accountability in food systems. This initiative

proved the efficacy of blockchain in safeguarding sensitive data related to food production, processing, and distribution, offering enhanced security to supply chain stakeholders.

7. Establishment of Living Labs and Public Policy Influence
The project facilitated the creation of Living Labs, which played a critical role in influencing public policy. For example, the Municipal Urban Plan of Pollica (FoodScape) was designed with the help of a Living Lab to guide urban development while preserving unique environmental and landscape characteristics. Another key achievement was the development of a Manifesto for the first Experimental Marine Area of the Mediterranean, emphasizing the ecological regeneration of the Mediterranean Sea.
These Living Labs also served as hubs for policy discussions, educational programs, and engagement with local communities. Their activities supported the realization of public policy documents and fostered closer collaboration between policy-makers, government representatives, and the Cities2030 project.

8. Green Public Procurement (GPP) in Vidzeme
In Latvia, Cities2030 began addressing Green Public Procurement (GPP) policies, particularly in the Vidzeme region. Stakeholders, including national authorities, engaged in discussions to enhance regulations on GPP, focusing on how local food systems could better support sustainable public procurement. These efforts emphasized the importance of sourcing locally-produced food, particularly for school meals, in line with environmental and economic sustainability goals.

9. Interviews and Workshops for Community Engagement
In collaboration with local communities, Cities2030 ran several interviews and workshops to identify challenges and dormant resources. These activities laid the groundwork for potential policy actions that would address community needs and foster local resilience. Workshops conducted by the Paideia Campus Living Lab, for instance, explored local food system policies and strategies, contributing to the broader Cities2030 network. The findings from these workshops were shared through reports and scientific publications, providing a foundation for future policy and management decisions.

10. Support for Urban Development Policies
Cities2030 activities directly supported urban development policies, particularly through the creation of Municipal Urban Plans that aligned with sustainability and food security objectives. For example, the Manifesto for the Mediterranean and the FoodScape initiatives aimed to restore and protect natural ecosystems, while ensuring food system policies were sustainable and beneficial to local communities.

By 2022, Cities2030 had made considerable progress in shaping legal, policy, security, and management frameworks. The project promoted innovative approaches to food security, waste management and blockchain for supply chain security, while fostering collaboration between local governments and communities to create resilient food systems. The establishment of Living Labs

and policy documents demonstrated the project's lasting impact on urban development and sustainability across Europe.

4.7.2. Qualitative Legal, Policy, Security and Management Impact of Cities2030 in 2023

The Cities2030 project has made significant strides forward in influencing legal, policy, security, and management frameworks in 2023. Through its living labs, policy labs, and collaborative initiatives with municipalities, local governments, and international organizations, the project has advanced the integration of City-Region Food Systems (CRFS) into sustainable development strategies.

1. Digital Tools for CRFS Policy Collection

As a technological partner, the project orchestrated the collection and organization of European, national, regional, and local policies related to CRFS. This comprehensive policy database enables cities and regions to align their food systems strategies with broader sustainability and food security goals. This tool has proven instrumental in guiding policy decisions for urban agriculture, food waste management, and circular food systems.

2. Bruges Living Lab Policy Impact

In Bruges, the living and policy labs worked collaboratively to overhaul the city's food strategies. The Tasteful Transformation: From Farm to Table Food System Dialogue was a key event for gathering input from policy-makers and stakeholders. This initiative specifically targeted a shift toward plant-based proteins as part of a broader protein transition strategy endorsed by the regional green deal. The event successfully brought together policy stakeholders from the Bruges region and West Flanders, setting the stage for further collaboration in shaping sustainable food policies.

Four notable activities—Culinary Upgrade on the Spot, Plant-Based Proteins, Buddy Moments, and Intergenerational Cooking—were successfully implemented across the Bruges region. The Intergenerational Cooking initiative, in collaboration with local schools, not only engaged the elderly, but also integrated the activity into the school curriculum, emphasizing the importance of nutrition education within the community. These initiatives will be carried forward in collaboration with policy-makers and educators, contributing to healthy and sustainable food policies.

3. Vejle Municipality's Climate and Food Strategy

Vejle Municipality has been actively engaging with policy-makers to sign the Milan Urban Food Policy Pact (MUFPP). The city is simultaneously working toward developing a Climate Action Plan and a comprehensive Food Strategy. The ongoing dialogues focus on reducing meat consumption and food waste, which are integral to achieving the municipality's climate goals. By aligning these efforts with the broader framework of the MUFPP, Vejle is setting a precedent for municipalities to address both climate change and food security through coordinated policy actions.

4. Green Public Procurement (GPP) in Latvia

The Policy Lab in Latvia made significant progress by creating a working group focused on Green Public Procurement (GPP). The group facilitated capacity-building activities and experience-sharing sessions with other Cities2030 partners, such as Seinäjoki, Finland. The collaboration has laid the foundation for developing a school feeding report for the Latvian government, with a focus on local farmers and short food supply chains.
The lab also worked closely with local action groups to highlight the importance of public catering services for schools in food system changes. These activities have helped shift mindsets toward the critical role of food security and sustainability in public procurement, especially for school meal programs. By promoting local farmers and integrating food short supply chains into public procurement processes, these efforts contribute to the stability of regional food security.

5. Setesdal.Shop and Regional Impact
The Setesdal region witnessed important developments through the Setesdal.Shop initiative, which supports local producers by providing an online platform for farmers and other small businesses. The initiative brought together stakeholders from across the Setesdal region, creating a system where farmers can sell directly to consumers. This model has proven especially impactful in rural areas, where access to markets can be limited. Supported by the Norwegian Research Council, the project provided financial backing and policy support to facilitate the establishment and sustainability of this innovative online food marketplace.

6. Living Lab and Food Strategies in Seinäjoki
The Living Lab in Seinäjoki has been working on integrating food systems into the Seinäjoki city food strategy, which is being developed in accordance with the MUFPP. In collaboration with local schools and other stakeholders, the lab launched the Food Business Club and the initiative to transform the school canteen into a school restaurant. These programs aim to promote healthy eating habits, food security, and sustainable food practices. The lab is also supporting the Pikkuprovinssi experiment, which aims to engage youngsters in local food production and sustainability efforts.

7. RegenerAction Initiative in Italy
The RegenerAction platform, hosted by the Living Lab in Italy, launched in 2023 to promote integral ecological regeneration and align environmental health with human prosperity. The platform hosted the ICCAR (International Coalition of Inclusive and Sustainable Cities) boot camp, a summer seminar for young people focusing on inclusive and sustainable cities. This boot camp fostered intergenerational dialogue between policy-makers, youngsters, and civil society on issues such as active inclusion and sustainable urban food systems.
RegenerAction also hosted the UNAR (Italian National Office for Racial Discrimination) seminar, which brought together 28 policy-makers responsible for combating racism and discrimination. These high-profile events underscored the link between sustainable food systems and broader social justice issues, highlighting the importance of inclusive, community-driven solutions for food security and sustainability.

8. Public Policy and Community Gardening in Ireland

Inspired by a local green policy initiative advocating for the use of urban green spaces for community gardening, Cities2030 collaborated with stakeholders to align their policies with CRFS themes. Surveys and consultations with local Green Party councillors and VistaMilk SFI gathered input on issues related to food safety, security, and sustainable practices. These consultations culminated in an FSD event aimed at promoting collaboration between community gardening and foraging initiatives and policy-makers, fostering more sustainable local food systems.

In 2023, Cities2030 significantly impacted legal, policy, security, and management frameworks across multiple regions. The project has facilitated dialogue and collaboration between local governments, policy-makers, and communities to advance food security, sustainability, and public health through innovative strategies and policies. By engaging schools, local businesses, and action groups, Cities2030 has successfully integrated City-Region Food Systems (CRFS) into regional food strategies, climate action plans, and public procurement policies, contributing to a more resilient and sustainable future.

4.7.3. Qualitative Legal, Policy, Security and Management Impact of Cities2030 in 2024

In 2024, the Cities2030 Project made significant progress in its contributions to legal, policy, security, and management impacts. This progress spanned multiple aspects, from community-driven initiatives, public policy adaptations, to security and food safety efforts.

1. Food System Strategies and Policy Development

In Bruges, several impactful activities took place under the Living Lab and Policy Lab frameworks. The city initiated an overhaul of its Bruges Food Strategies, where the focus was primarily on the "protein shift" — a policy objective previously supported by the green deal initiative. The 'Tasteful Transformation: From Farm to Table' Food System Dialogue event played a key role in gathering feedback from a wide range of policy stakeholders, not just in Bruges but also across the West Flanders province. This event engaged policy-makers and community members alike, addressing important sustainability goals, and promoting healthy food systems.

The intergenerational cooking initiative was a prime example of the project's commitment to integrating policy and community welfare. This initiative, launched in collaboration with local primary schools, has been integrated into the school curriculum under "nutrition," ensuring that young people are educated on healthy and sustainable food practices. Furthermore, by engaging Bruges' elderly population in food delivery system innovations, the initiative also addressed social isolation, which helped improve the overall quality of life for seniors.

In addition, Bruges involved seven follower cities (Leuven, Ghent, Ostend, Hasselt, Sint-Truiden, Roeselare, and Knokke), further expanding the impact of these activities.

2. Circular Economy in Haarlem

In Haarlem, food security was given prominence within the circular economy action program, with ongoing efforts to bolster urban agriculture initiatives. The municipality has taken significant steps to improve food accessibility, exploring how to permanently integrate urban agriculture into the city's infrastructure. Regular meetings with schools, community leaders, and local farmers

continued to emphasize the importance of sustainable food production and equitable access to healthy, nutritious food.
Haarlem's food policy initiatives are also closely aligned with broader goals in health and green policy, helping create a more resilient urban environment by ensuring food security for all residents.

3. National Food Waste Reduction Initiative in Croatia
The City of Zagreb made advances in aligning its food policies with the national initiative from the Ministry of Agriculture to reduce food waste. By joining this national initiative, the city committed to reducing food waste by 30% by the year 2028. An action plan was devised to lay out the steps needed to achieve this target, with help from Croatian partners in the Cities2030 project. This plan is expected to be finalized and implemented before the end of the year.

4. Supporting Community Gardening and Local Food Systems
In Ireland, the Cities2030 Project was instrumental in supporting the Green Party's initiative to expand community gardening spaces. The project helped formalize these efforts into policy discussions, which are expected to be integrated into council planning. By engaging stakeholders across local government, NGOs, and community members, the project is helping to address legal issues around land use and the formal establishment of community gardens.

These gardens provide critical support for food security and nutrition security, offering affordable, nutritious food and fostering education around sustainable food systems. This initiative also ties into broader European policy objectives such as the EU FOOD2030 strategy and the United Nations' Sustainable Development Goals (SDG-11) on sustainable cities.

5. Food Security and Blockchain Integration
A significant breakthrough in food security was achieved through the integration of blockchain technology. This technology provided transparent data on food production, processing, and distribution, ensuring food safety and optimizing supply chains. The transparency provided by blockchain helped reduce food loss and ensured that urban areas, including food deserts, had better access to fresh, safe, and nutritious food.

In Reykjavik, the project supported the update of the city's food policy, incorporating documentation from Cities2030's CRFS Scan to bolster the city's commitment to food security. This update is set to focus on issues like blockchain-driven food traceability and data-driven food systems.

6. Scientific Contributions and Pedagogical Innovation
Through project workshops and academic collaborations, particularly in Italy, the Cities2030 activities in the Venice Lagoon contributed to pedagogical innovation. This work was highlighted through educational projects at the Iuav University of Venice and the University of Roma Tre, and the publication of scientific articles that focused on urban-rural food systems and policy solutions for hybrid territories.

The results from these initiatives have set a strong foundation for future food policy documents and urban food system innovations. The work also had a broader influence on food security, through its emphasis on the resorption of urban food deserts and the advancement of sustainable food systems.

7. Food Safety and Nutritional Security

In terms of food safety, the project made significant strides forward in promoting healthy and safe nutrition. Blockchain technology was instrumental in verifying the origin, safety, and nutritional content of food, ensuring that only high-quality and safe food was distributed. This helped build consumer confidence and promoted healthier food choices, especially in cities where food deserts were being addressed.

The Cities2030 Project has had a profound impact on the legal, policy, security, and management landscapes across multiple European cities in 2024. From supporting local governments with policy documents and food strategy overhauls to driving innovation in blockchain-based food security, the project has paved the way for more sustainable, secure, and community-oriented food systems. As these initiatives grow and develop, the lessons learned and policies crafted will serve as a model for other cities working to improve food security and sustainability on a global scale.

4.8. Culture and values impact

Overview of culture and values impact, see Figure 4.12.

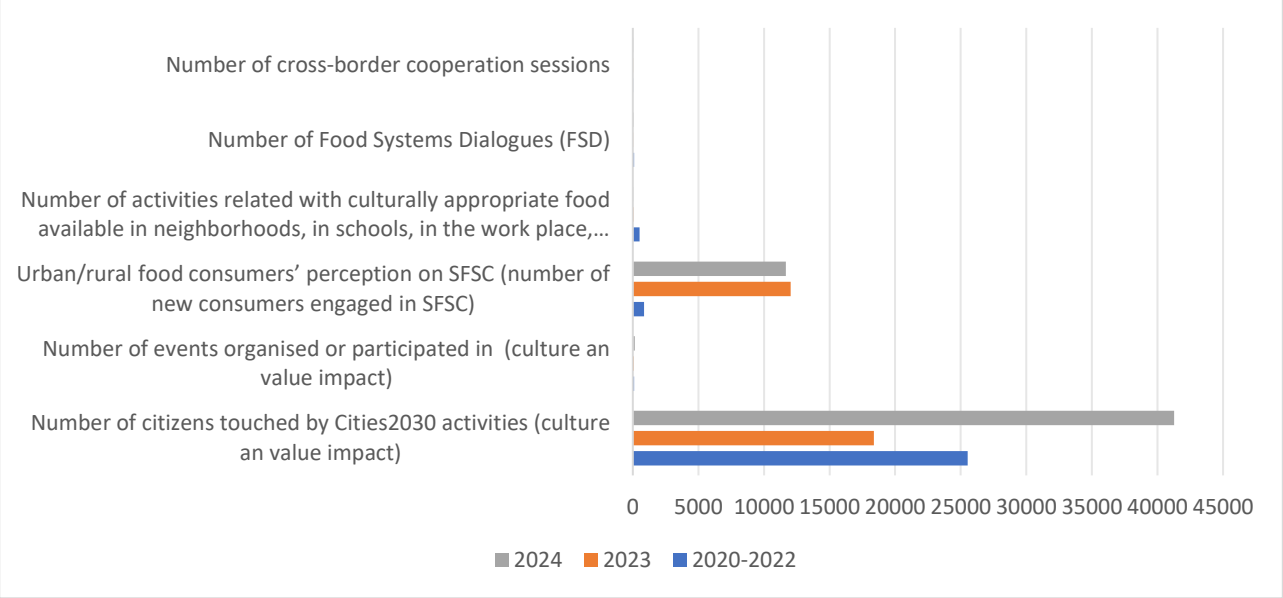


Figure 4.12. Culture and values impact

Cities2030 aims to transform the urban food system by incorporating cultural values and encouraging cross-border cooperation, rural and urban consumer engagement, and the provision of culturally-appropriate food systems. This chapter highlights the cultural and value impact of six

key elements measured across the years 2020–2024. The analysis covers the number of citizens impacted, events organized, consumer perceptions, activities promoting culturally-appropriate food, Food Systems Dialogues, and cross-border cooperation sessions. Through this lens, we explore the trends and shifts over the years and their implications for the future of sustainable food systems.

1. Number of Citizens Touched by Cities2030 Activities

The first and perhaps most significant metric is the number of citizens touched by Cities2030 activities, which focus on driving cultural and value-oriented impact. This metric captures the reach of the initiative in terms of direct and indirect engagement.

- **2020–2022:** 25,539 citizens
- **2023:** 18,385 citizens
- **2024:** 41,271 citizens
- **Total:** 85,195 citizens impacted across 2020–2024

Trend Analysis:

The data shows a fluctuating trend. The period from 2020 to 2022 saw an impressive start, engaging over 25,000 citizens. However, there was a slight drop in engagement in 2023, where the figure decreased to 18,385 citizens. This decline could be attributed to external factors such as shifts in program focus or challenges faced in scaling the initiative. However, the resurgence in 2024, with over 41,000 citizens engaged, suggests a significant ramp-up in efforts and activities, perhaps driven by increased awareness and more effective outreach programs.

2. Number of Events Organized or Participated In

Another key metric is the number of events organized or participated in by Cities2030, reflecting direct actions taken to promote cultural and value impacts through public events, workshops, and other activities.

- **2020–2022:** 108 events
- **2023:** 87 events
- **2024:** 146 events
- **Total:** 341 events across 2020–2024

Trend Analysis:

The trend shows a steady pace of events between 2020 and 2022. There was a slight dip in 2023, where the number of events dropped from 108 to 87. This could potentially be linked to logistical challenges or recalibration of efforts to increase the quality of events rather than quantity. By 2024, the initiative regained momentum, with a sharp rise to 146 events. This surge highlights an intensified focus on outreach and cultural engagement, suggesting that Cities2030 found new ways to engage a broader audience or diversified their event formats.

3. Urban/Rural Food Consumers' Perception on SFSC (Short Food Supply Chains)

This metric focuses on the number of new consumers engaged in Short Food Supply Chains (SFSC), a key strategy in promoting more sustainable and localized food systems.

- **2020–2022:** 847 new consumers
- **2023:** 12,041 new consumers
- **2024:** 11,662 new consumers
- **Total:** 24,550 new consumers engaged across 2020–2024

Trend Analysis:
One of the most striking trends is the exponential growth in consumer engagement with SFSC between 2020–2022 and 2023. From a modest 847 new consumers in the early period, the number surged to over 12,000 in 2023 and continued at a similar rate in 2024 with over 11,600 new consumers. This rapid rise reflects a growing awareness and acceptance of localized food systems, likely driven by increasing public concern over food security, environmental sustainability, and the cultural value of locally produced food.

4. Number of Activities Related to Culturally-Appropriate Food

Culturally-appropriate food is a key component of the Cities2030 initiative, promoting the availability of food that aligns with local traditions and values in neighbourhoods, schools, and workplaces.

- **2020–2022:** 526 activities
- **2023:** 52 activities
- **2024:** 35 activities
- **Total:** 613 activities across 2020–2024

Trend Analysis:
The number of activities related to culturally-appropriate food saw a significant drop after 2020–2022. From 526 activities, the number drastically fell to 52 in 2023 and further to 35 in 2024. This sharp decline could indicate a shift in focus within the initiative or resource constraints in promoting these specific activities. Alternatively, it could also point to the increasing mainstreaming of culturally-appropriate food, reducing the need for specific promotional activities. Despite the decrease, the total number of activities over the four years shows the consistent importance placed on ensuring cultural relevance in food systems.

5. Number of Food Systems Dialogues (FSD)

Food Systems Dialogues (FSD) are essential platforms for discussion, bringing together stakeholders to address issues related to sustainable food systems, cultural values, and cooperation.

- **2020–2022:** 91 dialogues
- **2023:** 35 dialogues
- **2024:** 41 dialogues

- **Total:** 167 dialogues across 2020–2024

Trend Analysis:
The number of dialogues conducted declined from 91 in 2020–2022 to 35 in 2023, reflecting a potential reduction in stakeholder engagement or the evolving nature of the dialogues. However, in 2024, the number of dialogues rose slightly to 41, indicating a renewed effort in fostering discussions around food systems. This data highlights that while the number of dialogues has fluctuated, they remain a crucial tool for advancing food system transformation.

6. Number of Cross-Border Cooperation Sessions

Cross-border cooperation sessions are crucial in the context of fostering collaboration between different regions and countries, promoting shared values, and aligning strategies for sustainable food systems.

- **2020–2022:** 21 sessions
- **2023:** 13 sessions
- **2024:** 25 sessions
- **Total:** 59 sessions across 2020–2024

Trend Analysis:
Cross-border cooperation has shown a steady, if somewhat erratic, trend. The number of sessions dropped from 21 in 2020–2022 to 13 in 2023 but rose again in 2024 to 25. This increase may signal a growing recognition of the importance of cross-border collaboration, particularly as food systems become increasingly globalized and interconnected. The rise in 2024 suggests that Cities2030 has been successful in fostering international cooperation to advance shared cultural values around food.
The Cities2030 initiative has made significant strides in fostering cultural and value impacts in food systems from 2020 to 2024. While certain metrics, such as the number of citizens touched and the number of events organized, have fluctuated, the overall trend indicates increasing engagement, especially in the areas of consumer participation in short food supply chains and cross-border cooperation. See Table 4.6. for all results.

	2020-2022	2023	2024	SUM
Number of citizens touched by Cities2030 activities (culture and value impact)	**25539**	**183 85**	**412 71**	851 95
Number of events organised or participated in (culture and value impact)	**108**	**87**	**146**	341
Urban/rural food consumers' perception on SFSC (number of new consumers engaged in SFSC)	**847**	**120 41**	**116 62**	245 50
Number of activities related with culturally-appropriate food available in neighbourhoods, in schools, in the work place, etc.	**526**	**52**	**35**	613
Number of Food Systems Dialogues (FSD)	**91**	**35**	**41**	167
Number of cross-border cooperation sessions	**21**	**13**	**25**	59

Table 4.6. Culture and values impact

4.8.1. Qualitative Cultural and Values Impact of Cities2030 up to 2022

The Cities2030 project has contributed significantly to cultural and value-based shifts across several regions, fostering changes in consumer behaviour, promoting local food systems, and encouraging sustainable practices in multiple communities. The following sections highlight the key cultural and value-driven impacts that have emerged from the project up to 2022.

1. Promoting Healthy Food Consumption and Behaviour Change

Several initiatives under Cities2030 have sparked cultural changes, especially in the realm of healthy food consumption. For instance, sports clubs in Finland shifted their attitude toward food sold at kiosks. Instead of the usual unhealthy options, they began offering healthier food items, reflecting a broader cultural shift towards nutrition awareness within community activities. This change also aligns with the introduction of the school canteen-to-restaurant concept, which redefined the dining experience for 500 pupils, promoting healthier and more diverse eating habits at school.

Additionally, due to the rising inflation rates, consumers have shifted toward purchasing more affordable food options, which has further influenced consumption patterns in retail food stores.

2. Cultural Events and Community Engagement

Cities2030 leveraged various cultural events to foster greater awareness and participation in local food systems. The City of Velika Gorica hosted its largest gastro event, promoting local food producers and engaging more than 300 citizens in activities that supported the project's mission. Similarly, the gastro-bike tour in Velika Gorica connected more than 50 participants to local food sources, combining a love for sports with the promotion of sustainable and locally-produced food. These events not only served to promote local products, but also emphasized the cultural value of community collaboration in food systems. The widespread engagement of the public with food producers helped cement local food culture in public consciousness.

3. Changes in Children's Food Habits

One of the key cultural impacts of the Cities2030 project has been the change in food consumption habits among children. Through focused educational activities and events, children in participating regions have been introduced to healthier food choices. This cultural shift is significant as it establishes healthier behaviours early on, which can have long-term implications for public health.

4. Waste Management and Household Practices

In regions like Lahti, Finland, the Cities2030 project introduced innovative approaches to food waste management. These included bio-composting experiments such as the Bokashi method, which engaged households in more sustainable food waste practices. These new practices not only introduced a more sustainable mindset but also changed behaviours at the household level, contributing to a deeper understanding of the value of waste reduction.

5. Supporting Local Culinary Heritage

The Vidzeme region initiated efforts to join the European Culinary Heritage Network, aiming to preserve and promote local food traditions. This initiative is a direct result of the Cities2030 project, which fostered a renewed appreciation for regional culinary heritage. By promoting short food chains and encouraging collaboration between local producers and restaurants, the project is driving the use of locally sourced ingredients in menus, thus helping preserve cultural identity through food.

6. Educational and Cultural Integration in Italy

In Italy, particularly in the Paideia Digital Academy, the Cities2030 project contributed to the cultural education of young people. Programs involved visits to significant historical sites, such as the Archeological Park of Velia and the Archeological Park of Paestum, where students learned about the cultural roots of their region before engaging in digital education tools. This blend of historical appreciation with modern technology encouraged a stronger connection to local culture while promoting future-oriented skills.

Furthermore, the Digital Academy hosted concerts, poetry readings, and other cultural activities that deepened the connection between education, heritage, and community. This cultural integration serves as a foundation for future sustainability efforts, rooted in a strong sense of place and cultural identity.

7. International Cultural and Food System Dialogues

Cities2030 extended its cultural reach globally by participating in several high-profile international events such as the UN Food Systems Dialogues, COP summits, and the Dubai Expo. These events fostered cross-border cooperation and highlighted the importance of cultural exchange in building sustainable food systems. Additionally, by taking part in various global food conferences and festivals, the project underscored the value of cultural diversity and heritage in shaping resilient and equitable food systems.

For example, at the Edible Planet Summit in Italy, participants focused on rethinking urban food landscapes and integrating cultural heritage with modern food system innovations. These international engagements provided platforms for sharing regional successes, learning from other cultures, and building a more globally inclusive food system.

8. Integrating Culinary and Cultural Heritage in Vidzeme

In Vidzeme, the Cities2030 project encouraged the promotion of regional culinary heritage by working towards the European Culinary Heritage Network. This step aimed to raise awareness of traditional culinary practices, support the consumption of local products, and promote closer cooperation between local food providers and consumers. By involving local restaurants and caterers, the region seeks to increase the presence of local foods in public dining options, thus strengthening the cultural bond between the people and their food systems.

Through a series of local and international engagements, the Cities2030 project has profoundly influenced cultural values related to food consumption, waste management, and local heritage. By fostering healthier food habits, promoting regional food systems, and emphasizing the importance

of cultural heritage, the project has laid the groundwork for a more resilient and sustainable food culture across its participating regions.

4.8.2. Qualitative Cultural and Values Impact of Cities2030 in 2023

In 2023, the Cities2030 project expanded its cultural and value-oriented impact through various initiatives and events that engaged local communities, stakeholders, and citizens across several regions. These activities focused on promoting local food systems, sustainable practices, and fostering a deeper connection between citizens and their food cultures. Below are the key cultural and value-based impacts observed in the reporting period.

1. Food Systems Dialogues and Citizen Engagement

One of the most impactful cultural events in 2023 was the Food Systems Dialogue (FSD) held in Lahti, Finland, which engaged over 100 citizens directly and indirectly. Through social media outreach, the event reached over 13,000 people. This event emphasized the importance of sustainable food systems and prompted citizens to consider their role in achieving these goals. The FSD also focused on food waste management and composting practices, gathering policy-makers and the public for fruitful discussions. The engagement with over 1500 citizens across several events reflects a broad cultural shift toward more sustainable food practices and raised awareness of food waste as a critical issue within local communities.

2. H(Eerlijk Brugge) Event and Bruges Living Lab

In Bruges, the H(Eerlijk Brugge) event became a major cultural touchstone for promoting urban and local food systems. The event showcased plant-based and locally-sourced foods, introducing these concepts to the local community. The Living Lab Bruges participated actively, aligning the event with the objectives of Cities2030 by promoting plant-based proteins and sustainable food production.

A Food Systems Dialogue organized in Bruges highlighted the protein shift, drawing participants from various sectors. The insights gathered from these dialogues were incorporated into the updated Bruges Food Strategy, helping to reshape the city's approach to food systems.

Another impactful initiative in Bruges was the Intergenerational Cooking event, which involved local neighbourhoods, schools, and residential care centres. This activity strengthened community bonds and introduced children and older generations to healthier cooking practices, all while celebrating local culinary traditions.

3. Vejle Food Festival and Regional Competitions

The Vejle Food Festival emerged as a central cultural event in Denmark, engaging citizens through activities that celebrated the region's rich culinary history. Through initiatives like Gastro Days, local food professionals deepened their appreciation for the region's food culture, which they then passed on to younger generations and elders in public kitchens.

Competitions, such as the Championship of HotDog and The Potato Award, nurtured creativity in cooking, stimulating interest in food culture across generations. These events contributed to preserving Vejle's culinary identity, while also encouraging the use of local and sustainable

ingredients. Overall, the festival played a crucial role in enhancing the community's connection to its culinary heritage.

4. Citizen Touchpoints in Varying Regions

The Cities2030 project had a broad reach in terms of engaging citizens across different regions. For instance, in Arganda and Quart de Poblet, various workshops and Food Systems Dialogues were organized, touching thousands of citizens both directly and indirectly. These activities emphasized short supply chains, food waste management, and the importance of sustainable urban agriculture.

In the Social Innolabs, more than 2000 participants engaged in discussions and events around urban/rural food consumer perceptions. These dialogues contributed to raising awareness of the importance of short food supply chains and the impact of local food systems on regional resilience.

5. Children and Youth Engagement in Food Culture

Children and teenagers were a key focus for Cities2030's cultural impact efforts in 2023. In Latvia, the Rural Community Parliament played a vital role in bringing together rural communities and stakeholders to discuss food culture, cooperation with local catering services, and workshops on local food values.

Additionally, the Living Labs across several countries focused on introducing kids and young people to the concept of food systems. Events such as the Pikkuprovinssi festival in Finland involved school children in learning about the food supply chain, from field to fork. The emphasis was placed on healthy eating habits, particularly regarding snacks, and over 750 citizens were engaged in activities centered on improving food choices for children.

6. Cilento Region's Cultural and Educational Initiatives

The Cilento region in Italy continued to promote food culture through several educational programs, which included visits to historical sites like the Archeological Parks of Velia and Paestum. These programs emphasized the connection between regional history and modern food systems, encouraging participants to reflect on their cultural heritage before engaging in digital education tools.

Additionally, the Cilento region hosted more than seven cross-border cooperation sessions, with delegations from Japan visiting the region to learn about the European model of sustainable food systems. These international exchanges fostered a deeper understanding of food systems and their cultural significance across borders.

7. Cultural Events and Festivals

The Pollica municipality collaborated with LaFeltrinelli to host a summer festival filled with meetings, book presentations, and concerts. These events featured international writers and artists who were interviewed by local youngsters, thereby promoting cultural exchange and strengthening community bonds around the theme of food and sustainability.

Moreover, the Cities2030 project continued to participate in various international events, such as the UN Food System Dialogues, COP summits, and the Dubai Expo, where discussions about food systems and cultural heritage were elevated to a global level.

8. Cross-Border Cooperation and Educational Programs
Cross-border cooperation was a major feature of Cities2030's activities in 2023, with multiple sessions between European regions and international partners like Japan. These sessions focused on sharing best practices in urban food systems, and participants engaged in discussions about the integration of culinary heritage into modern food supply chains.
Educational programs including visits to historical parks and the hosting of cultural events such as poetry readings and concerts, also contributed to reinforcing local food cultures while fostering international collaboration on food sustainability.

9. Community Gardening and Food Security
In Ireland, community engagement around food systems was highlighted by the launch of the Cities2030 survey in Waterford. The survey focused on food choices, climate action, and sustainable food systems, reaching over 150 participants at the Waterford Imagine Arts Festival. This initiative raised awareness about the importance of sustainable food systems and allowed citizens to contribute their views on food security and future food choices.

The community gardening initiatives promoted by the project also supported food security by encouraging local food production and accessibility. These efforts contributed to strengthening community resilience and ensuring a stable supply of fresh, locally-grown produce.

10. Promotion of Local Food Consumption
Many of the project's activities encouraged the consumption of locally-produced food, which was significant from the perspective of value creation. Stakeholders and citizens were motivated to support local food producers, thereby fostering a deeper appreciation for regional food cultures and values.

In 2023, the Cities2030 project made considerable advances in reinforcing cultural values around local food systems, sustainability, and community engagement. By organizing events, promoting healthy food consumption, and encouraging cross-border cooperation, the project significantly influenced the cultural landscape in participating regions. It strengthened the connection between citizens and their food cultures while promoting sustainable practices that will continue to shape these communities for years to come.

4.8.3. Qualitative LCultural and Values Impact of Cities2030 in 2024

In 2024, the Cities2030 project expanded its cultural and value-based impact by engaging citizens, stakeholders, and local communities through events, initiatives, and educational programs. The project continued to emphasize the importance of sustainable food systems, local traditions, and fostering a deeper connection between communities and their food cultures. Below are the key cultural and value-oriented impacts observed during the reporting period.

1. Cultural Events and Local Food Promotion
Several cultural events organized by ITC and Zelena Točka promoted local food systems. Annual events held in June across 2022, 2023, and 2024 marked the start of the local food season and promoted food traceability. These events connected consumers with local food producers, highlighting the importance of short food supply chains. Stakeholders from various regions participated, sharing insights on establishing and managing local food systems. In addition to consumer outreach, Zelena Točka issued over 1000 loyalty cards to new consumers, helping to track consumer behaviour and promote local food consumption.

2. (H)Eerlijk Brugge and Bruges Living Lab Activities
In Bruges, the (H)Eerlijk Brugge event continued to promote local food culture by emphasizing urban and plant-based foods. The event attracted citizens to learn about local food systems, with the Living Lab Bruges actively participating. Furthermore, a Food System Dialogue (FSD) was organized in collaboration with P3BRUGES, P4VIVES, and P6INAGRO, focusing on the protein shift toward plant-based diets. Approximately 50 participants, representing various sectors of the food system, gathered to discuss opportunities in promoting plant-based proteins. The event was pivotal in shaping the revised Bruges Food Strategy.
Additionally, Intergenerational Cooking activities involved entire neighbourhoods within the Sint-Pieters area of Bruges. This initiative, organized in collaboration with local cultural centres and care facilities, promoted the inclusion of various age groups in food-related activities, emphasizing the importance of healthy and sustainable eating habits across generations.

3. Food and Cultural Events in Vejle
In Vejle, Denmark, the Food Festival remained a cornerstone event, showcasing the region's culinary heritage while also engaging the local community. Competitions such as the HotDog Championship and The Potato Award encouraged creativity in cooking and food preparation. These events fostered a deeper cultural appreciation for the region's food history and traditions, while also promoting the use of local and sustainable ingredients. Through events like Gastro Days, food professionals and public kitchens were encouraged to prioritize sustainability in their culinary practices, influencing broader changes in the community.

4. Urban Agriculture and Citizen Engagement
In France, the 48 Hours of Urban Agriculture event was a highlight of 2024, with over 50 individual events engaging more than 1500 participants. The opening ceremony at CITAG was attended by over 70 people, while specific events in Capri focused on transitioning farms toward citizen governance and encouraging changes in food consumption habits. Two FSDs focused on food waste and composting, and land access for urban agriculture drew a significant number of citizens, policy-makers, and urban farmers.

5. Educational Programs and Cross-Border Cooperation
Educational programs promoting food culture and sustainability played a significant role in Latvia, where the Latvian Rural Community Parliament and Living Labs engaged children and young

people in food systems education. The events included workshops on food supply chains, healthy snacks, and local food values. Additionally, the Food System Dialogues gathered experts and stakeholders to discuss food security, short food supply chains, and sustainable practices, involving cross-border cooperation with food experts from Finland.
Similarly, the Cilento region in Italy organized educational programs linked to local cultural heritage. These programs included visits to the Archeological Parks of Velia and Paestum, as well as workshops, concerts, and poetry readings. The region also hosted international delegations, fostering cooperation with countries such as Japan to share knowledge about food sustainability practices and urban food systems.

6. Community Events in Velika Gorica
In Velika Gorica, the annual Gastro event provided a platform for local food producers and NGOs to connect with citizens. In 2023, several events were held, including workshops for producers on product certification, educational workshops for children, and an exhibition space for certified local producers. Over 200 participants engaged with these activities, contributing to a broader appreciation for local food systems and food sustainability.

7. Food System Dialogues and Workshops in Ireland
In Ireland, the Cities2030 project organized a Food System Dialogue focused on food sustainability, climate action, and local food choices. The event engaged over 80 participants, including local policy-makers, citizens, and sustainability advocates. The discussions helped to promote sustainable food systems and revived interest in traditional food practices, such as foraging. In addition, Waterford City Library and the Environ Conference hosted a Virtual Reality pilot project, which allowed participants to explore the cultural and environmental values of food sustainability, bridging technology and cultural heritage in a meaningful way.

8. Food Consumption Habits and Cultural Impact
Across various regions, the Cities2030 project influenced food consumption habits. Events and initiatives promoted a shift towards more sustainable and local food consumption. In Bruges, the focus on plant-based proteins led to greater interest in plant-forward diets, while in Vejle, competitions and events emphasized the use of local ingredients and sustainable culinary practices. These cultural shifts were reinforced by the Food System Dialogues, which encouraged citizens to make sustainable food choices, fostering a connection between food culture and environmental stewardship.

9. Building Structures for Cultural Resilience
The project's focus on reviving traditional food systems, such as foraging, emphasized the cultural resilience of local food practices. Workshops and dialogues in Ireland, Italy, and France helped to rebuild these cultural connections by integrating heritage food practices into modern sustainability efforts. These initiatives contributed to a growing sense of community around local food systems, promoting cultural continuity while addressing contemporary food challenges.

10. Culturally-Appropriate Food and Community Engagement

The project made culturally-appropriate food more accessible in local neighborhoods, schools, and workplaces. For example, in Velika Gorica, workshops and activities at the annual Gastro event engaged children and families in learning about healthy, locally-produced foods. In Capri, neighbourhood events facilitated access to culturally relevant foods through mobile grocery stores, reaching over 40 families. These efforts reinforced the idea that local, sustainable food can be both culturally appropriate and environmentally beneficial.

The cultural and value impact of the Cities2030 project in 2024 was significant. Through a combination of educational programs, community events, cross-border cooperation, and local food promotion, the project strengthened cultural ties to food systems and encouraged sustainable food consumption habits. By reviving traditional food practices, promoting local food systems, and engaging diverse communities, the project played a key role in shaping a more sustainable and culturally-rich food future across Europe.

4.9. MUFPP Criteria Reached in Cities2030

The Cities2030 project has made significant strides forward in meeting the Milan Urban Food Policy Pact (MUFPP) criteria across various domains, including governance, food production, social equity, food waste, and sustainable diets. Below is an overview of the MUFPP criteria reached in the context of the project:

1. Governance and Policy Development

Indicator 1: Presence of an active municipal interdepartmental government body for advisory and decision-making on food policies and programmes
Several cities within the Cities2030 project, including Marseille and Seinäjoki, have established interdepartmental government bodies to oversee food policies and decision-making processes. These groups, often called steering committees or food policy councils, involve collaboration between multiple stakeholders.
Indicator 2: Presence of an active multi-stakeholder food policy and planning structure
Cities such as Marseille have created cooperative groups to foster urban agriculture installations and stakeholder engagement. This structure is crucial for promoting food policies that address urban agriculture, food security, and food supply chain efficiency.
Indicator 3: Presence of a municipal urban food policy or strategy and/or action plans
Seinäjoki has worked on a dedicated City Food Strategy, while other cities have developed or refined policies that support sustainable food systems, urban agriculture, and food equity.
Indicator 4: Presence of an inventory of local food initiatives and practices to guide development and expansion of municipal urban food policy and programmes
Multiple cities have developed or are in the process of creating inventories of local food initiatives. Marseille is working on a local observatory of urban agriculture, which will start in one area and expand citywide.

2. Sustainable Diets and Nutrition

Indicator 9: Develop sustainable dietary guidelines

The Cities2030 project has made efforts to develop sustainable dietary guidelines through various public campaigns, particularly in schools. Efforts include promoting healthy snacks for children, as well as educating citizens on the importance of sustainable food consumption habits.

Indicator 15: Reorient school feeding programmes

Several initiatives within Cities2030, particularly in Marseille and Seinäjoki, focus on reorienting school feeding programs towards healthier and more sustainable meals. For example, Seinäjoki has worked on transforming a school canteen into a school restaurant, providing children with healthier meal options.

Indicator 14: Number of city-led or supported activities to promote sustainable diets

Events and campaigns have been held to promote sustainable diets. This includes activities like the Food Systems Dialogues (FSD) and school programs that encourage the adoption of healthier diets through education and policy changes.

3. Food Production and Urban Agriculture

Indicator 27: Surface area of potential agricultural spaces within the municipal boundary

In Marseille, efforts are being made to identify available land for agricultural projects, thereby increasing the number of residents with access to urban agriculture gardens.

Indicator 22: Number of community-based food assets in the city

The development of a mobile grocery store in Marseille is an innovative initiative that ensures access to sustainable food sources across different neighbourhoods. It is part of the broader goal of supporting community-based food assets in urban areas.

Indicator 35: Presence of a development plan to strengthen resilience and efficiency of local food supply chain logistics

ITC and local partners have been focusing on developing and updating local food supply chains to ensure efficiency, food safety, and resilience. This includes promoting local food delivery systems and strengthening urban food governance.

4. Food Waste Reduction

Indicator 42: Annual number of events and campaigns aimed at reducing food loss and waste

Cities2030 has made considerable progress in raising awareness about food waste. Various campaigns and events such as Food Systems Dialogues (FSDs) have been organized to address issues of food waste and composting, particularly in cities such as Lahti and Marseille.

Indicator 41: Total annual volume of food losses & waste

In cooperation with Zelena Točka, the project aims to measure and reduce the amount of surplus food created in the regional supply chain. This focus on food waste management is part of the broader goal of improving the overall sustainability of food systems.

5. Social and Economic Equity

Indicator 19: Percentage of people supported by food and/or social assistance programmes

Social assistance programs targeting vulnerable populations have been a critical component of the project. The creation of social stores and food assistance programs aims to increase food security for specific vulnerable groups in various cities.

Indicator 23: Presence of food-related policies and targets with a specific focus on socially-vulnerable groups

Many of the urban food policies developed within Cities2030 have a specific focus on socially-vulnerable populations. This includes policies that aim to enhance food security, provide access to nutritious foods, and promote inclusion within the food system.

Indicator 40: Existence of support services for the informal food sector providing business planning, finance, and development advice

In several cities, including Marseille, the project has facilitated support services for informal food sectors, providing business planning, finance, and development advice. These services are essential for enhancing the resilience and sustainability of local food systems.

The Cities2030 project has effectively advanced several MUFPP indicators by promoting multi-stakeholder engagement, sustainable diets, urban agriculture, food waste reduction, and social equity. These efforts have had a broad impact across the participating cities, contributing to stronger, more resilient, and sustainable food systems at the local level.

5. LESSONS SO FOR

5.1. Discussion of the collaboration with researchers, entrepreneurs, civil society leaders, and cities

Collaboration is at the heart of the Cities2030 project, which brings together a wide range of stakeholders, including researchers, entrepreneurs, civil society leaders, and cities, to co-create solutions for the transformation of City Region Food Systems (CRFS). The project recognizes that sustainable and resilient food systems cannot be developed in isolation; they require the collective expertise and efforts of diverse actors to address complex challenges such as food security, environmental sustainability, and social equity. By fostering cross-sector collaboration, Cities2030 aims to leverage the strengths of each group to drive systemic change in urban food systems.

1. Researchers:
Researchers play a critical role in Cities2030 by providing the scientific and evidence-based foundation needed to develop innovative food systems solutions. Through interdisciplinary research in areas such as food science, social science, and environmental sustainability, researchers contribute valuable insights that guide policy development, inform best practices, and help shape future food systems. Their work in data analysis, environmental impact assessments, and the study of consumer behaviour provides the evidence base for creating effective, adaptable policies and practices within CRFS. Cities2030 actively collaborates with universities and research institutions to ensure that the project is informed by the latest academic research and innovation, helping to refine and validate the tools and strategies implemented across partner cities.

2. Entrepreneurs:
Entrepreneurs and innovators are key drivers of change within Cities2030, as they bring new technologies, business models, and creative approaches to the challenges of food system transformation. Startups and established businesses alike contribute to the development of cutting-edge solutions, such as blockchain-based supply chain tracking, vertical farming, and circular economy practices. These innovations help make urban food systems more efficient, transparent, and sustainable. By collaborating with entrepreneurs, Cities2030 encourages the scaling of successful models that can be replicated in other urban regions, while also fostering public-private partnerships that attract investment and generate economic growth. This entrepreneurial involvement not only stimulates innovation, but also ensures that the solutions developed are practical, market-driven, and financially sustainable.

3. Civil Society Leaders:
Civil society organizations (CSOs) and community leaders play a pivotal role in promoting social equity and inclusivity within the Cities2030 framework. These organizations bring a deep understanding of local communities, food access issues, and social justice concerns, helping to ensure that the solutions developed are not only sustainable, but also equitable. Civil society leaders advocate for vulnerable and marginalized groups, ensuring that the voices of those most affected by food insecurity and poverty are heard and considered in the decision-making process. Their involvement in Cities2030 fosters community engagement, empowering citizens to take an active

role in shaping food policies and practices. By working closely with CSOs, the project ensures that solutions are co-created with the communities they aim to serve, building trust and promoting long-term sustainability.

4. Cities:

Cities themselves are central actors in the Cities2030 project, as they are the key implementers of CRFS strategies and the environments in which these food systems operate. Urban governments and local authorities are responsible for enacting the policies and initiatives that drive the transformation of food systems. Cities provide the context in which innovative solutions are tested, adapted, and scaled to meet the specific needs of urban populations. Through the establishment of policy and living labs, Cities2030 enables cities to experiment with new food system models, gather data on their impact, and refine approaches based on real-world outcomes. This collaboration with cities also allows for the exchange of knowledge and best practices across different urban regions, promoting a network of mutual learning and support that strengthens resilience and sustainability across all participating locations.

The collaborative approach of Cities2030 integrates the expertise and perspectives of researchers, entrepreneurs, civil society leaders, and cities to build more resilient and sustainable food systems. Each stakeholder group brings unique strengths to the table, creating a holistic framework for co-creation and innovation that addresses the multifaceted challenges of urban food systems. By working together, these diverse actors help to ensure that the solutions developed are scientifically sound, technologically advanced, socially equitable, and practically implementable. This collaboration is essential to achieving the overarching goal of Cities2030: to create future-proof, sustainable City Region Food Systems that benefit citizens and ecosystems alike.

5.2. Highlight the role of partnerships in achieving project goals

Partnerships are a cornerstone of the Cities2030 project, playing a critical role in achieving its ambitious goals of transforming City Region Food Systems (CRFS) into more sustainable, resilient, and equitable ecosystems. By bringing together a diverse range of stakeholders—including researchers, entrepreneurs, civil society organizations, local governments, and urban citizens—Cities2030 fosters cross-sector collaboration and co-creation, enabling the project to tackle complex food system challenges from multiple angles. The strength and diversity of these partnerships drive innovation, resource sharing, and the collective development of solutions that are adaptable to the unique needs of various city regions.

1. Cross-Sector Collaboration

Cities2030's partnerships span various sectors, allowing for the integration of expertise from diverse fields such as food science, environmental sustainability, technology, social justice, and public policy. By leveraging the knowledge and skills of each sector, the project is able to create multifaceted solutions that address the interconnected challenges of food security, sustainability, and health. For example, partnerships between researchers and local governments help cities apply evidence-based policies, while collaborations with entrepreneurs bring cutting-edge technology and innovative business models into urban food systems. These cross-sector partnerships ensure that the project's solutions are comprehensive and capable of achieving systemic change.

2. Public-Private Partnerships

Public-private partnerships are particularly critical in advancing the technological and financial goals of the Cities2030 project. These partnerships enable the pooling of resources from both the public and private sectors to fund innovations in CRFS, such as smart food systems, blockchain technology for supply chain transparency, and urban farming initiatives. The private sector brings the entrepreneurial drive, investment, and technological innovation needed to implement and scale new solutions, while the public sector provides regulatory support, policy frameworks, and infrastructure necessary for sustainable urban food system development. This collaboration accelerates the adoption of innovative practices and ensures the financial sustainability of project initiatives.

3. Civil Society and Community Engagement

The partnership with civil society organizations (CSOs) and local communities is vital for ensuring that the Cities2030 project remains inclusive and socially equitable. CSOs act as intermediaries between the project and urban residents, particularly those in marginalized and vulnerable communities. They ensure that the voices of local communities are heard and considered in decision-making processes, helping to shape food policies that are both inclusive and equitable. These partnerships foster citizen engagement, turning consumers into active participants in food systems and ensuring that solutions reflect the needs of all urban populations, particularly those facing food insecurity. By partnering with civil society, Cities2030 promotes social justice and ensures that the benefits of food system transformation are distributed fairly.

4. Academic and Research Institutions

Partnerships with academic and research institutions play a crucial role in providing the scientific rigour and innovation needed to inform and guide the Cities2030 project. Researchers contribute valuable data, insights, and analysis that help shape evidence-based policies and interventions. By collaborating with universities and research bodies, the project ensures that its strategies are grounded in the latest research on food security, sustainability, and public health. These partnerships also facilitate the development of new technologies and methodologies, such as precision agriculture and big data analytics, that can be applied to improve the efficiency and effectiveness of CRFS. Academic partnerships help cities refine their approaches, making their food systems more resilient and adaptable to future challenges.

5. Partnerships with Cities and Regional Governments

City and regional governments are key partners in the implementation of the Cities2030 project. As the primary stakeholders responsible for urban planning and food policy, local governments are crucial for translating project goals into actionable policies that impact urban food systems. These partnerships ensure that CRFS interventions are aligned with local needs, allowing cities to pilot and refine innovative approaches to food system management. By working closely with local governments, Cities2030 can tailor its solutions to fit the specific challenges and opportunities of each city-region, ensuring that the policies are both effective and sustainable. Additionally, these

partnerships facilitate the exchange of knowledge and best practices between cities, creating a network of mutual learning and support.

6. International and Transnational Partnerships

Cities2030 also benefits from its partnerships with international organizations and transnational networks, which broaden the project's impact and reach. By collaborating with global partners, Cities2030 can exchange ideas, innovations, and best practices beyond European borders, fostering a more extensive transformation of food systems worldwide. These international partnerships provide opportunities for knowledge sharing on a global scale, helping cities and regions in different parts of the world learn from each other's experiences in developing sustainable CRFS. Such partnerships also open doors for global funding opportunities and international policy advocacy, further supporting the scalability and sustainability of Cities2030's initiatives.

Partnerships are integral to the success of Cities2030, as they enable the project to harness the collective strengths of various sectors and stakeholders. Through cross-sector collaboration, public-private partnerships, and engagement with civil society and academic institutions, Cities2030 fosters an inclusive, innovative, and adaptable approach to transforming City Region Food Systems. These partnerships not only help achieve the project's immediate goals but also lay the groundwork for long-term sustainability and resilience in urban food systems, ensuring that the benefits of transformation extend across multiple regions and sectors for years to come.

5.3. Future directions

As the Cities2030 project continues to evolve, several future directions will shape its impact and guide the next phases of City Region Food Systems (CRFS) transformation. These directions are informed by ongoing research, the increasing complexity of urban food challenges, and the lessons learned from the initial implementation of innovative solutions across various cities. By embracing emerging trends, addressing persistent challenges, and leveraging new opportunities, Cities2030 aims to ensure the long-term sustainability and resilience of CRFS.

1. Scaling and Replicating Successful Models

One of the key future directions for Cities2030 is the scaling and replication of successful CRFS models across new urban and regional contexts. The innovations and best practices developed in the project's pilot cities—such as urban agriculture, circular economy practices, and blockchain-enabled transparency—can be adapted and applied in other cities worldwide. The Cities2030 CRFS Alliance, a growing network of stakeholders, will play a crucial role in facilitating knowledge exchange and supporting cities in adopting these proven models. By expanding the reach of the project, Cities2030 can help more cities build food systems that are resilient, sustainable, and adaptable to local conditions.

2. Strengthening Public-Private Partnerships

As the project moves forward, there will be an increasing focus on building and strengthening public-private partnerships to foster innovation and drive investment in CRFS. Collaboration between governments, businesses, and research institutions will be essential to scale technological

solutions, such as smart food systems, and ensure they are financially sustainable. Entrepreneurs and startups will continue to play a vital role in introducing new technologies and business models that can enhance urban food systems. Future efforts will focus on mobilizing private sector investments alongside public funding to support sustainable food system initiatives, ensuring that solutions are scalable and economically viable.

3. Advancing Technological Innovation

Technological innovation will remain a driving force in the future of CRFS, with new and emerging technologies offering opportunities to further optimize food systems. Future directions will involve integrating advanced data analytics, artificial intelligence (AI), and Internet of Things (IoT) systems into CRFS to enhance decision-making, optimize resource use, and improve supply chain efficiency. Blockchain technology will continue to advance, offering even greater transparency and traceability within food systems, ensuring food safety, and fostering consumer trust. Additionally, vertical farming and other forms of high-tech urban agriculture will become more prevalent, enabling cities to produce food more sustainably and efficiently within urban environments.

4. Enhancing Climate Resilience

As climate change continues to threaten global food security, one of the critical future directions for Cities2030 will be to further enhance the climate resilience of urban food systems. This will involve scaling up climate-smart agriculture practices, such as regenerative farming and agroecology, and promoting the adoption of sustainable water and energy management techniques. Future efforts will also focus on developing climate adaptation strategies for urban food systems, helping cities to mitigate the impacts of extreme weather events and shifting environmental conditions on local food production. Integrating CRFS with urban planning and green infrastructure will ensure that cities can withstand climate disruptions while maintaining reliable food supplies.

5. Deepening Citizen Engagement and Participation

Cities2030 will continue to prioritize citizen engagement as a cornerstone of resilient and inclusive CRFS. Future efforts will focus on deepening citizen participation by expanding educational programs, promoting food literacy, and empowering consumers to make informed, sustainable food choices. Living Labs and participatory governance models will be further developed to provide citizens with platforms to engage directly in food policy development, ensuring that the solutions reflect local needs and values. By promoting a bottom-up approach, Cities2030 will strengthen the role of citizens as active agents in transforming their food systems, creating a culture of shared responsibility and collaboration.

6. Fostering Inclusivity and Social Equity

A key future direction for Cities2030 will be the continued focus on fostering inclusivity and social equity within CRFS. The project will work to ensure that marginalized and vulnerable populations have access to nutritious, affordable food, and that their voices are included in the decision-making process. This will involve creating equitable food policies that address food insecurity, reduce inequalities in food access, and support low-income communities. Special attention will be given to

developing inclusive food systems that promote diversity, protect food heritage, and empower disadvantaged groups to participate in the food economy.

7. Developing Robust Monitoring and Evaluation Frameworks

As the Cities2030 project advances there will be a growing need to develop more robust monitoring and evaluation frameworks to track the long-term impacts of CRFS interventions. These frameworks will help assess the effectiveness of policies and practices in achieving sustainability goals, such as reducing food waste, improving food security, and lowering the environmental footprint of urban food systems. By utilizing data-driven tools and real-time monitoring systems, Cities2030 can provide cities with valuable insights into the performance of their food systems, allowing for continuous improvement and adaptation of strategies.

8. Expanding the Cities2030 CRFS Alliance

The continued growth and expansion of the Cities2030 CRFS Alliance will be crucial to the future success of the project. This alliance, which brings together researchers, policy-makers, civil society leaders, entrepreneurs, and urban residents, will serve as a dynamic platform for collaboration, knowledge sharing, and innovation. In the future, the alliance will seek to engage more cities, regions, and stakeholders across Europe and beyond, creating a global network dedicated to transforming food systems. By expanding the alliance, Cities2030 will strengthen its impact and contribute to a more widespread transition to sustainable, resilient CRFS.

The future of Cities2030 lies in its ability to adapt, innovate, and scale solutions that have already begun to reshape urban food systems. Through collaboration with a diverse range of stakeholders, the project will continue to drive technological innovation, promote social equity, and enhance climate resilience in City Region Food Systems. By prioritizing citizen engagement, fostering public-private partnerships, and expanding its network of partners, Cities2030 is poised to lead the next wave of transformative change in urban food systems, creating sustainable, resilient, and inclusive food ecosystems for future generations.

4.3.4. Summary about Social Impact

Key findings from the social impact analysis include:

- **Community Members and Youngsters Involved**: These metrics saw a sharp increase, especially in 2023 and 2024, highlighting the project's growing engagement with local populations, particularly young people.
- **New Partnerships and External Partner Ideas**: The number of new partnerships grew steadily, with a significant rise in 2024, demonstrating the project's ability to foster collaboration. Ideas from external partners and crowds showed moderate fluctuations, but 2024 saw an overall increase.
- **Coherence with Policies**: The alignment with broader European Union policies, such as the Green Deal, showed steady improvement, emphasizing the project's commitment to policy integration.

- **Learning and Development**: There was a small decline in 2023, but 2024 saw a rebound, reinforcing the project's focus on continuous education and capacity building.

Across 2020-2024, Cities2030 has made a substantial impact through its efforts to engage various stakeholders—communities, experts, and policy-makers. The steady growth in partnerships and expert involvement, along with a focus on social responsibility and inclusivity, has positioned Cities2030 as a leader in driving sustainable urban food systems. The project's alignment with EU policies and its emphasis on innovation further contributed to its long-term success, ensuring that the cities and regions involved are better equipped for future challenges.

6.CONCLUSIONS

The **Cities2030 project** has been a transformative initiative, achieving remarkable outcomes in reshaping food systems across several key areas: social, environmental, technological, and policy. By fostering innovation and collaborative partnerships across cities and regions, it has laid the groundwork for sustainable food systems. Below are the extended conclusions based on the diverse impacts created by the project.

1. Social and Community Impact

The Cities2030 project created a profound **social impact**, centered on engaging communities, fostering inclusivity, and addressing food-related inequalities:

Community Engagement: Through the establishment of 296 new partnerships and the engagement of over 11,700 community members, the project successfully created awareness and spurred active participation in sustainable food systems. This engagement not only raised awareness but also fostered collaboration between different sectors—government, private sector, civil society, and the general public.

Youth Engagement: A key achievement was the successful connection between young people and the food system transformation efforts. The project offered numerous educational activities, workshops, and living labs where children and teenagers could learn about food sustainability, nutrition, and healthy diets. The cultural and educational programs, including intergenerational cooking projects, empowered young generations to lead the charge toward food system resilience in the future.

Reducing Food Inequality: The project also addressed social equity by targeting food security for vulnerable populations. Through various social and food assistance programs, a significant number of citizens gained access to more affordable and nutritious food options. These initiatives were critical in urban areas where food deserts and poverty exacerbated food insecurity. By empowering local communities with the knowledge and infrastructure to produce and consume locally-sourced, sustainable food, the project made considerable advances in addressing food poverty.

2. Environmental and Sustainability Impact

Cities2030 made considerable strides forward in integrating **sustainability** into food systems and **mitigating environmental impact**:

Circular Food Systems: One of the core objectives of the project was to transition food systems toward circular models. With the involvement of 1,356 stakeholders in circular food activities, the project laid the foundation for sustainable practices. This involved food waste reduction initiatives, composting programs, and encouraging the use of alternative water sources and renewable energy in food production.

Food Waste Reduction: Through public awareness campaigns, food waste dialogues, and the promotion of composting at household and institutional levels, the project significantly impacted the way citizens perceive and manage food waste. The introduction of community-based food assets, such as mobile grocery stores and neighbourhood-level food distribution hubs, also contributed to reducing food waste and redistributing surplus food.

Climate Action: Cities2030 also tackled climate change by promoting environmentally-friendly food production practices. Urban agriculture initiatives encouraged sustainable urban planning, integrating green spaces for food production, which improved the overall ecological health of urban areas while reducing carbon footprints related to food transportation.

Sustainable Diets: The project promoted the adoption of sustainable diets by emphasizing plant-based foods and locally sourced products. By engaging schools, workplaces, and public spaces in discussions about sustainable diets and healthy eating habits, the project contributed to reshaping food consumption patterns across regions.

3. Technological Advancements and Innovation

Technology played a crucial role in achieving Cities2030's objectives by driving **innovations** in food system management and logistics:

Creation of New Technologies: The project generated 29 new technological innovations while improving 29 existing systems. These innovations included blockchain technology for enhancing food traceability, IoT devices for monitoring urban agriculture, and digital tools to manage food supply chains more efficiently. Blockchain technology, in particular, provided transparency and accountability in food production, processing, and distribution, fostering trust between producers and consumers.

Data-Driven Food Systems: One of the hallmarks of the project was its use of data to inform policy decisions. Cities2030 developed systems to collect and analyze data related to urban food systems, enabling local governments to make informed decisions. This included monitoring food waste levels, tracking food consumption patterns, and assessing the impact of local agricultural initiatives on food security and economic performance.

Digital Platforms: Cities2030 also developed digital platforms that connected food producers with consumers in urban settings. These platforms streamlined local food supply chains, facilitating the direct sale of agricultural products from farmers to residents while reducing intermediaries. These platforms supported food producers by providing logistical support, marketing tools, and opportunities for capacity building.

4. Cultural and Value Impact

The **cultural and value impact** created by Cities2030 was reflected in its deep connection to local traditions, cultural heritage, and community-based food practices:

Promoting Local Food Culture: The project facilitated numerous cultural events that showcased the importance of local and traditional food practices. Events such as the **Haarlem Food Festival**, **Gastro Days**, and **intergenerational cooking sessions** brought local communities together and raised awareness about the value of locally-produced, culturally-appropriate foods. These events not only celebrated food but also highlighted the environmental, economic, and health benefits of supporting local food systems.

Changing Perceptions and Mental Models: One of the most significant cultural impacts of Cities2030 was the change in how food was perceived by urban populations. The project shifted mental models from viewing food purely as a commodity to understanding food as a cultural asset intertwined with environmental sustainability and community well-being. Through educational workshops and food systems dialogues, participants were encouraged

to view food production, consumption, and waste management through a lens of cultural preservation and environmental responsibility.

Educational Initiatives: The project extended its cultural reach through schools, universities, and community programs, fostering a deeper understanding of food's role in culture, tradition, and sustainability. In cities such as Bruges and Velika Gorica, children and teenagers were introduced to food culture through hands-on activities and discussions, helping to shape future generations' views on sustainable consumption and local food production.

5. Policy and Governance Impact

Cities2030 had a **tangible impact on food policy and governance**, working closely with local governments and policy-makers:

Policy Formation and Food Strategies: Through 40 public policy documents and over 500 actions promoting EU-wide policies like **FOOD2030** and the **UN's New Urban Agenda**, Cities2030 provided substantial input into the formation of local and regional food policies. This included the creation of municipal food strategies that emphasized sustainable food procurement, local food systems, and the importance of short food supply chains.

Multi-Stakeholder Platforms: The project demonstrated the importance of multi-stakeholder collaboration in food system governance. By establishing food councils, partnerships, and coalitions, Cities2030 ensured that policy-makers, businesses, and communities had a platform to discuss, co-create, and implement food system policies that were both inclusive and effective.

Influence on Public Procurement: Cities2030 introduced innovations in public procurement, particularly focusing on school feeding programs that integrated more sustainable and local food products. This not only provided children with healthier food options, but also supported local farmers by creating a reliable market for their products.

Cross-Border Cooperation: The project's impact extended beyond individual cities to regional and cross-border collaborations. Partnerships between cities and regions facilitated the sharing of best practices, policies, and innovations, strengthening the overall food system resilience across Europe.

6. Resilience and Future Scalability

Building Resilient Food Systems: One of the most significant contributions of Cities2030 was its focus on **resilience**—building food systems that are adaptable, sustainable, and capable of withstanding future challenges, such as climate change and global supply chain disruptions. The project's emphasis on **short food supply chains**, **urban agriculture**, and **community-based food assets** has laid the groundwork for cities to be more self-reliant in food production and distribution.

Scalability of Solutions: The flexible and adaptive frameworks developed during the project are highly scalable and can be replicated in other cities and regions. The integration of innovative technologies, the participatory governance models, and the focus on sustainability provide a blueprint for other cities looking to reform their food systems. Further research is needed to examine how these solutions can be adapted and expanded on a global scale.

The **Cities2030 project** has made significant advances in reshaping the way urban food systems are perceived, governed, and managed. Its **holistic approach**—combining social innovation, technological advancement, environmental sustainability, cultural preservation, and policy reform—has had a profound impact on the resilience and sustainability of city-region food systems. The success of Cities2030 demonstrates that through collaboration, innovation, and inclusive governance, cities can lead the way toward a more equitable, sustainable, and resilient food future.

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