

Article

Toward a New Agro-Urban Paradigm: Networked Systems for Sustainable Futures

Giorgia Tucci 

Department of Architecture and Design, University of Genoa, 16126 Genova, Italy; giorgia.tucci@unige.it

Abstract

Over the past fifty years, urban and rural spaces have been reshaped by global sustainability policies, digital innovation, and emerging socio-ecological needs. This article investigates the convergence of agro-urban planning strategies, Smart City infrastructures, and adaptive governance models, proposing an integrated agro-urban paradigm for sustainable territorial transformation. Drawing on a literature review and comparative analysis of international case studies—including Toronto, Milan, and Woven City—the research develops a triadic interpretative framework based on worldview, program, and faith. The study identifies AgroCities as systems centered on food sovereignty and ecological resilience, Smart Cities as efficiency-driven digital ecosystems, and Adaptive Cities as flexible, human-centered responses to complexity. Findings suggest that integrating food systems, technological innovation, and participatory governance enhances urban resilience and sustainability across scales. The article concludes by advocating for multi-scalar planning tools, cross-sectoral policies, and civic engagement to support the transition toward inclusive and regenerative cities. This framework offers a theoretical and operational contribution to reimagining urban planning in line with the principles of Smart Land and adaptive urbanism.

Keywords: AgroCities; Smart Land; urban transformation; digital innovation; Adaptive Cities; policy integration

1. Introduction

In recent decades, urban and rural spaces have undergone radical transformations influenced by global sustainability agendas, technological innovation, and changing societal needs. This article addresses these shifts by investigating the emergence of three interconnected paradigms—AgroCities, Smart Cities, and Adaptive Cities—that reflect different models of urban transformation.

The main objectives of this study are to: (1) define a comparative analytical framework to interpret the evolution of these paradigms; (2) assess their capacity to address contemporary urban challenges; and (3) propose policy and research directions that integrate food systems, digital technologies, and resilience.

Methodologically, the article employs a theoretical and comparative approach, structured as a critical literature review enriched with selected international case studies, including Toronto's Food Strategy, the Milan Urban Food Policy Pact, and the Woven City project in Japan.

The framework is grounded in a triadic understanding of revolutionary and social movements, as discussed in the literature on political sociology and urban transformation [1,2]. This approach identifies three interrelated dimensions—worldview, program,



Academic Editor: Jianming Cai

Received: 16 December 2024

Revised: 11 March 2026

Accepted: 17 March 2026

Published: 2 July 2026

Copyright: © 2026 by the author.

Licensee MDPI, Basel, Switzerland.

This article is an open access article distributed under the terms and conditions of the [Creative Commons Attribution \(CC BY\)](https://creativecommons.org/licenses/by/4.0/) license.

and faith—which collectively capture the ideological, strategic, and motivational foundations of each urban paradigm [3]. These dimensions are used to categorize the core principles and guiding visions underlying urban transformations, as illustrated in the following table (see Table 1).

Table 1. Summary of the reference framework based on Donald Fleming’s triadic model of revolution. It is divided into three dimensions: the worldview, program and faith of the three urban paradigms discussed in the text, as well as the related scientific literature cited in the reference article.

Paradigm	Worldview	Program	Faith	References
AgroCity	Food sovereignty, ecological equity	Urban food strategies, community gardening	Local self-reliance and agro-urban resilience	[4–10]
Smart City	Efficiency, digitalization	ICT integration in services and governance	Technological innovation for competitiveness	[11–18]
Adaptive City	Resilience, circularity	Co-designed services, AI, prototyping	Human-centered and responsive urbanism	[19–27]

2. Global Policies and the Ecosystemic Shift: 1970–Present

‘Any revolution that can be called such has three main components: a specific attitude toward the world, a program to transform it in an essential way, and an unshakable faith that this program can be realized: a worldview, a program, and a faith’ said Donald Fleming [3].

In the city of the new millennium, the worldview has been the new widespread awareness and sensitivity (the global challenge) to pursue a more sustainable future, the agenda has been the set of internationally promoted policies, guidelines, and actions, and the faith is the common purpose that has united the different countries in their intent to contribute concretely to change.

However, to best understand the dynamics that led to this turning point in the overall perception and development of urban and nonurban space, we need to take a step back and retrace the major events that have conditioned the history of cities.

This is right in 1970s, when the consequences of the post-World War II world ‘economic boom’ such as: the development of heavy industry (mechanical, chemical and energy), the dizzying expansion of international trade and exports, the work of post-war reconstruction, the competitiveness of markets and productive sectors, intense migration flows, population growth, processes of dense urbanization (urban and infrastructural), the increase in mass consumer goods (from means of transport to household appliances), advances in technological innovations, etc., led to drastic political, economic, social and especially environmental changes.

The irreparable damage caused to the environment by the intensive and indiscriminate land development of the previous decades became, in fact, evident, and for the first time, the ‘environmental issue’ became a topic to be discussed at international diplomatic tables, alongside debates on war and peace.

Significant in parallel is the birth of the first environmental associations such as World Wild Fund (1961), Friends of the Earth (1969) and Greenpeace (1971).

More specifically, the issue was addressed centrally in 1972, in Stockholm, with the United Nations Conference on the Human Environment, where 113 nations examined the relationship between the economy and the environment and reasoned about the need to preserve natural resources [28].

Since then, the environmental issue remained a central theme in the global debate, which saw as milestones: (1) the drafting of the World Charter for Nature [29], which

affirmed respect for nature as a fundamental principle of environmental protection and contained a progressive vision of the strategies and policies needed to achieve environmental well-being; (2) the publication of the Brundtland Report, *Our Common Future* [30], which defined the meaning of the term ‘sustainable development,’ understood as development that can secure the needs of present generations without compromising the ability of future generations to meet their own needs; (3) the Earth Summit, the United Nations Conference on Environment and Development, UNCED, in Rio de Janeiro (1992) which definitively sanctioned the world community’s acknowledgement of the need to activate comprehensive global action on behalf of the environment, approving the Declaration on Environment and Development [31] and Agenda 21 [32]; (4) the signing of the Kyoto Protocol (1997) [33] at the Conference of the Parties COP3 on climate change; (5) the presentation of the Millennium Declaration and Millennium Development [34], which is a set of ambitious anti-poverty goals to be achieved by 2015; (6) the endorsement of the 2030 Agenda [35] with its 17 Sustainable Development Goals promoted by the UN General Assembly, United Nations Sustainable Development Summit, on 25 September 2015; and (7) the signing of the Paris Climate Agreement [36] on 12 December 2015, ratified by 196 signatories including the European Union at the UN Climate Change Conference COP21.

The approval of the 2030 Agenda undoubtedly represented the turning point in the perception of the human–nature relationship, consumption–sustainability, human well-being–ecosystem health, and economic development–environmental impact.

Since its ratification, in fact, all UN member states (193) worldwide have committed to declining actions and strategies in their policy to address a wide range of economic and social development issues, which include poverty, hunger the right to health and education, access to water and energy, jobs, inclusive and sustainable economic growth, climate change and environmental protection, urbanization, production and consumption patterns, social and gender equality, and justice and peace.

Although no other multilateral agreements were hoped for at the international level, 2022 marked another historic resolution. Indeed, the United Nations Environment Assembly UNEA meeting in Nairobi resolved to end the pollution caused by the entire life cycle of plastic, from material to waste at sea, and to draft a legally binding agreement by 2024 [37].

The combination of these policies and actions has drastically influenced the evolution of the natural landscape and the city, shaping the contemporary scenario.

Over the past 50 years, the anthropized territory has, therefore, undergone a profound transformation process in order to align itself with global policies on the one hand and, on the other, to respond to the needs and requirements of contemporary society, first and foremost the primary need for food.

3. Toward AgroCities: A New Horizon After the Green Revolution

Historically, the places of greatest food production have always been considered to be agricultural suburban areas, the countryside at or near the edge of cities, where ample natural space and favorable soil conditions facilitated extensive agricultural practices (Figure 1).

With the advent of the industrial revolution, large numbers of families began to migrate from the countryside to the cities in search of work, abandoning the agricultural tradition [38]. In the postwar period, during the 1950s and 1960s, the need to rebuild a shattered Europe led to the occupation of rural spaces to expand rapidly expanding cities, and this process of urbanization has continued to the present day, causing a strong impact on the land.

The steady demographic rise that began with the Industrial Revolution (a period when the first billion people were reached), the realization of ‘hunger’ as a social issue and primary need, coupled with the need to significantly increase agricultural production, gave

rise to a period from the 1940s until the 1970s identified as the Third Agricultural Revolution or Green Revolution. The year 1943 is referred to as the official beginning of the Green Revolution, the year in which, thanks to funding from the Rockefeller Foundation, a U.S. philanthropic organization, the collaboration of the Ford Foundation, and the support of the U.S. and Mexican governments under President Avila Camacho, the Mexican Agricultural Program (MAP) was launched. In those years Mexico was experiencing a deep food crisis and a difficult internal situation, in which peasant class unrest threatened to open the door to socialist ideology. MAP's goal was to solve these internal problems through a project to increase agricultural production of wheat and corn.

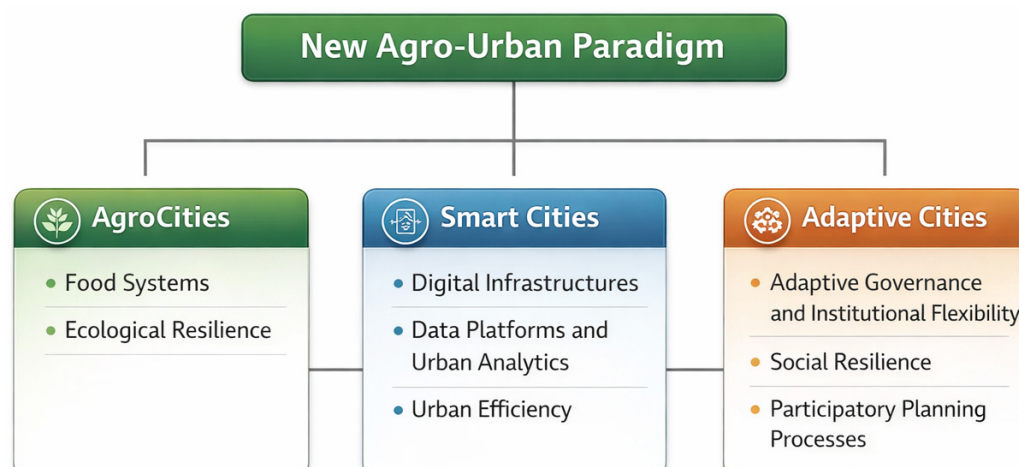


Figure 1. Conceptual framework of the New Agro-Urban Paradigm, integrating AgroCities, Smart Cities, and Adaptive Cities as complementary dimensions of sustainable territorial development.

The father of this revolution was Norman Borlaug, an American geneticist who advanced an innovative approach to agricultural production issues through development and research into production methodologies, agricultural technologies and food genetics [39–41]. New varieties that did not exist in nature were created by Borlaug through crosses to meet the required needs. As a result, Mexico achieved self-sufficiency in wheat production in 1956. This new system was such a success that other developing countries wanted to replicate it. Borlaug was recognized for this achievement as the ‘father of the Green Revolution’ and in 1970 he was awarded the Nobel Peace Prize.

Although the Green Revolution has achieved significant quantitative success, it has not always been so from a qualitative (low-quality grain varieties and nutritional depletion) and environmental (loss of biodiversity, pollution degradation, dependence on fossil fuels) perspective [42–44].

At the end of this period, the new ecological sensibility that emerged since the 1970s led to questions about the criticalities of the Green Revolution and to investigations of alternative strategies and systems, giving rise to the first community farming movements within urban contexts as a form of self-determination, self-management and independence from the market. Widespread as early as the World Wars as an alternative form of local subsistence, Urban and Peri-Urban Agriculture (UPA) refers to all agricultural activities occurring within the urban fabric and in peri-urban areas aimed at agribusiness cultivation. By the Industrial Revolution, the first concepts of garden cities and urban gardens emerged [45,46], precursors to modern UPA, and during World War I urban gardens were called in many ways according to the various regions Victory, Liberty, War Gardens [47] (see Figure 2).



Figure 2. Intensive agriculture: aerial view of the agricultural landscape of Albenga, Liguria, Italy, courtesy of Ph. Luciano Rosso, Albenga.

During World War II, about 40 percent of fresh food was grown in urban gardens in the United States with over 20 million gardens nationwide [48]. Despite its wide dissemination, it was not until the 1970s that true organized practices of urban agriculture were established, which represented the beginning of a radical change in the way of experiencing and perceiving urban and peri-urban greenery, later materialized with the definition of the Brundtland Report [30] into a central tool for sustainable urban development.

Since then, advances in knowledge and technological developments have made it possible to practice this type of activity in all urban settings, adapting it to specific needs, and enriching urban agriculture with a wide range of functions complementary to food production [49], such as: the creation of new recreational activities (recreational and agri-tourism farms), the provision of educational (educational farms), social (social farms) and health services (therapeutic farms), the mitigation of environmental measures (organic-organic practices), the planning of urban green areas, implementation of direct and accessible marketing activities ('pick-your-own' approach), contribution to procurement and self-production, implementation of new technologies and advanced production methods (experimental farms), and improvement of urban quality of life (see Table 2).

These new scenarios, in which multifunctional forms of urban agriculture diversified in strategies and activities attempt to meet the needs of cities, are taking a central role in the planning and development of urban space. Concerns about food quality, sustainability, health, food miles and ecological impact have all been factors behind the development of the burgeoning urban community gardens movement, encouraging a new generation of young citizens to participate in collective cultivation and food production.

Evidence of this is the numbers showing the widespread occurrence of all those phenomena that emerged around the 1970s—the 'food movements' (FMs)—and consolidated as one of the main actors of the contemporary food revolution, which has made urban agriculture the main instrument of action. In the United States, there were 1755 FMs in

1994, which have increased fivefold within two decades (8144 in 2013) [50,51] and are now spread all over the world, with some of the largest being found in Japan and Australia.

Table 2. Overview of the socio-cultural, health, environmental, economic, and agro-productive benefits of multifunctional urban agriculture, with relevant case studies.

Benefits		Case Studies
Socio-cultural benefits	Redeveloping blighted neighborhoods improves social cohesion, inclusion, cooperation, and the participation of diverse stakeholders.	Shettleston Community Farming Project is located in Glasgow (Scotland); Red de Huertos Urbanos de Madrid (Rehdmad) is a network of 75 urban community gardens located in Madrid; The city of Bamberg is located in northern Bavaria (Germany).
Health benefits	Improving physical and mental health through landscaping, reducing the human toxicity of agricultural products and inputs, improving quality of life, encouraging healthier eating behavior, and strengthening social ties.	Ninewells Community Garden, located in the grounds of Ninewells Hospital, in the city of Dundee (Scotland), aims to encourage physical and healthy activities through therapeutic and rehabilitative gardening; Orchard Project is a U.K. national charity involving more than 540 orchards in England, Scotland, and Wales; Agricoopetto is a cooperative, organic, and social farm started in 2010 in the peri-urban area of Turin (Italy).
Environmental benefits	Improving and expanding urban green spaces and green infrastructure, enhancing sustainable water management (rainwater retention and erosion control), mitigating the urban heat island effect, contributing to carbon sequestration and reducing air pollution, conserving biodiversity, supporting pollination, and regenerating brownfield and contaminated sites.	Park Belvedere is located in Cologne, Germany, as part of its green infrastructure system and green space network; Orti Generali is a community garden in southern Turin, Italy; Nabofarm is an urban farm located in Copenhagen, Denmark.
Economic benefits	Improving local economies and reducing economic losses by creating new business models, implementing agricultural diversification, creating new jobs, reducing public space management costs, developing alternative markets, and innovating marketing-consumer relations.	Onze, in the peri-urban area of the city of Almere (the Netherlands), is a commercial vegetable garden run by a farming family that rents 450 plots (of about 40 m ² each) for fruit and vegetable production; Parc des Lilas, a vast area of about 97 hectares containing orchards, cereal crops, gardens, meadows, and pasture areas, in Vitry-sur-Seine, Île-de-France (France); Blizkata Ferme, a local farm in the peri-urban area of Sofia (Bulgaria), produces varieties of vegetables and sells them through direct sales systems, such as the ‘box scheme’.
Agro-productive benefits	Improving cities’ food self-sufficiency and self-supply, reducing supply chains, promoting alternative distribution channels and networks, strengthening food security, expanding supply, and developing food diversity.	Oosterwold is a new peri-urban area located in the city of Almere (Netherlands) that aims to supply 10 percent of the region’s food production; MicroFlavours is an innovative Urban farm in Brussels (Belgium) specializing in the production of microgreens; DAM Consortium involves 30 farms located in the peri-urban areas of Milan (Italy), within the boundaries of the Parco Agricolo Sud di Milano (PASM) and in close connection with several urban parks.

Alongside the food movements, alternative organizations such as ‘alternative food movements’ (Alternative Food Movements AFMs), Alternative Food Networks (AFNs), Solidarity Purchasing Groups (GASs), farmers’ markets, direct sales, inner-city mar-

kets, Community Supported Agriculture (CSA), etc., have spread rapidly over the past 30–40 years [52].

These are just some of the networks and practices that stand in open rupture with the dynamics and methodologies of large-scale retailing (GDO), proposing new values related to food production and consumption (see Figure 3).



Figure 3. Self-sufficient food campaigns since WWII up today have focused on community-based UA practices. Collage by G. Tucci (2019).

The big change from this type of point and sectoral approach is the promotion by cities of true integrated food strategies (Urban Food Strategies, UFS), multi-sectoral, characterized by a holistic approach to food chains and systems, and the multidimensionality of food [4]. The debate identifies some pioneering realities, such as large North American urban areas, Toronto among them [5,53]. Later, the phenomenon spread to London and small and medium-sized cities in the United Kingdom (which formed a network of Sustainable Food Cities, now called Sustainable Food Places) and Northern Europe.

More recently, Southern European countries such as Greece, Spain, and Italy have also begun to implement participatory food policy processes [4].

Milan is the first Italian city to have approved an urban food policy (Milan Urban Food Policy Pact MUFPP), as well as Pisa, which launched a Food Plan for the region of Tuscany, which signed a Plan for Urban Food Policies in 2018, but Rome and the metropolitan city of Turin have also started a project in a logic of a multi-scalar approach—Rome’s Food Council and Metropolitan Turin’s Food Atlas with the aim of building a supporting tool for future policies in the area.

The two main denominators of these urban food strategies are certainly the systemic approach to the issue of food, resulting in policies aimed at integrating and connecting actors, resources and tools, and the inclusion of civil society within the processes.

These new Food Cities or Agro-Cities have again placed the food issue and the importance of collaboration on multiple levels at the center of the debate: from political-territorial governance to public awareness, from a diversified food economy to a sustainable production system (see Figure 4).



Figure 4. Shettleston community garden, 2009 [54].

4. From Digital Innovation to Smart Cities: Bridging Technology and Urban Living

In parallel, technological evolution, has allowed for further advances in research and development (R&D, Research & Technological Development) processes in this area over the past decade, opening the door to smart management and processing (smart agriculture, smart farming, Agriculture 4.0), circular approaches (cradle to cradle, Km0 circuits) and new innovative production systems (hydroponics, aquaponics, aeroponics, vertical farming, etc.) (Figure 5).

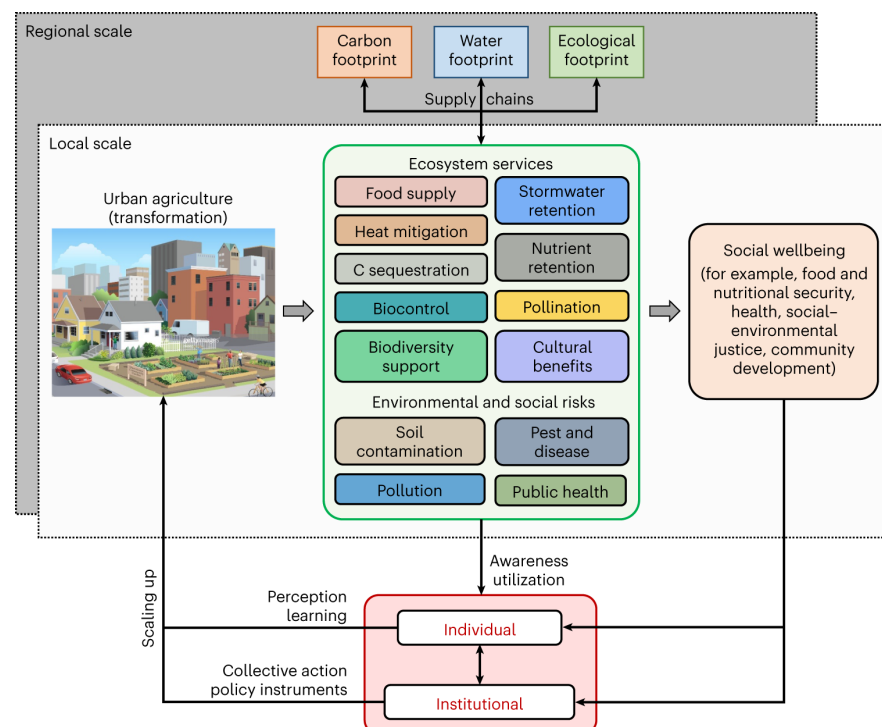


Figure 5. Conceptual representation of the multifunctional forms of urban agriculture and their integration within urban food strategies, highlighting links to sustainability, public health, short supply chains, and civic participation [55].

Evidence of this can be seen in the numbers embracing this growing sector: in 2019 Canada invested \$50.3 million to support digital agriculture in the Canadian Agricultural Strategic Priorities Program CASPP plans, in Italy in 2021 the market for Agriculture 4.0 grew by 23% compared to the previous year (Elaboration TIM Study Center on data from Polimi Smart Agrifood Observatory) thanks to the use of IoT (Internet of Things) solutions (The Internet of Things (an acronym for IoT) was first talked about in 1982 when researchers at Carnegie Mellon University applied sensors and a network connection to an Athenaeum soda machine to test its operation. A decade later, since about 1999, the term IoT became part of mainstream terminology. Textually translated to Internet of Things, but perhaps it would be more correct to call it the Internet of Things) applied to agriculture (data sensing sensors, farmbots, drones, digital and automated monitoring systems, connected and self-driving vehicles and equipment, management software, etc.), and Australia and New Zealand increased the value of their agricultural production relatively by 25% and 21%, between 2015 and 2018 [56].

The figure shows three remote sensing layers applied to agro-urban areas: (1) vegetation density (NDVI), which is used as an indicator of vegetation cover and health; (2) estimated water deficit, which is used to identify crop stress and irrigation vulnerabilities; and (3) crop stress signals, which are used to define priority areas for technological interventions. Integrating these layers with IoT data (ground sensors) and GPS locations for sampling campaigns enables the following: (a) real-time monitoring of productivity and environmental conditions, (b) optimization of the allocation of water and other resources, and (c) the development of data-driven urban services (e.g., early warning of drought events and integration with urban food distribution networks). In summary, Figure 5 illustrates the transition from pure remote observation to operational services that link digital innovation to urban quality of life.

The agro-technological revolution has made it possible to make production processes more efficient and streamlined, optimizing tools and limiting resource consumption; however, this new approach is not limited to production alone, but extends to an awareness and willingness to harness innovation in an increasingly ecological direction: from production to processing to distribution to consumption, the industry and research approach looks to progress through increasingly circular and sustainable agrifood systems. The Smart AgriFood Observatory has, in fact, found continued growth of innovative start-ups in the digitization of the international agri-food sector, i.e., 1200 entities registered in 2022 (+449 compared to 2021), with the amount of funding received by them, amounting to \$16.9 billion (1.7 more than in 2021), with more than half of the agri-food start-ups analyzed located between North America and Europe.

Dynamic processes in which food is configured not only as a food raw material, but as a hyper-material capable of generating new resources, thanks to the technological-creative capacities of fab-labs, start-ups, creative hubs, and green-sensitive industries, which are engaging in recovering, rethinking, transforming and reusing agro-food waste and by-products [54,57,58].

Here, then, this agro-urban functional evolution rethinks the 'rurality-urbanity' relationship enriched with new connotations such as innovation, technology, creativity, sustainability, awareness, which become part of a new operational and multi-scalar landscape [6,7].

This intense technological revolution or digital transformation, so-called, has, therefore, not only affected the production sector, but has involved all aspects of the urban-rural ecosystem, both material and immaterial (society, economy, environment, culture, space, infrastructure, services. . .) favoring more interconnected and responsive processes.

Although it is a recurring theme in the current technology landscape, digital transformation is a topic that has been talked about for more than two decades.

Identified as a set of predominantly technological, cultural, organizational, social, creative, and managerial changes associated with the applications of digital technology in all aspects of human society, digital transformation has made it possible to deliver services, goods, bring experiences to life, find, process, and make accessible large amounts of content regardless of the actual availability of resources (human, material, intellectual, and economic, etc.), creating new connections between people, places, and things.

When companies realized that they could take advantage of digitized data, they began to develop appropriate processes.

Since then, the speed of technological development has accelerated exponentially and the use of technological devices has become part of everyday life, making the need for industry and the market to adapt and remain competitive even more pressing.

According to the Digital 2020 report by wearesocial.com together with Hootsuite, half of the world's population (3.8 billion) regularly use social media, and 4.54 billion people are constantly connected to the Internet. Regarding new technologies, there is a growth of as much as 5 percent over last year in the use of voice assistants from mobile or dedicated devices (from 30 percent to 35 percent). Instead, one in 12 Italians owns smart home devices, while the use of wearables, such as smartwatches or other devices for tracking physical activity or health, triples (from 5 percent to 15 percent).

It is certainly not news that the use of smartphones has reached (almost) saturation levels: we find confirmation of this in the figure regarding 98% of social users connecting from mobile devices.

Considering, the type of today's digital consumer, always on the move, connected and up-to-date, actively seeking information of all kinds and wanting to find answers to their needs easily and quickly, companies have had to update and redefine their strategies to keep up with a new and more complex customer journey, and not be cut off from a perpetually evolving marketplace facing Industry 4.0.

Similarly, cities have had to 'digitize' themselves to adapt to the needs of modern society.

Parallel to the AgroCities and digital transformation phenomenon, in fact, since the 1990s, the concept of Smart City has become widespread, understood as 'an innovative city that uses information and communication technologies (ICT) and other means to improve the quality of life, efficiency of urban operations and services, and competitiveness, ensuring the satisfaction of the needs of present and future generations, while respecting economic, social and environmental aspects' [59].

Understood in principle as the irruption of digital devices into urban governance [60,61] or as the digitization of data [62], there has been the industrial proposition that has most capitalized on the urbanization of the digital revolution, both in terms of infrastructure, information systems, services, planning regimes, and governance modes [11,63] through the application of digital and automation technologies.

According to the European Union, the Smart City is based on six key aspects: (1) Smart People, participatory and inclusive society, participatory politics, and bottom-up decision-making approach; (2) Smart Governance, centrality to human capital, environmental resources, relationships, and community assets; (3) Smart Economy, economy aimed at increasing productivity and employment within the city through technological innovation, collaboration, and research; (4) Smart Living, technologies that can improve the level of comfort and well-being for citizens with regard to health, education, safety, culture, etc. (5) Smart Mobility, new efficient, low environmental impact and energy-saving smart mobility solutions (e-mobility, sharing mobility, mobility management); (6) Smart Environment, sustainable development and energy efficiency (smart grid, smart metering, green and smart building).

The goal behind the Smart City is to create a single core infrastructure and service delivery platform that can process information transmitted by digital devices to deliver value-added services for citizens, helping to improve their quality of life [12].

But is this really the direction in which contemporary cities are being configured?

In the wake of Graham's approach at the turn of the 2000s regarding what he considered a 'pre-Smart City' moment [64], there has been a focus in recent years on the prospects for what might be called a 'post-Smart City' era.

At the Innovation Summit World Tour 2020, Jean-Pascal Tricoire, President and CEO of Schneider Electric said 'As we try to adapt to a new normal and learn to live differently, we have witnessed the acceleration of digitization. A trend that has made possible the remote management of activities and their continuous operation.' At this event, Schneider Electric is devoting special attention to exploring the role that electrification, digitization and industrial automation can play in the energy transition (Innovation Summit World Tour 2020).

A key issue that is missing from the definition of a Smart City is then raised, namely that of speed: the speed with which changes and events occur that affect the urban fabric and cities, as well as the speed with which Smart Cities are able to respond to new needs and digital evolution.

Tricoire again said, 'Beyond Smart Cities, we need resilient cities that respond to the needs of citizens and the environment in unpredictable evolutionary contexts'.

Connect, predict, and prevent.

Everything that is connected can be monitored, making the whole system more resilient; predicting means not being caught unprepared by events; and finally, preventing imposes useful choices so that at least some of the unforeseen is avoidable.' A Smart City is also a resilient city because it does not just adapt to climate change and global warming, but changes itself by providing new social, environmental and economic solutions to adapt to change.

Tricoire then expresses his views regarding Smart Cities by focusing on the need to consider the city's speed of response to issues, such as the response to damage caused in urban centers by exceptional weather events such as floods, storms, landslides and earthquakes, or recently how the city has changed and evolved to respond to the pandemic. The Smart City must therefore lean toward an adaptive capacity, able to read an event, react and adapt.

This means that beyond Smart Cities, it is about generating Adaptive Cities, or resilient and flexible cities focused on local problems and resources. With a human-centered orientation, services are built to solve identified problems based on local resilience and self-sufficiency [19].

The city has been transformed into a dynamic entity capable of adapting to the particular needs of each citizen, and technology has become a tool for tailoring services, increasing user involvement and awareness.

So, how to look beyond the Smart City to transform it into an Adaptive City?

5. From Smart Cities to Sustainable Futures: Reimagining Urbanism

Cities are the point from which to start with 'humanist' innovation, which rethinks the interactions between people to increase the quality of life, but also to create the conditions for releasing energy and potential for development, according to resilient and sustainable models. Technology in this plays an important but not central role [20].

To transform a city into an Adaptive City, it is first necessary to intervene with the redevelopment of critical areas, which already have significant problems and are regularly exposed to adverse phenomena. Then, partly through the experience of Smart Cities,

applications are launched that can monitor events and respond accordingly, thanks to sensor technology and which allow for constant monitoring of urban centers and potentially critical environmental (and other) phenomena.

Artificial Intelligence completes the picture of an entirely new Adaptive City, capable of autonomously reading, analyzing, and understanding changes and providing the correct response (self-learning). In practical terms, this approach can be applied, for example, to traffic and mobility management of people and goods, or to infrastructure, communication systems, and emergency management.

Therefore, it becomes necessary to move beyond the smart approach, which starts from the infrastructure layer, moves to the data layer and finally to the service layer.

The focus of an Adaptive City is to reverse the order of the addends, starting with the services layer, which are designed and implemented according to human-centered design and innovation management approaches (see Figure 6).

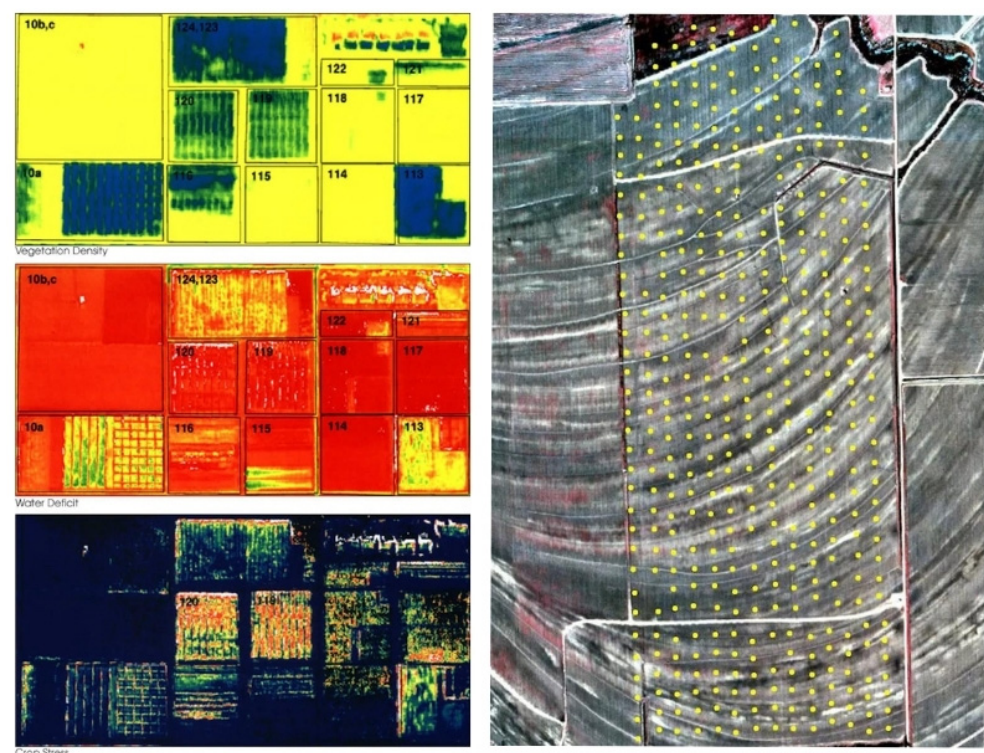


Figure 6. Examples of remote sensing in agriculture, top to bottom: vegetation density, water deficit and crop stress. Susan Moran, Landsat 7 Science Team and USDA Agricultural Research Service, NASA Earth Observatory 2001. Right: Predefined field locations on remote sensing imagery that can be located in the field using GPS for sampling, CC BY-NC-ND.

These strategies, which are already widely used in the world of technological start-ups, allow solutions to be developed on the basis of a context-specific analysis that is useful for identifying the problems and resources present in the area at the infrastructural, economic, sociological, cultural and technological levels [65].

In addition, innovation management approaches introduce a prototypical and iterative logic in the implementation of new urban services, according to a principle of continuous improvement based on user feedback, but also efficient allocation of resources as they are invested in adjustments and improvements that are tested and validated.

This vision of cities aims to improve the quality of life for citizens, but also to build urban experience systems that are not dropped from above, but co-designed with users and, increasing the sense of participation and belonging, realizing visions of cities that truly adhere to the characteristics and desires of citizens.

Digital innovation represents, therefore, a building block in the transition process to an Adaptive City, the engine for a new development paradigm aimed at converging scientific and technological services in the areas of energy innovation and environmental sustainability, as well as a new evolutionary mechanism based on experimentation in design processes [21].

In this sense, in the global scenario there are many post-Smart City prototypes looking at the ‘city of the future’ in which all ecosystems are connected and human-centered and the city is configured as a living laboratory in continuous evolution. This is the case, for example, with LAND’s research on adaptive design applied to the urban landscape, which aims to ‘reconnect people with nature’ by declining the regenerative urban development strategy, considering streets as a shared ecosystem.

The goal is to transform the streetscape into a shared ecosystem that works with nature to provide environmental, social, and economic benefits to people. In this vision, the digital landscape unfolds its full potential by informing and guiding city users in their daily life decisions and increasing environmental awareness. Data-driven design measures sustainability performance and provides biodiversity monitoring in both planning and management. Thus, nature-based solutions become an effective ally in adapting to climate change and coping with economic crisis and socio-cultural change.

BIG studio, in collaboration with Toyota, is also completing the realization of a sustainable and autonomous proto city, the Woven City, in the city of Susono in Japan, at the base of Mount Fuji, founded on the slogan ‘For the benefit of others’.

All the way to actual ‘Cities of the Future’ forecasts in which the SOM study—Skidmore, Owings & Merrill—addresses urbanization in the year 2050, promoting a project designed around several key principles, including conservation of ecological resources, dense settlement patterns, livability and social equity (see Figure 7).

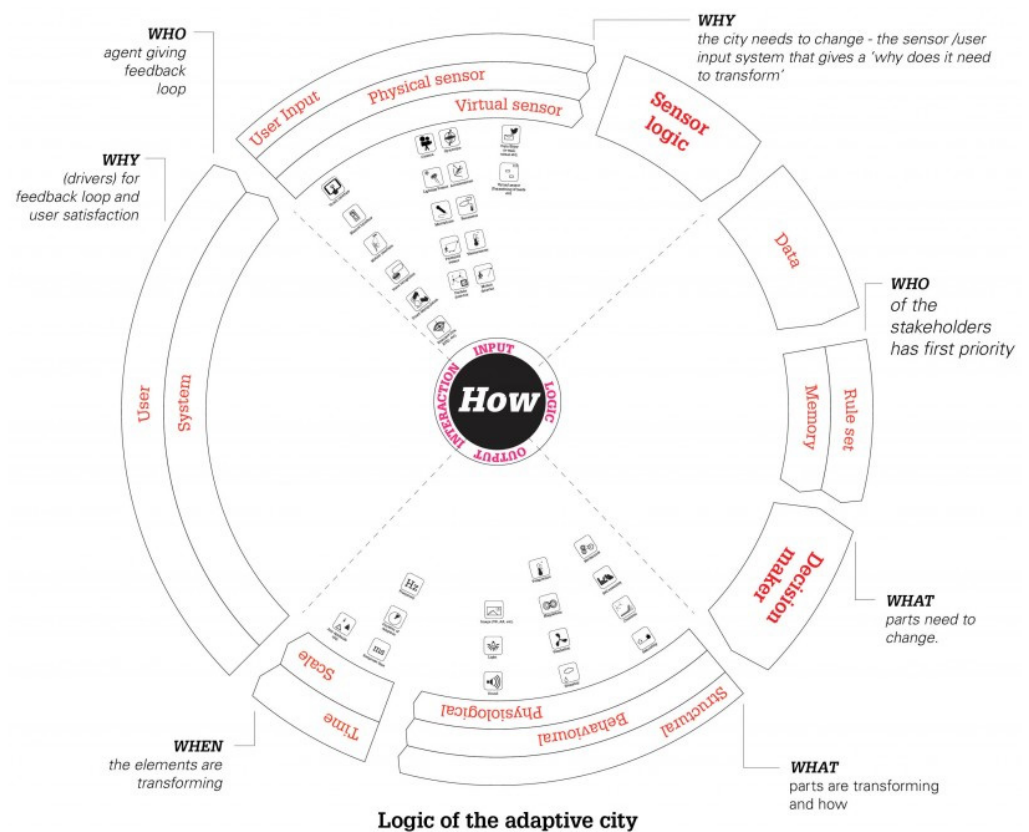


Figure 7. Adaptive city logic. Diagram explaining “How the City Adapt?”, by Stavros Gargaretas, Jayson Johnstone, Albert Mark, Leo Stuckardt, Lara Tomholt.

The project, led by urban planner Peter Kindel, director of SOM's City Design Practice in California, addresses a process called 'Now & Next,' where current urban design concepts are evaluated and then reimagined for the year 2050, in which traditional urbanism gives way to biomorphic urbanism. The latter is based on the belief that humans are intrinsically connected to nature and should therefore live in harmony with it; consequently cities should be shaped by life, human or natural, and half of the city's surface should be under nature conservation [66] (see Figure 8).



Figure 8. Analytical reworking of the SOM “Future City” concept: left—bird’s-eye with hub structure and ecological land-share; right—schematic cross-section illustrating 50% protected area. Photo inset: original SOM illustration (used for context) [66].

The urban vision focuses on the quality of life in a changing city by restoring and protecting the natural environment such as native forests and wetlands, and creating open space systems surrounding waterways. In their Future City concept, the city is composed of ‘urban hubs,’ where an urban hub is understood as a group of eight to ten (or more) pedestrian-centered neighborhoods bounded by important natural systems such as hydrological corridors and connected by transportation infrastructure.

These hubs can be high or low density and can have a mix of land uses needed by the city: residential, manufacturing, or commercial. Basically, by concentrating development within defined areas, this approach to city planning can help maintain a balance between urbanized areas and protected land.

The urbanized area, composed of interconnected hubs, would, in fact, be interwoven with ecological zones of approximately equal area to make the city complete.

6. Conclusions

This article explores the interconnected evolution of agro-urban systems and urban digital paradigms. It highlights how the concept of the ‘Adaptive City’ can provide a

comprehensive and integrated model for promoting sustainable and resilient urban futures. The analysis reveals several key concepts.

- Firstly, AgroCities local food systems, recognizing them as not only production mechanisms, but also as fundamental drivers of the ecological and social regeneration of territories. They are capable of strengthening the connection between cities and the countryside, promoting circular economies, and enhancing rural cultural and landscape capital.
- Smart Cities introduce and consolidate advanced digital infrastructures that can increase urban efficiency through monitoring, data analysis, and intelligent resource management. However, an overly technocentric vision can reduce the focus on social, cultural and environmental dimensions, creating imbalances that limit the effectiveness of interventions.
- Adaptive Cities offer a more balanced approach, focusing on inclusiveness, flexibility, and human-centered design. This approach integrates technological innovation and continuous adaptability while taking into account complex socio-spatial dynamics, climate change and demographic transformations. The Adaptive City is therefore a meeting point between innovation, sustainability and resilience, capable of responding holistically to contemporary challenges.

In light of this reasoning, the following suggestions for future research can be summarized:

1. Firstly, an in-depth analysis of the socio-spatial impacts of urban food strategies is needed, assessing not only production aspects but also the dynamics of social inclusion, equity, and civic participation.
2. The development of specific metrics and indicators to measure the performance of Adaptive Cities in terms of environmental sustainability, social well-being, adaptability, and territorial innovation.
3. The development of multi-scale, participatory and integrated planning tools that combine urban and rural perspectives and promote synergies under the concept of 'Smart Land' and agro-urban strategies.
4. Finally, we hope that policymakers will adopt innovative, integrated approaches and promote governance policies that overcome sectoral and territorial fragmentation. These policies should enhance the complementarity between technology, nature and local communities in order to build truly sustainable and resilient cities.

In this sense, then, is it possible to rethink planning systems in order to reprogram consolidated urban space?

There is no single answer that can resolve the issues raised for future development, so much so that a whole range of concepts have emerged over the past two decades aimed at providing possible directional scenarios: Responsive City [22], Augmented City [23], Senseable City [21], Post-Carbon City [67], Post-Human City [68], Fab City (2014), etc.

However, today's established cities can adopt many of these experiences to begin rethinking infrastructure, development patterns and transportation systems in order to counter the most pressing problems such as restoring ecosystems, achieving resilience against natural hazards, creating social mobility and economic equity for citizens.

The new urban and spatial approach, to which cities should approach, nowadays appeals to a dynamic, evolutionary and reticular systematic approach that is more relational, intelligent and responsive [24], leaning toward a new paradigm of integration between artificial and natural, technology and sustainability, digital and ecology.

The goal for the future must be to put humans, citizens, and society back at the center of planning, and the cities of the future must be a combination of technological innovation and environmental sustainability [21,69].

In contrast to a past deterministic view of architecture then, the prospects that open for innovation and future change in our urban ecosystems will thus have to be less rhetorical and more intentional, or to paraphrase Wright, the challenges of the future will be ‘people, people, people’.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Conflicts of Interest: The author declare no conflicts of interest.

References

1. AISU International. Adaptive cities through the post pandemic lens. Rethinking Times and Challenges of the Flexible City in Urban History/Times and Challenges in Urban History. In Proceedings of the 10th AISU Congress, Turin, Italy, 6–10 September 2022.
2. Andreatta, S.L. Through the Generations: Victory Gardens for Tomorrow’s Tables. *Cult. Agric. Food Environ.* **2015**, *37*, 38–46. [CrossRef]
3. Aurigi, A. *Making the Digital City. The Early Shaping of Urban Internet Space*; Routledge: London, UK, 2005; p. 236. [CrossRef]
4. Pinto, R.; Cosenza, F.; Sirchia, P. *Adaptive Cities: User-Centered Approach, Contextual Design, and Innovation Management for the Evolution of the City*; Pnsix: Bergamo, Italy, 2020.
5. Shaw, D. *Posthuman Urbanism: Mapping Bodies in Contemporary City Space*; Rowman & Littlefield: Lanham, MD, USA, 2017.
6. United Nations. *Report of the United Nations Conference on Human Environment*; UN: New York, NY, USA, 1973. Available online: <https://documents.un.org/doc/undoc/gen/n17/300/05/pdf/n1730005.pdf> (accessed on 10 September 2024).
7. United Nations. *World Charter for Nature*; UN: New York, NY, USA, 1982. Available online: <https://digitallibrary.un.org/record/39295> (accessed on 9 September 2024).
8. Shao, J.; Min, B. Sustainable development strategies for Smart Cities: Review and development framework. *Cities* **2025**, *158*, 105663. [CrossRef]
9. Angelopoulos, C.M.; Katos, V.; Kostoulas, T.; Miaoudakis, A.; Petroulakis, N.; Alexandris, G.; Demetriou, G.; Morandi, G.; Rak, U.; Waledzik, K.; et al. IDEALCITIES: A Trustworthy and Sustainable Framework for Circular Smart Cities. In Proceedings of the 15th International Conference on Distributed Computing in Sensor Systems (DCOSS), Santorini, Greece, 29–31 May 2019. [CrossRef]
10. Dameri, R.P.; Giovannacci, L. *Smart City e Digital City. Strategie Urbane a Confronto*; FrancoAngeli: Milano, Italy, 2016.
11. United Nations. *Transforming Our World: The 2030 Agenda for Sustainable Development*; UN: New York, NY, USA, 2015. Available online: <https://sdgs.un.org/sites/default/files/publications/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf> (accessed on 15 October 2024).
12. United Nations. *The Paris Agreement*; UN: Paris, France, 2015. Available online: <https://unfccc.int/process-and-meetings/the-paris-agreement> (accessed on 15 October 2024).
13. Dameri, R.P. *Smart City Implementation. Creating Economic and Public Value in Innovative Urban Systems*; Springer: Cham, Switzerland, 2017.
14. Grigg, D.B. *Population Growth and Agrarian Change: An Historical Perspective*; Cambridge University Press: Cambridge, UK, 1980.
15. De Zeeuw, H.; Van Veenhuizen, R.; Dubbeling, M. The role of urban agriculture in building resilient cities in developing countries. *J. Agric. Sci.* **2011**, *149*, 153–163. [CrossRef]
16. OECD/FAO. *OECD-FAO Agricultural Outlook 2019–2028*; OECD Publishing: Paris, France, 2019. [CrossRef]
17. Gausa, M.; Tucci, G. *Knitting Food: Food and Eco-Textiles. New Perspectives for Sustainable Urban Production Systems*; Springer: Singapore, 2024. [CrossRef]
18. Gausa, M.; Pericu, S.; Canessa, N.; Tucci, G. Creative Food Cycles: A Cultural Approach to the Food Life-Cycles in Cities. *Sustainability* **2020**, *12*, 6487. [CrossRef]
19. United States Department of Agriculture (USDA). *U.S. Farmers Markets-2000: A Study of Emerging Trends*; USDA: Washington, DC, USA, 2002. Available online: http://agmarketing.extension.psu.edu/ComFarmMkt/PDFs/emerg_trend_frm_mrkt.pdf (accessed on 12 October 2024).

20. United States Department of Agriculture (USDA). *USDA Celebrates National Farmers Market Week, August 4–10: Confirms Growth and Sustainability in Farmers Markets*; USDA: Washington, DC, USA, 2013. Available online: <http://www.usda.gov/wps/portal/usda/usdahome?contentid1%2F42013%2F08%2F0155.xml> (accessed on 10 October 2024).
21. Roseland, M. Dimensions of the ecocity. *Cities* **1997**, *14*, 197202. [CrossRef]
22. Bayat, A.; Kawalek, P. Digitization and urban governance: The city as a reflection of its data infrastructure. *Int. Rev. Adm. Sci.* **2023**, *89*, 320. [CrossRef]
23. Mupfumira, P.; Mutingi, M.; Sony, M. Smart city frameworks SWOT analysis: A systematic literature review. *Front. Sustain. Cities* **2024**, *6*, 1449983. [CrossRef]
24. Ochoa, W.A.A.; Neto, A.I.; Junior, P.C.V.; Calabokis, O.P.; Ballesteros-Ballesteros, V. The Theory of Complexity and Sustainable Urban Development: A Systematic Literature Review. *Sustainability* **2025**, *17*, 3. [CrossRef]
25. Weber, M. *Economy and Society*; University of California Press: Berkeley, CA, USA, 1922.
26. McAdam, D. *Political Process and the Development of Black Insurgency, 1930–1970*; University of Chicago Press: Chicago, IL, USA, 1982.
27. Juergensmeyer, M. *Terror in the Mind of God: The Global Rise of Religious Violence*; University of California Press: Berkeley, CA, USA, 2000.
28. Balboni, M. *The Planet Eaten*; Dissensi Edizioni: Viareggio, Italy, 2017.
29. Baker, L. *Unfolding Story of Food*; Toronto Food Policy Council: Toronto, ON, Canada, 2014.
30. Baraud-Serfaty, I. La nouvelle privatisation des villes. *Esprit* **2011**, *3–4*, 149–167. [CrossRef]
31. Batty, M. Big Data, Smart Cities and City Planning. *Dialogues Hum. Geogr.* **2013**, *3*, 274–279. [CrossRef] [PubMed]
32. Bentley, A. *Eating for Victory*; University of Illinois Press: Urbana, IL, USA, 1998; p. 272.
33. Bocci, R. The Trojan Horse of the Green Revolution. In *Capitalism, Nature, Socialism*; Routledge: London, UK, 2006; Volume 17, pp. 183–188.
34. Borsboom-van Beurden, J.; Kallaos, J.; Gindroz, B.; Costa, S.; Riegler, J. *Smart City Guidance Package. A Roadmap for Integrated Planning and Implementation of Smart City Projects*; Norwegian University of Science and Technology: Trondheim, Norway, 2019.
35. Burchardt, J. *The Allotment Movement in England, 1793–1873*, 1st ed.; Boydell & Brewer: Woodbridge, UK, 2002. Available online: <https://www.perlego.com/book/2013477/the-allotment-movement-in-england-17931873-pdf> (accessed on 5 September 2024).
36. Carta, M. *The Augmented City*; ListLab: Trento, Italy; Barcelona, Spain, 2017.
37. Crouch, D.; Ward, C. *The Allotment*; Faber & Faber: London, UK, 1988.
38. Dowswell, C. Norman Ernest Borlaug (1914–2009). *Science* **2009**, *326*, 381. [CrossRef] [PubMed]
39. Evans, N.; Odeh, I.; Sauter, G. *The Adaptive City: 3 Steps to Achieving the Smart City of the Future*; World Economic Forum: Geneva, Switzerland, 2022. Available online: <https://cdn.github.org/umbraco/media/5234/the-adaptive-city-3-steps-to-achieving-the-smart-city-of-the-future.pdf> (accessed on 5 September 2024).
40. Eveno, E. Comment l’intelligence vint aux villes. *Urbanisme* **2014**, *394*, 26–27.
41. Fleming, D.; Bailyn, B. *The Intellectual Migration*; Harvard University Press: Cambridge, MA, USA, 1969.
42. Gausa, M. City Sense: Territorializing Information. In *City Sense—4th Advanced Architecture Contest—Shaping Our Environment with Real-Time Data*; Institute for Advanced Architecture of Catalonia, Ed.; Actar Publisher: Barcelona, Spain, 2015; pp. 6–13.
43. Gausa, M. CFC—Multiscalar Challenges. In *Creative Food Cycles Experience*; Pericu, S., Gausa, M., Tucci, G., Ronco Milanaccio, A., Eds.; ADDDoc Logos: Genoa, Italy, 2021; pp. 13–52.
44. Gausa, M.; Canessa, N.; Tucci, G. (Eds.) *AC+ Agro-Cultures, Agro-Cities, Eco-Productive Landscapes*; Actar Publishers: Barcelona, Spain; New York, NY, USA, 2018.
45. Goldsmith, S.; Crawford, S. *The Responsive City: Engaging Communities Through Data-Smart Governance*; John Wiley & Sons: Hoboken, NJ, USA, 2014.
46. Graham, S. Spaces of Surveillant Simulation: New Technologies, Digital Representations, and Material Geographies. *Environ. Plan. D Soc. Space* **1998**, *16*, 483–504. [CrossRef]
47. Graueholz, L.; Owens, N. *Alternative Food Movements*; Elsevier: Orlando, FL, USA, 2015.
48. Heinberg, R. *Power Down: Options and Actions for a Post-Carbon World*; New Society Publishers: Gabriola Island, BC, Canada, 2004.
49. Moragues, A.; Morgan, K.; Moschitz, H.; Neimane, I.; Nilsson, H.; Pinto, M.; Rohrer, H.; Ruiz, R.; Thuswald, M.; Tisenkopfs, T.; et al. Urban Food Strategies: The Rough Guide to Sustainable Food Systems. Available online: https://www.researchgate.net/publication/261315754_Urban_Food_Strategies_the_rough_guide_to_sustainable_food_systems (accessed on 7 September 2024).
50. Kondepudi, S.N. *Smart Sustainable Cities: Analysis of Definitions*; United Nations: Washington, DC, USA, 2014.
51. Palassio, C.; Wilcox, A. *The Edible City: Toronto’s Food from Farm to Fork*; Coach House Books: Toronto, ON, Canada, 2009.
52. Picon, A. *Smart Cities: A Spatialised Intelligence*; Wiley: Hoboken, NJ, USA, 2015; p. 168. [CrossRef]

53. Rizko, S.; Elias, L. *Organic or Conventional Green Revolution? A Field Study Conducted in Ribaue, Mozambique*; Linnéuniversitetet, Institutionen för Samhällsstudier (SS): Växjö, Sweden, 2013. Available online: <https://lnu.diva-portal.org/smash/record.jsf?pid=diva2%3A605872&dswid=3204> (accessed on 7 September 2024).
54. Tucci, G. *MedCoast AgroCities: New Operational Strategies for the Development of Mediterranean Agro-Urban Areas*; ListLab: Trento, Italy; Barcelona, Spain, 2020.
55. Halloran, P.; Bell, T.; Bolajoko Awodun, K.; Findlay, H.; Gorbounov, M.; Hooper, G.; Liu, Y.; McDonald, S.; Pewter, J.; Mawsoudi Soltani, S.; et al. *SeaCURE Report Phase 2 Public Facing Final*; Department for Energy Security and Net Zero (DESNZ): London, UK, 2026.
56. Shiva, V. *The Violence of the Green Revolution*; University Press of Kentucky: Lexington, KY, USA, 1989.
57. Stiglitz, J.E. *An Economy for Man*; Castelvecchi: Rome, Italy, 2016.
58. Tucci, G.; Ratti, C. Technology as an Enabler of a New Ecosystem Responsive Urbanism: Interview with Carlo Ratti (CRA Studio). *Agathón. Int. J. Archit. Art Des.* **2023**, *12*, 190–201. [CrossRef]
59. United Nations. *Our Common Future. Report of the World Commission on Environment and Development*; UN: Oslo, Norway, 1987. Available online: <https://oneplanetschool.wwf.it/system/files/pubblicazioni/Report%20of%20the%20World%20Commission%20on%20Environment%20and%20Development%2C%20Our%20Common%20Future.pdf> (accessed on 6 September 2024).
60. United Nations. *Report of the United Nations Conference on Environment and Development*; UN: New York, NY, USA, 1993. Available online: <https://documents.un.org/doc/undoc/gen/n92/836/55/pdf/n9283655.pdf> (accessed on 15 October 2024).
61. United Nations. *Agenda 21*; UN: New York, NY, USA, 1993. Available online: <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf> (accessed on 15 October 2024).
62. United Nations. *Kyoto Protocol to the United Nations Framework Convention on Climate Change*; UN: Kyoto, Japan, 1998. Available online: <https://unfccc.int/resource/docs/convkp/kpeng.pdf> (accessed on 11 October 2024).
63. United Nations. *United Nations Millennium Declaration*; UN: New York, NY, USA, 2000. Available online: <https://www.ohchr.org/en/instruments-mechanisms/instruments/united-nations-millennium-declaration> (accessed on 11 October 2024).
64. United Nations. *UNEA Resolution 5/14 Entitled End Plastic Pollution: Towards an International Legally Binding Instrument*; UN: Dakar, Senegal, 2022. Available online: https://wedocs.unep.org/bitstream/handle/20.500.11822/39812/OEWG_PP_1_INF_1_UNEA%20resolution.pdf (accessed on 10 October 2024).
65. Norton, B. Agroecology as a path to food sovereignty and social justice. *Ukr. J. Ecol.* **2024**, *14*, 57–59.
66. Skidmore, Owings & Merrill (SOM). *We Could Live This Green in 2050*; SOM: Chicago, IL, USA, 2020. Available online: <https://www.som.com/news/we-could-live-this-green-in-2050/> (accessed on 2 December 2025).
67. Bosco, G.; Riccardi, V.; Sciarrone, A.; D'amore, R. AI-driven innovation in smart city governance: Achieving humancentric and sustainable outcomes. *Transform. Gov. People Process Policy* **2024**, *20*, 98–123. [CrossRef]
68. Meerow, S.; Newell, J.P.; Stultus, M. Defining urban resilience: A review. *Sci. Landsc. Urban Plan.* **2016**, *147*, 38–49. [CrossRef]
69. Castelnovo, W.; Misuraca, G.; Savoldelli, A. Smart Cities Governance: The Need for a Holistic Approach to Assessing Urban Participatory Policy Making. *Soc. Sci. Comput. Rev.* **2016**, *34*, 724739. [CrossRef]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.