

THE CONTRIBUTION OF LOCAL GOVERNMENT TO THE PROMOTION OF SUSTAINABLE DEVELOPMENT – THE CASE STUDY OF THE MUNICIPALITY OF AMAROUSSION AND OF THE SYGGROU FOREST

DOI: 10.26341/issn.2241-4010-2026-1a-3-L02137

Sereti Evangelia - Paraskevi

Geographer, M.Sc. in "Strategic Management of Tourist Destinations and Hospitality Businesses" with a specialization in Hospitality Management, University of the Aegean, Greece, M.Sc. in Public Administration - Public Management, University of West Attica, Greece.

evisereti995@gmail.com

Abstract

The role of local government in promoting sustainable development is of crucial importance, as only municipalities have a deep understanding of local characteristics, comparative advantages, and opportunities for innovative actions, as well as the size, geomorphological, developmental, and cultural particularities of each city and community.

The UN 2030 Agenda recognizes the potential of Local Government Authorities to transform, through a bottom-up planning, the urban and rural environment and contribute to improving sustainability conditions globally. Sustainability as an ongoing commitment should be an integral part of the functioning of local government and the basis for social, environmental and economic sustainability.

This paper aims to highlight the results of the research conducted as part of my Master's Thesis, as well as to present the related recommendations and conclusions. The purpose of the research conducted in the context of my Master's Thesis is to capture the current situation in terms of strengthening innovation, strategy, implementation and prioritization of sustainable urban development actions of the Municipality of Maroussi and the protection of the Syggrou Forest, as well as to identify the areas in which further initiatives could be developed, with an emphasis on the environmental, social, economic, and governance dimensions of sustainability.

Key words: *Sustainable urban development, innovation, local government, Municipality of Amarooussion, Syggrou Forest*

1. INTRODUCTION

Capital, land, labor and entrepreneurship, with the contribution of science and technology, become factors of production, when they are used for production. These traditional of production are no longer sufficient to ensure sustainability, that is, to maintain a steady state in the resources available for the production of goods or services. Environmental Management is added as a crucial pillar of sustainable development. Sustainable development⁴ is considered to be the kind of development that meets present economic, social, and

⁴As defined in the 1987 Brundtland Report of the World Commission on Environment and Development, "Our Common Future."

environmental needs without endangering the ability of future generations to meet their own needs.

Climate change and the energy crisis, depletion of natural resources and ecosystem degradation, inflation, structural shifts in the labor market, and demographic deadlock are some of the challenges faced by modern economies. Modern economies are called upon to address environmental management issues in the short, medium, and long term, and to implement policies that promote outward-looking production models based on the sustainable management of natural resources.

Effectively addressing these challenges necessitates targeted policymaking and data-driven planning of smart, sustainable and resilient cities and communities, where a high quality of life, social cohesion, a decent standard of living, ample green and recreational spaces, and the overall well-being of citizens are guaranteed.

The interdisciplinary and holistic approach to issues concerning the three dimensions of sustainable development (social, environmental, and economic), as well as the integration of all dimensions of sustainable development into sectoral policies and legislative frameworks, is a prerequisite for achieving the 17 Sustainable Development Goals (SDGs) and the 169 targets of the United Nations by 2030 (2030 Agenda for Sustainable Development). Regarding the progress toward the 17 Sustainable Development Goals, a UN report is published every year, based on the global indicator framework and on data produced from national statistics as well as information collected at the regional level.⁵

In Greece, local government consists of first-level Local Government Organizations, whose sole authority is the Municipality, and second-level Local Government Organizations, whose authority is the Region. The number of administrative Regions in Greece amounts to 13, the number of Regional Units to 74, and the number of Municipalities to 332.

The sustainability actions implemented in the Municipality of Amarousion - with an emphasis on green spaces, the protection of the Syggrou Forest, and the areas in which innovative "Smart City" and green transition initiatives could be integrated, as a contribution to sustainable development and as a way to improve citizens' quality of life, are the issues addressed in this case study.

The selection of this case study is justified both by the challenges the city faces in relation to sustainable development and by the apparent existence of a clear sustainability strategy.

As part of the qualitative research, the concepts of sustainable development, environmental, social, and economic sustainability, as well as their interconnection with local government, were explored through a literature review.

The quantitative research was conducted on a random sample of 84 residents of the Municipality of Amarousion, focusing on the following key questions:

- ✓ The level of awareness of the Municipality's citizens regarding sustainable development issues.
- ✓ The contribution of the local government to the protection of the Syggrou Forest.
- ✓ The obstacles identified as inhibitory factors for the sustainable management of the Syggrou Forest.

Six elected members of the local government of the Municipality of Amarousion also participated in this quantitative research. They completed a questionnaire aimed at capturing

⁵ United Nations 2023 "Times of Crisis, Times of Change: Science for Accelerating Transformations to Sustainable Development", Global Sustainable Development Report 2023
https://sdgs.un.org/sites/default/files/2023-09/FINAL%20GSDR%202023-Digital%20-110923_1.pdf

their views on sustainable development, the management of the Syggrou Forest, and the role of institutional partnerships.

An interview was also conducted with the President of the Board of Directors of the Institute of Agricultural Sciences, with the aim of recording the perspective of the institutional body responsible for managing the Syggrou Forest.

2. THEORETICAL BACKGROUND

The three components of sustainability, which can be defined as economic efficiency or economic capital, social equity or social capital, and environmental preservation or environmental capital, are a commonly accepted notion in the international literature.⁶ They exhibit coherence and indivisibility, as none of them can exist independently. A fourth dimension has been added to the three pillars of sustainability – the adherence to the principles of good governance or governance capital.

The origins of the concept of the “three pillars” of sustainability are attributed to the Brundtland Report of the World Commission on Environment and Development, to Agenda 21,⁷ and to the 2002 World Summit on Sustainable Development.⁸ In 2015, the 193 member states of the United Nations deemed it necessary to establish 17 Sustainable Development Goals to address poverty and ensure the planet’s sustainability, with the commitment that these goals would be universal and indivisible.⁹

Environmental sustainability focuses on maintaining the environmental system as a fundamental prerequisite for supporting life. For any resource-based system that aims to become sustainable, three main approaches are followed: **efficiency**, which addresses the question, “What do we really need and why?”, **consistency**, which addresses the question, “How can we minimize resource use in production and consumption?” and **sufficiency**, which addresses the question, “How can we design what we need in a sustainable way?”. These approaches aim to reduce resource consumption. However, none of them can reduce environmental impacts to zero, when applied in combination, though, they can significantly enhance the sustainability of a resource-dependent system. With the main goal of maintaining social justice and peace, the concept of **social sustainability** is closely linked to the 17 United Nations Sustainable Development Goals (SDGs) (No Poverty, Zero Hunger, Good Health and Well-being, Quality Education, Gender Equality, Clean Water and Sanitation, Affordable and Clean Energy, Decent Work and Economic Growth, Industry, Innovation and Infrastructure, Reduced Inequalities, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action, Life Below Water, Life on Land, Peace, Justice and strong Institutions, Partnerships for the Goals).¹⁰

In summary, we can mention that the pillars of sustainability are as follows:

- ✓ **Environmental:** concerned with the preservation of the natural environment.
- ✓ **Economic:** related to economic development and resilience.
- ✓ **Institutional:** refers to governance and resource management.
- ✓ **Social:** focuses on the well-being and cohesion of society.

⁶ Purvis, B., Mao, Y., & Robinson, D. (2019). Three pillars of sustainability: in search of conceptual origins. *Sustainability Science*, 14(3), 681-695. <https://doi.org/10.1007/s11625-018-0627-5>

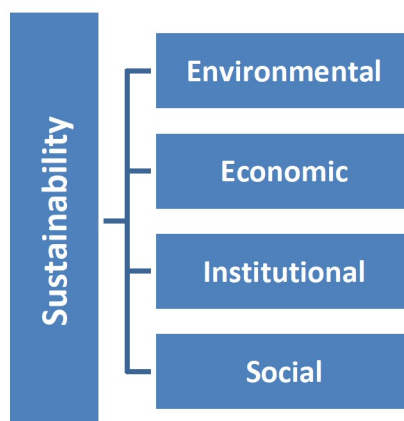
⁷ UNCED (1992). *Agenda 21: programme of action for sustainable development, Rio Declaration on Environment and Development*. New York: United Nations.

⁸ Moldan B, Janoušková S, Hák T (2012) How to understand and measure environmental sustainability: indicators and targets. *Ecol Indic* 17:4–13. <https://doi.org/10.1016/j.ecolind.2011.04.033>

⁹ United Nations (2015c), *Transforming Our World: The 2030 Agenda for Sustainable Development*, New York, NY. <https://sustainabledevelopment.un.org/post2015/transformingourworld>

¹⁰ Fischer et al., (2022) *Sustainable Business Managing the Challenges of the 21st Century*, Springer Briefs in Business. 10-11 & 19-20. https://doi.org/10.1007/978-3-031-25397-3_2

Figure 1: The pillars of sustainability



Sustainable development¹¹ is defined as development that meets the economic, social and environmental needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable development is governed by:

- (a) The **principle of normativity**, as it is linked to regulations that very depending on the cultural context and the specific historical period.
- (b) The **principle of equity**, as it takes into account both present human needs and those of future generations.
- (c) The **principle of indivisibility**, as it aims to harmonize economic, environmental and social objectives.
- (d) The **principle of dynamism**, as it balances multiple parameters within a constantly changing environment.¹²

As a development policy, sustainable development is highly ambitious, as it aims to take into account both current and future conditions across all regions of the world, in a way that ensures prosperity in the short, medium and especially the long term.

For the formulation of the theoretical framework, a review of the literature related to the investigation of the topic was conducted. Starting from 1987, the year in which the Brundtland Report of the World Commission on Environment and Development entitled “*Our Common Future*” was published, the concept of sustainable development was established and acquired a universal and multifaceted character.¹³

Through the European Green Deal, the Investment Plan of the European Union and the Just Transition Mechanism, within the framework of good governance, the sustainable course of Europe is pursued by transforming the way we produce and consume, with the ultimate goal of achieving climate neutrality by 2050.

At this point, it is worth noting that energy constitutes a field of geopolitical power for all countries and Europe, within the framework of a complex balancing process, must ensure

¹¹ As defined in the 1987 Brundtland Report of the World Commission on Environment and Development, “*Our Common Future*”

¹² Gibson, B., Hassan, S., & Tansey, J. (2013). *Sustainability assessment: criteria and processes*. Routledge.

¹³ Satterthwaite, D. (1999) “The Earth scan reader in Sustainable cities”, London: Earth scan. Sneddon, C., Howard, R.B. and Norgaard, R.B. (2006). “Sustainable development in a post-Brundtland world”, *Ecological Economics*, 57, 253-268.

energy sufficiency, prevent price surges and at the same time pursue gradual decarbonization. Aiming at energy security and stability, the recent agreement between the United States and Greece for LNG imports from the U.S. and investments in the Greek energy market highlights the prominent role of the East Mediterranean in the strategy for a sustainable Europe.

The International Monetary Fund shares the United Nations' objectives and formulates proposals concerning sustainable development.¹⁴ The Organization for Economic Co-operation and Development (OECD) intends to provide technical support to its member countries to achieve sustainable and inclusive growth.¹⁵

The progress in implementing the 17 Sustainable Development Goals is monitored by the World Bank through the indicators of the "World Development Indicators" database and the "Atlas of Sustainable Development Goals" platform.¹⁶

In the Greek legal system, the concept of the city as a spatial entity – geographically and administratively defined and considered suitable for promoting the vaguely defined goal of sustainable development – was adopted within the framework of urban and spatial planning in the late 1990s.¹⁷

After the 1990s, the concepts of the sustainable city and urban sustainability dominated the discussion and were reflected in policies, international agreements and global networks.¹⁸

On 26 June 2024, the Directors-General on Urban Matters (DGUM) validated the ex-ante assessment for the two priority themes of Water-Sensitive City and Building Decarbonization, focusing on integrated renovation programs and local heating and cooling strategies. On 16 May 2025, the Directors-General on Urban Matters (DGUM) adopted the Ex-Ante Assessment (EAA) on Compact Cities – Sustainable Urban Planning and Sprawl Mitigation, thereby progressing the establishment of a new Thematic Partnership under the Urban Agenda for the EU (UAEU). In a joint declaration adopted at their informal meeting of 21 May 2025, EU ministers in charge of cohesion policy, territorial cohesion and urban matters highlight that cities of every scale, along with their functional areas, play a pivotal role in competitiveness and innovation, driving economic growth and fostering social and cultural development. Between 14 April and 26 May 2025, the European Commission held a call for evidence on the new EU policy agenda for cities, aimed at developing a more formal and structured framework. The consultation drew significant input from local and regional stakeholders. The Council of European Municipalities and Regions (CEMR) notes that the Urban Agenda for the EU has not reached its full potential, citing constrained political involvement, inadequate financial resources and the absence of integration within the EU's wider multiannual policy framework. European Regions Research and Innovation Network (ERRIN) emphasizes that the future EU agenda for cities must focus on three core priorities to

¹⁴ Fabrizio, M. S., Garcia-Verdu, M. R., Pattillo, M. C. A., Peralta-Alva, A., Presbitero, A., Shang, B., Verdier, G., Cammilleri, M.-T., Washimi, K., Kolovich, L., Newiak, M., Cihak, M., Otker, I., Zanna, L.-F. & Baker, M. C. L. (2015). *From Ambition to Execution: Policies in Support of Sustainable Development Goals*. International Monetary Fund.

¹⁵ OECD (2016). "Better Policies for 2030. An OECD Action Plan on the Sustainable Development.

¹⁶ ATLAS of Sustainable Development Goals <https://datatopics.worldbank.org/sdgateatlas/>

¹⁷ Athanasiou, E. (2001). *The concept of the sustainable city in the context of crisis*. *Topos: Review of Spatial Development, Planning and Environment*, Issue 2 (47).

¹⁸ The "Lille Action Programme", 2000; Rotterdam Urban Acquis, 2004; The Bristol Accord 2005 (EU Urban Policy); Leipzig Charter, 2007; Marseille Declaration, 2008; Toledo Declaration on urban development, 2010; EU Territorial Agenda 2020 - *Cities of Tomorrow*, 2011. https://ec.europa.eu/regional_policy/en/information/publications/communications/2011/territorial-agenda-of-the-european-union-2020; Urban Agenda for the EU (UAEU) 'Pact of Amsterdam', 2016. <https://ec.europa.eu/futurium/en/urban-agenda/>; The New Leipzig Charter-The transformative power of cities for the common good, 2020. https://ec.europa.eu/regional_policy/whats-new/newsroom/12-08-2020-new-leipzig-charter-the-transformative-power-of-cities-for-the-common-good_en; The Territorial Agenda – A future for all places 2030, 2020; The 2021 Ljubljana Agreement;

empower urban areas as central actors in driving the green and digital transitions. As a network encompassing over 200 cities and regions dedicated to advancing sustainable urban development, ICLEI Europe formally welcomes the Commission's initiative aimed at reinforcing the EU's strategic ambitions for cities and sustainable urban development in the coming years. METREX Network of European Metropolitan Regions and Areas frames metropolitan regions and areas as integrated territories that include urban cores, peri-urban zones and surrounding municipalities. Metropolitan governance must be recognized as a strategic layer to effectively address challenges ranging from competitiveness and climate resilience to housing and mobility. The debate on the future EU urban agenda has been revitalized by the Commission's call for evidence on a new policy agenda for cities. The Commission's July 2025 proposals for the 2028-2034 budget envisage 27 national and regional partnership plans (NRPPs), combining cohesion funding and agricultural subsidies under a unified planning and implementation framework.¹⁹

Local authorities in many municipalities are committed to sustainable development goals and demonstrate a willingness to exchange knowledge and experiences at the inter-municipal level. In the international literature, numerous studies can be found analyzing the reasons why the contribution of local government to sustainable development is necessary²⁰. However, clarifying the conditions under which local authorities can contribute to sustainable development requires further investigation.²¹

In smart, sustainable and resilient cities (SSRC) in order to ensure sustainability and social cohesion, technologies of the Fourth Industrial Revolution (Industry 4.0) are utilized, such as: the Internet of Things (IoT) – sensors for monitoring and managing resources; Artificial Intelligence (AI) – data analysis for process optimization; Big Data Analytics – for understanding trends and improving policies; Smart Grids – for managing energy systems; Renewable Energy Sources (RES) – for achieving energy autonomy and Blockchain – as a decentralized digital transaction system aimed at ensuring transparency and reliability in management.

Smart, sustainable and resilient cities focus on the following:

- ✓ **Environmental Sustainability:**
 - Management of natural resources (e.g., energy, water)
 - Application of technologies to reduce CO₂ emissions
 - Development of green spaces and infrastructures
- ✓ **Smart Governance:**
 - Transparency in decision-making
 - Citizen participation
 - Support through e-Government and other digital tools
- ✓ **Social Well-being:**
 - Access to education and healthcare for all
 - Reduction of social inequalities

¹⁹ EPRS European Parliamentary Research Service (2025) A new urban policy agenda for the EU: Addressing cities'

Current challenges. Author: Vasilis Margaras. Members' Research Service PE 777.938 – October 2025, 3-10. [https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2025\)777938](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2025)777938)

²⁰Georgakellos, D., Alexandropoulou, A. (2021). Sustainable Urban Development: The Key Role of Local Government. E-journal of the Institute of Local Government, 7 July 2021, available at: <https://www.ita.org.gr>

²¹ Wang, Xiaohu & Van Wart, Monty & Lebrede, Nick. (2014). *Sustainability Leadership in a Local Government Context*. Public Performance & Management Review. 37, 339-364. DOI:10.2753/PMR1530-9576370301

- ✓ **Smart Economy:**
 - Support for innovation and entrepreneurship
 - Digital transformation
- ✓ **Culture and Quality of Life:**
 - Preservation of cultural heritage
 - Enhancement of citizens' safety and well-being
- ✓ **Social Cohesion and Resilience:**

The concept of a smart sustainable city is not limited to the use of technology but extends to the creation of socially resilient and equitable communities.
- ✓ **Regional Development:**

The concept of smart regions connects cities with surrounding settlements, promoting integrated development through regional cooperation.²²

One of the most comprehensive classifications and analyses of indicators for smart, sustainable and resilient cities is presented below. Indicators are classified according to their stage of development or implementation:

Type of Indicators

Input: Resources introduced into the system (for example funding, infrastructure)

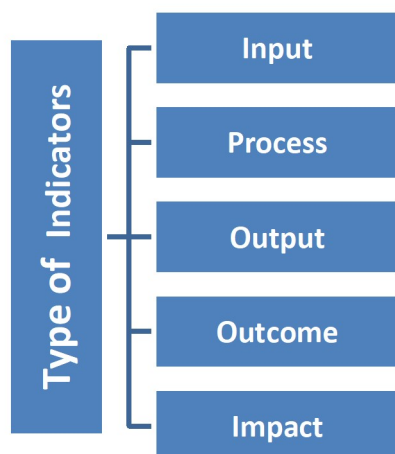
Process: Activities and actions that are carried out.

Output: Products or services that are produced.

Outcome: Short- or medium-term changes.

Impact: Long-term effects on society, the economy or the environment.

Figure 2: Type of Indicators



Input indicators measure the quantity and quality of human, financial, material and political resources required for the implementation of smart interventions and the provision of smart services.

Process indicators deal with the activities and actions undertaken to ensure the proper development of smart cities and the delivery of smart services.

Output indicators refer to the products or actions implemented as smart city interventions. For example, the number of electric buses in operation compared to the total bus fleet.

²² Parr, J. B. (1999). "Growth-pole strategies in regional economic planning: A retrospective view." *Urban Studies*, 36(7), 1195-1215.

Outcome indicators are difficult to determine, as they measure the extent to which objectives have been achieved in the medium term. An example could be the change in the percentage of people using electric buses.

Impact indicators measure the long-term contribution of smart city interventions.

Urban Sectors /Dimensions

The main sectors evaluated include:

Ecology: Quality of the natural environment.

Built Environment: Infrastructure and urban design.

Water Management and consumption of water resources.

Energy: Consumption and efficiency of energy resources.

Waste: Waste management and recycling.

Mobility: Transportation and accessibility.

Economy: Innovation, employment and economic development.

Education: Access to Education and quality of educational services.

Quality of Life: Health, safety and well-being.

Social Structure: Equality and social cohesion.

Governance: Transparency and decision-making.

Information and Communication Technology: Digital infrastructure and intelligence.

The following can be identified as capacities for achieving a city's resilience: planning, absorption, recovery, adaptation, robustness, stability and flexibility. The following can be identified as characteristics of resilient cities: resourcefulness, coordination capacity, redundancy, diversity, foresight capacity, self-organization, collaboration and equity.

The framework mentioned above provides the tools for monitoring and improving the performance of cities at a global level.²³

In order to support the institutions that develop sustainable development strategies, UN member states voluntarily submit their national reports, applying 231 indicators to measure progress on the 17 Goals and the 169 sub-targets of sustainable development. In the context of the OECD's theoretical and empirical analysis of the 17 SDGs, with a focus on governance and comparative analysis among countries, a 'Sustainable Development Report' has been published by the UN Sustainable Development Solutions Network in recent years. This report is prepared by the research team led by professor Jeffrey Sachs. The authors of the report attempt to identify potential synergies and divergences among the Sustainable Development Goals and they propose global-level cooperation as well as a re-examination of the relationship between markets and governments within the framework of implementing the following six parameters for sustainable development:

1. Education, gender and inequalities.
2. Health, well-being and demography.
3. Energy, decarbonization and sustainable industry.
4. Sustainable food systems, land, water and oceans.
5. Sustainable cities and communities.
6. The digital revolution.

²³ United Nations (2015c), *Transforming Our World: The 2030 Agenda for Sustainable Development*, New York, NY. <https://sdgs.un.org/2030agenda>; OECD (2018). *Environmental Performance Reviews*. IPCC (2022). *Climate Change 2022: Impacts, Adaptation, and Vulnerability*; Rockefeller Foundation (2014). *100 Resilient Cities Initiative*; UN-Habitat (2016). *World Cities Report*.

According to the authors of the report, governments must intervene in the economy, promote public investments – primarily in infrastructure – ensure a low-emission economy, advance social justice through the redistribution of income from economically stronger to economically weaker citizens and regulate industry with the aim of safeguarding environmental and social sustainability.²⁴

The same research team created an index ranging from 0 (lowest performance) to 100 (highest performance) in order to assess the progress countries have made toward achieving the UN's 17 Sustainable Development Goals. Greece ranks 29th among 193 countries and has been scored 78.7. In other words, Greece's achievement rate regarding the UN Sustainable Development Goals stands at 78.7%.²⁵

The UN's 17 SDGs have been incorporated into the strategy of all European Union institutions, including the European Commission. The European Commission conducts an assessment based on Eurostat's measurements, which apply 100 indicators aimed at measuring the progress of the EU member states.²⁶

According to the data from the European Commission's voluntary review²⁷ presented at the United Nations in 2023 regarding the progress of the implementation of the 2030 Agenda for Sustainable Development at the European Union level, the Goals on Climate and Energy show stagnation, despite the fact that ecosystems and biodiversity in certain areas have been negatively affected and given that the strategy for achieving the SDGs in the European Union incorporates most of the goals into the European Green Deal.

3. LOCAL GOVERNMENT AND SUSTAINABLE DEVELOPMENT

Improving the performance of local government in sustainability requires reforms, with clear targeting and coordination, at the level of central government – national and regional – as well as on the part of municipalities, civil society, enterprises and the scientific community.²⁸

From the perspective of municipalities, sustainability must be addressed not as a marketing, but as a strategic transformation with an emphasis on multi-level governance, accountability and measurable outcomes.

For managing the complexity of modern urban systems and achieving the goal of an Intelligent Sustainable City, cooperation of multiple scientific disciplines is required (Environmental Economics, Urban and Regional Planning, Economic and Regional Science, Bioeconomy, Computer Science, Statistics, Mathematics, Engineering, Urban, Regional and Environmental Law, Public Law, Administrative Science, Social and Humanitarian Sciences, Health and Life Sciences):

²⁴ Sachs, J. D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N. and Rockström, J. (2019). "Six Transformations to achieve the Sustainable Development Goals". *Nature Sustainability*, 2: 805-814. <https://doi.org/10.1038/s41893-019-0352-9>

²⁵ Sachs, J.D., Lafortune, G., Fuller, G. (2024). The SDGs and the UN Summit of the Future. Sustainable Development Report 2024. Paris: SDSN, Dublin: Dublin University Press. <https://ae4ria.org/directory2/greece-ranks-29th-in-the-2024-sustainable-development-report/>

²⁶ Trantas, N. (2021). Assessment of the Implementation Progress of the Sustainable Development Goals: Towards a More Informed and Political Content. *Review of the Hellenic Evaluation Society*, Issue 8, June 2021. <https://www.hellenicevaluation.org/>

²⁷ European Union (2023). EU Voluntary Review on progress in the implementation of the 2030 Agenda

²⁸ Sachs, J. D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N. and Rockström, J. (2019). "Six Transformations to achieve the Sustainable Development Goals". *Nature Sustainability*, 2: 805-814. <https://doi.org/10.1038/s41893-019-0352-9>

Urban and Spatial Planning

- Spatial planning for balancing the built and natural environment.
- Scientists specializing in the sustainable management of space and the creation of functional, resilient and green urban areas.

Environmental Sciences and Engineering

- Addressing challenges such as climate change, air quality, waste management and renewable energy sources.
- Scientists who design technologies to improve energy efficiency and promote a circular economy.

Computer Science and Engineering

- Development of smart technologies such as the Internet of Things (IoT), Big Data and Artificial Intelligence (AI).
- Applications for smart automation of city services and enhancing decision-making efficiency.

Economics and Management

- Economists who assess the costs and benefits of investments in smart technologies.
- Management scientists engaged in creating public-private partnerships (PPPs) and optimizing resource management.

Social Sciences and Law

- Political scientists and legal experts for shaping regulatory frameworks and participation policies.
- Sociologists, anthropologists and psychologists studying citizen behavior and social cohesion.

Transportation and Accounting

- Transport planners and experts in smart mobility, such as sustainable public transportation, electric vehicles and autonomous systems.

Health and Public Hygiene

- Public health specialists focused on disease prevention, as well as the maintenance and promotion of citizens' health (for example, through access to urban green spaces and clean air).

For the period 2021-2027, the European Commission, serving the policy objective 'A Europe closer to its citizens', actively supports sustainable urban development by increasing funding, embracing the primacy of local government, local authorities and civil society on city-related issues and launching the European Urban Initiative to upgrade cities through capacity building, innovative solutions and cohesion policies.

According to the findings of a 2022 survey conducted by the European Investment Bank²⁹, which covered 744 municipalities in the Member States of the European Union, there appear to be significant gaps in the knowledge, skills and competencies of local government employees. Municipalities highlight the difficulty they face in finding specialized personnel, particularly mechanical engineers and technicians in the fields of 'Environment' and 'Climate Change'.

²⁹ The state of local infrastructure investment in Europe EIB Municipalities Survey 2022-2023
© European Investment Bank, 2023. <https://www.eib.org/en/publications/20230043-eib-municipalities-survey-2022>.

Findings from a recent study ³⁰on the effectiveness of municipalities in Greece, examining resource efficiency and the alignment of their actions with the existing legal framework, indicate that the majority of municipalities do not systematically maintain data related to sustainability indicators.

Aiming at sound financial management, transparency, integrity and accountability to citizens, as well as improving environmental, social and corporate governance, a recent legislative act introduced the evaluation of the performance of Local Government Organizations and established a dedicated online platform for monitoring their progress. According to the Greek legislative framework,³¹ the performance evaluation data of municipalities and their legal entities are published annually through the digital platform **deiktesOTA.gov.gr** and are categorized into 12 axes: Financial Data, Investments and Utilization of Real Estate, Quality of Life – Sports – Culture, Environment – Waste, Education and Early Childhood Care, People with Disabilities – Social Protection, Civil Protection, Management of Stray Companion Animals, Infrastructure – Energy Consumption, Human Resources, Smart Cities and Demographics and other data.

The table below attempts to map the above evaluation axes to the 17 UN Sustainable Development Goals (SDGs).

Table 1: Mapping the evaluation axes of Greek Municipalities to the 17 UN SDGs

Municipal Evaluation Axes	17 UN Sustainable Development Goals (SDGs)
Financial Data	8 (Decent Work and Economic Growth), 10 (reduced Inequalities), 11 (Sustainable Cities and Communities), 17 (Partnerships for the Goals)
Investments and Utilization of Real Estate	11 (Sustainable Cities and Communities), 17 (Partnerships for the Goals)
Quality of Life – Sports – Culture	11 (Sustainable Cities and Communities), 17 (Partnerships for the Goals)
Environment – Waste	6 (clean Water and Sanitation), 11 (Sustainable Cities and Communities), 13 (Climate Action), 14 (Life below Water), 15 (Life on Land), 17 (Partnerships for the Goals)
Education and Early Childhood Care	4 (Quality Education), 17 (Partnerships for the Goals)
People with Disabilities – Social Protection	3 (Good Health and Well-Being), 11 (Sustainable Cities and Communities), 17 (Partnerships for the Goals)
Civil Protection	11 (Sustainable Cities and Communities), 17 (Partnerships for the Goals)
Management of Stray Companion Animals	11 (Sustainable Cities and Communities), 17 (Partnerships for the Goals)
Infrastructure – Energy Consumption	7 (Affordable and Clean Energy), 9 (Industry, Innovation and Infrastructure), 12 (responsible Consumption and Production), 17 (Partnerships for the Goals)
Human Resources	4 (Quality Education), 5 (Gender Equality), 8 (Decent Work

³⁰ Saravakos, K., Plymakis, I., Mantas, Chr., Kalantzakis, G., Chena, R., Vallianos, I., Ulkeroglou, A., Pletsa, D., hood Stathopoulou, M. (2023). *Municipal Effectiveness Index 2023*. Center for Liberal Studies & Center for International and European Political Economy & Governance, University of the Peloponnese (Department of Political Science and International Relations). Athens, December 2023.

³¹ The provisions of articles 33 and 52 of Law 5056/2023 (A' 163) as well as article 1 of Decision No. 105203/2023 (B' 7094) of the Deputy Minister of the Interior.

	and Economic Growth), 10 (reduced Inequalities), 11 (Sustainable Cities and Communities), 16 (Peace, Justice and strong Institutions), 17 (Partnerships for the Goals)
Smart Cities	11 (Sustainable Cities and Communities), 17 (Partnerships for the Goals)
Demographics and other data	1 (No Poverty), 2 (zero Hunger), 3 (Good Health and Well-Being), 5 (Gender Equality), 8 (Decent Work and Economic Growth), 10 (reduced Inequalities), 16 (Peace, Justice and strong Institutions), 17 (Partnerships for the Goals)

Source: Author’s own elaboration based on the Ministerial Decision No. 105203/2023 (Government Gazette B’ 7094) and the 2030 Agenda for Sustainable Development.³²

More than 6 in 10 municipalities are not satisfied with their investments in climate change adaptation and 4 in 10 municipalities are dissatisfied with their investments in digital transformation infrastructure. However, digital transformation is progressing more rapidly compared to the green transition. At this point, it should be noted that local government is the first to demonstrate, at the international level, numerous good practices for achieving the goal of sustainable urban development.

Municipalities in Greece are intensifying their actions to reduce carbon dioxide emissions, improve the energy efficiency of buildings and promote the circular economy. Greece has undertaken multiple pilot initiatives at the municipal level, demonstrating how local authorities can effectively align with sustainability goals. For example, some municipalities have introduced community recycling and composting programs that prioritize citizen engagement and awareness campaigns. These programs have contributed to reducing the use of landfills and enhancing environmental awareness, thus aligning with the broader EU guidelines on waste management.

Another area of best practice concerns sustainable tourism development in regions such as Crete and the Cyclades islands. Local authorities cooperate with enterprises, non-governmental organizations and local communities to implement measures that safeguard natural ecosystems and promote cultural heritage tourism. Through proactive management of visitor flows and the development of infrastructure, these municipalities aim to balance economic growth with environmental and social well-being. These best practices demonstrate the ability of local authorities to negotiate complex interests and maintain a balance between development objectives and environmental protection goals.

The cooperation between public and private entities for crisis prevention and management aims to create an Intelligent, Sustainable and Resilient City that functions as an ecosystem capable of adapting to future challenges.³³

Managing water scarcity in an Intelligent, Sustainable and Resilient City involves Smart Water Resource Management, which can be achieved through:

- The use of IoT sensors to monitor water quality and quantity and to detect and repair damages in water supply networks (for example, leaks) through automated systems.
- Recycling and reusing water through technologies for the treatment and utilization of greywater and liquid waste.
- Collecting rainwater through green infrastructure (for example, green roofs, rainwater harvesting tanks).

³²United Nations (2015c), Transforming Our World: The 2030 Agenda for Sustainable Development, New York, NY. <https://sustainabledevelopment.un.org/post2015/transformingourworld>

³³Batty, M., Axhausen, K. W., Giannotti, F., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., ... & Portugali, Y. (2012). Smart cities of the future. *The European Physical Journal Special Topics*, 214, 481-518

- Raising awareness and informing citizens about the use of applications that promote water-saving practices.

Earthquake prevention and mitigation can be achieved through:

- Vibration monitoring systems for the early detection of dangerous cracks.
- Networks of seismographs that provide warnings before the main tremor.
- Smart, high-strength building structures and self-repair technologies as well as citizen training and education.

Fire prevention and mitigation can be achieved, as far as possible, through:

- Satellite monitoring (drones for detecting smoke and fire sources).
- Temperature sensors in forests and urban areas.
- Green zones that limit the spread of fires.
- Robotic fire suppression systems and smart water supply networks.

Flood prevention and mitigation can be achieved through:

- Sensors for monitoring the water levels of rivers and canals.
- Early warning systems for citizens.
- Information systems with real-time flood risk mapping.
- Smart dams and pumping stations that adapt to water flow.
- Urban green areas that absorb water.
- Tree planting to reduce erosion and absorb water.

Maroussi has the potential to emerge as an Intelligent Sustainable City and this direction significant steps have already been taken through a focus on green and technologically innovative policies.

4. THE CASE STUDY OF THE MUNICIPALITY OF MAROUSSI AND THE SYGGROU FOREST

The Municipality of Maroussi is located in the northeastern part of the Athens metropolitan area. Historically, it was an agricultural region that gradually transformed into a suburban settlement and later became an important economic center. This transformation is attributed to various factors, including urban expansion, infrastructure development and the relocation of business and commercial activities from central Athens to its outskirts.³⁴

Although Maroussi is administratively part of the greater Athens area, it possesses unique characteristics, such as relatively high elevation, proximity to major road axes and a mix of purely residential areas alongside zones hosting large shopping centers and major businesses. These features place Maroussi at the crossroads of intense urban development pressures and opportunities for sustainable governance.³⁵

The Municipality of Maroussi is administratively part of the North Athens Regional Unit within the Region of Attica, according to the “Kallikratis Program” (Law 3852/2010, Government Gazette 87/A/2010). The Municipality of Maroussi covers an area of approximately 13.330.971 m². The population of the city of Maroussi amounts to 72.227 inhabitants. The governing bodies of the Municipality consist of the Mayor, the Municipal Council and the Municipal Committee.³⁶

³⁴ Chorianopoulos I., Pagonis T., Koukoulas S., Drymoniti S. (2010). Planning, competitiveness and sprawl in the Mediterranean city. The case of Athens Cities 27 (4), 249-259.

³⁵ Wassenhoven, L. C. (2022). *Compromise planning: A theoretical approach from a distant corner of Europe*. Springer Nature.

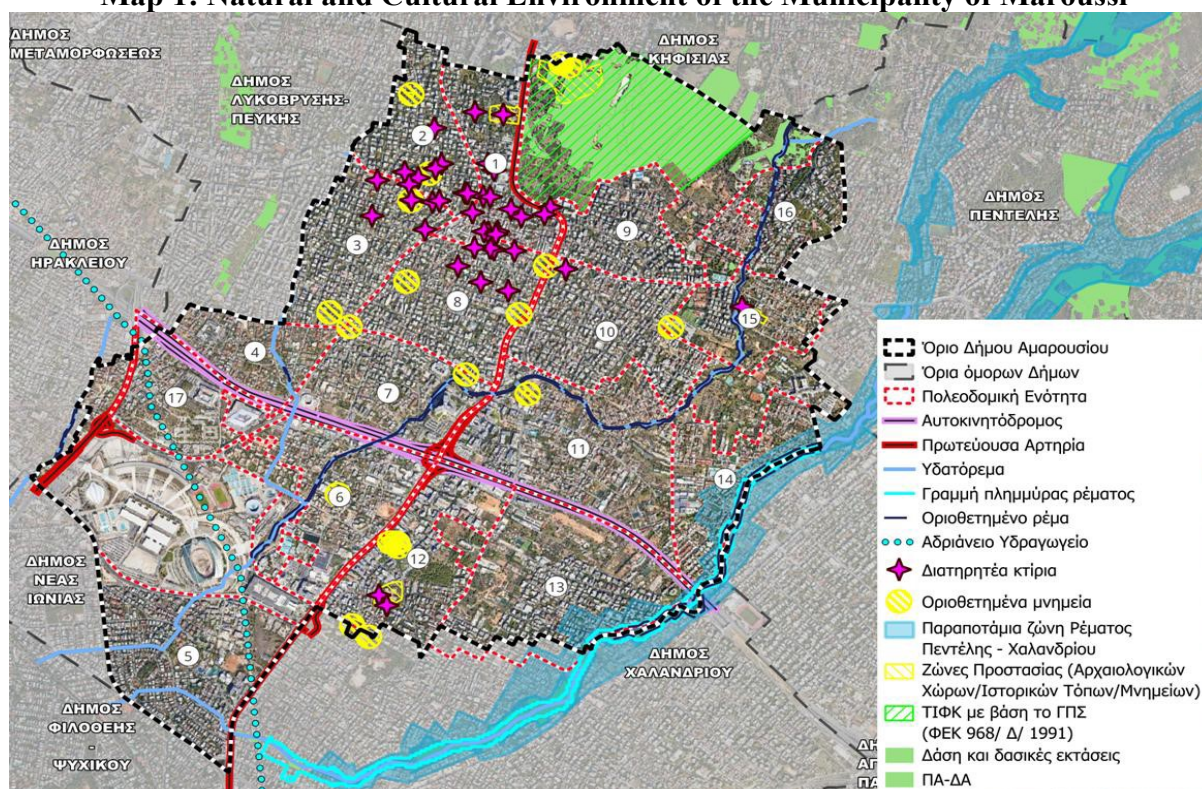
³⁶ Hellenic Republic, Ministry of the Interior, May 2024. *Structure and Operation of Local and Regional Democracy, Greece 2024, p. 17. Structure and Operation of Local and Regional Democracy, Greece 2024, p. 17.*

Over the past decades, the Municipality has sought to balance rapid commercial development with the preservation of local and cultural characteristics, including older neighborhoods, parks and cultural institutions. Nevertheless, pressures to accommodate multinational companies, shopping centers and large infrastructure projects – as evidenced by the presence of prominent complexes and the Olympic Stadium (built for the 2004 Olympic Games)-have significantly impacted the municipality’s natural and socio-economic landscape.³⁷

Maroussi has a rich cultural heritage, is connected to the history of ancient Greece and dates back to 3000 B.C., the year of its founding by Cecrops. The patron deity of Maroussi was Artemis Amarysia, the goddess of the hunt, who was worshiped in the area and whose sanctuary served as an important religious center. The city possesses features that can significantly contribute to its urban environmental sustainability, enhance the quality of life for its residents and preserve its cultural heritage.

The map below illustrates the natural and cultural environment of the Municipality of Maroussi.

Map 1: Natural and Cultural Environment of the Municipality of Maroussi



















Source: Elaboration of the study for the Local Urban Plan of the Municipality of Maroussi, p.7³⁸

<https://www.ypes.gr/wp-content/uploads/2024/06/STRUCTURE-OPERATION-LRD-GREEK-VERSION-2024.pdf>

³⁷Chorianopoulos I., Pagonis T., Koukoulas S., Drymoniti S. (2010). Planning, competitiveness and sprawl in the Mediterranean city. The case of Athens Cities 27 (4), 249-259.

³⁸Technical Chamber of Greece. Study Team: Joint Venture “ERATOSTHENES S.A. – Anastasia Lagoudaki – ΤΟΠΟΔΟΜΙΚΗ S.A.-MSM Consulting – Seeman Environmental – Dimitrios Argyriou” (2025). *Elaboration of the study for the Local Urban Plan of the Municipality of Maroussi.*

Legend

Municipal boundary of the Municipality of Maroussi	
Boundaries of neighboring municipalities	
Urban Planning Unit	
Motorway/Highway	
Primary arterial road	
Watercourse/Stream	
Flood flow line	
Delineated stream	
Hadrian's Aqueduct	
Protected buildings	
Designated monuments	
Riparian zone of the Penteli-Chalandri stream	
Protection zones (archaeological sites/historic areas/monuments)	
Value according to the Local Urban Plan (GG968/D/1991)	
Forests and wooded areas	
PA-DA (retained as original code)	

As illustrated on the map above the Municipality of Maroussi is bordered by the Municipality of Penteli to the northeast, Kifissia to the north, Lykovryssi-Pefki to the northwest, Nea Ionia to the west, Filothei-Psychiko and Neo Iraklio to the southwest, Chalandri to the south and Vrilissia to the northeast.

Ancient Infrastructure and Cultural Monuments: The Hadrianic Aqueduct is one of the most important ancient waterworks in Attica. It was constructed during the Roman period, around 140 A.D., under the supervision of the Roman Emperor Hadrian. This aqueduct constituted an extensive water supply system, providing water to Athens and the surrounding areas for over 1.800 years. It originates in the region of Parnitha, specifically from the Tatoi spring and passes through several areas of the northern suburbs of Athens, including Maroussi. It ensured the water supply to the city of Athens.

Traditional Architecture and Urban Redevelopment: The traditional architecture of Maroussi featuring neoclassical buildings, can contribute to environmental sustainability through proper restoration and preservation of these structures.

Urban Planning: 10% of the Municipality of Maroussi falls under protection (these areas have their own legal status).

The areas presented in the table below are subject to the same legal framework

Table 2: Areas of the Municipality of Maroussi with their own legal status

Type	Area (m ²)	% of the total municipal area	Comments
Total area of the Municipality	13,330,971	100%	
Forests and lands governed by forestry law	723.763	5,43%	Part of it overlaps with Syggrou Forest, the protection zones of the Penteli stream and the protection

			zones of archaeological sites/historic areas/monuments
Syggrou Forest which is designated as a Landscape of Exceptional Natural Beauty in the General Urban Plan of Maroussi	936.796	7.03%	A part of it overlaps with forested areas and the Protection Zones of archaeological sites/historic areas/monuments
Zone A of the Penteli-Chalandri Stream Protection Area	64.091	0,48%	A part of them overlaps with forested areas
Zone B of the Penteli-Chalandri Stream Protection Area	281.200	2,11%	
Protection Zones of archaeological sites/historic areas/monuments	146.429	1,10%	Parts of them overlap with forested areas and the Syggrou Forest

Source: Elaboration of the study for *the* Local Urban Plan of the Municipality of Maroussi, p.

3

The detailed urban plans of different areas of the Municipality of Maroussi which cover 76.2% of the municipality’s total area, were approved at different periods between 1921 and 2018, as presented in the table below

Table 3: Applicable urban planning framework

Period of legal Enactment	% of the municipality’s area with an approved Urban Plan
1920-1940	33,1%
1940 – 1960	8,1%
1960 – 1980	16,8%
1980 – 2000	32,3%
After 2000	9,7%
Total	76,2%

Source: Elaboration of the study for the Local Urban Plan of the Municipality of Maroussi, p. 3

A comprehensive approach to the urban organization of the Municipality of Maroussi as a whole was carried out later with the approved General Urban Plan (Government Gazette 968/D/1991) and with subsequent amendments in 1993, 1994, 1997 and 2019.

On July 2, 2025, at the Maroussi City Hall the presentation of the three alternative spatial development scenarios for the city was held, which are part of Stage A of the study for the Local Urban Plan of the Municipality of Maroussi. Stage B of the study for the Local Urban Plan of the Municipality of Maroussi will follow, which will constitute the final proposal for the urban redesign of the city of Maroussi. The Local Urban Plan of the Municipality of Maroussi is being prepared within the framework of the National Urban Reform Program ‘Konstantinos Doxiadis’. Local Urban Plans are implemented by the Ministry of Environment and Energy with the support of the Technical Chamber of Greece and financed by the Recovery and Resilience Fund.

Green Spaces and Urban Biodiversity: Maroussi has numerous green areas, parks and groves that can be expanded and enhanced to improve urban biodiversity. These green spaces

contribute to better air quality, temperature reduction and provide recreational areas for residents.

Promotion of Sustainable Cultural Events: Maroussi has a tradition of hosting cultural events, which can be designed to focus on environmental awareness.

Civil Protection: The rapid increase in vehicles, the reduction of open spaces and the climate crisis (fires, floods etc.) constitute a harsh reality for modern cities. The Municipality of Maroussi places particular emphasis on civil protection, leverages technology (artificial intelligence, sensors, thermal cameras, digital risk maps) and has installed the ANANIAS system, an intelligent and fully automated thermal-camera system for timely and effective fire detection.

Social Participation and Education: Preserving Maroussi's cultural heritage can serve as a foundation for educating residents, especially young people about the importance of environmental protection.

The historical and cultural background of Maroussi is not only a treasure of the past but also an opportunity for a sustainable future. With appropriate strategies that integrate tradition and innovation, Maroussi can serve as a model city, leveraging its cultural capital to enhance its environmental sustainability. The Syggrou Forest covers 700,000 m² of a total area of approximately 950,000 m². It is the only natural forest remaining in the Metropolitan Region of Athens and is designated as an Urban Green Space of supra-local importance, as it exceeds the criteria for size and tree canopy density. In view of rapid urban expansion, environmental pressures and evolving social needs, the Municipality of Maroussi is undertaking sustainability-oriented initiatives (infrastructure projects, community participation programs and strategic partnerships with other municipalities, national agencies, private companies and civil society organisations). The impetus for such initiatives arises not only from local needs - such as mitigating traffic congestion or preserving green spaces – but also from global and European policy frameworks that support resilient urban environments.

5. THE E-PARK AS A MODEL OF SUSTAINABLE AND INNOVATIVE RECREATION

The creation of the e-Park constitutes a good practice in developing a model green and active recreation space that incorporates elements of technological innovation, energy self-sufficiency and environmental sustainability. Before the construction of the e-Park by BAT Hellas in cooperation with the Municipality of Maroussi, the residents of Psalidi area in Maroussi had repeatedly submitted to the Municipal Authority their request for the upgrade of 'Degleri Square' and the creation of a green space. In the same area there was a lack of modern infrastructure, green space and facilities for physical activity.

The need for sustainable development, safe and accessible public spaces for all and an improvement in residents' quality of life was urgent. The existing infrastructure was insufficient to meet the growing demands of modern urban life and both the square itself and the surrounding area presented a marked appearance of neglect.

The area has been designated as a purely residential zone. It has been burdened by rapid and intense urbanization, resulting in the exhaustion of the area's urban carrying capacity and the deterioration of residents' quality of life. Outdated methods of lighting and energy consumption were no longer sustainable, creating the need for the implementation of innovative, green technologies. The construction of the first e-Park in Greece combines environmental sustainability with technological innovation. The aim was to upgrade 'Degleri Square' in the Psalidi area of Maroussi and transform it into a modern, sustainable and technologically advanced public space.



Source: BAT Hellas

The e-Park leveraging the achievements of technology and ‘smart’ equipment, includes solar lighting poles, smart solar benches and tables, a specially designed area with electric vehicle charging stations and a smart irrigation system – features that ensure the space’s complete energy self-sufficiency. It attracts visitors from all over Attica and serves as a reference point for the green transition, the utilization of renewable energy sources, the use of innovative technologies and sustainable urban development. This park represents a good practice of Public-Private Partnership, Corporate Social Responsibility, as well as volunteer engagement. Visitors to the e-Park have the ability to access free wireless internet, connect their portable devices via Bluetooth for music or information playback and charge their mobile devices wirelessly or via cable, while complete energy self-sufficiency is ensured through the use of solar panels.

6. METHODOLOGY

The findings of this research which is part of my Master’s thesis, came from a wide range of secondary sources, as well as from primary field research. The methodology is based on the development of a case study, incorporating both quantitative and qualitative research. From the literature review, it can be concluded that local government and especially municipalities can make a significant contribution to promoting sustainable development, as they possess knowledge of local characteristics, comparative advantages and the developmental opportunities of cities. Three structured questionnaires were used, which were specifically designed for the needs of the present research.

The first survey question is addressed to residents of the Municipality of Maroussi and includes questions related to: (a) the level of awareness among citizens of the Municipality of Maroussi regarding sustainable development issues, (b) citizens’ evaluation of the Municipality’s policies and actions for sustainable development and the protection of Syggrou Forest and (c) citizens’ perceptions of factors that constitute obstacles to the sustainable management of Syggrou Forest. The second survey question is addressed to elected officials (municipal councilors and deputy mayors) and aims to capture their perceptions of the Municipality of Maroussi’s policies and actions that focus on sustainability and the protection of Syggrou Forest. The third survey question is addressed to the President of the Board of

Directors of the Institute of Agricultural Sciences. The Institute of Agricultural Sciences is the managing authority of Syggrou Forest. The interview focused on issues related to administrative functioning, financial sustainability, the implementation of sustainability initiatives, the challenges faced by the Institute and proposals for strengthening the protection of Syggrou Forest.

In the context of the present research, the following working hypotheses are formulated. These hypotheses seek to examine statistical relationships between key variables related to sustainable development, the contribution of the Municipality of Maroussi to sustainability and the protection of Syggrou Forest.

Hypothesis 1

- Null hypothesis (H0): The level of citizens' awareness regarding sustainable development and the protection of Syggrou Forest is not statistically significantly related to their educational level.
- Alternative hypothesis (H1): Citizen's educational level is statistically significantly related to their level of awareness regarding sustainable development and the protection of Syggrou Forest.

Hypothesis 2

- Null hypothesis (H0): The perceived contribution of local government to sustainable development and the protection of Syggrou Forest is not statistically dependent on its financial autonomy.
- Alternative hypothesis (H1): The perceived contribution of local government to sustainable development and the protection of Syggrou Forest is statistically dependent on its financial autonomy.

Hypothesis 3

- Null hypothesis (H0): The lack of financial resources, bureaucracy and insufficient specialized personnel do not constitute significant obstacles to the contribution of local government to sustainable development and the protection of Syggrou Forest.
- Alternative hypothesis (H1): The lack of financial resources, bureaucracy and insufficient specialized personnel constitute significant obstacles to the contribution of local government to sustainable development and the protection of Syggrou Forest.

7. FINDINGS

Profile of the citizens of the Municipality of Maroussi who participated in the Survey

Demographic Data

Gender and Age Distribution

Eighty-four (84) residents of the city of Maroussi participated in the survey. The distribution of survey participants by gender shows a clear majority of women, with 67.9% (57 citizens) being women and 32,1% (27 citizens) being men. Regarding age, 34.5% (29 citizens) belong to the 46-55 age group, while the age groups "up to 35 years" and "36-45 years" are evenly distributed, each accounting for 21.4% (18) of the respondents. The "56 and above" age group represents 22.6% (19 citizens).

Educational Level and Marital Status

Regarding educational level, a high percentage of participants are university graduates, accounting for 42.9% (36 citizens). Holders of a Master’s degree represent 39.3% (33 citizens), while only 7.1% (6 citizens) hold a doctoral degree. High school graduates make up 10.7% (9 citizens) of the survey respondents.

Concerning marital status, the majority of respondents, 53.6% (45 citizens), are married. Single participants account for 21.4% (18 citizens). Those with children, either minors or adults, represent 10.7% (9 citizens). The remaining participants are divorced, 2.4% (2 citizens) or widowed, 1.2% (one citizen).

Employment Status

With regard to the employment of the survey participants, it is evident that the majority are private sector employees, accounting for 45.2% (38 citizens). The percentage of self-employed professionals is 27.4% (23 citizens), public sector employees account for 15.5% (13 citizens), and retirees represent 7.1% (6 citizens). Pupils/students account for 1.2% (one citizen), while homemakers represent 3.6% (3 citizens).

Municipal Residency of Participants

The overwhelming majority of the survey participants, 82.1% (69 citizens) are residents of the Municipality of Maroussi, while 17.9% (15 citizens) are not residents.

Duration of Residence and Reasons for Settling in Maroussi

The majority of survey participants have lived in Maroussi for over 20 years (66.7%, 56 citizens), while 13.1% (11 citizens) have lived there for 6-20 years and 7.1% (6 citizens) for 1-5 years.

Regarding the reasons for settling in Maroussi, the largest group of participants (42.9%, 36 citizens) resides in Maroussi because it is their birthplace. A further 21.4% (18 citizens) chose it for acquiring permanent residence, 20.2% (17 citizens) selected it because it is the location of their workplace, 9.5% (8 citizens) for the high quality of life and a small percentage, 6% (5 citizens) settled there because of the choice of their husband or wife.

The distribution of survey participants across the 17 Urban Planning Units (UPUs) of the Municipality of Maroussi is as follows:

Table 2: Distribution of survey participants across the 17 Urban Planning Units of Maroussi

Urban Planning Units (UPUs)	Number of participants
UPU-1 “Center”	14 citizens
UPU-2 “Agios Nikolaos”	3 citizens
UPU-3 “Neo Terma”	4 citizens
UPU-4 “Psalidi (Pelika)”	22 citizens
UPU-5 “Nea Filothei”	3 citizens
UPU-6 “Agios Thomas”	4 citizens
UPU-7 “Ergatikes Polykatoikies”	2 citizens
UPU-8 “Agioi Anargyroi”	2 citizens
UPU-9 “Vorre”	4 citizens
UPU-10 “Kokkinia”	4 citizens
UPU-11 “Soros-Lakka Kottou”	5 citizens
UPU-12 “Paradeisos”	2 citizens

UPU-13 “Polydrosso”	2 citizens
UPU-14 “Sismanogleio – Neo Maroussi”	3 citizens
UPU-15 “Karpathiotika-Ipirotika-Dodoni-Studio Alpha”	3 citizens
UPU-16 “Nea Lesvos – Anavryta – Angelopoulou”	5 citizens
UPU-17 “ASPAITE”	2 citizens
Total	84

The Contribution of the Municipality of Maroussi to Sustainable Development

When asked about their knowledge of the concept of sustainable development, 11.9% of respondents reported being highly familiar with it, while 70.2% indicated that they have a clear understanding of its meaning.

Regarding the question of whether participants are familiar with the 17 United Nations Sustainable Development Goals (SDGs), 4 respondents answered “very much”, 41 answered “much”, 15 answered “moderately”, 10 answered “little” and 14 answered “not at all”.

When asked about the sources of their knowledge regarding the 17 United Nations Sustainable Development Goals (SDGs), 45.2% of respondents reported acquiring it through participation in educational programs, 42.9% through studying relevant texts and 11.9% through involvement in local initiatives.

Survey participants were asked to assess the extent to which the actions of the Municipality of Maroussi are linked to the 17 United Nations Sustainable Development Goals (SDGs) and contribute to sustainable development. The results, ranked from highest to lowest mean score, are as follows:

- ✓ LIFE GRIN model green space (Sustainable Cities and Communities): 3.40.
- ✓ H020 Socio Bee research and innovation project (Climate Action/Environmental Protection): 3.36.
- ✓ Energy-autonomous park (Affordable and Clean Energy): 3.35.
- ✓ Recycling and waste management initiative (Climate Action): 3.24.
- ✓ Water supply and sewage management initiative (Clean Water and Sanitation): 3.23.
- ✓ Programs supporting the elderly: 3.23.
- ✓ Environmental Volunteer Charter (Sustainable Cities and Communities): 3.17.
- ✓ Action supporting institutional functions and ensuring transparency (Peace, Justice and Strong Institutions): 3.14.
- ✓ Maroussi Digital Academy (Decent Work and Economic Growth): 3.11.
- ✓ Geospatial information platform (Partnerships for the Goals): 3.11.
- ✓ Flood monitoring and early warning initiative (Sustainable Cities and Communities): 3.08.

The survey results highlight the important role that Syggrou Forest holds in the daily lives of the residents of the Municipality of Maroussi. Visitor rates are particularly high (89.3%), confirming the Forest’s significance as a place of recreation and well-being for the local community. The majority of participants visit it regularly, either for walking (31%) or exercising, running, cycling (23.8%), while many people combine activities such as social gatherings, playtime with children and relaxation.

Additionally, 13.1% of the respondents stated that they combine walking with social activities (such as meeting friends or attending children’s celebration) during their visit to the forest, highlighting its role as a social gathering point. Finally, 3.6% of the respondents reported combining walking with nature observation, playing with their children, picnicking or visiting the Natural History Museum.

In response to the question regarding the frequency of their visits to Syggrou Forest, 45.2% of the participants stated that they visit the forest on a weekly basis. A further 23.8% reported visiting Syggrou Forest a few times per year, 19% indicated that they visit it a few times per month, while approximately 11.9% stated that they visit the forest rarely.

The survey reveals a strong recognition of the Forest's contribution to improving quality of life, with 82.1% of respondents stating that it contributes very much.

With respect to respondents' satisfaction with the organization, planning and maintenance of Syggrou Forest, the majority (56%) reported being moderately satisfied, while 13.1% stated that they are very satisfied and 22.6% indicated that they are somewhat satisfied.

Regarding how informed participants feel about the Municipality of Maroussi's sustainability actions-and specifically its initiatives for the protection of Syggrou Forest – the findings indicate that 41.7% of respondents feel adequately informed, while 17.9% stated that they feel very well informed. 25% stated that they feel only minimally informed.

An impressive 92.9% of respondents express a positive willingness to participate in volunteer activities for the protection of Syggrou Forest, highlighting the strong social awareness and the residents' commitment to contributing to the forest's preservation and protection.

Regarding the need for further initiatives to enhance and protect Syggrou Forest, survey participants expressed their opinions and priorities. The control of the harmful plant *Ailanthus* received a high mean score of 4.60%, suggesting that participants view this action as very important for forest protection (M=4.60, SD=0.762). Strategic planning for the protection of Syggrou Forest received the second-highest mean score of 4.54 (M=4.54, SD=0.813), indicating that participants consider this need very important. Tree planting and the care of green areas are viewed as important for the preservation and regeneration of natural vegetation, with a mean score of 4.25 and a standard deviation of 0.557. Concerning educational programs for the residents of Maroussi and school students, the mean score is relatively high, reflecting that participants perceive a strong need for such initiatives (M=4.13, SD=0.597).

The majority of survey participants, 88.1% recognize the significant role of the Syggrou Forest in promoting sustainable urban development in the Municipality of Maroussi. An even higher percentage, 95.2% of respondents, consider the cooperation between local government and volunteer organizations to be extremely important and crucial for the protection of the Syggrou Forest.

The survey participants express a positive assessment of the Municipality's ability to adapt and respond to unpredictable situations and emergency events.

Respondents gave a positive evaluation of the Municipality of Maroussi's "smart" management, which refers to the use of technologies and innovations to achieve objectives and serve citizens. They noted that there are still aspects that could be improved.

Regarding actions that should be intensified to improve urban environmental sustainability in the Municipality of Maroussi and to protect Syggrou Forest, the survey results are as follows:

The adequacy of financial resources ranks highest with a mean score of 4.79 (SD=0.561), emphasizing the need for sufficient funding.

Prevention and management of natural disasters received an exceptionally high mean score of 4.77 and a low standard deviation (SD=0.499).

The adequacy of specialized staff received the third highest mean score, equal to 4.73 and a standard deviation of 0.588, indicating that participants consider the presence of qualified personnel to be critical.

The control of the harmful tree-of-heaven (*Ailanthus altissima*) received a mean score of 4.68 and a standard deviation of 0.604, indicating that participants consider this action to be

very important for the health of Syggrou Forest, while forest cleaning scored a mean of 4.30 (SD=0.636).

The use of solar energy achieved a mean score of 4.52 (SD=0.736), confirming that renewable energy forms are a high priority. The expansion of recycling and waste management.

The development of smart applications and infrastructure for a “Smart City” received a high mean score of 4.52 and a standard deviation of 0.814, highlighting the need for the use of innovative technologies in the management of the city and the forest.

Waste management and recycling received a mean score of 4.35 and a standard deviation of 0.611, highlighting the importance of sustainable waste management for environmental protection.

The conservation of the natural and native biodiversity of Syggrou Forest is also ranked highly (M=4.35, SD=0.549).

Energy conservation is also ranked highly among the issues that participants consider very important for the urban environmental sustainability of the Municipality of Maroussi and the protection of Syggrou Forest (M=4.33, SD=0.665).

The expansion of green spaces received a high mean score of 4.30 (SD=0.617), indicating that participants recognize the importance of increasing urban greenery to enhance city quality.

Air pollution follows with a similarly high mean score of 4.26 and a standard deviation of 0.661.

Similar results were observed for the improvement of access infrastructure for people with mobility challenges (M=4.25, SD=0.656).

Strengthening citizen awareness, education and engagement actions also received a high mean score (M=4.21, SD=0.561).

The promotion of volunteer activities in Syggrou Forest was positively evaluated, though with somewhat lower relative priority (M=4.14, SD=0.624).

Improvements in climate governance were also positively evaluated (M=4.13, SD=0.724).

8. INTERPRETATION OF RESEARCH HYPOTHESES

Hypothesis 1

The analysis conducted using the Kruskal-Wallis test to examine the relationship between educational level and the degree of awareness among residents of the Municipality of Maroussi regarding issues of sustainable development and the protection of Syggrou Forest did not reveal any statistically significant differences ($p=0.610$). The null hypothesis – that the level of citizens’ awareness regarding sustainable development and the protection of Syggrou Forest is not statistically significantly related to their educational level – was confirmed.

To investigate this relationship, the independent variable used was the educational level, as recorded in the demographic section of the questionnaire. The dependent variable was defined as an awareness index, which was derived from the calculation of the mean score of participants’ responses to questions related to: their knowledge of the concept of sustainable development, their knowledge of the 17 UN Sustainable Development Goals and their assessment of the necessity of specific environmental initiatives undertaken by the Municipality of Maroussi. Therefore, environmental awareness appears to be more broadly distributed and is not exclusively dependent on citizens’ educational level.

Hypothesis 2

The correlation between the Municipality's financial adequacy and its contribution to sustainable development (Spearman's $\rho=0.429$, $p<0.001$) was statistically significant and positive. Therefore, the null hypothesis is rejected and the alternative hypothesis is confirmed, indicating that the Municipality's financial autonomy, as perceived by citizens, is related to its effectiveness in matters of sustainability and environmental protection. Consequently, a statistically significant association was identified between citizens' perceptions of the Municipality's financial adequacy and its contribution to environmental policy, reinforcing the view that citizens directly link available financial resources with the effectiveness of local governance.

Hypothesis 3

The third research hypothesis focuses on examining how citizens evaluate potential obstacles to the Municipality of Maroussi's contribution to sustainable development and the protection of Syggrou Forest. Specifically, it investigates whether these obstacles are considered equally important or whether some of them are perceived by citizens as more significant than others. For this purpose, four key issues were selected:

- ✓ The improvement of climate governance,
- ✓ The securing of additional financial resources, combat the invasive
- ✓ The actions to combat the harmful plant *Ailanthus* in Syggrou Forest
- ✓ The enhancement of access infrastructure to the Syggrou Forest for individuals with mobility difficulties.

The Friedman test revealed statistically significant differences in the way citizens evaluated the four obstacles to local government action ($X^2 = 72,947$, $p < 0,001$). The paired comparisons indicate that participants consider the lack of financial resources and the presence of harmful plant *Ailanthus* in Syggrou Forest to be more significant obstacles compared to general climate governance and the accessibility infrastructure of the Syggrou Forest for individuals with mobility difficulties. According to the views of the survey participants, the financial autonomy of municipalities constitutes a fundamental prerequisite for the effective implementation of sustainability policies.

9. RESULTS OF THE SURVEY CONDUCTED WITH ELECTED OFFICIALS OF THE MUNICIPALITY OF MAROUSSI

Six (6) officials who were elected in the municipal elections participated in the survey. The analysis of the responses of the elected officials of the Municipality of Maroussi reveals a positive attitude toward the Municipality's strategy for sustainable development and the protection of Syggrou Forest. The survey participants are familiar with the 17 United Nations Sustainable Development Goals (SDGs). This knowledge is mainly derived from institutional and professional frameworks of information, as well as from their participation in educational programs.

The elected officials' perception of sustainable development is multidimensional, incorporating issues such as environmental protection, quality of life and green infrastructure into a unified framework for action. Rather than prioritizing a single isolated objective, there is a clear preference for the need for integrated interventions that enhance both the ecological and social functions of the city. At the same time, the elected officials of the Municipality of Maroussi recognize that urban environmental sustainability requires not only environmental management but also the availability of adequate financial and human resources, staff training, technological innovation and the active participation of society.

Syggrou Forest is universally recognized as a highly significant environmental, social, cultural and educational resource. The elected officials of the Municipality of Maroussi view Syggrou Forest as a multifunctional public space that meets a wide range of residents' daily and institutional needs. Its contribution to the promotion of sustainable urban development is assessed very positively, as is the importance of cooperation between local authorities and volunteer organizations for its protection. They identify areas where further strengthening and strategic planning are required, particularly with regard to securing financial resources, training municipal employees, integrating innovation, further enhancing citizen information and participation and implementing targeted interventions that ensure the effective management of the area.

The unanimous agreement on the need for additional initiatives, as well as the full willingness to participate in volunteer actions, demonstrates a politically active and environmentally aware core of elected officials who are willing to contribute both institutionally and practically to the long-term protection of Syggrou Forest.

10. ANALYSIS OF THE INTERVIEW WITH THE PRESIDENT OF THE BOARD OF DIRECTORS OF THE INSTITUTE OF AGRICULTURAL SCIENCES

According to the legal framework, the Institute of Agricultural Sciences is the body responsible for the management of Syggrou Forest, which has been designated as a Landscape of Outstanding Natural Beauty and an area where archaeological finds have been identified. The Institute of Agricultural Sciences has been implementing agricultural education programs for over 120 years. It offers thematic seminars of one hundred (100) hours' duration in fields such as beekeeping, aromatic plants, olive cultivation, pest and rodent control.

The President of the Board of Directors of the Institute of Agricultural Sciences acknowledges that improvements should be made for the benefit of trainees and visitors to Syggrou Forest. He also states that the financial resources derive from the Institute of Agricultural Sciences' own revenues.

With regard to the priorities of actions for the protection of Syggrou Forest, he identifies the following as very important: strategic planning; strict surveillance and protection of the forest from fires; securing financial resources through European programs; the use of smart technologies; improvement of trainees' practical training; control of the harmful tree-of-heaven (*Ailanthus altissima*); Protection of biodiversity; Information and education of citizens; Organization of cultural events; cooperation with environmental organizations and improvement of infrastructure (e.g. maintenance of trails).

The association "Friends of Syggrou Forest" is committed to the protection of Syggrou Forest. According to the assessment of the President of the Board of Directors of the Institute of Agricultural Sciences, cooperation between the Institute and the Municipality of Maroussi, as well as with volunteer organizations and environmental associations is very important for the protection of Syggrou Forest. Syggrou Forest is affected by the climate crisis and additional resources – both human and financial-are required to ensure its effective protection.

11. CONCLUSIONS

The following conclusions are confirmed by both the primary and secondary research:

Achieving a sustainable, safe and resilient city in the face of the impacts of the climate crisis and social inequalities appears to be a challenging path, closely linked to: (a) financial autonomy and the capacity to invest in technology and innovation and (b) four types of capabilities: (1) strategic capacity, (2) data management capacity, (3) organizational capacity and (4) collaborative capacity.

The above-mentioned conditions do not guarantee, but rather support, the effectiveness of sustainable development policies at the local government level.

To address economic, environmental, climatic, demographic and social challenges in urban areas, the following are necessary: coordination in the implementation of sustainability actions; the existence of city networks and synergies among the Government, Regions and Municipalities with the support of social stakeholders, civil society, enterprises and the scientific community.

To strengthen the operational capacity of cities, upgrading the skills of the human resources employed in Local Government Organizations is of great importance, with the aim of taking initiatives that will contribute to sustainable development.

For Maroussi to become a smart, sustainable and resilient city, the following are required:

- **Strategic Planning:** A sustainable development plan with the active participation of citizens.
- **Investment in Technology:** Sensor networks for traffic, energy and environmental monitoring, as well as the development of smart infrastructure.
- **Resource Management:** Recycling and waste reduction and the use of renewable energy sources in public buildings.
- **Partnerships:** Cooperation with universities, research centers and the creation of “smart neighborhoods” as pilot initiatives.
- **Education and Awareness:** Informing and engaging citizens in sustainable practices.

If technologically innovative policies are promoted in Maroussi in a consistent and long-term manner and emerging technologies such as artificial intelligence, robotics and big data are fully leveraged, the city could emerge as a “development hub” and function as a “sustainable enclave”, creating added value at the economic, technological and social levels.

References

- Athanasiou, E. (2001). *The concept of the sustainable city in the context of crisis*. Topos: Review of Spatial Development, Planning and Environment, Issue 2 (47).
- ATLAS of Sustainable Development Goals <https://datatopics.worldbank.org/sdgateatlas/>
- Batty, M., Axhausen, K. W., Giannotti, F., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., ... & Portugali, Y. (2012). Smart cities of the future. *The European Physical Journal Special Topics*, 214, 481-518.
- Chorianopoulos I., et al (2010). Planning, competitiveness and sprawl in the Mediterranean city. *The case of Athens Cities* 27 (4), 249-259.
- European Union (2023). EU Voluntary Review on progress in the implementation of the 2030 Agenda
- EPRS European Parliamentary Research Service (2025) A new urban policy agenda for the EU: Addressing cities' Current challenges. Author: Vasilis Margaras. Members' Research Service PE 777.938 – October 2025, 3-10.
- Fabrizio, M. S., et al. (2015). From Ambition to Execution: Policies in Support of Sustainable Development Goals. International Monetary Fund.
- Fischer et al., (2022) Sustainable Business Managing the Challenges of the 21st Century, Springer Briefs in Business. 10-11 & 19-20.
- Georgakellos, D., Alexandropoulou, A. (2021). Sustainable Urban Development: The Key Role of Local Government. *E-journal of the Institute of Local Government*, 7 July 2021.
- Gibson, B., Hassan, S., & Tansey, J. (2013). *Sustainability assessment: criteria and processes*. Routledge.

- Hellenic Republic, Ministry of the Interior, May 2024. *Structure and Operation of Local and Regional Democracy, Greece 2024*, p. 17. *Structure and Operation of Local and Regional Democracy, Greece 2024*, 17.
- Moldan B, Janoušková S, Hák T (2012) How to understand and measure environmental sustainability: indicators and targets. *Ecol Indic* 17:4–13.
- Norgaard, R.B. (2006). “Sustainable development in a post-Brundtland world”, *Ecological Economics*, 57, 253-268.
- OECD (2016). “Better Policies for 2030. An OECD Action Plan on the Sustainable Development.
- Parr, J. B. (1999). "Growth-pole strategies in regional economic planning: A retrospective view." *Urban Studies*, 36(7), 1195-1215.
- Purvis, B., Mao, Y., & Robinson, D. (2019). Three pillars of sustainability: in search of conceptual origins. *Sustainability Science*, 14(3), 681-695.
- Sachs, J.D., et al. (2024). The SDGs and the UN Summit of the Future. Sustainable Development Report 2024. Paris: SDSN, Dublin: Dublin University Press.
- Sachs, J. D., et al. (2019). “Six Transformations to achieve the Sustainable Development Goals”. *Nature Sustainability*, 2: 805-814.
- Saravakos, K., et al. (2023). *Municipal Effectiveness Index 2023*. Center for Liberal Studies & Center for International and European Political Economy & Governance, University of the Peloponnese (Department of Political Science and International Relations). Athens, December 2023.
- Satterthwaite, D. (1999) “The Earth scan reader in Sustainable cities”, London: Earth scan.
- Sneddon, C., Howard, R.B. and Norgaard, R.B. (2006). “Sustainable development in a post-Brundtland world”, *Ecological Economics*, 57, 253-268.
- Sereti, E.-P. (2025). The contribution of local government to the promotion of sustainable development - The case study of the Municipality of Amaroussion and of the Syggrou Forest. Master’s Thesis. Postgraduate Program (MSc) “Public Administration – Public Management”. University of West Attika. <https://polynoe.lib.uniwa.gr/xmlui/handle/11400/9548>
- Technical Chamber of Greece. Study Team: Joint Venture “ERATOSTHENES S.A. – Anastasia Lagoudaki – TOPODOMIKI S.A.-MSM Consulting – Seeman Environmental – Dimitrios Argyriou” (2025). *Elaboration of the study for the Local Urban Plan of the Municipality of Maroussi*.
- Trantas, N. (2021). Assessment of the Implementation Progress of the Sustainable Development Goals: Towards a More Informed and Political Content. *Review of the Hellenic Evaluation Society*, Issue 8, June 2021.
- UNCED (1992). *Agenda 21: programme of action for sustainable development, Rio Declaration on Environment and Development*. New York: United Nations.
- United Nations 2023 "Times of Crisis, Times of Change: Science for Accelerating Transformations to Sustainable Development", *Global Sustainable Development Report 2023*.
- United Nations (2015c), *Transforming Our World: The 2030 Agenda for Sustainable Development*, New York, NY.
- Wang, Xiaohu & Van Wart, Monty & Lebrede, Nick. (2014). *Sustainability Leadership in a Local Government Context*. *Public Performance & Management Review*. 37, 339-364.
- Wassenhoven, L. C. (2022). *Compromise planning: A theoretical approach from a distant corner of Europe*. Springer Nature.