ANTALYA 2050

CLIMATE RESILIENT DEVELOPMENT STRATEGY

COP31 Joint Policy and Action Report

Protecting Antalya's Natural Capital,
Enhancing Its Competitiveness,
A Roadmap for Shaping Its Future Together



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AN INVITATION TO ANTALYA'S SHARED FUTURE

Not for a City Alone, but for a Shared Future

Antalya is not merely one of Türkiye's leading tourism destinations. It is a strategically significant region within the Mediterranean Basin, distinguished by its rich natural, economic and cultural assets, biodiversity, fertile agricultural lands, water resources, coastlines and millennia of historical heritage.

This unique ecosystem, extending from the Taurus Mountains to the Mediterranean coast, represents a shared responsibility not only for its current inhabitants but also for future generations. Accordingly, Antalya's future is not solely a matter of local development; it entails a collective responsibility to protect natural capital, sustain economic prosperity and safeguard societal well-being and quality of life.

Humanity is currently at a critical turning point. Climate change is no longer a future projection but a global reality directly affecting water resources, agricultural production, tourism, urbanization, energy systems and economic competitiveness. Scientific research demonstrates that the Mediterranean Basin is among the regions most severely affected by this transformation. Given its geographical characteristics, economic diversity and coastal location, Antalya is among the cities facing both the risks and opportunities associated with this process.

Nevertheless, every major transformation also presents an opportunity for a new beginning.

Rather than perceiving climate change exclusively as a threat, it can be approached as an opportunity to develop more resilient cities, improve water-use efficiency, protect natural assets, promote green technologies and strengthen international competitiveness. Achieving these objectives requires evidence-based planning, strong institutional cooperation and a shared commitment to responsibility.

This report has been prepared to contribute to Antalya's climate-resilient development pathway. Its objective extends beyond identifying existing challenges to establishing an integrated vision for the future that safeguards natural capital, supports economic development and enhances quality of life. From this perspective, environmental protection and economic development are regarded not as competing priorities but as two fundamental and mutually reinforcing components of sustainable progress.

This study is founded on the recognition that Antalya's future cannot be shaped by any single institution or segment of society. Bringing together the knowledge, experience and responsibilities of all stakeholders—including central government institutions, local authorities, universities, professional chambers, the private sector and civil society organizations—around a shared objective is essential to building a climate-resilient future.

Accordingly, this report is more than an assessment document; it constitutes an open invitation to collective knowledge, shared responsibility and a common future.

The decisions made today will determine not only how current needs are addressed but also the quality of life of children living in Antalya in 2050. The future will not take shape independently; it will be built upon the vision, cooperation and determination demonstrated today.

We believe that, through the effective management of its natural and human potential, Antalya can become one of the Mediterranean Basin's most climate-resilient, livable and economically competitive cities. We therefore invite all stakeholders not merely to read this report, but to engage in collective reflection, collaborative planning and joint action to shape Antalya's shared future.

FOREWORD

Cities That Plan for the Future Shape the Future

In the 21st century, cities have entered a new era in which their development is assessed not only in terms of their size but also through their capacity to adapt to changing conditions. Climate change, water security, energy transition, natural resource conservation and sustainable development are no longer solely matters of environmental policy; they have become strategic priorities that directly influence economic competitiveness, investment decisions and societal well-being.

This transformation necessitates a reassessment of urban development decisions based on scientific evidence. For cities such as Antalya, located in the Mediterranean Basin and characterized by substantial natural capital and economies heavily dependent on tourism and agriculture, this transition presents both significant risks and considerable opportunities.

This report goes beyond the scope of a conventional environmental assessment of Antalya's current vulnerability to climate change. Its primary objective is to establish a comprehensive, evidence-based framework encompassing policy recommendations, implementation priorities and governance approaches to support Antalya's climate-resilient development toward 2050.

The preparation of this report involved an integrated assessment of international climate policies, Türkiye's current legislative framework, scientific literature, national and international strategic documents, and Antalya's environmental, economic and social characteristics. Furthermore, a multidisciplinary approach was adopted, incorporating contributions from experts across various disciplines, public institutions, universities, professional chambers, private sector representatives and civil society organizations. Accordingly, the report seeks not only to ensure scientific and technical robustness but also to establish an actionable policy framework supported by a broad range of stakeholders.

A defining characteristic of this study is its recognition that climate change extends beyond environmental impacts. The report examines interconnected policy areas—including water management, energy, agriculture, tourism, ecosystems, climate finance and governance—within an integrated development framework. This approach is grounded in the understanding that environmental protection and economic development are not competing objectives but mutually reinforcing processes.

The ultimate value of this report lies not merely in its preparation but, more importantly, in its effective implementation. The recommendations presented are intended to foster a culture of collaboration among public institutions, local authorities, the private sector, universities and civil society organizations; inform investment decisions; and contribute to Antalya's long-term strategic planning processes.

We extend our sincere appreciation to all institutions, organizations, academics, experts, working groups and stakeholders who contributed their knowledge, perspectives and experience to the preparation of this report, as well as to all individuals who dedicated their time and efforts on a voluntary basis. We hope that this study will serve as a lasting reference for collaborative decision-making processes concerning Antalya's future.

MESSAGE FROM THE ANTALYA CIVIL PLATFORM

Shared Wisdom, Shared Responsibility, Shared Future

Dear Residents of Antalya,

Every city experiences defining moments in its history that shape its future. At such moments, what truly matters is not the magnitude of the challenges encountered, but the collective determination of society to develop solutions together.

Today, Antalya stands at such a turning point.

Climate change, water security, natural resource conservation, sustainable tourism, agricultural production, urbanization and economic transformation can no longer be addressed as independent issues. Antalya's future requires a shared vision, a strong culture of cooperation and a long-term planning approach that considers all these areas as an interconnected whole.

The Antalya Civil Platform was established in response to precisely this need.

Our Platform was established not to serve as an alternative to any public institution, local authority, professional organization or civil society organization, but to strengthen trust-based cooperation among all stakeholders, institutionalize collective wisdom and facilitate solution-oriented initiatives concerning Antalya's future. We believe that the future of a city is shaped not solely by public resources, but also by scientific guidance, the dynamism of the private sector, the knowledge accumulated by universities, the technical expertise of professional chambers and the voluntary contributions of society. In this context, the Antalya Civil Platform aims to serve as an independent and participatory forum for consultation, bringing together different institutions around a common objective.

The report presented here represents the first comprehensive outcome of this approach. However, from our perspective, this study is not an end in itself, but a beginning. The true value of a report lies not merely in its preparation, but in the implementation of its recommendations. Accordingly, our Platform will continue to contribute to Antalya's climate-resilient development in the coming period. Our priority areas of work will include supporting scientific studies, developing thematic working groups, strengthening cooperation between public institutions and the private sector, promoting national and international project partnerships, facilitating access to climate finance and monitoring the implementation of proposed measures.

Our most fundamental principle is impartiality.

Our Platform will act independently of political perspectives, institutional priorities and sectoral interests, placing Antalya's collective interests at the forefront. Every recommendation developed on the basis of scientific evidence will aim to protect our city's natural capital, enhance its economic competitiveness and leave a more livable Antalya for future generations.

We extend our sincere gratitude to all academics, public institutions, local authorities, professional chambers, private sector representatives, civil society organizations and working groups whose voluntary contributions supported the preparation of this report. We believe that Antalya's future will be shaped through collective wisdom, mutual trust and a culture of cooperation. As the Antalya Civil Platform, we embrace our responsibility to serve as a facilitator in this shared journey, supporting cooperation while respecting the mandates of public institutions and contributing to the continuity of implementation.

Respectfully,
Antalya Sivil Platformu

EXECUTIVE SUMMARY

Antalya 2050: A Shared Roadmap for a Climate-Resilient and Competitive Future

Antalya, with its rich natural resources, well-established tourism infrastructure, agricultural production capacity and internationally recognized brand value, is one of the strategic urban centers of Türkiye and the Mediterranean Basin. At the same time, its high exposure to the impacts of climate change places the city at a critical stage of transformation.

Drought, increasing pressure on water resources, extreme weather events, forest fires, changes in coastal areas, biodiversity loss and growing energy demand directly affect Antalya's economic growth, quality of life and international competitiveness. These developments clearly demonstrate that climate change is no longer solely an environmental issue but a strategic development challenge with economic, social and governance implications.

This report has been prepared to establish a shared policy framework aimed at accelerating Antalya's sustainable development while managing the risks it faces. Its fundamental approach is to regard environmental protection and economic development not as competing objectives but as mutually reinforcing components of an integrated development strategy.

Purpose of the Report

- The objectives of this report are to:
- Assess Antalya's climate change-related risks based on scientific evidence;
- Establish an integrated development model that safeguards natural capital and enhances economic competitiveness;
- Develop a collaborative framework for implementation involving public institutions, local authorities, universities, the private sector and civil society;
- Identify priority project areas for accessing national and international climate finance;
- Develop a concrete and measurable roadmap for implementation following COP31.

Antalya's Priority Strategic Risks:

The assessments conducted within the scope of this report identify the following five areas as strategic priorities for Antalya's climate-resilient development:

1. Water Security: Increasing water demand, drought and the impacts of climate change make integrated water resources management critically important.

2. Climate-Resilient Urbanization: Urban areas must be planned with due consideration of disaster risks and changing climatic conditions.

3. Transformation of the Tourism Sector: A sustainable tourism model should be developed to reduce water consumption, carbon footprints and seasonal vulnerabilities.

4. Agriculture and Food Security: Water-efficient production models and climate-adaptive agricultural practices should be widely adopted.

5. Natural Capital Conservation: Forests, coastlines, wetlands and biodiversity must be recognized as fundamental assets underpinning Antalya's long-term development.

Antalya 2050 Vision

The overarching vision of this report is to establish Antalya as a model Mediterranean city that safeguards its natural capital, ensures water security, completes the transition to a low-carbon economy, adapts to climate change, effectively utilizes technology and provides a high quality of life.

This vision is founded on an integrated approach to transformation that encompasses not only environmental policies but also the investment climate, economic growth, social well-being, institutional capacity and international competitiveness.

Strategic Approach

The "Antalya Model" proposed in this report conceptualizes climate change mitigation and adaptation not as the responsibility of a single sector, but as an integrated development model that aligns water management, energy, tourism, agriculture, ecosystems, urbanization, finance and governance around a common objective.

This model is based on five fundamental principles: natural capital conservation, climate-resilient economic transformation, integrated water and resource management, effective governance and stakeholder participation, and evidence-based decision-making supported by science, technology and data.

Implementation Framework

This report extends beyond an assessment document outlining strategic objectives. It also proposes a governance model designed to facilitate implementation.

Within this framework, the report establishes 10 Strategic Programmes, 100 Priority Actions, key performance indicators (KPIs), an institutional responsibility matrix, a monitoring and evaluation system, and a climate finance framework to ensure that its recommendations are actionable and measurable.

Priority Actions for Success

To ensure the successful implementation of the report, coordinated progress is required in several priority areas in the short term. These include strengthening Antalya-wide integrated data and decision-support systems; expanding integrated water management policies; developing a portfolio of projects to facilitate access to climate finance; reinforcing institutional coordination between local authorities and central government; encouraging private sector investment in green transformation; and establishing monitoring, performance evaluation and regular reporting mechanisms.

Conclusion

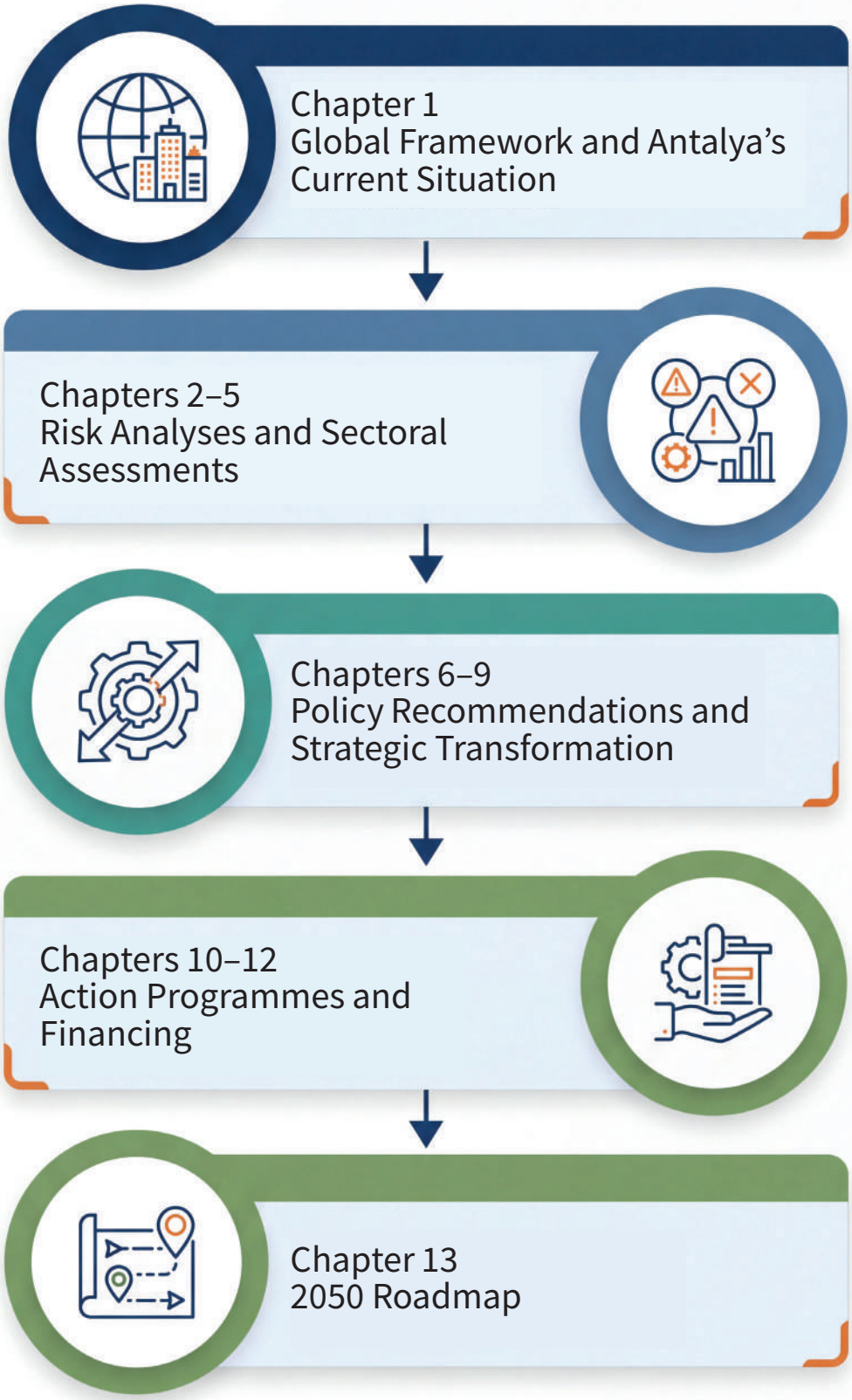
Antalya's future will depend less on how it responds to the risks posed by climate change than on how effectively it manages the broader transformation associated with these challenges.

This report is not merely a technical assessment identifying existing challenges. Rather, it presents an integrated development strategy aimed at safeguarding Antalya's natural capital, enhancing economic competitiveness, enabling more effective access to international climate finance and improving quality of life. Success will not be determined by the number of reports produced, but by the extent to which their recommendations are translated into institutional ownership and implemented with sustained commitment. Accordingly, coordinated action by central government, local authorities, universities, the private sector, professional organizations and civil society, guided by a shared sense of responsibility, is essential to achieving Antalya's 2050 vision.

Figure 1: Antalya 2050 Vision



Figure 2: Report Roadmap



CHAPTER 1

ANTALYA'S CLIMATE PROFILE AND STRATEGIC SITUATION ANALYSIS

Understanding Antalya's Natural Capital, Climate Risks and Development Dynamics

In This Chapter

- Antalya's Geography and Natural Environment
- Climate Characteristics and Trends
- Water Resources
- Agricultural Structure
- Ecosystems and Biodiversity
- Demographic Development
- Economic Structure
- Tourism
- Energy Profile
- Potential Impacts of Climate Change on Antalya

Chapter Objective

This chapter provides a comprehensive assessment of Antalya's current situation in relation to climate change, integrating its natural capital, economic structure, environmental assets and socioeconomic dynamics. The analyses presented in this chapter establish the scientific foundation for the strategic objectives, policy recommendations and action plans outlined in subsequent chapters of the report.

Key Message : Effective Future Planning Requires an Accurate Assessment of Current Conditions.

1.1 A New World on the Threshold of Global Transformation

The world is undergoing one of the most comprehensive transformations in human history in the 21st century. Since the beginning of the Industrial Revolution, the economic growth model has entered a period of profound change driven by increasing pressure on natural resources, biodiversity loss, energy transition, digitalization and the restructuring of the global economy. This transformation directly affects not only environmental policies but also production models, international trade, investment decisions, urban planning, financing mechanisms and societal lifestyles. Competitiveness is no longer measured solely by economic size, but increasingly by the capacity to adapt to changing climatic conditions, ensure the sustainable management of natural resources and develop resilient development models. In this new era, climate change has moved beyond an issue addressed exclusively as an environmental concern and has become a fundamental driver of economic security, food supply, energy policies and public health. Today, cities are responsible for a substantial proportion of greenhouse gas emissions while simultaneously serving as the primary locations where the impacts of climate change are most intensely experienced and where opportunities for transformation emerge.

The international community has developed a new governance approach in response to this transformation. The Paris Agreement, the United Nations Sustainable Development Goals, the reports of the Intergovernmental Panel on Climate Change (IPCC), the European Green Deal and the United Nations Climate Change Conferences of the Parties have established the global framework for this process. Climate change mitigation and adaptation policies are no longer regarded solely as international commitments; they have become central components of urban planning. Cities such as Antalya, located in the Mediterranean Basin, are particularly affected by this transformation. Scientific studies indicate that global warming is occurring at an accelerated rate in the Mediterranean region, while changes in precipitation patterns, water stress, prolonged droughts, forest fires and increasing pressure on coastal areas are reshaping the region's economic and ecological systems. Consequently, the future of Mediterranean cities will depend on their capacity to develop climate-resilient urban development models.

This global transformation presents not only new risks for cities but also significant opportunities. The expansion of green finance mechanisms, the widespread adoption of low-carbon production models, the implementation of circular economy practices, investments in renewable energy and nature-based solutions are emerging as new instruments supporting sustainable development. Within this transformation, cities capable of developing climate-resilient infrastructure, enhancing their attractiveness to international investment and improving quality of life will gain a stronger position in global competitiveness. The future of Antalya will therefore be shaped not merely by the extent to which it experiences the impacts of global climate change, but by its capacity to manage this transformation and develop an appropriate adaptation strategy. Accordingly, this first chapter of the report aims to establish the global framework and the evolving development paradigm before assessing the challenges facing Antalya.

Figure 3: Timeline of Global Transformation



1.2 Global Transformation and Antalya

From Climate Change to Green Development: Antalya's New Era of Competitiveness

The first quarter of the 21st century marks a period in which not only climate policies but also the global economy, international trade and investment paradigms are undergoing fundamental transformation. Green transition, low-carbon production, the circular economy, digitalization and sustainable finance have moved beyond the scope of environmental policies to become key determinants of urban competitiveness. In this new era, the success of cities is no longer measured solely by economic growth rates. Cities capable of safeguarding their natural capital, managing water resources sustainably, mitigating climate risks and complying with international sustainability standards gain significant advantages in attracting investment, improving quality of life and strengthening economic resilience.

This global transformation presents both significant risks and substantial opportunities for Antalya.

Antalya is a strategic urban center, recognized as one of the Mediterranean Basin's leading tourism destinations, a major center of protected cultivation in Türkiye, an area of high biodiversity and a city with strong connections to international trade networks. However, these characteristics also increase its vulnerability to the impacts of climate change.

Rising temperatures, changing precipitation patterns, increasing pressure on water resources, forest fires, changes in coastal areas and biodiversity loss threaten not only environmental assets but also Antalya's economic future. These developments directly affect sectors ranging from tourism revenues and agricultural production to energy demand and infrastructure investment. At the same time, the ongoing transformation of international trade is creating a new competitive environment for Antalya. The European Green Deal, carbon-related regulations, sustainable finance criteria, environmental reporting obligations and increasing sustainability requirements across supply chains are establishing new standards for a broad range of economic activities, from export-oriented enterprises to the tourism sector. Antalya's timely adaptation to this transformation is strategically important not only for achieving environmental objectives but also for maintaining its economic competitiveness.

Nevertheless, Antalya possesses significant strengths that provide a competitive advantage in managing this transformation successfully. Its substantial solar energy potential, well-developed tourism infrastructure, strong agricultural sector, entrepreneurial capacity, universities, research centers and international visibility constitute a valuable foundation for positioning the city among the pioneers of green transition.

Accordingly, Antalya faces a fundamental strategic choice: to remain a city that responds to the impacts of climate change as they emerge, or to become a city that proactively manages this transformation and converts its challenges into opportunities.

This report adopts the latter approach.

Antalya's future depends not only on the scale of new investments but also on the transformation of its existing economic structure toward a climate-resilient, resource-efficient and low-carbon development model. This approach recognizes the conservation of natural capital as a prerequisite for economic growth and considers environmental sustainability an integral component of competitiveness.

Therefore, Antalya's 2050 vision aims not merely to achieve climate change adaptation but also to implement a new development model centered on the green economy, innovation, technology, international finance and participatory governance. This approach provides the overarching framework for the policy recommendations and sectoral transformation strategies developed in subsequent chapters of the report.

1.3 The Antalya Model

A New Governance Approach Placing Natural Capital at the Center of Development

Global climate change requires cities to redefine not only their environmental policies but also their development paradigms. For many years, economic growth and environmental protection were regarded as competing objectives, while natural resources were often perceived as consumable inputs for economic development. Today, the unsustainability of this approach has become increasingly evident.

The emerging development paradigm recognizes natural capital as a prerequisite for economic growth. Water resources, forests, agricultural lands, coastlines, biodiversity and healthy ecosystems are not merely environmental assets requiring protection; they are fundamental factors of production underpinning tourism, agriculture, investment attractiveness and quality of life.

The Antalya Model has been developed on the basis of this understanding.

Unlike conventional approaches that address climate change solely in terms of its environmental impacts, the model proposes an integrated development system that establishes mutually reinforcing relationships among natural capital, economic competitiveness, social well-being and institutional governance. In this respect, the Antalya Model is not merely an environmental policy framework but a strategic governance framework designed to guide the city's long-term development. The model is founded on three core principles:

- **Growth through Conservation:** Recognizing the protection of natural assets not as a constraint on economic development, but as a fundamental safeguard of its long-term sustainability.
- **Development through Resource Efficiency:** Enhancing competitiveness through the efficient management and utilization of water, energy and other resources.
- **Strengthening through Collaborative Governance:** Ensuring that public institutions, local authorities, universities, the private sector and civil society act in accordance with a shared sense of responsibility.

In accordance with these principles, the Antalya Model is structured around six strategic pillars:

1. Natural Capital

The conservation of forests, water resources, coastlines, agricultural lands and biodiversity constitutes the foundation of Antalya's long-term economic sustainability.

2. Climate-Resilient Economy

The model aims to transform tourism, agriculture, industry, trade and the blue economy to enhance their capacity to adapt to climate change.

3. Resource Security

Water, energy, food and raw material security are recognized as essential components of economic resilience.

4. Resilient Urban Development

The model adopts a planning approach that reduces disaster risks, strengthens green infrastructure and supports smart city applications.

5. Green Finance

International climate funds, carbon markets, sustainable financing instruments and green investments are regarded as financial mechanisms capable of accelerating Antalya's transition.

6. Participatory Governance

The city's future is shaped through collaborative decision-making processes involving public institutions, local authorities, universities, the private sector, professional organizations and civil society. The Antalya Model is based not on a linear planning approach but on a mutually reinforcing, cyclical system. Investments in water management enhance agricultural productivity; a strong agricultural sector supports tourism; economic growth enables further environmental investment; and the strengthening of natural capital contributes to improved water security. In this way, environmental, economic and social benefits continuously reinforce one another, creating an integrated development transformation. This approach is fully aligned with international climate policies. The long-term objectives of the Paris Agreement, the United Nations Sustainable Development Goals, the European Green Deal and Türkiye's climate policies have been integrated with Antalya's local priorities to establish an actionable governance model.

One of the most significant characteristics of the Antalya Model is that it is not a temporary approach developed solely in preparation for COP31. Rather, the model has been designed as a permanent governance framework to support Antalya's development vision over the next 25 years. The success of the model will be measured not by the number of policy documents produced, but by tangible outcomes, including the conservation of natural capital, enhanced water security, increased green investment, improved access to international finance, greater climate resilience in the tourism and agricultural sectors, and stronger institutional cooperation.

All strategies, action plans and implementation recommendations presented in subsequent chapters of this report are founded on the core principles of the Antalya Model. Accordingly, the model represents not only the methodological foundation of this report but also a shared governance approach intended to translate Antalya's 2050 vision into practice.

1.4 Antalya's Strategic Risk Areas

Key Barriers to Climate-Resilient Development

A city's future is determined not only by its natural and economic assets. The accurate identification, prioritization and effective management of risks threatening these assets are equally important in shaping its long-term development potential. The preceding section outlined Antalya's natural capital, economic capacity and institutional strengths. However, establishing a robust vision for the future requires more than identifying existing strengths. It also necessitates a comprehensive assessment of the structural risks that could undermine these advantages.

In this report, risk is not defined merely as the possibility of an adverse event occurring. Rather, it encompasses the full range of strategic developments that, if not managed in a timely manner, could adversely affect Antalya's natural capital, economic competitiveness, societal well-being and quality of life over the long term. Consequently, risk management is not limited to disaster preparedness; it is an integral component of development policies. From the perspective of Antalya, climate change itself is not the only fundamental risk. The principal risk lies in maintaining existing planning approaches, investment priorities and resource management policies despite changing climatic conditions. In other words, the challenge is not solely climate change, but also the inability of urban governance systems to adapt to this transformation.

From this perspective, the risks facing Antalya are not independent of one another. Weakening water security may adversely affect agricultural production; agricultural losses may alter economic structures and rural livelihoods; pressures on tourism may influence investment decisions; and the degradation of natural ecosystems may undermine both quality of life and Antalya's international brand value. Therefore, these risks must be addressed not in isolation, but as components of an interconnected and mutually reinforcing system.

Based on the assessments conducted within the scope of this report, the principal strategic risk areas directly affecting Antalya's climate-resilient development have been identified as follows:

- Water security risks
- Risks associated with climate-vulnerable urban development and infrastructure
- Climate vulnerability of the tourism sector
- Agriculture and food security risks
- Ecosystem degradation and biodiversity loss
- Risks associated with delays in the energy transition
- Institutional coordination and governance risks
- Risks related to international competitiveness and access to finance

These risk areas have been identified not merely to describe existing challenges, but also to establish the foundation for the policy recommendations, investment priorities and implementation programmes developed in subsequent chapters of this report. Each risk area has been comprehensively assessed in relation to the overarching objectives of safeguarding Antalya's natural capital and promoting climate-resilient development.

Cities that effectively manage risks not only enhance their preparedness for disasters but also strengthen investor confidence, improve access to international finance, maintain economic competitiveness and enhance quality of life. Accordingly, the primary objective for Antalya's future is not to eliminate all risks, but to establish a resilient urban development model capable of anticipating, managing and transforming risks into opportunities. The following sections of this chapter provide a detailed examination of Antalya's priority strategic risk areas, drawing on scientific evidence and sectoral assessments.

Table 1: Antalya Strategic Risk Matrix

Strategic Risk	Likelihood	Impact Level	Priority
Water Security	Very High	Very High	Critical
Climate-Vulnerable Urban Development	High	Very High	Critical
Tourism Vulnerability	High	High	Very High
Agricultural Production	High	High	Very High
Ecosystem Loss	Moderate–High	Very High	High
Energy Transition	Moderate	High	Moderate–High
Institutional Coordination	Moderate	High	Moderate–High
Finance and Competitiveness	Moderate	High	Moderate–High

1.5 Conclusion and Transition to the Strategic Roadmap

From Analysis to Implementation

The assessments presented in this chapter demonstrate that the fundamental challenge facing Antalya is not limited to the impacts of climate change. The central issue is the city's capacity to implement, in a timely manner, a new governance approach that safeguards its natural capital while ensuring sustainable economic development.

When global developments, scientific evidence and Antalya's existing dynamics are considered together, climate change emerges not as an uncertain future scenario but as a tangible reality directly influencing public policies, investment decisions and urban planning. This situation presents two distinct future scenarios for Antalya.

Under the first scenario, the city continues to manage changing conditions through its existing planning approaches. This pathway would result in increasing pressure on water security, agricultural production, tourism, energy systems, urban development and natural ecosystems, while progressively undermining economic competitiveness.

Under the second scenario, Antalya approaches climate change not merely as a risk to be managed but as a strategic opportunity to accelerate the green transition. This approach would enable the development of a new economic model that safeguards natural capital, enhances resource efficiency, mobilizes international finance and improves quality of life. This report adopts the second approach.

Accordingly, the subsequent chapters of this report will not only provide detailed analyses of existing challenges but will also present, within an integrated framework, the policy recommendations, sectoral transformation strategies, implementation programmes and governance model required to achieve Antalya's 2050 vision.

The strategies developed within this framework are founded on four fundamental principles:

- Evidence-based decision-making
- A development approach centered on natural capital conservation
- Participatory and multi-stakeholder governance
- Development of measurable, monitorable and actionable policies

Guided by these principles, the following chapters provide a detailed examination of the priority policy areas that will shape Antalya's future, ranging from water management and energy to tourism, agriculture, urban development and climate finance.

Therefore, this report is not merely an analytical assessment of existing conditions; it is a strategic roadmap designed to guide implementation, define investment priorities and strengthen institutional cooperation.

Antalya's future will depend less on the natural assets it possesses than on the governance approach adopted to safeguard these assets. Accordingly, the subsequent chapters of this report present strategic transformation programmes that facilitate the transition from analysis to implementation and establish concrete policy instruments for operationalizing the Antalya Model.

CHAPTER 2

ANTALYA'S CLIMATE RISK PROFILE

Current Situation Analysis and Future Scenarios

"Risk that cannot be measured cannot be managed.
Unmanaged risk determines the future."

Chapter Objective

This chapter provides a scientific assessment of the environmental, economic and social risks facing Antalya as a result of climate change.

Water resources, rising temperatures, drought, extreme weather events, forest fires, sea-level changes, biodiversity loss, coastal areas and urbanization dynamics are assessed collectively to establish Antalya's climate risk profile.

By the end of this chapter, the principal areas of vulnerability facing Antalya over the next 25 years are identified, providing a scientific foundation for subsequent policy recommendations.

In This Chapter

- Antalya's Climate Characteristics
- Temperature Trends
- Changes in Precipitation Patterns
- Drought Analysis
- Future of Water Resources
- Forest Fire Risk
- Sea-Level Rise
- Coastal Areas
- Biodiversity
- Disaster Risk
- Climate Projections
- Antalya's Strategic Risk Map

Key Message

Climate change is not merely a future environmental challenge for Antalya. It is a structural development issue that already influences investment decisions, the tourism sector, agriculture, water security and urban life.

This chapter has been prepared based on IPCC assessment reports, Türkiye's national climate projections, meteorological data and regional analyses specific to Antalya.

Figure 4: Climate Risks



2.1 Antalya's Geographical and Strategic Location

A Natural Capital Hub at the Crossroads of the Mediterranean

A city's geographical location does more than define its physical position; it shapes its economic development potential, natural resources, climate, transportation networks, production patterns and long-term development strategies. Antalya's internationally recognized tourism capacity, strong agricultural production, biodiversity and quality of life are largely attributable to the advantages provided by its distinctive geographical setting. Located in southwestern Türkiye, Antalya occupies a strategic transition zone in the eastern Mediterranean Basin. Covering approximately **20,000 km²** and extending along **more than 640 kilometers of coastline,** Antalya is not only one of Türkiye's largest provinces but also one of the Mediterranean's most significant coastal cities. Bordered by Muğla to the west, Burdur, Isparta and Konya to the north, and Karaman and Mersin to the east, the province forms a natural connection between inland Anatolia and the eastern Mediterranean.

A defining characteristic that distinguishes Antalya from many other coastal cities is the close geographical proximity of its **marine, mountain, plain and forest ecosystems**. The Taurus Mountains extend parallel to the coastline, while fertile coastal plains, karstic water systems and extensive coastal ecosystems provide the city with both high levels of natural diversity and substantial economic production capacity. The coexistence of tourism, agriculture, forestry and the maritime economy within the same geographical area is a direct consequence of this integrated natural environment.

These geographical advantages make Antalya not only a major center of economic production but also a region particularly vulnerable to the impacts of global climate change. Scientific assessments, including those conducted by the IPCC, identify the Mediterranean Basin as one of the regions most vulnerable to climate change. Consequently, Antalya's coastlines, water resources, agricultural lands and natural ecosystems face multiple interconnected pressures, including rising temperatures, changing precipitation patterns, drought, forest fires and sea-level changes.

Antalya's strategic significance extends beyond its natural characteristics. The province is one of the major centers of regional development, supported by a tourism sector that attracts millions of visitors annually, its leading position in Türkiye's protected cultivation sector, expanding logistics networks and international trade relations. Consequently, environmental changes occurring in Antalya may have direct implications not only at the local level but also for the national economy. Antalya's geographical location also provides significant opportunities for international cooperation. Its established relationships with Mediterranean cities, accessibility to European markets, maritime transportation potential and strong international visibility as a tourism destination offer substantial advantages for green transition initiatives, climate finance and sustainable development projects. These characteristics demonstrate that Antalya has the potential not only to be a city affected by climate change but also to emerge as a leading Mediterranean city capable of developing solutions to climate-related challenges. Accordingly, Antalya's geographical location should be regarded not merely as a physical characteristic but as a strategic advantage that supports natural capital conservation, enhances economic competitiveness and promotes climate-resilient development. However, the sustainability of this advantage depends on the protection of natural resources, evidence-based land-use decisions and the adoption of climate-adaptive planning approaches. The analyses of climate characteristics, water resources, ecosystems, agriculture, tourism and urbanization presented in subsequent sections of this report are therefore structured around an integrated assessment of both the opportunities and vulnerabilities associated with Antalya's geographical and strategic position.

2.2 Climate Characteristics and Trends

Climate Dynamics Shaping Antalya's Competitiveness

Climate is more than an environmental factor defining Antalya's natural characteristics; it is a fundamental strategic determinant of economic production patterns, the sustainability of water resources, agricultural productivity, tourism seasonality, energy demand and the quality of urban life. Antalya's current development model has been largely shaped by the advantages provided by its Mediterranean climate. However, global climate change is altering the nature of these advantages. Climatic conditions that have supported economic growth for decades are increasingly generating new risks due to rising temperatures, changing precipitation patterns and more frequent extreme weather events. Therefore, planning Antalya's future requires not only an understanding of its existing climatic characteristics but also an accurate assessment of emerging climate trends and their implications for different economic sectors.

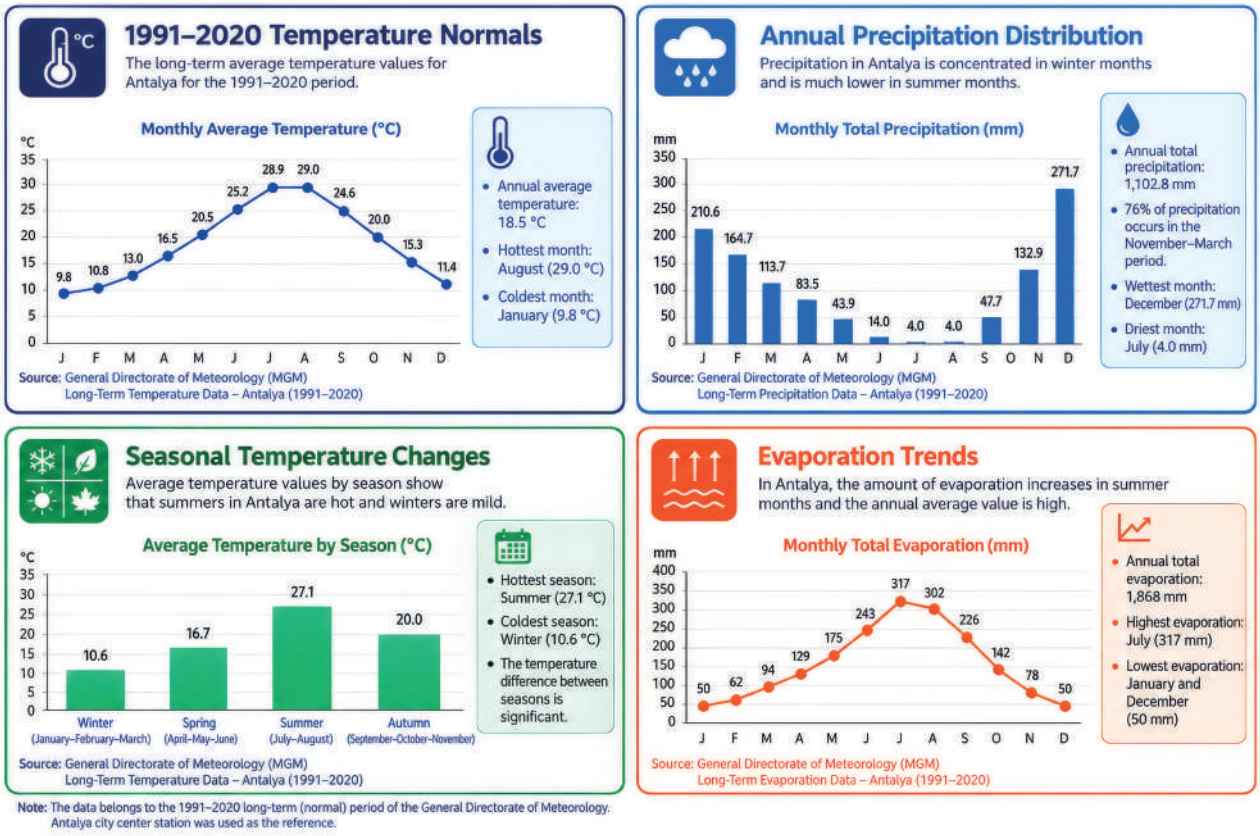
2.2.1 Antalya's Climatic Characteristics

Antalya is located within the typical Mediterranean climate zone, characterized by hot, dry summers and mild, rainy winters. However, the province's topographical characteristics create distinct microclimatic zones over relatively short distances, extending from the coastal belt to the higher elevations of the Taurus Mountains. This climatic diversity contributes to biodiversity while directly influencing agricultural production patterns and the hydrological cycle. It also results in spatial variations in the intensity of climate change impacts across the province.

2.2.2 Current Climate Indicators

Long-term meteorological observations indicate that Antalya experiences high summer temperatures, receives most of its annual precipitation during the winter months and is characterized by pronounced dry conditions in summer. Although these climatic characteristics have historically provided significant advantages for tourism and agriculture, they also make the seasonal balance of water resources particularly sensitive to climatic variability.

Figure 5: Data from the Turkish State Meteorological Service



2.2.3 Changing Climate Trends

Scientific observations and climate projections indicate that average temperatures in Antalya are increasing, heatwaves are becoming more frequent and prolonged, and significant changes are occurring in the temporal distribution of precipitation rather than merely in its total amount. Accordingly, short-duration but high-intensity precipitation events are expected to increase, prolonged dry periods to become more persistent, and pressure on water resources to intensify. Climate change is not only altering average climatic conditions but also increasing climate variability. This implies that infrastructure systems designed on the basis of historical climate data may no longer be capable of maintaining the same level of performance under future climatic conditions.

2.2.4 Strategic Implications for Antalya

- Changes in climatic conditions simultaneously affect multiple sectors.
- Tourism: Extreme temperatures may alter the timing and duration of the tourism season.
- Agriculture: Irrigation requirements and crop production patterns may undergo significant changes.
- Water Management: Increasing pressure on water supply security may emerge.
- Energy: Electricity demand for cooling purposes may increase during the summer months.
- Urban Areas: The urban heat island effect may intensify in city centers.
- Ecosystems and Biodiversity: Natural ecosystems and biodiversity may be exposed to increasing environmental stress.

Consequently, climate change is becoming a cross-cutting factor affecting Antalya's entire development system, from natural capital to economic competitiveness, rather than a challenge confined to a single sector.

Analytical Assessment

Antalya's climate has historically constituted one of the city's most significant competitive advantages. However, these climatic characteristics are now generating new vulnerabilities under changing global conditions. The strategic objective is not to alter the climate itself, but to develop a climate-resilient development model capable of adapting to changing climatic conditions. Accordingly, water management, energy efficiency, resilient urban development, ecosystem conservation and sustainable tourism policies should not be addressed as isolated initiatives, but as integral components of a coordinated transformation programme.

Policy Implications

Climate data should no longer be regarded solely as meteorological records in planning Antalya's future. Urban planning, infrastructure investments, tourism strategies, agricultural policies and water management decisions must be based on climate scenarios that account for changing climatic conditions. This approach is essential for safeguarding Antalya's climatic advantages and maintaining its long-term competitiveness.

Figure 6: Antalya Climate Dashboard



2.3 Demographic Structure and Population Dynamics

A Growing Antalya: Population, Migration and Climate-Resilient Urbanization

The vulnerability of cities to climate change is determined not only by natural conditions. Population size, distribution, mobility and socioeconomic characteristics directly influence the intensity of climate-related risks, from water demand and transportation systems to housing needs and energy consumption. Demographic structure is therefore one of the fundamental planning inputs for climate-resilient development.

Over the past three decades, Antalya has become one of Türkiye's fastest-growing cities. Driven by tourism, agriculture, trade, the service sector and quality of life, the city has experienced continuous migration and has evolved into a dynamic metropolitan area that must accommodate not only its permanent population but also substantial seasonal population movements. While this growth contributes to economic vitality, it also places increasing pressure on water resources, infrastructure, transportation, housing, natural areas and public services.

2.3.1 Population Growth Trends

According to the Turkish Statistical Institute (TurkStat), Antalya's population has grown steadily over the past two decades, exceeding 2.7 million. This growth extends beyond natural population increase. Antalya's demographic structure reflects several concurrent population movements:

- Internal migration
- International migration
- Temporary tourism-related population
- Seasonal agricultural workers
- Foreign resident population

This demographic diversity strengthens Antalya's economic dynamism while increasing the complexity of public service planning.

2.3.2 Seasonal Population Pressure

One of Antalya's defining characteristics is its fluctuating population throughout the year. During the tourism season, rising visitor numbers significantly increase the city's effective population. Seasonal agricultural workers and short-term foreign residents further contribute to fluctuations in water consumption, wastewater generation, energy demand, transportation and healthcare services.

Therefore, infrastructure planning in Antalya cannot rely solely on registered population figures. Planning must incorporate the concept of a **dynamic population.**

2.3.3 Migration and Spatial Development

Migration directly influences Antalya's spatial development. The emergence of new residential areas, increasing development pressure on coastal regions, conversion of agricultural land and rising transportation demand must be assessed in conjunction with climate adaptation policies.

Uncontrolled urban growth not only increases infrastructure costs but may also lead to the fragmentation of natural areas, the expansion of impermeable surfaces and the intensification of the urban heat island effect. Therefore, population policies and land-use decisions must be addressed within an integrated planning framework.

2.3.4 Implications of Demographic Structure for Climate Policies

Population growth is a key factor directly influencing the implementation of Antalya's climate policies. A growing population increases demand for drinking water, energy consumption, waste generation, transportation, green spaces and disaster management capacity. Therefore, climate change adaptation requires not only environmental investments but also urban planning that incorporates demographic trends.

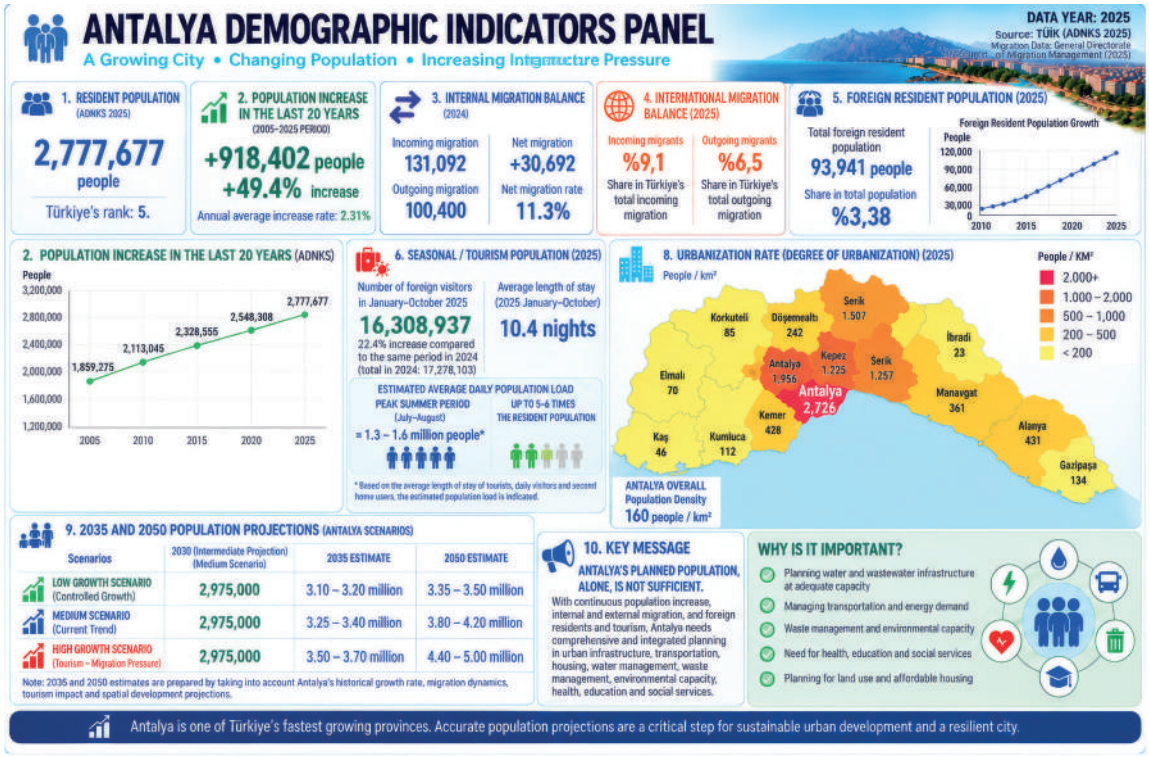
Analytical Assessment

Antalya's population growth is a significant indicator of economic development. However, this growth also creates new challenges for natural resource carrying capacity, infrastructure systems and public services. The city's success depends not on restricting population growth but on managing it through planning approaches that safeguard natural capital, improve resource efficiency and enhance quality of life.

Policy Implications

Population projections should not be used merely as statistical forecasts in planning Antalya's future. Water management, transportation, energy, housing, healthcare, education and disaster preparedness plans must account for seasonal population movements and long-term demographic trends. This approach is a fundamental requirement for climate-resilient urbanization.

Figure 7: Antalya Demographic Indicators Dashboard



2.4 Natural Capital and Ecosystem Services

Antalya's Greatest Asset: The Value Generated by Nature

A city's development capacity is measured not only by its capital, infrastructure or investment volume but also by the health and sustainability of the natural systems supporting economic activity. Forests, water resources, coastlines, agricultural lands, seas and biodiversity are not merely environmental assets requiring protection; they constitute natural capital that underpins economic production and social well-being.

Antalya's economic success largely depends on this natural capital. Its international tourism appeal, high agricultural productivity, quality of life, water resources and strong city brand are outcomes of ecosystem services provided by nature over time. Therefore, protecting Antalya's natural assets is not only an environmental responsibility but also a strategic necessity for maintaining economic competitiveness.

2.4.1 What Is Natural Capital?

Traditional development approaches have long regarded natural resources as unlimited and considered economic growth independently of environmental systems. Today, this perspective is being replaced by the concept of natural capital. Under this approach, nature is not a passive element outside economic activity but a productive asset that continuously generates value.

- Forests store carbon.
- Wetlands filter water.
- Soil supports agricultural production.
- Marine ecosystems sustain fisheries.
- Pollinators enhance agricultural productivity.
- Natural coastlines support the tourism economy.

Together, these processes continuously generate economic benefits for society without requiring the construction of factories or additional investment.

2.4.2 Antalya's Natural Capital Profile

Antalya possesses one of Türkiye's most significant natural capital endowments. The Taurus Mountains, extensive forests, fertile agricultural plains, abundant groundwater and surface water resources, long coastline, wetlands and rich biodiversity constitute the province's principal natural capital assets.

These components are interconnected. The Taurus Mountains sustain water catchments; water resources support agriculture; agriculture strengthens the rural economy; healthy coastlines contribute to tourism; and forests function as carbon sinks while supporting the hydrological cycle. Antalya's economic success depends on the combined functioning of these natural systems.

2.4.3 Ecosystem Services

Ecosystem services encompass the benefits that natural systems provide to society.

For Antalya, these services can be classified into four main categories:

- **Provisioning Services:** Drinking water, agricultural production, fisheries and forest products.
- **Regulating Services:** Carbon sequestration, flood control, erosion prevention, climate regulation and natural water filtration.
- **Cultural Services:** Tourism, recreation, landscape value, historical and natural heritage.
- **Supporting Services:** Soil formation, nutrient cycling, pollination and biodiversity conservation.

Although many of these services are not reflected in market prices, they form the invisible foundation of Antalya's economy.

2.4.4 Pressures on Natural Capital

Antalya's natural capital faces increasing risks from climate change, rapid urbanization, land-use changes, pressure on water resources, intensive coastal development, forest fires and biodiversity loss.

These pressures not only degrade environmental quality but may also cause economic losses across multiple sectors, from tourism revenues and agricultural production to investment attractiveness and quality of life.

Therefore, natural capital conservation should be regarded as a preventive investment that reduces potential future costs.

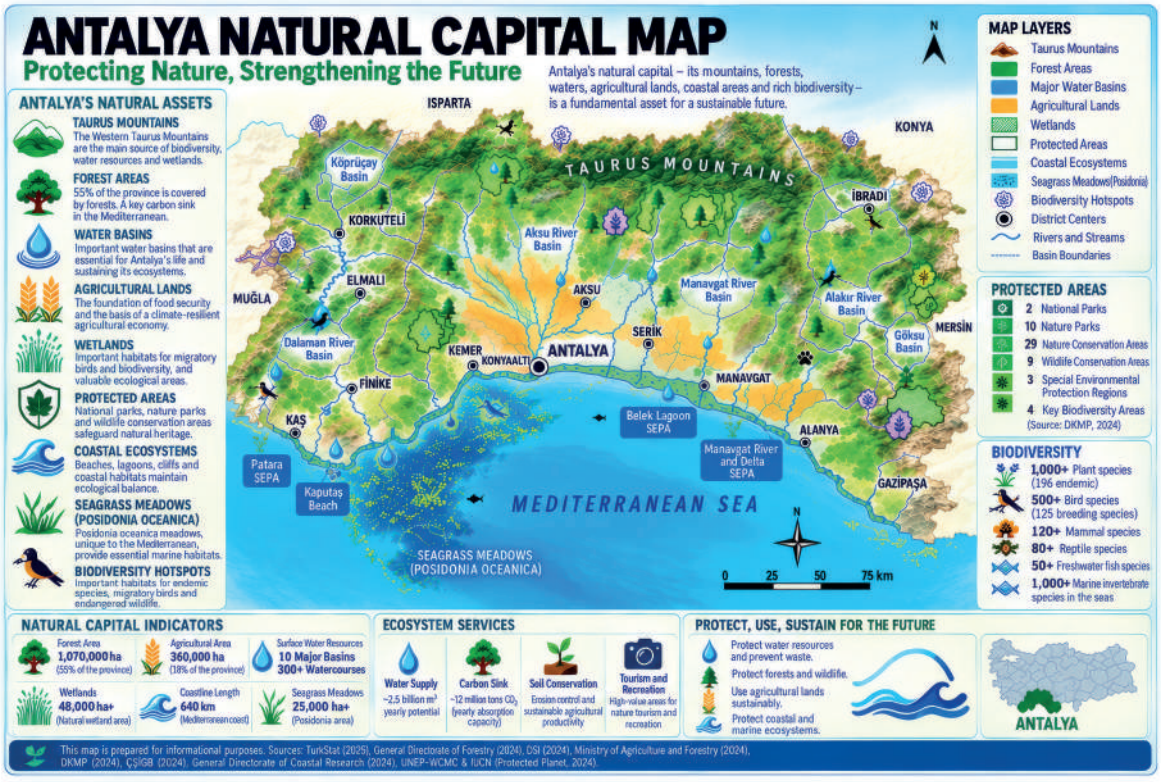
Analytical Assessment

Antalya's natural capital is not an alternative to economic growth but a prerequisite for it. The degradation of natural systems would directly affect not only the environment but also tourism, agriculture, water security and the urban economy. Natural capital management must therefore move beyond the narrow scope of environmental policy and become central to development planning.

Policy Implications

The impacts on natural capital must be systematically assessed when formulating investment decisions, land-use plans and sectoral development strategies in Antalya. Ecosystem conservation should be regarded not as an additional cost but as a strategic investment that strengthens long-term economic resilience. This approach will provide a practical foundation for implementing **"Development through Conservation"** one of the core principles of the Antalya Model.

Figure 8: Antalya Natural Capital Map



2.5 Land Use and Spatial Development Dynamics

Spatial Planning Decisions Shaping Antalya's Future

The future of a city is determined not only by how much it grows, but also by how it grows. Land-use decisions are among the fundamental planning instruments for conserving natural capital, ensuring the sustainable management of water resources, preserving agricultural land, improving the efficiency of transportation systems and reducing disaster risks. Spatial development therefore constitutes a cornerstone of climate-resilient development.

Over the past three decades, Antalya has undergone significant spatial transformation driven by tourism, agriculture, the service sector and population growth. New residential areas, transportation investments, tourism facilities and economic activities have accelerated urban development. However, this expansion has also intensified pressures on natural areas, coastal zones and fertile agricultural land.

Accordingly, the fundamental planning priority for Antalya should no longer be **"growing more," but rather "growing while conserving natural capital."**

2.5.1 Antalya's Spatial Structure

Antalya's spatial structure is characterized by the close geographical proximity of the Taurus Mountains, coastal zones, alluvial plains, forests, wetlands and urban settlements. This distinctive configuration generates both considerable economic diversity and heightened environmental sensitivity.

While mountainous areas serve as natural boundaries to development, coastal plains offer significant advantages for agriculture and human settlement. However, these same areas are among those experiencing the greatest pressures from unplanned urban expansion.

2.5.2 Land Use Trends

In recent years, Antalya has experienced several significant land-use trends, including the expansion of urban settlements, the concentration of tourism investments along coastal areas, the development of transportation infrastructure, the transformation of rural areas, and increasing development pressures associated with population growth.

While these changes support economic growth, they also introduce new risks, including the fragmentation of natural habitats, the loss of agricultural land, and the weakening of ecological corridors.

2.5.3 Climate Change and Spatial Planning

Climate change has become a critical parameter directly influencing land-use planning decisions. In the coming decades, areas exposed to high flood risks, coastal zones vulnerable to inundation, settlements susceptible to wildfires, river basins experiencing drought-related pressures, and urban areas prone to intensified heat island effects will require greater consideration in planning processes. Accordingly, land-use decisions must be informed not only by current needs but also by future climate scenarios.

2.5.4 Balancing Conservation and Development

Antalya's sustainable development depends on establishing an appropriate balance between conservation and land use. In this context, prime agricultural land, river basins, forest ecosystems, wetlands, coastal ecosystems, biodiversity habitats, and critical natural areas should be recognized not as barriers to development but as essential natural capital underpinning long-term economic sustainability. The designation of new development areas should therefore be guided by natural constraints, ecological carrying capacity, and climate projections as fundamental planning criteria.

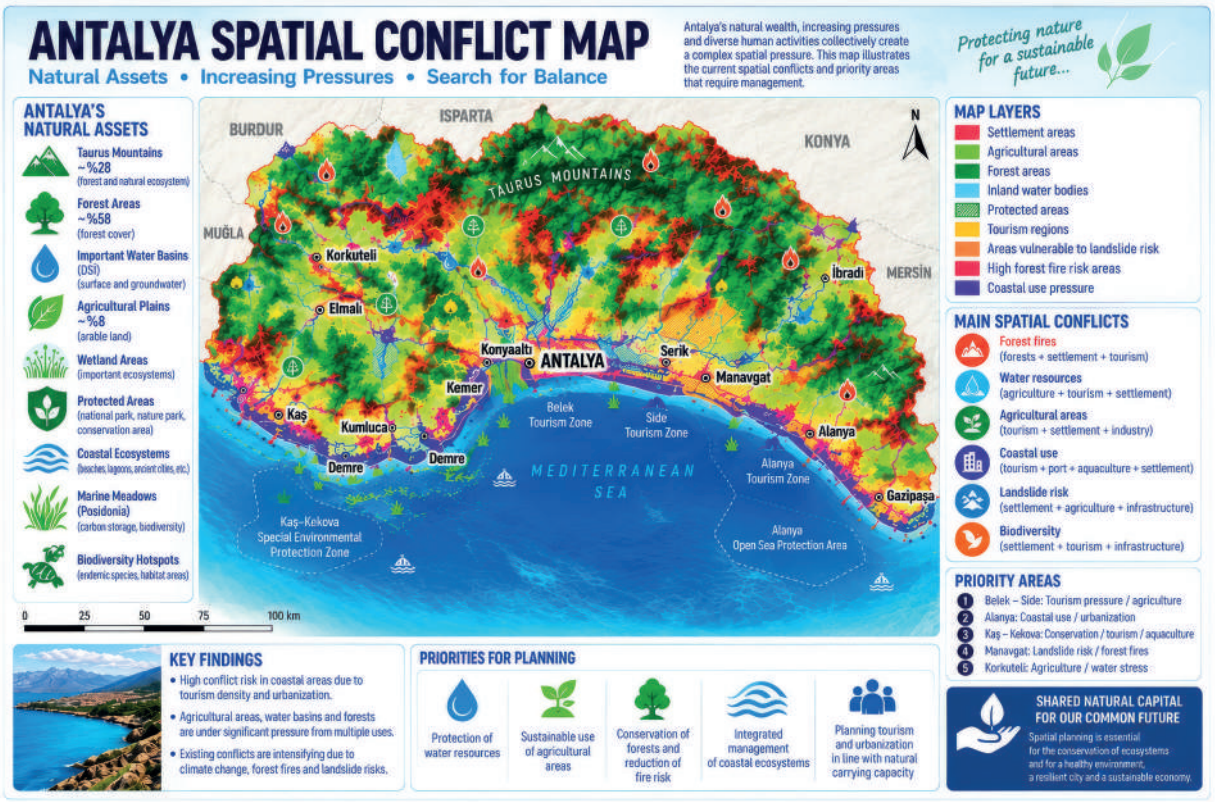
Analytical Assessment

Antalya's land-use policies extend beyond conventional urban planning considerations. Spatial planning decisions simultaneously affect multiple sectors, including water security, agricultural production, disaster risk management, and the tourism economy.Planning decisions must therefore be developed through an integrated, ecosystem-based approach rather than through fragmented, sector-specific interventions. Land-use decisions made today will determine Antalya's natural capital and economic competitiveness in 2050.

Policy Implications

In Antalya, metropolitan-scale environmental master plans, zoning and implementation plans, and sectoral investment decisions should be addressed within an integrated climate adaptation framework.Land-use changes should be systematically assessed not only in terms of their economic returns but also with regard to their impacts on water budgets, carbon sinks, agricultural production capacity, biodiversity, and disaster risks. Through this approach, spatial planning can evolve beyond a conventional instrument for managing urban growth into a strategic governance mechanism that actively shapes climate-resilient development.

Figure 9: Antalya Spatial Conflict Map



2.6 Water Resources and Integrated Water Management

A Strategic Resource Shaping Antalya's Future

Water is one of the most critical components of Antalya's natural capital. The sustainability of the city's agricultural production capacity, tourism economy, industrial activities, ecosystems, and quality of life depends on the availability and sustainable management of water resources. Water management is therefore not merely an environmental policy issue; it is a fundamental determinant of economic development, social welfare, and climate resilience. For many years, Antalya has been regarded as a city with abundant water resources due to its extensive surface water and groundwater reserves. However, climate change, population growth, rapidly increasing demand during the tourism season, agricultural irrigation requirements, and spatial expansion necessitate a reassessment of this perception. Today, Antalya's primary challenge is not simply to develop additional water resources, but to manage existing resources more efficiently, resiliently, and within a circular water management framework.

2.6.1 Antalya's Water Resource Potential

Antalya is among Türkiye's provinces with considerable water resource potential, owing to its rivers originating in the Taurus Mountains, karstic springs, and groundwater reserves. The Manavgat, Köprüçay, Aksu, Alara, and Dim rivers, together with karstic water systems, are of vital importance for drinking water supply, agricultural production, and ecosystem sustainability. Nevertheless, this potential cannot be regarded as an unlimited resource, particularly in the context of climate change and increasing pressures on water use.

2.6.2 Water Use Profile

Water consumption in Antalya is concentrated in four main sectors: domestic water supply, agricultural irrigation, tourism, and industry. Agriculture and tourism, in particular, generate high water demand during the same periods of the year. Increasing temperatures during the summer months further intensify this pressure. Water management in Antalya is therefore not merely a matter of resource allocation but a strategic governance issue requiring a balance among competing sectoral demands.

2.6.3 Pressures on Water Resources

The principal pressures affecting Antalya's water security include rising temperatures associated with climate change, irregular precipitation patterns, increased evaporation, rapidly growing tourism-related demand during the summer months, agricultural irrigation requirements, declining groundwater levels, and urban expansion. When considered collectively, these factors demonstrate that Antalya's primary future challenge is not merely water scarcity, but water security. The central issue is not only the total volume of available water resources, but also ensuring that water is available at the right time, in the right location, and at the required quality.

2.6.4 Climate Change and Water Security

For Antalya, climate change entails more than rising temperatures. The fundamental transformation is occurring within the hydrological cycle. Changes in the temporal distribution of precipitation, reduced snow accumulation, groundwater recharge, agricultural irrigation, and natural ecosystems are directly affected. Consequently, future water policies must focus not only on developing new water resources but also on demand management, water-use efficiency, and resilient infrastructure.

2.6.5 Integrated Water Management

The approach required for Antalya's future should be based on **Integrated Water Resources Management (IWRM).**

This model should be based on five fundamental principles:

- **River Basin-Based Planning:** Managing water resources according to natural river basin boundaries rather than administrative jurisdictions.
- **Demand Management:** Promoting water-efficiency measures across agriculture, tourism, industry, and urban areas.
- **Alternative Water Resources:** Assessing options such as the reuse of advanced-treated wastewater, rainwater harvesting, and seawater desalination where appropriate.
- **Ecosystem-Based Approach:** Protecting wetlands, rivers, and groundwater recharge areas.
- **Data-Driven Management:** Establishing real-time monitoring of water quantity and quality and ensuring that decision-making processes are based on reliable data.

Analytical Assessment

Water is not merely a natural resource consumed in Antalya; it is a strategic asset that determines the city's economic competitiveness, food security, tourism capacity, and the sustainability of its natural ecosystems. Water management must therefore prioritize not only the development of new water resources but also the protection, reuse, and equitable allocation of existing resources across sectors.

Policy Implications

Antalya's water policies should shift from the conventional **"increasing water supply"** approach towards a comprehensive **"ensuring water security"** framework. Reducing water losses and leakages, promoting the reuse of treated wastewater, implementing rainwater harvesting in urban areas, establishing digital monitoring systems, adopting basin-based planning, and developing alternative water resources should be addressed within an integrated management framework. Through this approach, Antalya has the potential to become one of the Mediterranean cities recognized as a model for water management, rather than merely a city managing the impacts of climate change.

Figure 10: Antalya Circular Water Management Model



Antalya's Strategic Production Capacity: Towards Climate-Resilient Agriculture

Agriculture is not only one of the key sectors of Antalya's economy but also a strategic production system that directly influences food security, rural employment, exports, the sustainable use of natural capital, and regional development. Antalya's agricultural success is attributable not only to its fertile soils but also to favorable climatic conditions, advanced greenhouse infrastructure, accumulated expertise among agricultural producers, and its capacity to access international markets.However, climate change is reshaping this competitive advantage. Rising temperatures, irregular precipitation patterns, drought, water stress, emerging pests, and extreme weather events are increasing production costs while affecting crop patterns and agricultural productivity. Therefore, Antalya's primary objective for the future should not be limited to increasing agricultural output but should focus on establishing **a climate-resilient, resource-efficient agricultural system that generates high added value.**

2.7.1 Antalya's Agricultural Production Profile

Antalya holds a leading position in Türkiye's greenhouse agriculture sector. The province makes significant contributions to the national economy through the production of fresh fruits and vegetables, citrus fruits, tropical fruits, ornamental plants, and seeds. Agricultural production not only supplies domestic markets but also generates substantial value through exports and international trade. This production structure demonstrates that agriculture in Antalya is not merely a rural economic activity but an integrated economic sector closely linked to advanced technology, logistics, and foreign trade.

2.7.2 Impacts of Climate Change on Agriculture

Climate change affects Antalya's agricultural sector in multiple ways. The principal impacts include increasing irrigation water requirements, yield losses associated with heat stress, changes in production calendars, increasing pest and disease pressures, crop losses resulting from extreme precipitation and hail events, and the deterioration of soil quality. These impacts directly affect not only agricultural producers but also food prices, export performance, and the rural economy.

2.7.3 Food Security and Rural Resilience

Antalya's agricultural production capacity represents not only an economic asset but also a strategic resource. In the context of increasing climate risks, the sustainability of domestic production, agricultural land security, price stability, and the continuity of rural livelihoods are becoming increasingly important. Rural development policies should therefore focus not only on income growth but also on strengthening farmers' capacity to adapt to climate risks, retaining younger generations in agriculture, promoting agricultural cooperatives, expanding digital farming practices, and facilitating knowledge and technology transfer.

2.7.4 Climate-Resilient Agriculture Model

The agricultural development approach proposed for Antalya's future should be structured around four fundamental pillars:

- **Water Efficiency:** Pressurized irrigation systems, precision irrigation techniques, and technologies designed to reduce water consumption.
- **Digitalization:** Sensors, remote monitoring, meteorological early warning systems, and data-driven agricultural production planning.
- **Value Addition:** Organic agriculture, good agricultural practices, geographically indicated products, and branding.
- **Circular Production:** Utilizing agricultural waste for energy and fertilizer production, promoting low-carbon agricultural practices, and maintaining soil health.

This model will enhance Antalya's capacity to adapt to climate change while also strengthening its competitiveness in international markets.

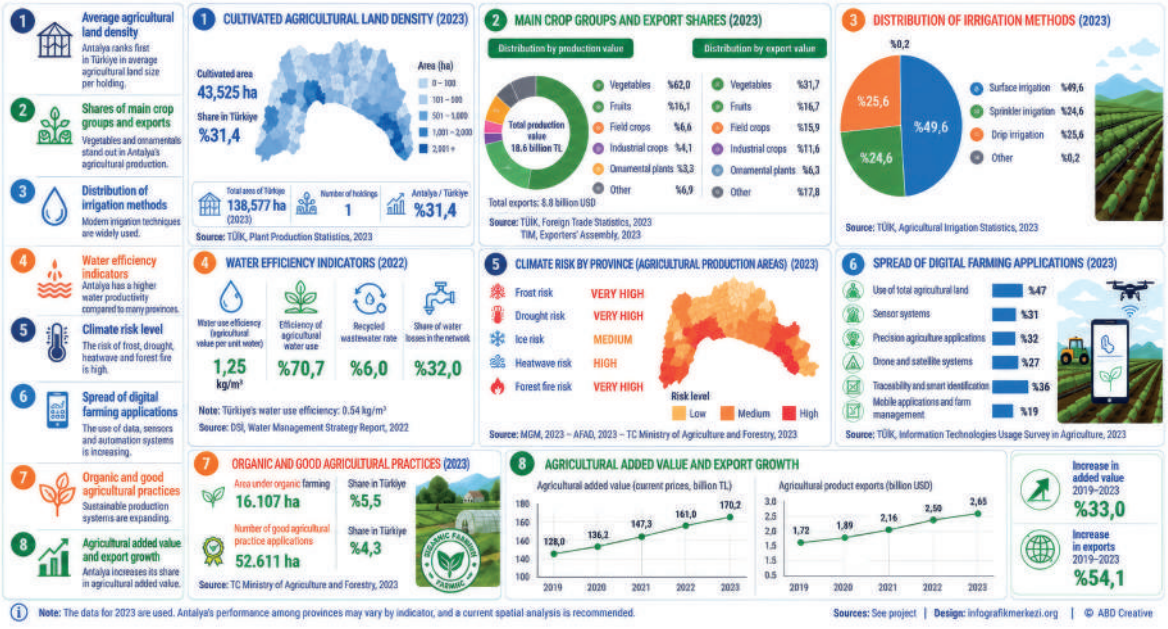
Analytical Assessment

The future performance of Antalya's agricultural sector should be assessed not solely in terms of production volume, but also in terms of its capacity to use natural resources efficiently. Future competitive advantages will increasingly depend on production models that consume less water, use less land, produce higher-quality outputs, achieve greater productivity, and generate lower environmental impacts. Therefore, agricultural policies should be designed in an integrated manner, incorporating water management, energy transition, biodiversity conservation, and climate adaptation strategies.

Policy Implications

Agricultural policies developed for Antalya should take into account climate projections, water budgets, and sustainability criteria in international trade. Support mechanisms for agricultural producers should be linked not only to production volumes but also to indicators such as water efficiency, carbon footprint reduction, digital farming practices, and high-value-added production. Through this approach, Antalya has the potential to emerge not only as Türkiye's agricultural production hub but also as **a model for climate-resilient agriculture** in the Mediterranean Basin.

Figure 11: Antalya Agricultural Resilience Dashboard



2.8 Industry, Trade and Economic Structure

Antalya's Economic Pathway towards Green Transformation

Antalya's economy has a diversified structure built upon its natural capital. Tourism, agriculture, trade, services, and emerging industrial activities collectively shape the city's economic growth. While this diversity provides Antalya with significant resilience, global climate change and the green transition necessitate a reassessment of its economic structure. Today, the economic performance of cities is measured not only by production capacity but also by resource efficiency, carbon intensity, technology adoption, and the capacity to comply with international sustainability standards. Therefore, Antalya's future competitiveness will depend more on **the pace of its economic transformation** than on the size of its economy.

2.8.1 Antalya's Economic Structure

Antalya's economy is predominantly based on the service sector, with tourism and related activities playing a significant role. The agricultural sector constitutes the second major pillar of the economy, particularly through greenhouse cultivation, fresh fruit and vegetable production, and food exports. The industrial sector complements this structure through organized industrial zones, food processing, construction materials, machinery, and various manufacturing activities.

This multisectoral structure represents a significant advantage in reducing Antalya's economic risks. However, interdependencies among sectors also contribute to the transmission of climate change impacts throughout the economy.

2.8.2 Green Transformation and New Competitive Conditions

Environmental performance is becoming an increasingly decisive factor in international trade. Carbon regulations, sustainable supply chains, environmental reporting obligations, and investor expectations are establishing new competitiveness criteria for businesses.

For Antalya, this transformation creates both new obligations and new opportunities for exporting enterprises, the tourism sector, agricultural producers, and industrial organizations.

Businesses that adapt early to the green transition will gain advantages in international markets, while sectors that delay this transformation may face increasing competitive pressures.

2.8.3 Industry and Resource Efficiency

The concept of sustainable production in industry is no longer limited to environmental protection objectives. Energy efficiency, water efficiency, circular economy practices, waste recovery, and carbon management have become essential instruments for reducing operational costs and enhancing the international competitiveness of enterprises.

Organized industrial zones and manufacturing facilities should serve as pioneering implementation areas for this transformation.

2.8.4 Trade, Investment and Innovation

Antalya's economic transformation is not limited to the development of existing sectors. The city also has the potential to attract investment in emerging fields such as green technologies, environmental engineering solutions, water technologies, renewable energy, digital applications, sustainable finance, and climate technologies. This approach will contribute to positioning Antalya not only as a tourism and agricultural center but also as **one of the Mediterranean's green innovation hubs.**

Analytical Assessment

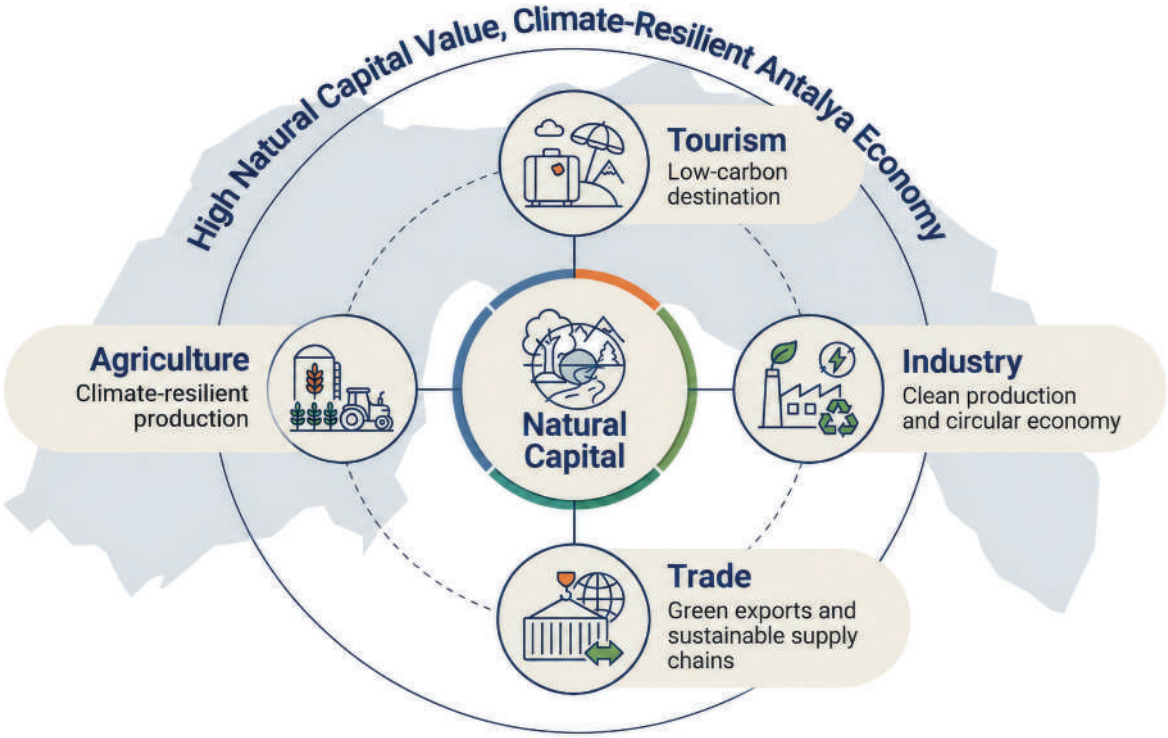
The greatest strength of Antalya's economy lies in its sectoral diversity. However, this diversity alone will not be sufficient in the future. Economic resilience will be strengthened through low-carbon production, resource efficiency, digital transformation, and compliance with international sustainability standards. Therefore, economic growth and environmental sustainability should not be regarded as competing objectives. On the contrary, an economic transformation model that protects natural capital will enhance Antalya's long-term competitiveness.

Policy Implications

Antalya's economic development policies should integrate the industrial, trade, tourism, and agricultural sectors under **a common green** transformation strategy. Investments in resource efficiency, clean production technologies, circular economy practices, carbon management, and green financing instruments should become fundamental components of investment incentive schemes.

Furthermore, a new economic vision should be developed to strengthen Antalya's international standing by promoting specialization in climate technologies, water technologies, sustainable tourism solutions, and environmental innovation.

Figure 12: Antalya's Green Economy Transformation Framework



2.9 Tourism, Cultural Heritage and the Blue Economy

Redefining Antalya's Global Competitiveness

Antalya is one of the most significant tourism destinations not only in Türkiye but also in the Mediterranean Basin. Owing to its natural beauty, climate, historical heritage, biodiversity, and well-developed service infrastructure, the city welcomes millions of visitors annually, while tourism continues to serve as one of the principal drivers of its economy.

However, the global tourism sector is undergoing a significant transformation. Climate change, environmental sustainability expectations, carbon footprints, the conservation of natural areas, and evolving visitor preferences are reshaping the competitive conditions among tourism destinations. Consequently, Antalya's future success will depend not merely on attracting greater numbers of tourists but also on developing a tourism model that **generates higher added value, preserves natural capital, and distributes tourism activities across all four seasons.**

2.9.1 Antalya's Tourism Profile

In addition to sun, sea, and sand tourism, Antalya has significant potential in various fields, including cultural, historical, nature-based, sports, health, conference, and gastronomic tourism. This diversity represents an important advantage in enhancing the province's international competitiveness. However, the concentration of tourism activities along the coastal zone increases pressures on water consumption, energy use, waste management, and natural areas. Therefore, sustainable destination management is a fundamental prerequisite for the sector's long-term success.

2.9.2 Climate Change and Tourism

Climate change is one of the principal factors directly affecting the tourism sector. Rising temperatures influence the characteristics of the summer tourism season, the use of outdoor spaces, water consumption, energy demand, coastal ecosystems, and wildfire risks.

Nevertheless, the restructuring of seasonal tourism patterns may also create new opportunities for Antalya. The extension of spring and autumn tourism periods, the development of alternative tourism products, and year-round sustainable destination management may contribute to a more balanced distribution of tourism activities across seasons.

2.9.3 Cultural Heritage and Identity

Antalya's international brand value is not derived solely from its natural attractions. Ancient cities, traditional settlements, Kaleiçi, archaeological heritage, rural culture, and local ways of life are also fundamental components of the destination's identity.

The preservation of this heritage is not merely a cultural responsibility; it is also a strategic investment in the sustainability of the tourism economy. Cultural heritage conservation and tourism development should be planned as two mutually reinforcing processes.

2.9.4 Blue Economy

Antalya's approximately 640-kilometer coastline offers substantial potential not only for coastal tourism but also for maritime activities, yacht tourism, cruise operations, fisheries, water sports, and marine ecosystems. Therefore, the blue economy should be considered a distinct strategic priority within Antalya's development vision.

The blue economy approach encompasses the conservation of coastal ecosystems, reduction of marine pollution, sustainable marine tourism, environmental performance of marinas, development of maritime transport, and sustainable utilization of marine resources. This approach offers significant opportunities to strengthen Antalya's international position in the Mediterranean.

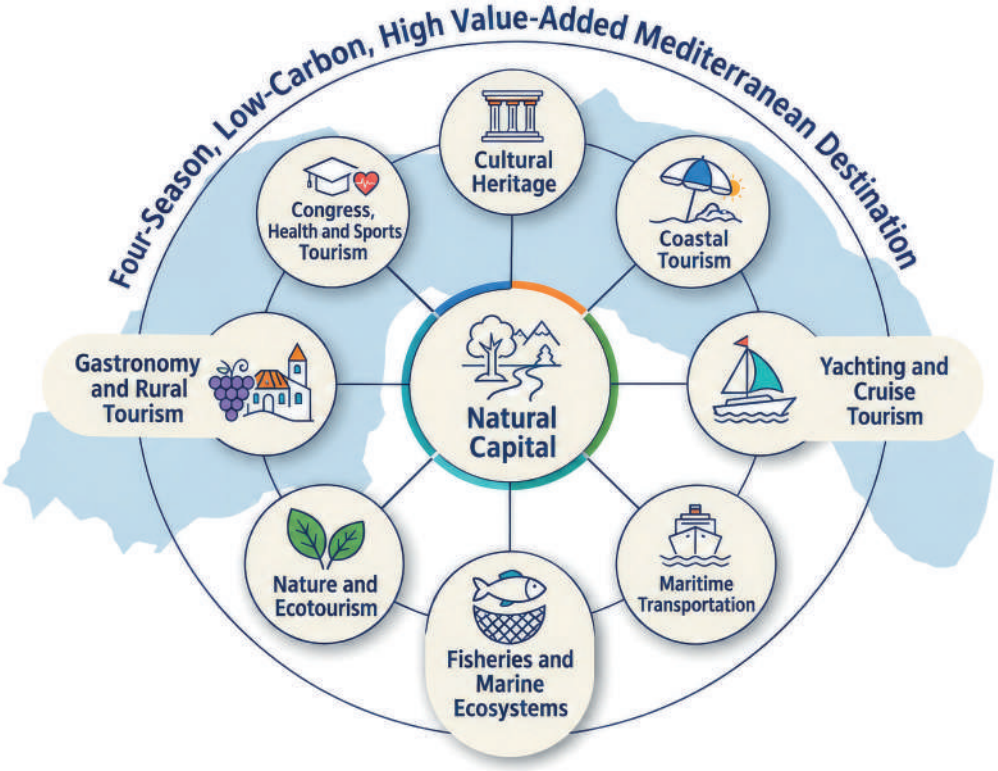
Analytical Assessment

Antalya's success in tourism depends on its natural capital. The cleanliness of its seas, conservation of forests, preservation of cultural heritage, assurance of water security, protection of urban aesthetics, and adaptation to climate change are all factors that directly determine the future of the tourism sector. Therefore, tourism policies should aim not merely to increase visitor numbers but also to **protect the destination's carrying capacity, natural capital, and quality of life.**

Policy Implications

Antalya's tourism strategy should be restructured around low-carbon destination management, sustainable tourism operations, water and energy efficiency, circular economy practices, cultural heritage conservation, and the development of the blue economy. Furthermore, Antalya should be positioned as one of the leading Mediterranean cities in climate-resilient tourism practices. Accordingly, sustainability certifications, environmental performance indicators, and green financing instruments should be established as fundamental mechanisms supporting the sector's transformation.

Figure 13: Antalya's Tourism and Blue Economy Ecosystem



2.10 Energy Systems, Energy Transition and Carbon Management

Transitioning Towards Antalya's Low-Carbon Future

Energy is one of the fundamental inputs of economic development, social welfare, and quality of life. At the same time, as one of the principal sources of greenhouse gas emissions, it lies at the center of efforts to address climate change. Today, the energy transition is not limited to ensuring security of supply; energy policies must also focus on improving energy efficiency, expanding the use of renewable energy sources, and reducing carbon intensity.

In Antalya, population growth, tourism activities, agricultural production, industry, and transportation continuously increase energy demand. In response, the city's substantial renewable energy potential, particularly solar energy, presents a significant opportunity. Antalya's future energy success should therefore be measured **not by increased energy consumption, but by its capacity to achieve the same level of welfare with lower carbon intensity and higher efficiency.**

2.10.1 Antalya's Energy Profile

Energy consumption in Antalya is primarily concentrated in residential buildings, tourism facilities, agricultural irrigation, industry, transportation, trade, and service activities. During the summer months, electricity demand increases significantly due to rising temperatures and the intensity of the tourism season. This situation requires the energy infrastructure to be resilient to seasonal demand fluctuations.

2.10.2 Renewable Energy Potential

Antalya is one of Türkiye's advantageous regions for renewable energy due to its high annual sunshine duration. Rooftop solar energy systems, tourism facilities, organized industrial zones, agricultural irrigation infrastructure, and public buildings represent important areas for expanding the use of solar energy. Furthermore, energy storage technologies and smart grid solutions will enable more effective integration of renewable energy sources into the energy system.

2.10.3 Energy Efficiency

The cleanest energy is the energy that is not consumed. Therefore, the first step in Antalya's energy transition should not be the construction of new generation facilities but rather improving the efficiency of existing energy consumption. In particular, hotels, public buildings, commercial facilities, organized industrial zones, and irrigation systems should be prioritized for energy efficiency investments. Building automation, high-efficiency equipment, LED lighting, thermal insulation, smart control systems, and digital energy management applications will contribute to reducing both energy costs and carbon emissions.

2.10.4 Carbon Management

In international trade, the carbon footprint is increasingly becoming an important competitiveness criterion. Antalya should develop management systems that regularly measure, report, and reduce carbon emissions from tourism enterprises, exporting companies, organized industrial zones, and municipalities. Carbon management is not merely an environmental obligation; it is also a strategic necessity in terms of access to finance, export capacity, and institutional reputation.

2.10.5 Integrated Energy Transition

Antalya's energy transition cannot be based on a single technology. A successful model should integrate renewable energy, energy efficiency, energy storage, smart grids, electric transportation, digital energy management, and carbon reduction programs. This approach will strengthen energy supply security while simultaneously enhancing economic competitiveness and climate resilience.

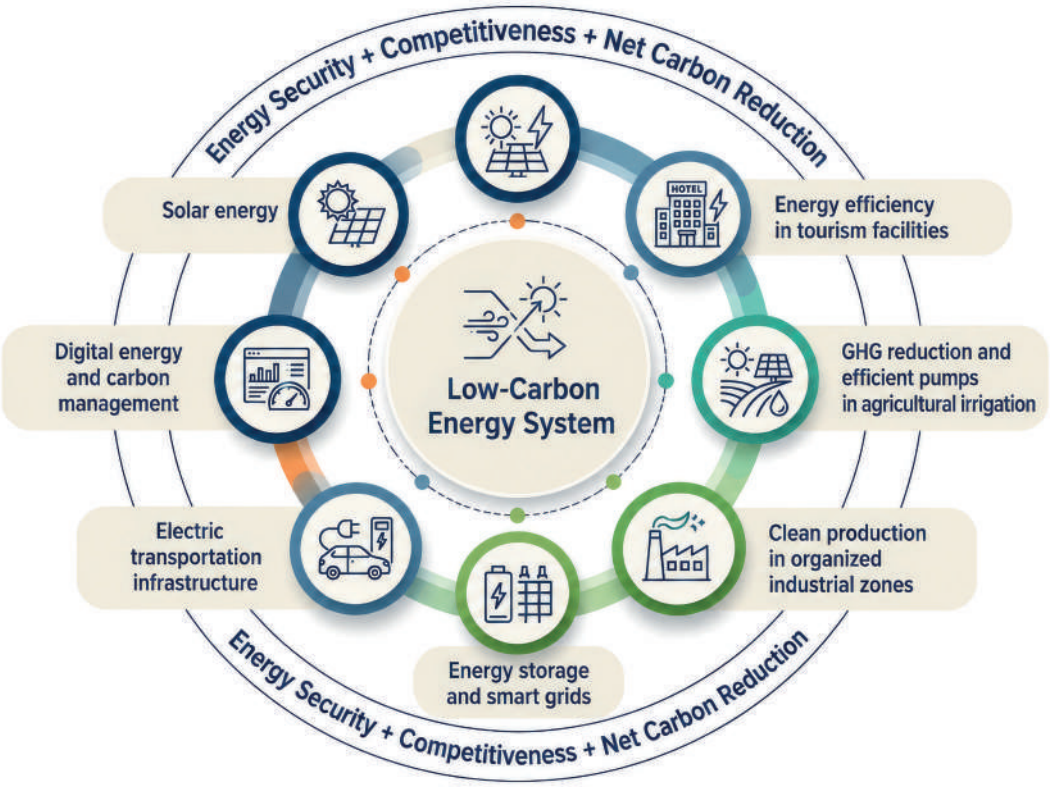
Analytical Assessment

For Antalya, the energy transition is not merely a transformation in electricity generation. This transition will reshape the operational practices of all sectors, from tourism and agriculture to industry and transportation. Therefore, energy policies should be regarded as an integral component of climate policies. When solar energy potential, the tourism sector's high energy consumption, and modern agricultural production infrastructure are considered together, Antalya has a strong foundation for becoming one of Türkiye's leading cities in the low-carbon energy transition.

Policy Implications

Antalya's energy policies should be restructured within **an integrated framework that prioritizes energy efficiency, focuses on renewable energy, and incorporates carbon management.** Public buildings, tourism facilities, organized industrial zones, and agricultural irrigation infrastructure should be designated as priority implementation areas for this transformation. Furthermore, collaborative digital energy monitoring systems, local energy data platforms, and carbon management tools should be widely implemented through cooperation among local governments, universities, professional organizations, and the private sector.

Figure 14: Low-Carbon Energy System



2.11 Transportation, Logistics and Sustainable Mobility

Antalya's Low-Carbon Transportation Future

Transportation systems constitute one of the fundamental components of infrastructure that directly determine the economic vitality, social integration, and quality of life of cities. At the same time, as a significant source of energy consumption and greenhouse gas emissions, transportation is among the priority policy areas in addressing climate change.

In Antalya, transportation demand is increasing throughout the year due to rapid population growtha strong tourism sector, agricultural production capacity, and international connectivity. Therefore, transportation policies should aim not only to improve accessibility but also to reduce carbon emissions, enhance energy efficiency, and establish a transportation system resilient to the impacts of climate change.

2.11.1 Antalya's Transportation Profile

Antalya's transportation system has a complex structure comprising road networks, an airport, seaports, public transportation systems, and rural transportation connections. Transportation demand experiences significant fluctuations due to increasing visitor numbers during the tourism season and ongoing urbanization. This situation requires infrastructure planning to consider not only current needs but also future climate conditions and population scenarios.

2.11.2 Climate Change and Transportation

Rising temperatures, extreme precipitation, floods, wildfires, and coastal flooding directly affect transportation infrastructure. Therefore, critical transportation corridors, bridges, tunnels, ports, airport connections, and public transportation infrastructure should be planned with enhanced climate resilience. Resilient transportation infrastructure is essential not only for post-disaster recovery but also for maintaining the continuity of daily life.

2.11.3 Sustainable Mobility

In the cities of the future, success will be measured not by constructing more roads but by establishing smarter mobility systems. In this context, strengthening public transportation in Antalya, expanding rail systems, promoting bicycle and pedestrian mobility, supporting electric vehicle infrastructure, and increasing the implementation of intelligent traffic management systems should be priority policy areas. This approach will both reduce carbon emissions and improve the quality of life.

2.11.4 Logistics and Regional Competitiveness

Antalya is not merely a tourism destination; it is also an important logistics center for agricultural production and international trade. The rapid and cost-effective transportation of agricultural products to markets, efficient utilization of port connections, and strengthening of logistics infrastructure directly influence economic competitiveness. The digitalization of logistics systems and the development of low-carbon transportation solutions will strengthen Antalya's position in international trade.

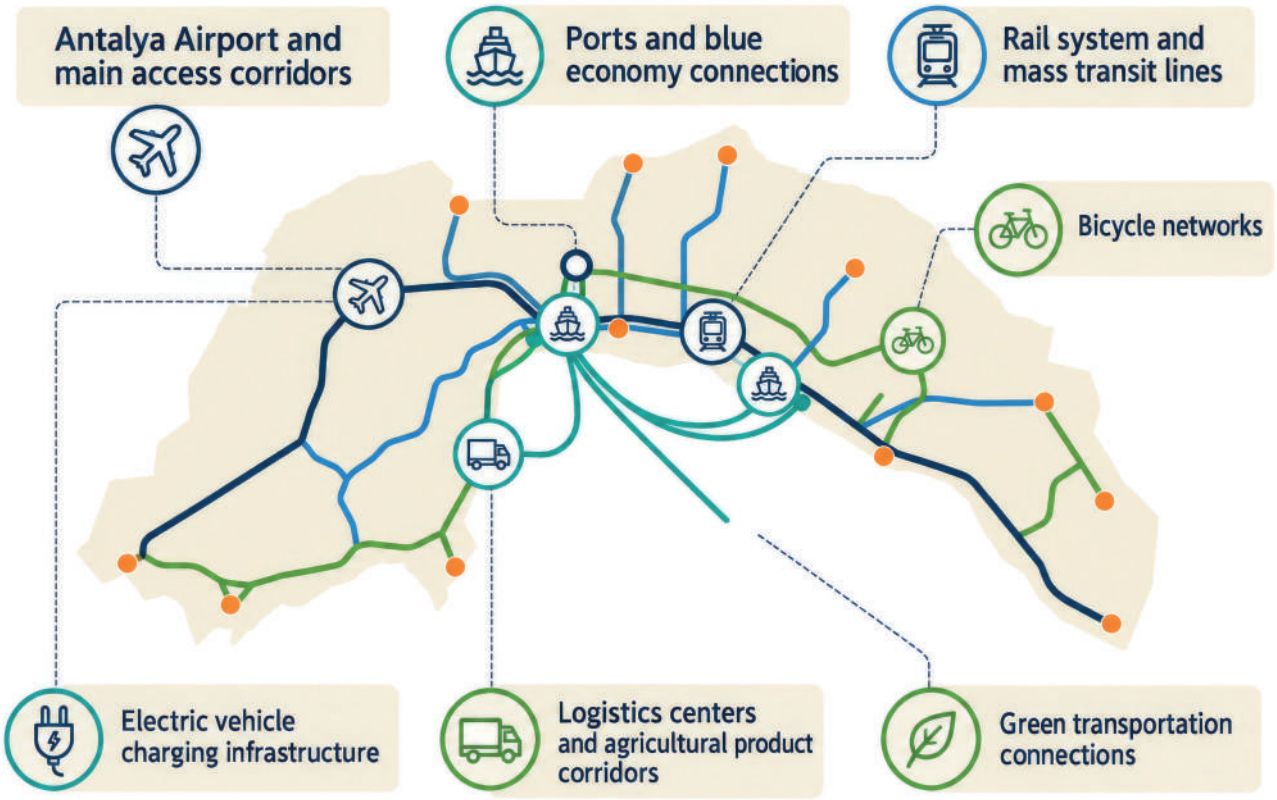
Analytical Assessment

Antalya's transportation system is not merely physical infrastructure; it is a strategic network connecting tourism, agriculture, trade, and daily life. In response to climate change, transportation investments should be evaluated in conjunction with resilience, energy efficiency, and low-carbon objectives. Accordingly, the transportation system will evolve beyond a means of mobility into an element that supports economic sustainability.

Policy Implications

Antalya's transportation strategy should be based on an integrated planning approach encompassing infrastructure investments that account for climate risks, low-carbon public transportation systems, the transition to electric vehicles, active mobility (cycling and walking), intelligent traffic management, and sustainable logistics solutions. Furthermore, transportation investments should be planned in coordination with land-use decisions and urban development strategies to contribute to long-term climate resilience.

Figure 15: Antalya Sustainable Mobility Network



2.12 Disaster Risks and Climate-Related Hazards

Antalya's Multi-Hazard Risk Profile and Resilience Approach

Climate change is transforming not only the frequency of natural disasters but also their severity, the areas they affect, and their economic consequences. Therefore, disaster management should no longer be considered solely an emergency response issue; it is an integral component of spatial planning, infrastructure investment, natural resource management, and economic development policies.

Due to its geographical location, extensive coastline, mountainous topography, intensive tourism activities, and rapidly expanding urban settlements, Antalya is simultaneously exposed to numerous natural and climate-related hazards. This situation necessitates the adoption of **a multi-hazard approach** rather than focusing on individual hazards in disaster management.

2.12.1 Antalya's Principal Disaster Risks

The principal risks expected to become more pronounced in Antalya in the context of climate change include drought and water stress, wildfires, sudden and intense precipitation, floods and flash floods, extreme heat waves, sea-level rise and coastal flooding, landslides and slope instability, and secondary disasters associated with earthquakes.

These risks often do not develop independently of one another; they may trigger each other and generate cascading effects.

2.12.2 Climate Change and the Risk Cascade

The impacts of climate change are not limited to a single event. For example, rising temperatures may trigger drought; drought may increase the risk of wildfires; wildfires may lead to watershed degradation; watershed degradation may increase flood risks; floods may cause infrastructure damage; and infrastructure damage may result in economic losses. Therefore, risks should be assessed not individually but as a **dynamic, mutually reinforcing system.** The "Climate Change and Disaster Impact Chain" approach proposed in this report supports this perspective..

2.12.3 Resilience of Critical Infrastructure

The impacts of disasters are not confined to the natural environment. Drinking water systems, energy infrastructure, transportation corridors, healthcare facilities, communication networks, ports, tourism areas, and organized industrial zones may also be directly affected by climate-related events. Therefore, climate risk analyses, vulnerability assessments, continuity plans, backup systems, and resilience-enhancing investments should constitute an integral part of institutional planning for critical infrastructure.

2.12.4 Risk Reduction and Resilience

The primary objective of modern disaster management is not to respond after a disaster has occurred but to reduce risks before disasters occur. Accordingly, the following should be priority areas for implementation in Antalya:

- Preparation of climate risk maps,
- Integration of high-risk areas into spatial plans,
- Expansion of nature-based solutions,
- Strengthening of early warning systems,
- Development of community-based disaster preparedness programs,
- Reassessment of critical infrastructure in accordance with climate scenarios.

2.12.5 Antalya's Climate Resilience Approach

Antalya's objective should not be limited to reducing disaster-related losses.

The primary objective is to establish **a climate-resilient urban system** capable of anticipating risks, minimizing impacts, maintaining the continuity of essential services, recovering rapidly after disasters, learning from experience, and continuously improving its resilience.

This approach requires shared responsibility among public institutions, local governments, universities, the private sector, professional chambers, and civil society.

Analytical Assessment

Antalya's disaster risk profile exhibits a level of complexity that cannot be managed through conventional approaches focused on a single hazard. The impacts of climate change exert simultaneous pressures on water security, agricultural production, tourism, energy supply, transport systems and natural ecosystems.

Therefore, disaster management should be assessed not only in terms of emergency response capacity during crises but also in terms of risk reduction, resilience, data-driven planning and the level of intersectoral coordination.

Policy Implications

Disaster management policies in Antalya should be restructured based on a **multi-risk and climate-adaptive** planning approach. The **Climate Risk Map, Critical Infrastructure Vulnerability Assessment and Antalya Climate Risk and Resilience Index** to be developed at the provincial level should serve as key decision-making tools for determining investment priorities and ensuring the efficient use of public resources. Early warning systems, nature-based solutions and regular risk monitoring mechanisms should constitute complementary components of this framework. This approach is also consistent with the risk maps and resilience indicators proposed in this report.

Figure 16: Antalya Multi-Hazard Disaster Risk Map

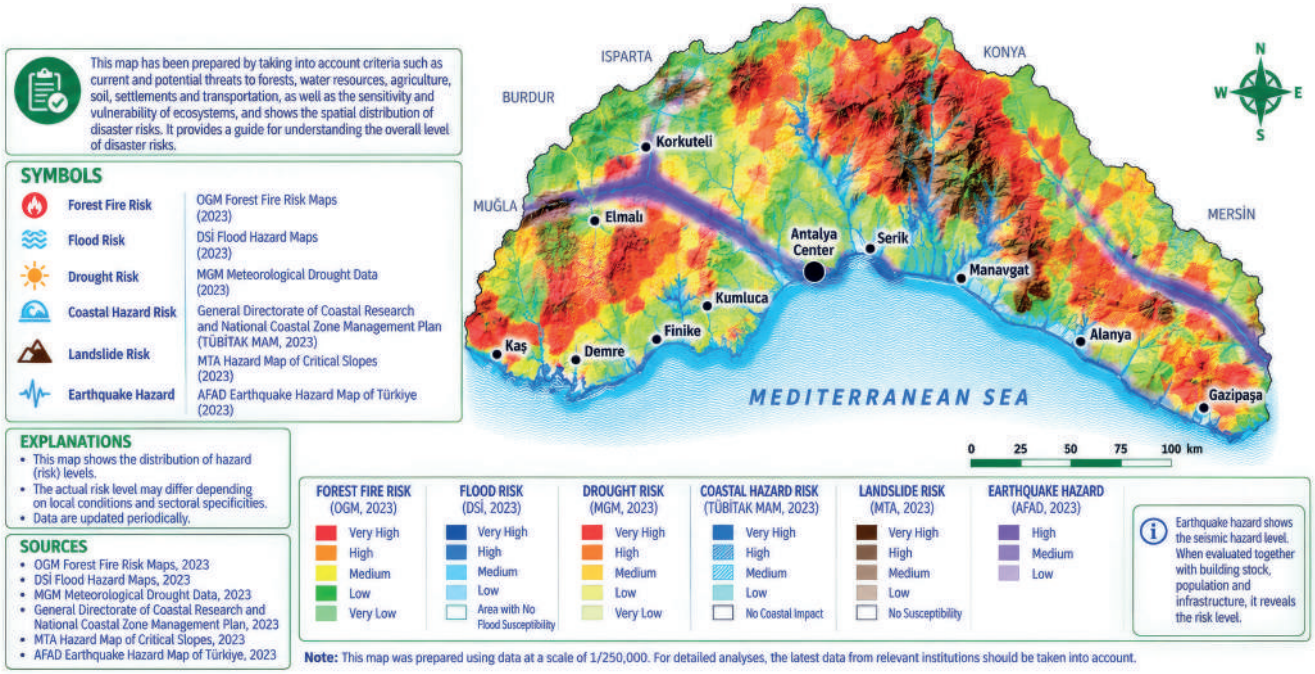


Figure 17: Climate Change and Disaster Impact Chain

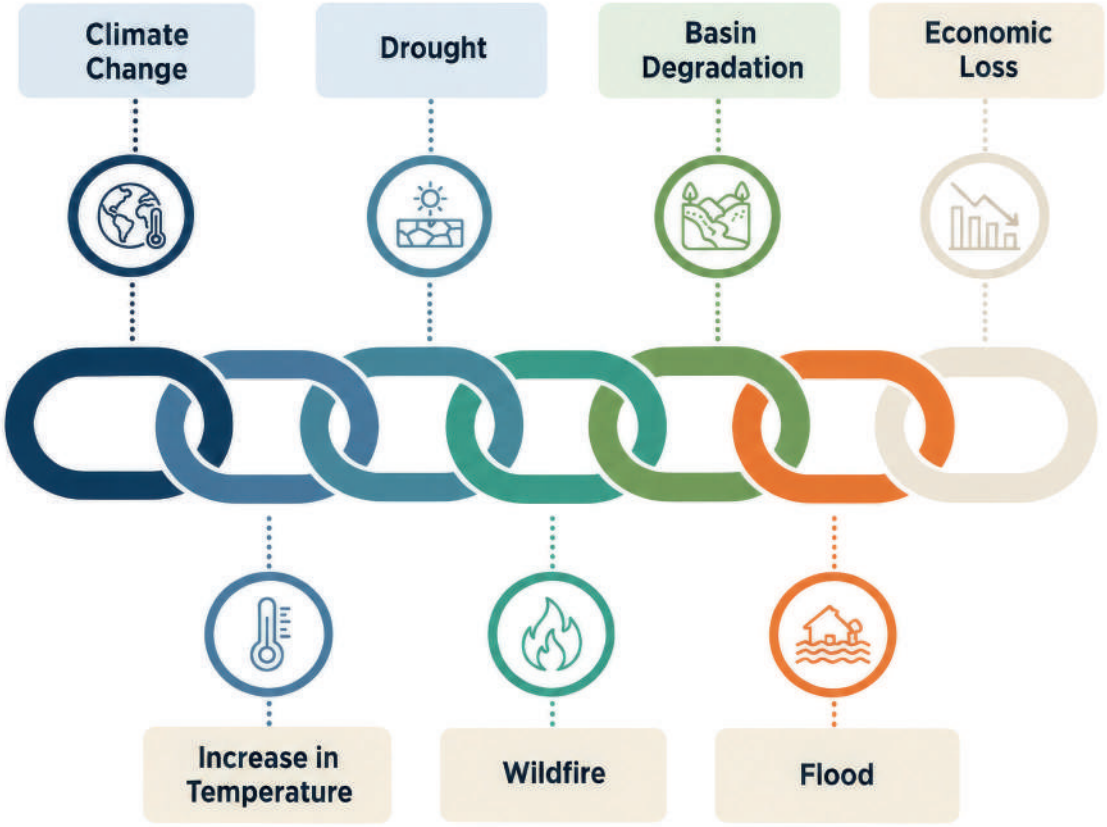


Figure 18: Critical Infrastructure Vulnerability Map



2.13 Section Conclusion and Strategic Synthesis

From Antalya's Current Situation to Its Future Strategies

This section has comprehensively assessed Antalya's natural, economic, social and spatial characteristics from a climate change perspective. The analyses have demonstrated that Antalya's strong natural capital, economic diversity and international competitiveness offer significant opportunities; however, climate change, pressures on natural resources and rapid spatial transformation also create new risk areas. The indicators examined throughout the section point to a common conclusion: **The fundamental factor determining Antalya's future is its capacity to sustain development while protecting its natural capital.**

Water resources, agricultural land, coastal ecosystems, forests, biodiversity and cultural heritage are not merely environmental assets; they constitute the fundamental production infrastructure of all economic sectors, from tourism and agriculture to industry and trade. Therefore, the conservation of natural capital is not an alternative to economic growth but a prerequisite for long-term economic success. The assessments also demonstrate that Antalya will be affected by climate change not through a single sector, but through multiple interconnected systems. Disasters affecting water security, agriculture, tourism and energy production may simultaneously affect transport infrastructure, economic activities and social life. This situation requires integrated planning and strong institutional coordination rather than sector-specific solutions. One of the most significant findings of Section 2 is that Antalya possesses substantial transformation potential. Its high solar energy potential, strong tourism infrastructure, advanced agricultural production capacity, young entrepreneurial ecosystem and international visibility could position Antalya as one of the leading cities in climate-resilient development in the Mediterranean Basin, provided that these advantages are supported by appropriate policies. Therefore, the fundamental choice facing Antalya is not merely to adapt to climate change, but to transform this transition into an opportunity for economic, technological and social development.

Key Findings of Section 2

The following strategic conclusions have been drawn from this section:

- Antalya's most significant competitive advantage is its natural capital.
- Water security is a priority strategic issue affecting all sectors.
- Land-use decisions are decisive for climate resilience and economic sustainability.
- Agriculture, tourism, energy and industrial policies should not be addressed independently but through an integrated approach.
- Climate change creates a multi-risk environment; therefore, risk-based planning approaches should be strengthened.
- Renewable energy, the circular economy and resource efficiency are key areas of transformation that will enhance Antalya's future competitiveness.
- Transport, infrastructure and critical services must be made resilient to climate change.
- Data-driven governance and institutional coordination constitute the foundation of the entire transformation process.

Transition to Section 3

Section 2 has presented Antalya's current situation and identified its key vulnerabilities. However, identifying the current situation alone is insufficient. The next step is to assess in detail the impacts of these vulnerabilities on individual sectors and to develop applicable adaptation and transformation policies for each sector.

Therefore, Section 3 of the report will provide a detailed analysis of the impacts of climate change on water resources, agriculture, tourism, energy, transport, ecosystems and other strategic areas. Risks, opportunities and policy options will be assessed in the light of scientific evidence. This will establish a sectoral transformation framework to enable Antalya to achieve its 2050 vision.

Table 2: Section Conclusion and Strategic Synthesis

Strengths	Vulnerabilities	Opportunities	Strategic Priorities
Natural capital	Water stress	Green finance	Water security
Strong tourism	Climate risks	Renewable energy	Climate-resilient urbanization
Agricultural production	Land use pressure	Circular economy	Protection of natural capital
Economic diversity	Critical infrastructure risks	Digital transformation	Integrated governance

CHAPTER 3

SECTORAL IMPACTS OF CLIMATE CHANGE IN ANTALYA

Antalya's Risk Analysis, Impact Assessment and Areas of Transformation

Purpose of the Chapter

This chapter assesses the current and future impacts of climate change on Antalya's natural, economic and social systems from a sectoral perspective. Vulnerabilities across key areas, including water resources, agriculture, tourism, energy, industry, transport, ecosystems, public health and urbanisation, are systematically analysed. Alongside the risks posed by climate change, emerging opportunities and areas of transformation are identified. The objective is to establish a scientific and strategic basis for determining sectoral priorities within Antalya's climate-resilient development process.

Topics Covered in This Chapter

- Impacts on Water Resources
- Agriculture and Food Security
- Tourism and the Blue Economy
- Energy Systems
- Industry and Trade
- Transport and Logistics
- Natural Ecosystems and Biodiversity
- Public Health
- Urban Life and Infrastructure
- Social and Economic Vulnerabilities
- Multiple Risk Interactions
- Priority Areas for Intervention

Key Message of the Chapter

Climate change does not affect individual sectors in Antalya in isolation. Water resources, agriculture, tourism, energy, transport, ecosystems and the economy constitute interconnected systems. Therefore, climate change adaptation policies must be developed through effective intersectoral coordination and an integrated planning approach.

3.1 Introduction to Sectoral Impact Analysis

Impacts of Climate Change on Antalya's Development Systems

Climate change is not merely a phenomenon that alters environmental conditions. It constitutes a multidimensional transformation process that simultaneously affects all economic and social systems, from water resources and agriculture to tourism, energy, transport and public health. Therefore, the impacts of climate change are too extensive to be addressed within the responsibilities of any single sector or institution.

The assessment of current conditions presented in Chapter 2 demonstrated that Antalya possesses substantial natural capital, a highly diversified economy and significant development potential. The same analyses also revealed increasing vulnerabilities in relation to water security, land use, critical infrastructure, natural ecosystems and disaster risks. This chapter evaluates the impacts of these vulnerabilities on Antalya's key sectors from an integrated perspective.

The impacts of climate change are often non-linear. Changes occurring in one sector may directly affect others. For example, a reduction in water resources affects not only the supply of drinking water but also agricultural production, tourism activities, energy consumption and natural ecosystems. Similarly, extreme temperatures may increase energy demand, heighten the risk of forest fires and place pressure on outdoor tourism activities. These interdependencies make it necessary to develop Antalya's climate policies through strong intersectoral coordination.

The assessments undertaken in this chapter are not limited to identifying existing risks. They also address emerging opportunities, areas of transformation and strategic priorities arising from climate change. Antalya's future will depend not only on measures to mitigate the impacts of climate change but also on its capacity to transform this process into an opportunity for innovation, green investment, resource efficiency and sustainable development.

Accordingly, water resources, agriculture, tourism, energy, industry, transport, natural ecosystems, public health and other strategic sectors are assessed individually, taking into account current trends, climate scenarios and vulnerability levels, while interactions between sectors are examined within an integrated systems approach.

Approach of the Chapter

The analyses in this chapter are based on four fundamental principles:

- **Scientific Basis:** Assessments have been prepared with reference to current climate projections, sectoral data, and national and international policy frameworks.
- **Systems Approach:** Sectors are considered not as independent entities but as an interconnected whole characterised by mutual interactions.
- **Balance Between Risks and Opportunities** Opportunities for transformation are assessed alongside vulnerabilities.
- **Policy Orientation:** Applicable strategic priorities and decision-support approaches have been developed for each sector.

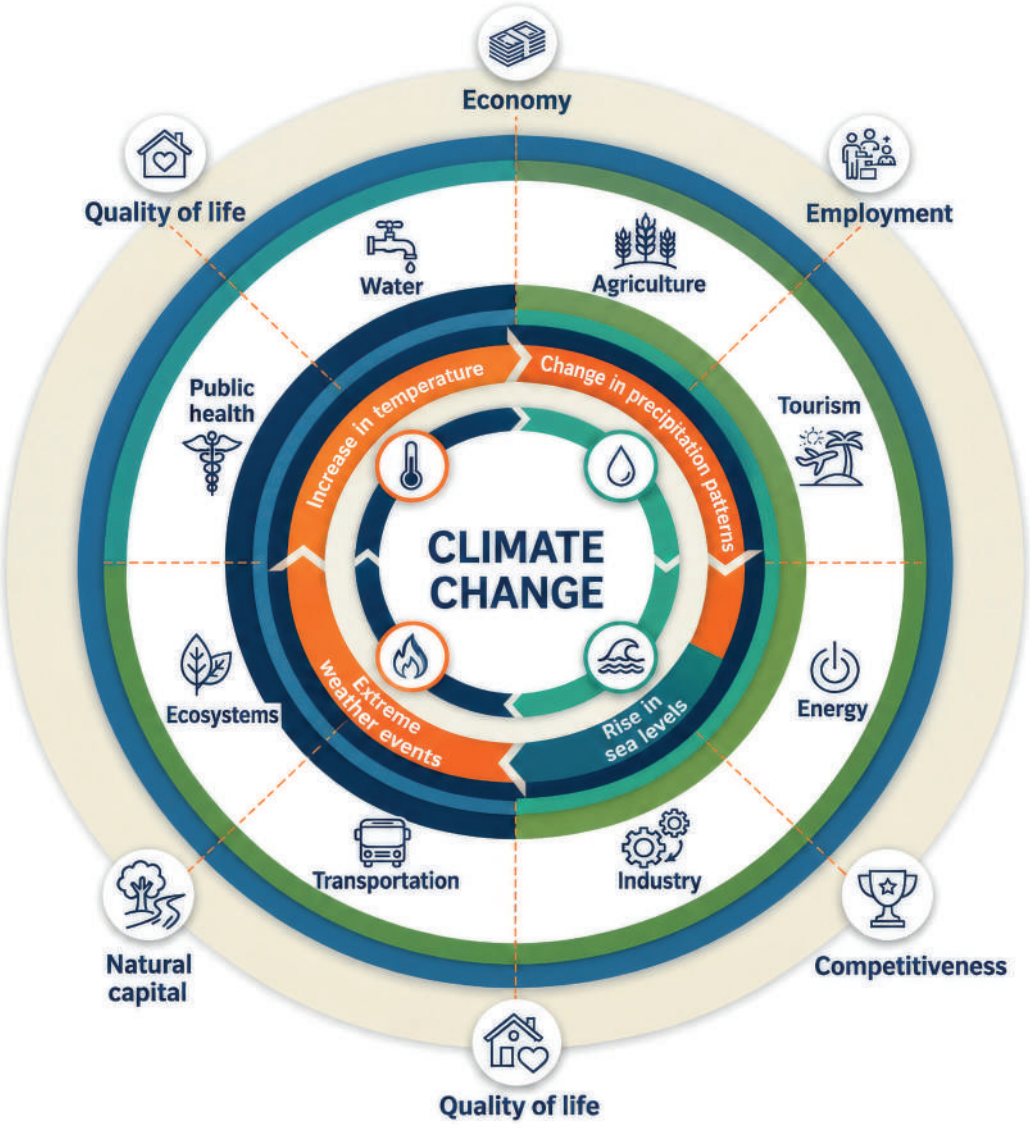
Analytical Assessment

What will determine Antalya's future is not the impact of climate change on individual sectors in isolation, but how these impacts reinforce one another or how they can be managed through appropriate policies. Therefore, the sectoral analyses have been prepared not merely to provide a snapshot of current conditions, but to establish a sound scientific basis for the adaptation strategies and action plans to be developed in subsequent chapters.

Policy Implications

Climate change-related decision-making processes in Antalya should move beyond sector-specific assessments and adopt an **integrated impact assessment** approach. Policies to be developed for water resources, agriculture, tourism, energy, transport and ecosystems should be supported by shared data infrastructure, interinstitutional coordination and regular monitoring mechanisms. This would enable the development of a more resilient and sustainable development model by ensuring that decisions made in each sector also take into account their impacts on other sectors.

Figure 19: Climate Impact System



3.2 What Is a Climate-Resilient City?

A New Generation Approach to Urban Governance for Antalya

Climate change is fundamentally transforming the planning, management and priorities of cities. Today, successful cities are assessed not only by their economic size or population growth rates, but also by their capacity to anticipate climate risks, adapt to these risks and recover rapidly from disasters. At the centre of this new approach is the concept of the climate-resilient city.

A climate-resilient city is an urban settlement system that analyses the risks arising from climate change in the light of scientific evidence, develops planning decisions to reduce these risks, protects its natural capital, strengthens critical infrastructure and sustainably maintains quality of life.

Resilience does not merely refer to responding after a disaster has occurred. Its primary objective is to establish an urban system that anticipates risks, minimises damage and adapts to changing conditions.

3.2.1 Key Characteristics of a Climate-Resilient City

A climate-resilient city:

- Integrates climate risks into planning processes,
- Regards natural ecosystems as an integral component of development,
- Manages water, energy and land use efficiently,
- Ensures the continuity of critical infrastructure,
- Strengthens disaster preparedness and rapid recovery capacity,
- Enhances community participation and institutional cooperation.

This approach aims to prepare cities not only for present needs but also for future climatic conditions.

3.2.2 From Conventional Urbanisation to Climate-Resilient Urbanisation

Conventional urban planning has predominantly focused on population growth, transport and construction needs. In addition to these considerations, the climate-resilient city approach incorporates heatwaves, flood risks, drought pressures, coastal flooding, forest fires and the sustainable use of natural resources as fundamental components of planning. Accordingly, the measure of success is not merely the construction of new buildings, but the creation of safe, healthy and climate-adapted living environments.

3.2.3 Climate Resilience in the Context of Antalya

Antalya's climate resilience depends on the protection of its natural capital and the integrated management of economic development. The conservation of river basins, sustainable management of coastal areas, strengthening of green infrastructure, energy efficiency, sustainable transport and reduction of disaster risks are the fundamental components of this transformation. Considering its economic structure based on the tourism, agriculture and service sectors, climate resilience is not merely an environmental objective for Antalya, but also a fundamental requirement for economic sustainability and international competitiveness.

3.2.4 Relationship with the Antalya Model

The **Antalya Model,** presented in the preceding chapters of this report, establishes a framework for implementing the climate-resilient city approach at the local level. The model addresses the protection of natural capital, reduction of climate risks, enhancement of economic competitiveness, improvement of quality of life and participatory governance within a single strategic framework. Therefore, climate resilience is not merely one component of the Antalya Model, but a fundamental principle connecting all policy areas..

Analytical Assessment

Antalya's future depends on addressing climate change not merely as an environmental issue, but as a development concern affecting all decision-making processes, from spatial planning and economic development to infrastructure and social policies. The climate-resilient city approach provides a strategic framework for ensuring that policies developed across different sectors are implemented in a coordinated manner towards shared objectives..

Policy Implications

All higher-level plans, infrastructure investments and sectoral strategies prepared in Antalya should be reviewed in accordance with the principle of climate resilience. Climate risk assessments should become standard practice in planning processes, while green and blue infrastructure, nature-based solutions, critical infrastructure security and data-driven decision-support systems should be adopted as fundamental components of urban governance. In this way, Antalya could become a model Mediterranean city that not only adapts to climate change but also transforms this transition into a development opportunity.

Figure 20: Climate-Resilient Antalya



3.3 Assessment of Antalya's Existing Urban Development Structure

Transition from Rapid Growth to Climate-Resilient Urbanisation

Over the past three decades, Antalya has become one of Türkiye's fastest-growing cities. The expansion of the tourism sector, growth of the service economy, internal migration and increasing international investment have significantly increased the city's population, rate of urban development and demand for infrastructure.

While this growth has contributed to Antalya's economic dynamism, it has also created new areas of vulnerability to climate change. Most urban development decisions have been made on the basis of historical climatic conditions. However, projected temperature increases, drought, extreme rainfall and changes in sea level necessitate a reassessment of the existing urban structure.

Therefore, the fundamental challenge facing Antalya is not to halt growth, but to guide it through a climate-resilient planning approach.

3.3.1 Building Density and the Urban Heat Island Effect

Increasing building density in the city centre and along urban development corridors is narrowing natural ventilation corridors and increasing the proportion of impermeable surfaces. Consequently, surface temperatures rise during the summer months, outdoor thermal comfort decreases and energy consumption increases.

The urban heat island effect is not merely an environmental issue; it is a strategic urban development challenge with direct implications for public health, energy infrastructure and quality of life.

3.3.2 Impermeable Surfaces and Stormwater Management

The increasing prevalence of asphalt, concrete and other hard surface materials prevents rainwater from infiltrating the soil and increases surface runoff. This heightens the risk of flash flooding, reduces groundwater recharge and places additional pressure on existing stormwater infrastructure.

Given that climate change is projected to increase the frequency of short-duration but high-intensity rainfall events, expanding permeable surfaces and nature-based stormwater management solutions is becoming an important priority

3.3.3 Natural Drainage Systems and Stream Corridors

During the urbanisation process, some stream channels and natural drainage corridors have been narrowed, covered or allocated to other land uses. This situation increases flood risk while simultaneously weakening ecological connectivity and adversely affecting the natural water cycle.

Stream corridors should be regarded not merely as flood conveyance channels, but as important components of green infrastructure.

3.3.4 Responsibilities Associated with Being a Coastal City

Antalya's extensive coastline is one of the main pillars of its tourism economy. However, coastal areas are also among the areas most vulnerable to climate change due to sea-level changes, coastal erosion, storm surges and intense development pressure.

Coastal planning should adopt an approach that considers not only tourism investments but also natural coastal systems, public access to the coastline and ecosystem services.

3.3.5 Planning Implications of Being a Tourism City

During certain periods of the year, Antalya's population significantly exceeds its permanent resident population. This seasonal intensity creates substantial fluctuations in infrastructure systems, including water consumption, wastewater management, energy demand, transport and solid waste management.

Therefore, urban planning in Antalya should be undertaken through a dynamic approach that considers not only the resident population but also tourism-related seasonal population movements.

Analytical Assessment

Antalya's existing urban development model has largely responded to the economic needs of the past. However, it cannot be assumed that the same model will remain sustainable under climate change. Urban development decisions must be assessed in conjunction with climate projections, water security, natural capital and disaster risks.

Successful cities are no longer merely those that construct more buildings, but those that are safer, cooler, more permeable, greener and more efficient in their use of resources.

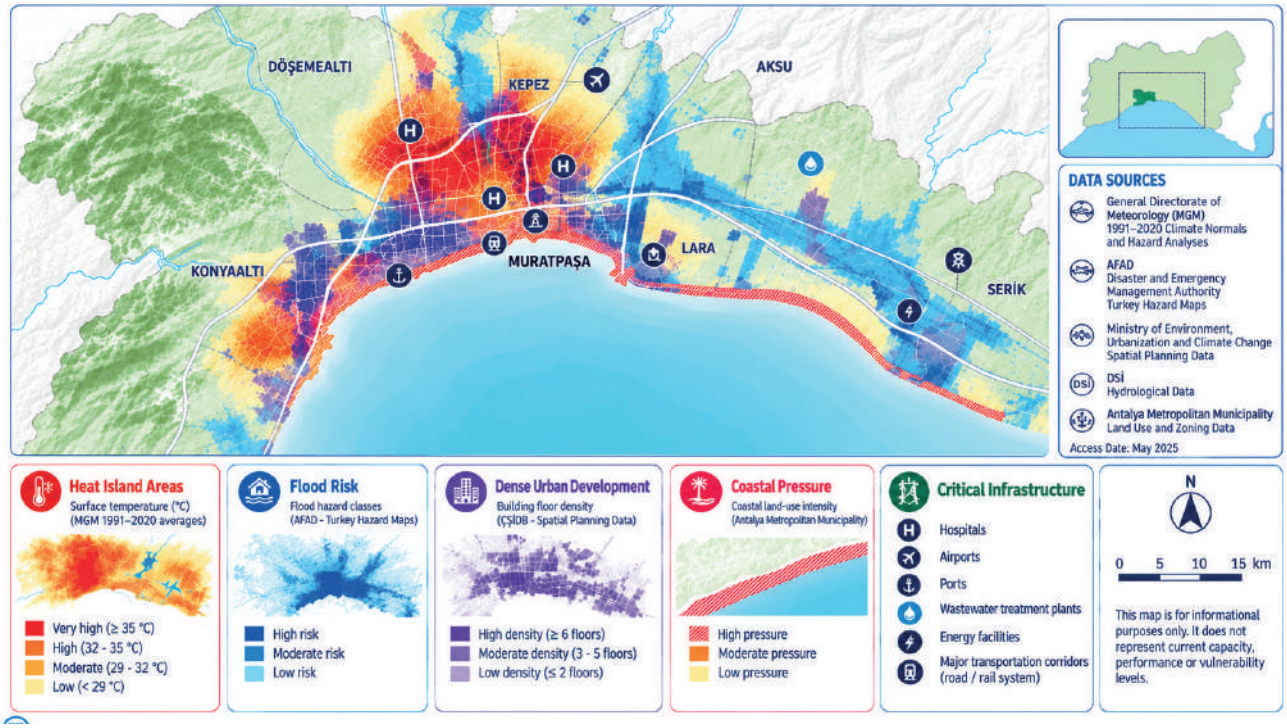
Policy Implications

Antalya's spatial development policies should be restructured in accordance with climate-resilient planning principles. Climate risk assessments should become standard practice at all stages, from higher-level plans to implementation development plans. Green infrastructure, blue infrastructure, permeable surfaces, ventilation corridors and natural drainage systems should be regarded as integral components of planning.

Table 3: Climate Risks Associated with Urbanisation in Antalya

Urbanization Element	Climate Impact	Priority Solution
Dense Urban Development	Urban Heat Island	Green Corridors
Impervious Surfaces	Flooding	Permeable Surfaces
Stream Corridors	Flash Flood Risk	Ecological Restoration
Coastal Development	Erosion and Flooding	Climate-Resilient Coastal Planning
Seasonal Population Increase	Infrastructure Pressure	Dynamic Capacity Planning

Figure 21: Antalya Urban Vulnerability Map



3.4 Climate-Related Spatial Risks and Vulnerable Areas in Antalya

Impacts of Climate Risks on Urban Development

Climate change directly affects not only Antalya's natural environment but also its settlement patterns, infrastructure systems, economic activities and quality of life. Rising temperatures, irregular precipitation patterns, drought, coastal flooding and extreme weather events are among the key factors that may make the existing urban development model more vulnerable in the future. A significant proportion of these risks do not occur independently but generate cascading effects that reinforce one another. Therefore, Antalya's spatial development should be planned by taking into account not only current needs but also projected future climate scenarios.

3.4.1 Flooding and Flood Risk

Climate projections indicate that short-duration, high-intensity rainfall events may increase in the Mediterranean Basin. The expansion of impermeable surfaces in the city centre, the narrowing of stream channels and the fact that stormwater infrastructure is approaching its capacity limits in some areas increase flood risk. Flood management should be supported not only by infrastructure investments but also by nature-based solutions, including the expansion of permeable surfaces, rainwater harvesting, bioswales and the conservation of natural drainage systems.

3.4.2 Extreme Temperatures and the Urban Heat Island Effect

Dense urban development, hard surfaces and the disruption of green space continuity intensify the urban heat island effect in the city centre. This increases energy consumption while also heightening health risks, particularly for older people, children and individuals with chronic illnesses. Shading, green roof applications, permeable surfaces and the preservation of ventilation corridors should be considered essential climate change adaptation measures in urban design.

3.4.3 Drought and Water Security

Antalya's growing population, tourism activity and agricultural production are increasing pressure on water resources. Changes in precipitation patterns and rising temperatures associated with climate change necessitate a reassessment of existing water management systems based on a more efficient and circular approach.

In this context, water reuse, the development of alternative water resources and integrated river basin management are of strategic importance alongside water conservation.

3.4.4 Coastal Areas and Sea-Level Risks

Antalya's coastal areas are of considerable importance for tourism, recreation and urban life. However, coastal flooding, coastal erosion and changes in sea level may place pressure on coastal infrastructure and economic activities in the long term. Coastal planning should prioritise the conservation of natural coastal systems, the alignment of coastal land-use decisions with climate projections and the strengthening of coastal ecosystems.

3.4.5 Critical Infrastructure

Electricity, drinking water, wastewater, telecommunications, transportation, and healthcare infrastructure must be capable of maintaining uninterrupted service delivery during climate-related disasters. Therefore, resilience assessments incorporating climate risk scenarios, rather than relying solely on engineering standards, should be conducted for critical infrastructure.

3.4.6 Pressures on Natural Capital

Electricity, drinking water, wastewater, communications, transport and healthcare infrastructure are essential services during climate-related disasters. Therefore, resilience assessments incorporating climate risk scenarios, rather than relying solely on engineering standards, should be conducted for critical infrastructure.

Analytical Assessment

Antalya's spatial risks are not independent of one another. Drought reduces water availability while increasing energy demand; extreme temperatures affect public health while altering thermal comfort in tourism activities; and coastal pressures create new management requirements for both natural capital and economic activities. Therefore, climate risks should be assessed as an interconnected system. This approach is also consistent with the existing analytical framework presented in this report.

Policy Implications

When preparing planning and investment decisions in Antalya, **climate risk assessment** should become a mandatory component of the planning process. Particularly in new development areas, flood risk, water security, temperature-related impacts, coastal pressures and impacts on natural capital should be assessed together. Regular **Climate Risk Impact Assessments** should also be conducted for critical infrastructure. This approach will strengthen a proactive urban governance framework aimed at reducing risks during the planning stage rather than managing them after they materialise.

Figure 22: Antalya Climate Risk Chain



Table 4: Antalya Spatial Risk Matrix

Risk Type	Water	Agriculture	Tourism	Energy	Transportation	Health
Drought	●	●	○	●	○	○
Flood	●	○	●	○	●	●
Heat Wave	○	●	●	●	○	●
Coastal Flood	○	○	●	○	●	○
Forest Fire	○	●	●	○	○	●

3.5 Strategic Objective

A Vision for Climate-Resilient Urban Development in Antalya

The primary objective of Antalya's urban development policies is to establish a **climate-resilient urban model** that reduces the risks posed by climate change, protects natural capital, enhances resilience to disasters, and integrates economic development with the principles of sustainability.

This approach does not regard urban development merely as the construction of new buildings or the management of population growth. Rather, it adopts an integrated development approach that considers spatial planning, water security, energy efficiency, transport, green infrastructure, disaster management, and quality of life within a unified planning system.

Antalya's future depends on transitioning from a city that responds to climate change to a governance model that anticipates climate risks, directs investments in accordance with these risks, and enhances competitiveness by protecting natural capital. Therefore, the fundamental objective of urban development policies should not be limited to meeting present needs, but should also encompass the establishment of resilient urban settlement systems capable of adapting to climatic conditions in 2050 and beyond.

Strategic Principles

Within the scope of this report, it is recommended that Antalya's urban development policies be formulated in accordance with the following fundamental principles:

1.Risk-Based Planning

Spatial development plans and investment decisions should be prepared with due consideration of flood risks, drought, heatwaves, forest fires, and coastal risks.

2. Data-Driven Decision-Making

Geographic information systems, climate projections, remote sensing technologies, and digital monitoring infrastructure should constitute integral components of planning processes.

3. Ecosystem-Based Approach

Forests, agricultural land, coastal areas, wetlands, and stream corridors should be regarded not merely as areas requiring protection, but as natural infrastructure that contributes to the city's climate resilience.

4. Low-Carbon Urban Development

Energy-efficient buildings, sustainable transport, renewable energy systems, and circular resource use should constitute the fundamental components of the new urban development model.

5. Social Resilience

Urban development policies should strengthen not only physical infrastructure but also communities' disaster preparedness capacities, social solidarity, and quality of life.

6. Institutional Integration

Central government, local authorities, universities, the private sector, and civil society organisations should act on the basis of shared data, common objectives, and coordinated implementation.

Urban Development Targets for Antalya by 2050

In line with this strategic objective, the key long-term targets that Antalya should achieve are as follows:İklim risklerinin planlama süreçlerine tam entegrasyonu,

- A water security-based urbanisation model,
- Strengthening of blue-green infrastructure networks,
- Widespread adoption of low-carbon and energy-efficient urban development,
- Conservation of natural capital and its transformation into economic value,
- Data-driven governance supported by smart city technologies,
- Establishment of disaster-resilient critical infrastructure systems,
- A healthy and liveable urban environment offering a high quality of life.

Analytical Assessment

The fundamental choice facing Antalya is between an urban model that continuously responds to the risks posed by climate change and one that manages these risks at the planning stage. Long-term success will be possible not merely through physical investments, but through ensuring that investment decisions are aligned with scientific evidence, climate projections, and a natural capital-based approach.

Policy Implications

All higher-level plans, spatial development plans, infrastructure investments, and sectoral programmes prepared in line with this strategic objective should be evaluated on the basis of climate resilience, natural capital **conservation, resource efficiency, and measurable performance indicators.** In this way, Antalya's urban development policies can evolve from being merely instruments for managing physical growth into a governance system that supports climate-resilient development. "Antalya's future will be shaped not by an approach that regards nature conservation and development as mutually exclusive alternatives, but by a climate-resilient urban model that recognises natural capital as a fundamental component of development."

3.6 Strategic Policies and Transformation Programme

Priority Policy Areas for a Climate-Resilient Antalya

The assessments conducted throughout Chapter 3 demonstrate that physical infrastructure investments alone are insufficient for Antalya to achieve a climate-resilient urban structure. The dimensions of urban development policy, including planning, engineering, ecology, finance, digitalisation, and governance, must be implemented within an integrated transformation programme that addresses them collectively. Within this framework, the following strategic policy areas are recommended as priorities for Antalya.

Policy 1 Integration of Climate Risk Maps into Planning Processes

When preparing environmental master plans, spatial master plans, and implementation development plans, maps of flood risk, drought, forest fires, heatwaves, coastal flooding, landslides, earthquakes, and critical infrastructure vulnerability should serve as fundamental inputs to planning decisions. Risk analyses should become an integral part of the planning process.

Policy 2 Climate-Resilient Land Use

Density decisions in new development areas should be made by jointly assessing water capacity, energy infrastructure, transport capacity, disaster risk, green space requirements, and natural capital, rather than relying solely on population projections.

Policy 3 Establishment of a Blue-Green Infrastructure Network

Parks, stream corridors, coastal areas, urban forests, cycle routes, and green corridors should be planned not as isolated projects, but as an interconnected ecological network. This approach will enhance carbon sequestration capacity, reduce flood risks, mitigate urban heat, and strengthen biodiversity.

Policy 4 Water-Sensitive Urban Designı

In new development areas, rain gardens, permeable pavements, bioswales, rainwater harvesting systems, greywater systems, and green roofs should be incorporated into planning standards. This policy is directly linked to the Integrated Water Management approach, which will be examined in detail in the following chapter.

Policy 5 Mitigation of the Urban Heat Island Effect

In new development areas, shading, natural ventilation, green roofs, green façades, light-coloured surfaces, and urban tree planting should be considered mandatory design criteria.

Policy 6 Digital Urban Management and Decision Support Systems

Electricity, drinking water, wastewater, stormwater, transport, and communications infrastructure should be reassessed in accordance with projected future climate scenarios, and resilience criteria should be developed to ensure the uninterrupted provision of critical services.

Policy 7 Dijital Kent Yönetimi ve Karar Destek Sistemleri

Geographic Information Systems, remote sensing, sensor networks, and artificial intelligence-supported analyses should become essential tools in planning and investment processes. A shared data infrastructure should be established, and performance indicators should be regularly monitored in decision-making processes.

Policy 8 Participatory and Adaptive Governance

Climate change is a dynamic process. Therefore, plans should be regarded as living documents and regularly updated through the participation of central government, local authorities, universities, the private sector, and civil society.

Policy 9 Initiating Climate-Resilient Construction and Green Building Transformation

The success of urban development policies depends not only on planning decisions but also on the climate performance of buildings. Therefore, energy efficiency, water management, the use of low-carbon materials, and a life-cycle approach should be adopted as fundamental principles in new public buildings, tourism facilities, large-scale residential developments, and commercial projects in Antalya.

Within this framework, **LEED, BREEAM, DGNB, EDGE, and Türkiye's Green Certification System (YeS-TR)** should be recognised as equivalent national and international green building certification systems, and local implementation criteria appropriate to Antalya's climate, tourism, and water management conditions should be developed.

Analytical Assessment

This policy framework defines Antalya's climate change adaptation process not merely as an environmental issue, but as an integrated development programme encompassing spatial planning, economic competitiveness, investment security, and quality of life. Its success depends not on the implementation of individual projects alone, but on the adoption of these policies as a shared governance model.

3.7 Priority Actions for Antalya

Roadmap for Climate-Resilient Urban Development

The analyses conducted throughout Chapter 3 have demonstrated that Antalya's climate change adaptation process requires a long-term transformation. However, this transformation cannot be defined solely by the targets set for 2050. Success can be achieved by taking confidence-building steps in the short term, strengthening institutional capacity in the medium term, and establishing a climate-resilient urban system supported by robust infrastructure in the long term. Accordingly, the proposed actions have been planned across three time horizons.

A. Short-Term Priorities (2026–2028)

The primary objective during this period is to establish the scientific foundation and institutional capacity required for Antalya's transition towards climate-resilient urban development.

Priority Actions

- The Antalya Climate Risk Atlas should be prepared.
- An Urban Heat Island Map should be developed.
- Flood and coastal risk maps should be updated.
- A GIS-based Antalya Urban Resilience Centre should be established.
- Climate risk assessments should be made mandatory in all higher-level plans.
- The Antalya Climate Indicators Monitoring System should be established.
- Climate-focused technical training programmes should be initiated within municipalities and public institutions.

B. Medium-Term Priorities (2028–2032)

During this period, planning decisions should be translated into practical implementation, and physical transformation should commence.

Priority Actions

Rainwater harvesting practices should be widely implemented in new developments.

Standards for permeable surfaces should be established.

Cool roof and green roof applications should be encouraged.

The initial phases of blue-green infrastructure corridors should be completed.

Ecological restoration of stream corridors should be undertaken.

A climate resilience programme should be implemented for critical infrastructure.

Climate resilience criteria should be made mandatory for new public investments.

C. Long-Term Priorities (2032–2050)

During this period, the objective is for Antalya to become an internationally recognised model of a climate-resilient Mediterranean city.

Priority Actions

- An integrated blue-green infrastructure network should be completed across the city.
- The amount of active green space per capita should be increased.
- Low-carbon transport systems should be widely adopted.
- Climate-resilient building standards should be implemented in all new development areas.
- Digital urban management and real-time environmental monitoring systems should be implemented throughout the city.
- Antalya should be established as an international centre of best practice in climate adaptation and sustainable urban development.

Table 5: Antalya Climate Resilience Strategic Priority Matrix

Priority Area	2026–2028	2028–2032	2032–2050
Risk Analysis	✓	Update	Continuous monitoring
Planning	✓	Implementation	Revision
Green Infrastructure	Pilot	Scaling up	Full implementation
Critical Infrastructure	Analysis	Strengthening	Full resilience
Digital Management	Establishment	Integration	AI-supported management
Construction	Development of criteria	Pilot applications	Standard implementation

Analytical Assessment

Climate-resilient urban development is not a single investment project, but a long-term, phased transformation programme. Success depends on the appropriate prioritisation of actions, interinstitutional coordination, and regular performance monitoring mechanisms. Tangible achievements in the early stages will strengthen both public support and access to national and international financing opportunities. This approach is also consistent with the phased implementation framework presented in the current report.

Policy Implications

The **Climate-Resilient Urban Action Plan** to be prepared for Antalya should not merely be a document listing the actions to be undertaken. For each action, the responsible institution, collaborating stakeholders, implementation timetable, financing model, performance indicators (KPIs), and annual monitoring and reporting procedures should be defined. This will enable actions to be implemented within a measurable, accountable, and adaptable governance system. This approach will also ensure coherence with the implementation and monitoring mechanisms to be developed in the final chapters of our report.

Figure 23: Antalya Climate-Resilient Urban Development Roadmap



3.8 Legal Transformation of Climate Change and the New Regulatory Framework

From Climate Policies to Climate Law

For many years, climate change was addressed within the framework of voluntary measures aimed at mitigating environmental impacts, international declarations of goodwill, and sectoral sustainability initiatives. However, global developments in recent years have demonstrated that climate change is no longer merely a matter of environmental policy; it has evolved into a new legal framework that directly shapes economic systems, investment decisions, trade relations, and public administration.

Today, climate change is not merely a technical issue concerning the reduction of greenhouse gas emissions; it has become an increasingly binding regulatory field affecting a broad range of areas, from international trade rules and the financial sector to industrial policies and public investments. This transformation is establishing a new framework that determines countries' competitiveness while redefining the legal obligations of cities and sectors.

Consequently, climate change adaptation is no longer a discretionary environmental policy, but a mandatory development policy shaped by national and international legislation.

3.8.1 Evolution of International Climate Law

International regulations addressing climate change have undergone a significant transformation over the past three decades. The process initiated by the Rio Summit has progressively evolved into a more binding and implementation-oriented framework through the Kyoto Protocol, the Paris Agreement, and the Conferences of the Parties (COP) held under the United Nations Framework Convention on Climate Change (UNFCCC).

International climate policies, which initially focused exclusively on reducing greenhouse gas emissions, have now evolved into a comprehensive legal framework encompassing climate change adaptation, natural capital conservation, sustainable finance, carbon markets, climate risk reporting, and green investment standards. This process has transformed climate change from an environmental issue into one of the fundamental policy instruments reshaping the global economy.

3.8.2 The New Regulatory Era in the European Union and the United States

The European Union has placed climate policies at the centre of economic growth through the European Green Deal. The Carbon Border Adjustment Mechanism (CBAM), the EU Emissions Trading System (EU ETS), the Corporate Sustainability Reporting Directive (CSRD), sustainable finance regulations, and circular economy policies have introduced new obligations across numerous sectors, from production to exports.

Similarly, in the United States, incentive mechanisms supporting clean energy investments, low-carbon production policies, and climate-focused investment programmes play an important role in the global transition process.

These developments directly affect not only businesses operating in Europe or the United States, but also all sectors that export to these markets, utilise international financing, or participate in global supply chains. Consequently, climate policies have become an integral component of international trade and investment decisions.

3.8.3 The New Era of Climate Law in Türkiye

Türkiye has also entered a new process of legal and institutional restructuring in parallel with the transformation of global climate policies. This process, which began with the ratification of the Paris Agreement, has entered a new phase with the entry into force of the Climate Law. The Climate Law establishes the fundamental framework for reducing greenhouse gas emissions, adapting to climate change, establishing carbon markets, developing sustainable finance mechanisms, supporting the green transition, and strengthening institutional coordination. At the same time, the Law defines new areas of responsibility for public institutions, local authorities, organised industrial zones, the private sector, and other stakeholders. Consequently, climate policies are no longer solely a matter of environmental management but are becoming one of the fundamental components of development planning.

3.8.4 The New Era Shaped by Secondary Legislation

While the Climate Law establishes the overall framework for the transition, the implementation process will be shaped by regulations, communiqués, technical guidelines, and implementation procedures to be prepared by the relevant institutions. In the coming period, particular emphasis will be placed on:

- Monitoring and reporting of greenhouse gas emissions,
- Implementation of the emissions trading system,
- Carbon pricing mechanisms,
- Sustainable finance criteria,
- Green taxonomy,
- Energy efficiency,
- Resource efficiency,
- Circular economy practices,
- Corporate sustainability reporting,
- Climate change adaptation plans.

New regulations are expected to enter into force in numerous areas, including those listed above. Therefore, it is of considerable importance for public institutions and the private sector to prepare not only for the existing legislative framework but also for the secondary regulations expected to enter into force in the coming years.

Table 6: Institutions / Expected Areas of Regulation

Institution	Expected Regulatory Areas
Ministry of Environment, Urbanization and Climate Change	ETS, carbon market, MRV, climate change adaptation plans
Ministry of Energy and Natural Resources	Energy efficiency, renewable energy integration
Ministry of Agriculture and Forestry	Water efficiency, agricultural adaptation, carbon sinks
Ministry of Culture and Tourism	Sustainable tourism criteria, green accommodation
Ministry of Industry and Technology	Green Organized Industrial Zone (OIZ) standards, cleaner production
Ministry of Trade	Green export strategies, EU CBAM compliance
Municipalities	Local Climate Action Plans (LCAPs), greenhouse gas inventories

3.8.5 Potential Impacts on Antalya's Economy

This transformation in climate law will directly affect Antalya's key economic sectors. In the tourism sector, energy efficiency, water management, carbon footprint, sustainable tourism certifications, and environmental performance indicators will become decisive factors in international competitiveness. In the agricultural sector, water efficiency, climate-resilient production techniques, traceability, carbon footprint, and sustainable production standards will become increasingly important. In the industrial sector, energy costs, carbon management, resource efficiency, and green production practices will directly influence competitiveness.In the logistics and maritime sectors, low-carbon transport, the environmental performance of ports, and compliance with international maritime standards will come to the forefront. In the construction and real estate sectors, buildings with high energy performance, green building standards, climate-resilient design principles, and sustainable infrastructure practices will shape investment decisions. For local authorities, climate action plans, greenhouse gas inventories, climate-resilient urban development policies, and planning approaches that protect natural capital will become increasingly significant. Consequently, all sectors operating in Antalya must consider climate change not merely as an environmental issue, but as a process of legal, economic, and commercial transformation.

Priority Sectors Likely to Be Affected in Antalya

- Tourism
- Agriculture
- Food Industry
- Marble
- Natural Stone
- Maritime
- Marina Operators
- Ports
- Organised Industrial Zones
- Logistics
- Construction
- Water Management

3.8.6 Strategic Implications for Antalya

The global and national transformation taking place in climate law presents not only new obligations but also significant opportunities for Antalya. Encouraging green investments, facilitating access to international climate finance, expanding low-carbon production models, and strengthening sustainable tourism practices will provide strategic advantages that enhance Antalya's international competitiveness. Therefore, the fundamental objective for Antalya's future should not merely be to become a city that complies with legislative changes, but rather to become a pioneering city that identifies the opportunities offered by the emerging climate law framework at an early stage, strengthens its investment environment, and makes the green transition an integral part of its development strategy.

For Antalya, climate law should be regarded not merely as a regulatory framework introducing new obligations, but as a new development framework that protects natural capital, enhances economic resilience, and supports international competitiveness.

Figure 24: Evolution of Global Climate Law

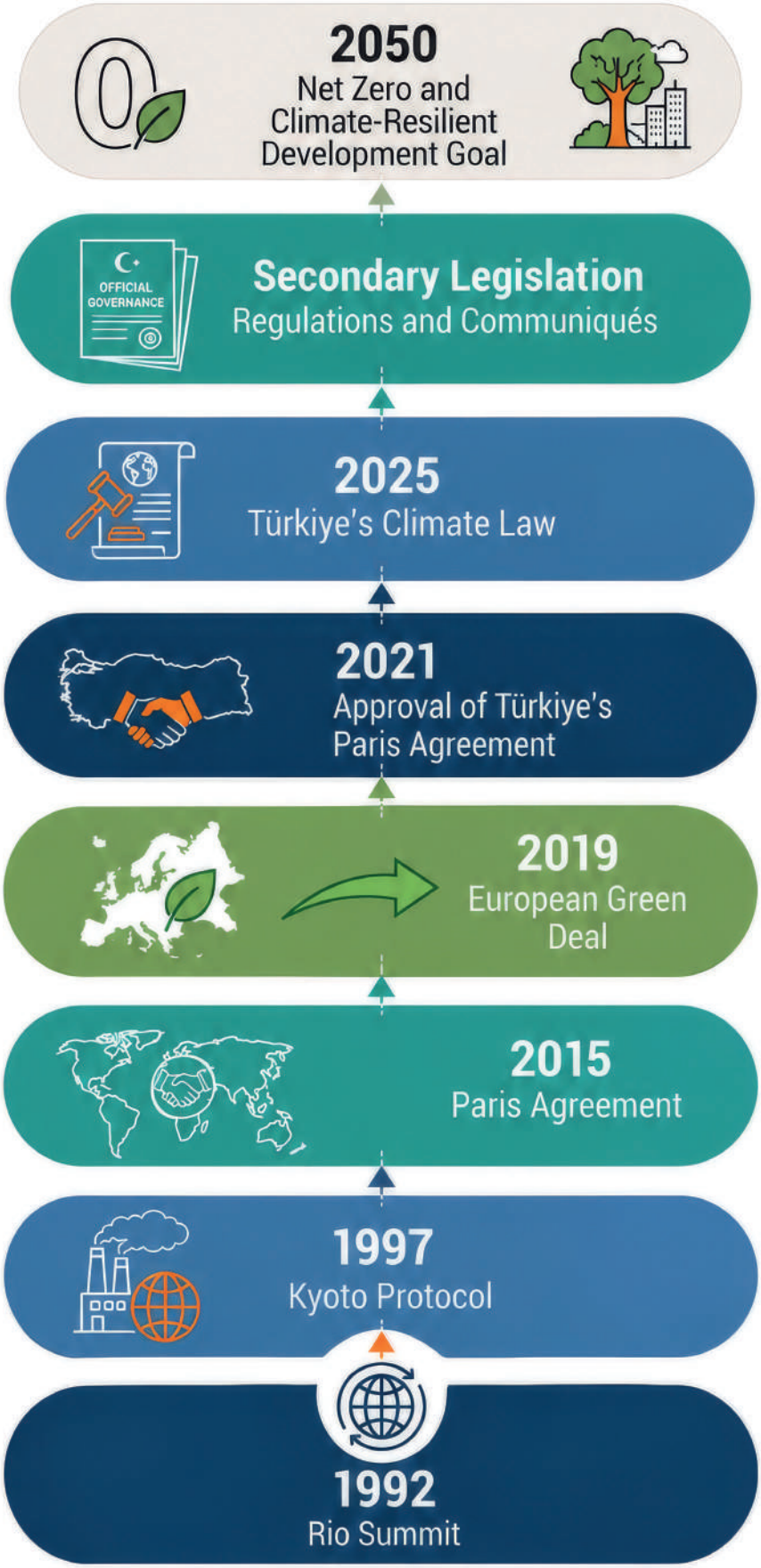
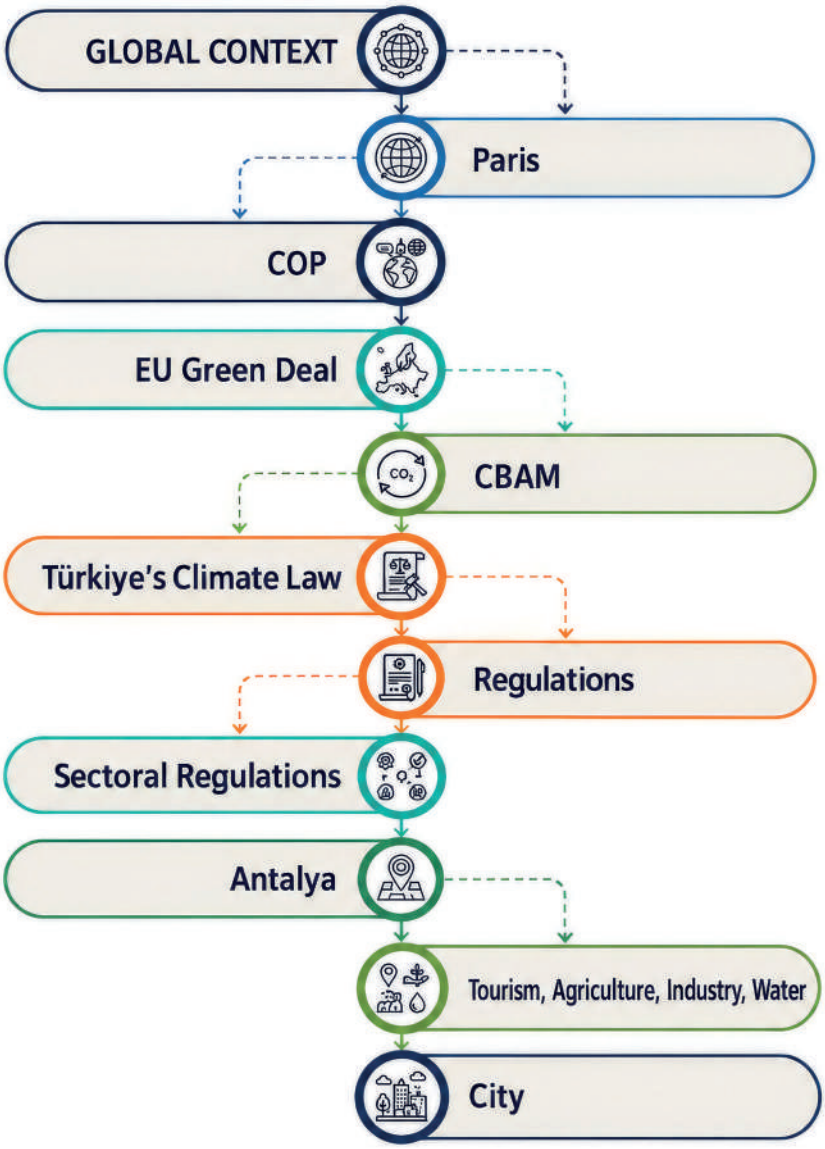


Figure 25: Global Regulatory Framework



Strategic Message for Decision-Makers

Climate change is no longer solely a matter of environmental policy. Today, investment decisions, export processes, access to finance, industrial production, tourism standards, agricultural production, urban planning, and public investments are increasingly being shaped by international and national climate legislation. Therefore, Antalya's climate-resilient development strategy is not merely an environmental preference, but a legal, economic, and institutional necessity. Sectors that adapt early will gain a competitive advantage, while those that delay will face increasing costs and market losses. Antalya's priority should be to develop a pioneering urban model that keeps pace with this transformation and turns risks into opportunities. The actual transformation brought about by the Climate Law will take place through the preparation and implementation of secondary legislation following its entry into force. Regulations, communiqués, and technical guidelines to be issued in the coming years will directly shape the responsibilities of public institutions, the obligations of sectors, and investment decisions. Therefore, it is of strategic importance for all stakeholders in Antalya to closely monitor not only the existing legislation but also the evolving regulatory framework.

3.9 The Role of the Antalya Civil Platform

Collective Intelligence, Scientific Coordination and Climate Governance

Antalya's climate change adaptation process cannot be undertaken solely by public institutions or local authorities. Strengthening climate resilience requires a multi-stakeholder governance model based on the shared responsibility of central government, local authorities, universities, the private sector, professional chambers, civil society organisations and citizens. In this context, the Antalya Civil Platform should be regarded as a collaborative structure that brings together the knowledge, experience and capacities of different institutions and organisations around shared objectives, supports evidence-based decision-making processes and contributes to the sustainability of implementation. The Platform's primary function is not to assume the responsibilities of existing institutions, but to strengthen interinstitutional cooperation, establish a shared vision and provide technical contributions to climate-related transformation processes.

3.9.1 Strategic Coordination

The Platform should facilitate regular communication and information sharing among public institutions, municipalities, universities, professional chambers, the private sector and civil society organisations. This will ensure that projects developed towards common objectives complement one another and that resources are utilised more effectively.

3.9.2 Generation of Scientific Knowledge

To ensure that decision-making processes are based on reliable data, the Platform should establish thematic working groups, support scientific research, prepare policy briefs, publish sectoral analyses and develop solution proposals applicable to Antalya by monitoring national and international developments. Scientific knowledge should constitute a fundamental input into implementation processes.

3.9.3 Monitoring and Evaluation

The Platform should contribute to an independent monitoring mechanism that regularly assesses Antalya's progress in climate resilience. In this context, an annual **Antalya Climate Resilience Report** should be published, sharing performance indicators, implementation progress, examples of good practice and areas requiring improvement with the public. This report will serve as an important reference document for transparency and accountability.

3.9.4 Project Development and International Cooperation

The Platform can provide technical cooperation and knowledge-sharing support for projects developed with international organisations, including European Union programmes, the World Bank, the European Bank for Reconstruction and Development, the Green Climate Fund and United Nations agencies. It can also strengthen knowledge exchange by promoting Antalya's good practices internationally.

3.9.5 Public Participation and Awareness

Climate change adaptation cannot be achieved through technical investments alone; it also requires the active participation of society in the process. The Platform should contribute to improving public climate literacy through educational programmes, workshops, youth programmes, volunteer networks and public information activities.

3.9.6 Lasting Institutional Legacy Beyond COP31

COP31 represents not only an international event for Antalya but also an opportunity for long-term institutional transformation. Therefore, it is important that the Antalya Civil Platform establishes a sustainable governance model beyond COP31, maintaining its working groups, data generation capacity, national and international partnerships, and project development processes. The continuity of the Platform will support the long-term implementation of the policies and actions proposed in the report.

Analytical Assessment

Successful climate policies depend not only on appropriate technical solutions but also on institutional structures capable of jointly developing and implementing these solutions. The Antalya Civil Platform should not be positioned as a structure that replaces public institutions, but rather as a governance mechanism that builds trust among different stakeholders, generates scientific knowledge and facilitates joint project development processes. This approach places the report's existing emphasis on coordination and scientific contributions within a stronger and more institutionalised framework.

Policy Implications

The effectiveness of the Antalya Civil Platform should be measured not merely by the number of meetings held, but by the policy recommendations produced, projects developed, international partnerships established and recommendations implemented by public institutions. Accordingly, an annual work programme, performance indicators and regular activity reporting should form the basis of the Platform's operations.

Figure 26: Antalya Climate Governance Model



3.10 Financing Mechanisms and Climate Investments

A Sustainable Financing Model for a Resilient Antalya

The success of climate change adaptation and greenhouse gas emission reduction policies depends not only on technical capacity and effective planning, but also on the establishment of sustainable financing mechanisms to support these policies. Developing resilient cities requires long-term investments in water management, energy transition, transport infrastructure, green spaces, disaster management and the conservation of natural capital. These investments cannot be financed solely through public resources. Therefore, a **multi-source investment model** that integrates national and international financing sources should be adopted.

Considering Antalya's economic scale, its position in international tourism and the visibility that COP31 will provide, the city has significant financing potential for climate investments. To realise this potential, project development capacity and financing instruments need to be strengthened simultaneously. This approach is consistent with the existing financing framework presented in the report.

3.10.1 National Financing Sources

National resources constitute one of the fundamental financing components of climate adaptation and green transition investments. The main sources include:

- Central government investment programmes,
- Local government budgets,
- İller Bankası financing instruments,
- Development Agency support programmes,
- TÜBİTAK research and innovation funding,
- KOSGEB support programmes,
- Agricultural and rural development programmes.

These resources play a particularly critical role in pilot projects, feasibility studies and the initial stages of investment.

3.10.2 International Climate Finance

Financing mechanisms established under global climate policies offer significant opportunities for Antalya. Priority sources to be considered include the World Bank, the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), the Green Climate Fund (GCF), the Global Environment Facility (GEF), Horizon Europe, the LIFE Programme, IPA Programmes and United Nations programmes.

To make effective use of these resources, it is essential that project preparation processes are conducted in accordance with international standards.

3.10.3 Public–Private Partnership Models

A significant proportion of climate-resilient infrastructure investments can be implemented through public–private partnership models based on appropriate risk-sharing arrangements.

In particular, the technical capacity and financial resources of the private sector can make significant contributions in areas such as advanced water treatment, water reclamation, renewable energy, energy efficiency, smart mobility, waste management and digital infrastructure.

3.10.4 Green Capital Markets

In addition to conventional loan models, new-generation financing instruments should also be considered by municipalities and public institutions.

These include green bonds, sustainability bonds, sustainability-linked loans, carbon finance, impact investments and blended finance, which are becoming increasingly important.

3.10.5 Portfolio of Investment-Ready Projects

A prerequisite for securing financing is the development of bankable projects. Therefore, a regularly updated **Climate Investment Project Portfolio** should be prepared for Antalya.

At a minimum, the following information should be standardised for each project:

- Technical description
- Feasibility
- Environmental impact
- Economic analysis
- Carbon emission reduction potential
- Contribution to climate change adaptation
- Investment size
- Appropriate financing model
- Implementation timetable

This approach will accelerate the decision-making processes of investors and financial institutions.

3.10.6 Post-COP31 Antalya Climate Investment Programme

COP31 is not merely a conference, but also a strategic opportunity to enhance Antalya's international investment visibility. In this context, an **Antalya Climate Investment Programme** should be developed, encompassing investor forums, project matchmaking meetings, green finance workshops, cooperation with international municipalities and a green investment call. This programme should be designed as a permanent investment development mechanism that continues beyond COP31.

Analytical Assessment

In climate investments, a lack of financing is often not the primary challenge; the shortage of sufficiently developed projects constitutes a more significant barrier. Antalya's success will depend less on the diversity of available financing sources than on its capacity to develop feasible, implementable and measurable projects that meet the requirements of these sources. Therefore, project preparation capacity and financing strategies should be addressed together.

Policy Implications

A **Climate Finance and Project Development Programme** should be established for Antalya. The programme's primary objectives should be to:

- Develop a pipeline of investment-ready projects,
- Coordinate applications for international funding,
- Provide technical support to municipalities and the private sector,
- Determine investment priorities based on common criteria,
- Regularly monitor financing outcomes.

This structure will facilitate the development of an ecosystem that not only seeks funding but also generates credible projects from the perspective of investors.

Figure 27: Antalya Climate Finance Ecosystem



Table 7: Financing Sources and Priority Investment Areas

Source of Finance	Priority Support Areas
Central Budget	Infrastructure, disaster risk management
EBRD / EIB	Energy, transport, water
World Bank	Water security, urbanization, resilience
UNDP	Capacity building, pilot projects
EU Programs	İnnovation, green transition
Green Climate Fund	Large-scale municipal investments
Carbon Markets	Forestry, biogas, carbon reduction

3.11 Key Performance Indicators (KPIs)

Antalya Urban Climate Resilience Performance System

The success of climate-resilient urban development policies can be assessed not only through the plans prepared or investments completed, but also through the regular measurement of the extent to which these efforts contribute to the city's resilience. Therefore, the performance system proposed for Antalya should be designed not merely as a mechanism for monitoring implementation progress, but also as a strategic management tool that informs decision-making processes, optimises resource utilisation and supports continuous improvement.

Performance indicators should be measured annually, shared with the public and, where necessary, provide a basis for policy revisions.

The level of climate change adaptation in urban development should be monitored through the following key indicators.

3.11.1 Table 8: Spatial Resilience Indicators

Indicator	2026	2030	2035
Climate Risk Atlas	Completed	Updated	Continuous updating
Landslide Risk Maps	Updated	Integration with CBS	Real-time monitoring
Urban Heat Island Map	Prepared	Updated	Continuous monitoring
Integrated Climate Risk Zoning Plan	Pilot	Widespread implementation	Standard implementation

3.11.2 Table 9: Green and Blue Infrastructure Indicators

Indicator	2026	2030	2035
Share of permeable surfaces	Baseline year	+10%	+20%
Per capita active green space	Baseline year	+15%	+30%
Restoration of completed stream corridors	Pilot	Widespread implementation	Fully integrated network
Implementation of rainwater harvesting systems	Pilot	Widespread implementation	Standard

3.11.3 Table 10: Urban Development and Energy Indicators

Indicator	2026	2030	2035
Cool Roof Implementation	Pilot	Public buildings	Widespread in new buildings
Green Building Implementation	Criteria	Pilot projects	Standard implementation
Energy Efficiency in Public Buildings	Initial stage	Widespread	Continuous improvement
Renewable Energy Integration	Initial stage	Increase	Widespread implementation

3.11.4 Table 11: Water Management Indicators

Indicator	2026	2030	2035
Rainwater Harvesting	Pilot	Widespread	Standard
Greywater Use	Pilot	In new projects	Widespread
Reuse of Treated Wastewater	Increase	Widespread	Integrated system
Reduction of Water Losses and Leakage	Baseline	Improvement	Continuous improvement

3.11.5 Table 12: Institutional and Governance Indicators

Indicator	2026	2030	2035
Antalya Climate Performance Report	First publication	Regular	Institutionalized
Antalya Civil Platform Working Groups	Established	Actively operating	Continuous
Number of Interinstitutional Joint Projects	Baseline	Increase	Continuous increase
Open Data Platform	Established	Updated regularly	International standards

Urban resilience should be measured not only through environmental indicators but also through the capacity for economic transformation.

The proposed indicators are: the amount of international climate finance secured, the number of investment-ready projects developed, the volume of green investment, the number of international collaborations, carbon reduction projects, and joint initiatives developed following COP31. These indicators will help monitor Antalya's position within the global climate economy.

Analytical Assessment

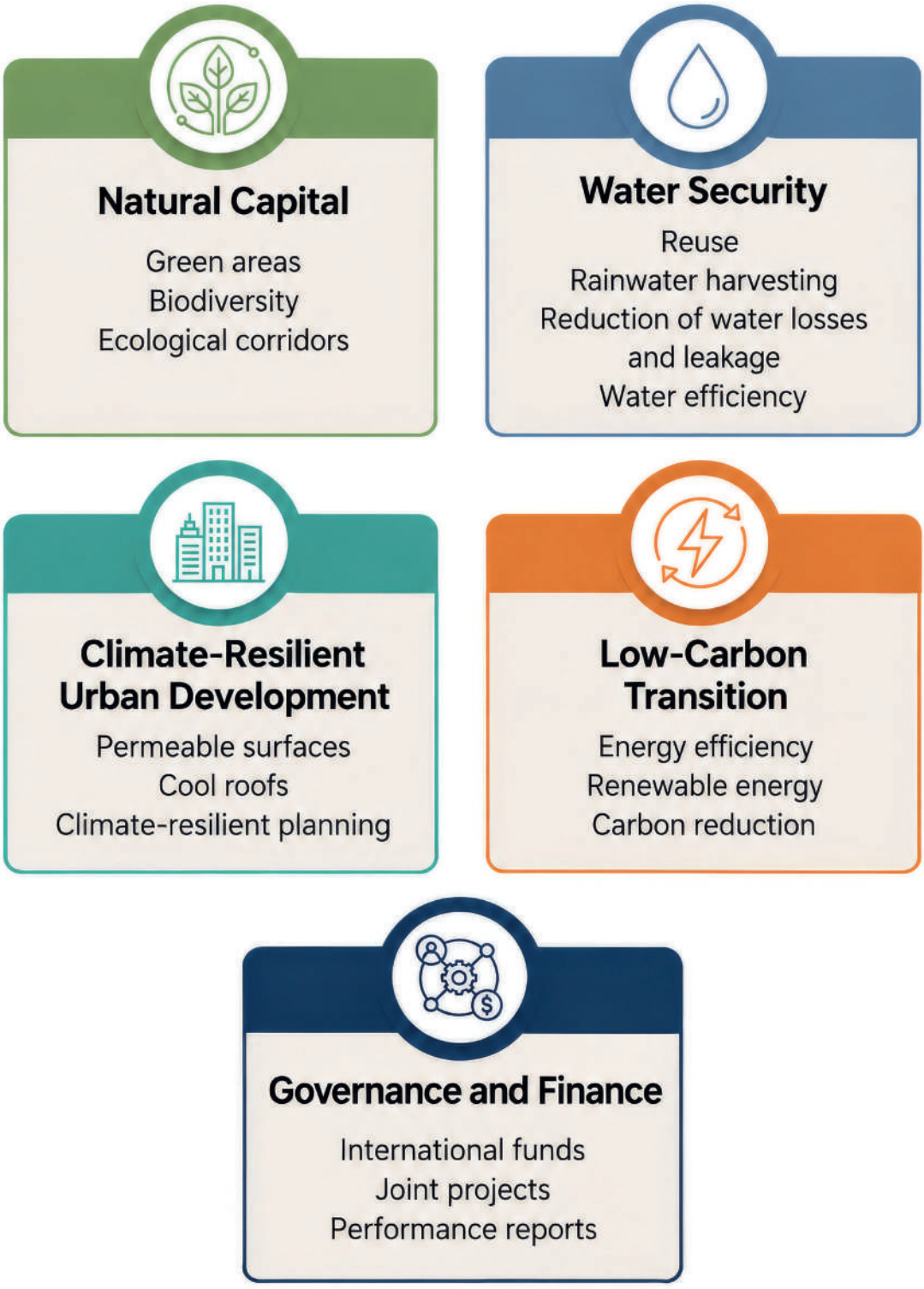
A well-designed performance system not only records activities undertaken but also reveals which policies are delivering results, which areas require further intervention, and how effectively resources are being utilised. Therefore, the KPI framework should be one of the most important management tools during the implementation phase of the report. A similar monitoring and reporting approach is also recommended in subsequent chapters of the report.

Policy Implications

A comprehensive **Urban Resilience Dashboard** covering all sectors should be established for Antalya.

This system should generate real-time data, inform annual performance reports, establish common data standards across public institutions, support investment decisions, and provide an open and transparent monitoring mechanism accessible to the public. In this way, performance assessment will become a dynamic tool that not only reports on past performance but also guides future policy decisions.

Figure 28: Antalya Urban Resilience Dashboard



3.12 Chapter Conclusion

From Climate-Resilient Urbanisation to Climate-Resilient Resource Management

The assessments presented in this chapter have demonstrated that the relationship between urban development policies and physical spatial planning in Antalya's climate change adaptation process is of strategic importance for the protection of natural capital, enhancement of economic competitiveness, reduction of disaster risks and improvement of quality of life.

Antalya's future depends not on constructing more buildings, but on developing in the right locations, at appropriate densities, with suitable infrastructure and through a planning approach that takes climate risks into account. Therefore, urban development policies should be regarded not merely as decisions regulating present-day needs, but as part of a long-term development vision that safeguards the quality of life of future generations.

The approaches proposed in this chapter—including climate risk-based planning, green and blue infrastructure, water-sensitive urban design, low-carbon development, data-driven decision-making, participatory governance, sustainable financing and performance management—constitute an integrated policy framework that will enable Antalya's climate-resilient transformation through their coordinated implementation.

The success of urban development decisions will depend not only on the preparation of plans, but also on the coordinated operation of institutional capacity, financing mechanisms, public participation and regular performance monitoring processes that support their implementation.

Strategic Message for Antalya

limate change is not merely an environmental issue to be managed in Antalya. It also presents an opportunity for comprehensive transformation by renewing the approach to urban planning, enhancing economic competitiveness, protecting natural capital, improving investment quality and raising quality of life. To capitalise on this opportunity, urban development policies must be addressed in an integrated manner across all sectors.

The fundamental choice facing Antalya is not to wait for the obligations arising from new climate legislation, but to become a pioneering Mediterranean city that anticipates this transformation, prepares its sectors, strengthens its investment environment and turns the transition into an international competitive advantage. This approach provides the legal foundation for the strategies and action recommendations presented throughout the report.

Key Outcomes of the Chapter

This chapter has established the following key strategic framework for Antalya:

- Antalya's climate-related spatial risks have been analysed.
- A reassessment of urban development policies from a climate change adaptation perspective has been recommended.
- A vision for climate-resilient urban development has been defined.
- Strategic policy areas have been identified.
- A priority action programme has been developed.
- The facilitating governance role of the Antalya Civil Platform has been defined.
- A sustainable financing model has been established.
- Performance indicators and a monitoring system have been developed.

This framework provides a common reference model for Antalya's future spatial development decisions.

Transition to Chapter 4

The success of urban development policies is directly linked to the sustainable management of natural resources. In Antalya, water is the foremost of these resources.

Considering rising temperatures, changes in precipitation patterns, increasing drought risks and population pressures in the Mediterranean Basin, water management has become not merely an environmental service but a strategic factor determining the city's economic and social future.

Therefore, the next chapter of the report addresses **Integrated Climate-Resilient Water Management in Antalya,** an approach that considers drinking water, agricultural irrigation, tourism, industry, wastewater reuse, rainwater management and alternative water resources together. This transition is consistent with the chapter structure of the existing report draft and its emphasis on the strategic importance of water.

Analytical Assessment

Chapter 3 completes the spatial planning dimension of the report. The principles developed here establish a common planning foundation for the water management, energy transition, agriculture, tourism and governance policies addressed in subsequent chapters. The report thus moves beyond an approach that examines sectors independently and becomes an integrated strategic document that addresses climate resilience as a common dimension of all development policies.

"Climate-resilient cities are not merely safer cities; they are cities that protect their natural capital, attract investment, improve quality of life and leave a stronger development model for future generations. Antalya's 2050 vision should be built upon this understanding."

CHAPTER 4

INTEGRATED CLIMATE-RESILIENT WATER MANAGEMENT IN ANTALYA

Water Security, the Circular Water Economy and Climate Adaptation Strategies

Chapter Overview

Water is the most critical natural resource determining Antalya's capacity to adapt to climate change. Increasing population, the expanding tourism sector, agricultural production, industrial activities and drought pressures resulting from climate change make it essential to manage water resources through a more efficient, resilient and integrated approach. This chapter presents an integrated water management model for Antalya by jointly addressing water security, basin management, drinking water, agricultural irrigation, water efficiency in tourism, wastewater reuse, rainwater management, alternative water resources, seawater desalination, the circular water economy and climate change adaptation policies.

Chapter Objective

The objective of this chapter is to assess Antalya's existing water management system from a climate change perspective, analyse current and future pressures on water resources, develop strategic policy recommendations to strengthen water security, establish implementation models that support the circular water economy, and develop an integrated water management model tailored to Antalya in light of international best practices.

Scope of the Chapter

This chapter covers an analysis of Antalya's water resources and current conditions; the impacts of climate change on water resources; basin-based integrated water management; drinking and domestic water security; water efficiency in agricultural irrigation; sustainable water management in the tourism sector; water efficiency in industry; wastewater recycling and reuse; rainwater harvesting; greywater systems; seawater desalination and alternative water resources; the circular water economy; digitalisation and smart monitoring systems in water management; and financing and governance.

4.1 Introduction

Water Security and Integrated Water Management in the Era of Climate Change

Beyond being an essential source of life, water is a strategic resource that determines the sustainability of economic development, social welfare, food security, energy production, the tourism sector and natural ecosystems. In the 21st century, access to water has become not merely an environmental issue, but also one of the fundamental development indicators shaping the competitiveness, investment capacity and social resilience of cities.

The Mediterranean Basin is recognised as one of the world's most vulnerable regions to the impacts of climate change. Rising temperatures, irregular precipitation patterns, increasing drought frequency and severity, extreme weather events and changes in sea level are placing growing pressure on both the quantity and quality of water resources. These developments demonstrate that traditional supply-oriented approaches to water management are no longer sufficient and that comprehensive policies are needed to address demand management, reuse, alternative resources and ecosystem protection together.

Although Antalya possesses significant water potential through its karstic water resources, surface waters, coastal aquifers and natural hydrological characteristics, it is among the cities that must manage their water resources carefully due to rapid population growth, a strong tourism sector, intensive agricultural activities and urbanisation pressures. Particularly during the summer months, the tourism-related increase in water demand coincides with the period of highest consumption during the dry season, making water security even more critical. This multi-sectoral structure demonstrates that water management in Antalya is not merely a matter of resource development, but also one of strategic planning, demand management and institutional coordination.

Therefore, Antalya's future water policies should be shaped by an Integrated Water Resources Management (IWRM) approach, moving away from the conventional focus on securing additional water supplies towards a model that uses existing water more efficiently, reduces losses, reuses treated water, retains rainwater within the urban environment and mobilises alternative resources when necessary. This approach is an internationally recognised management model that considers not only the quantity of water, but also its quality, its relationship with ecosystems and its allocation across sectors.

This chapter assesses Antalya's existing water resources and water supply system; analyses the impacts of climate change on water resources; and addresses alternative water resources, the circular water economy, sector-based water management and future strategic policy recommendations through an integrated approach. The objective is to establish a resilient water management model for Antalya that not only protects its water resources but also facilitates climate change adaptation, supports economic development and safeguards the needs of future generations.

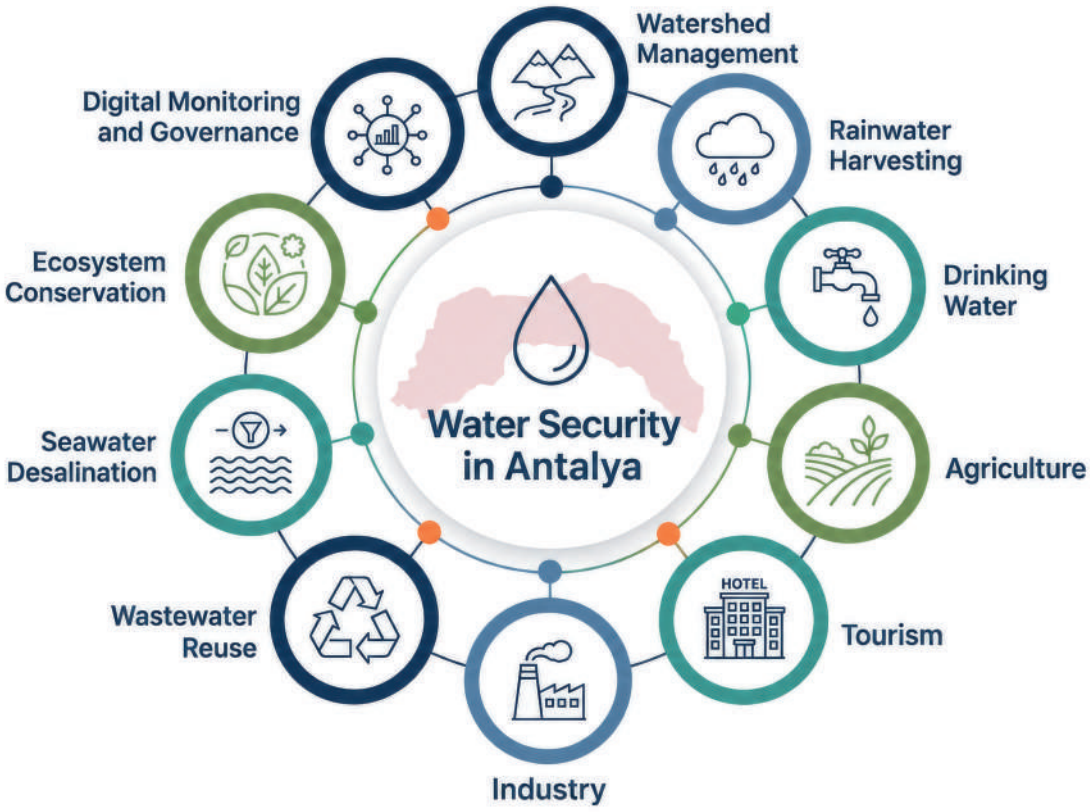
Analytical Assessment

For Antalya, water security does not merely mean ensuring the continuity of drinking water supplies. The continuity of agricultural production, the competitiveness of the tourism sector, industrial sustainability, the protection of natural ecosystems and the quality of urban life are all different components of this transformation. Therefore, every decision concerning water management should be addressed through a systems-based approach that considers its economic, environmental and social impacts together.

Policy Implications

All water policies developed for Antalya should be based on the principles of Integrated Water Resources Management, water security, climate adaptation and the circular water economy. Basin-scale planning, demand management, the development of alternative water resources, advanced treatment technologies and reuse practices should form the common framework for all future sectoral water strategies. This approach is also consistent with the strategic directions proposed throughout the report.

Figure 29: Antalya Water Cycle and Integrated Water Management Model



4.2 Antalya's Water Resources, Hydrological Characteristics and Existing Water Management System

Antalya's Strategic Water Resources

Antalya is considered one of Türkiye's relatively advantaged cities in terms of water resources. Springs fed by the Taurus Mountains, abundant karstic resources, groundwater reserves, coastal aquifers and its natural hydrological system provide the city with significant water potential. However, this potential should not be regarded as an unlimited resource, but as strategic natural capital that must be protected against climate change and increasing water demand. Antalya's water system is not merely a structure consisting of natural resources. Drinking water, agricultural irrigation, tourism, industry, ecosystems and energy production are different users of the same hydrological cycle. A water management decision in one area can directly affect other sectors. Therefore, Antalya's water management should be conducted through an integrated approach that protects the balance between sectors, undertakes planning at the basin scale and safeguards both the quantity and quality of water.

4.2.1 Surface Water Resources

Antalya's surface water system is largely dependent on river basins fed by the Taurus Mountains.

The principal surface water systems include:

- Manavgat River
- Köprüçay River
- Aksu River
- Alara River
- Dim River

These include the sections of the Esen Basin located within Antalya's provincial boundaries. These rivers are critically important not only for drinking and domestic water supplies, but also for agricultural production, ecological balance and the sustainability of natural habitats. Seasonal changes in river flow regimes that may occur as a result of climate change make the long-term management of these resources increasingly important.

4.2.2 Groundwater and Karstic Systems

The most distinctive characteristic of Antalya's hydrogeological structure is its karstic systems. Karstic aquifers play a significant role in Antalya's water supply security due to their high storage capacity, natural filtration and substantial spring discharge. However, these systems are also vulnerable to excessive groundwater abstraction, pollution, saltwater intrusion and reduced recharge resulting from climate change. Therefore, groundwater should be regarded not merely as a reserve available for use, but as a strategic natural resource that must be protected.

4.2.3 Dams, Reservoirs and Water Storage Infrastructure

In Antalya, water supply security is supported by dams, reservoirs and other storage facilities in addition to natural water resources. These facilities perform important functions in drinking water supply, agricultural irrigation, flood control and maintaining continuity of supply during dry periods. However, changes in precipitation patterns and increased evaporation associated with climate change may necessitate a reassessment of reservoir operating strategies and water storage infrastructure.

4.2.4 Water Demand and Consumption Profile

Water consumption in Antalya is shaped by four main sectors: drinking and domestic water, agricultural irrigation, tourism and industry. Particularly during the summer months, the intensification of tourism activities and the simultaneous increase in agricultural irrigation requirements create significant seasonal fluctuations in water demand. This situation makes not only the development of new water resources, but also demand management, efficiency improvements and water reuse practices essential.

4.2.5 Assessment of the Existing Water Management System

Although Antalya's existing water management system is supported by significant natural resources, it faces increasing pressures arising from climate change, population growth, tourism activity and economic expansion.

The future success of water management will depend on measures taken to protect existing resources, implement basin-based planning, safeguard water quality, reduce water losses and leakages, integrate alternative water resources into the system and develop digital monitoring systems. This assessment places the current approach presented in the report within a more strategic framework.

Analytical Assessment

Antalya's water security depends on more than the total quantity of water available; it is also determined by **the temporal distribution of water, its spatial accessibility, its quality and a balanced approach to its allocation across different sectors.** Therefore, water management is not merely a matter of engineering infrastructure, but an area where natural capital management, climate adaptation and economic planning intersect.

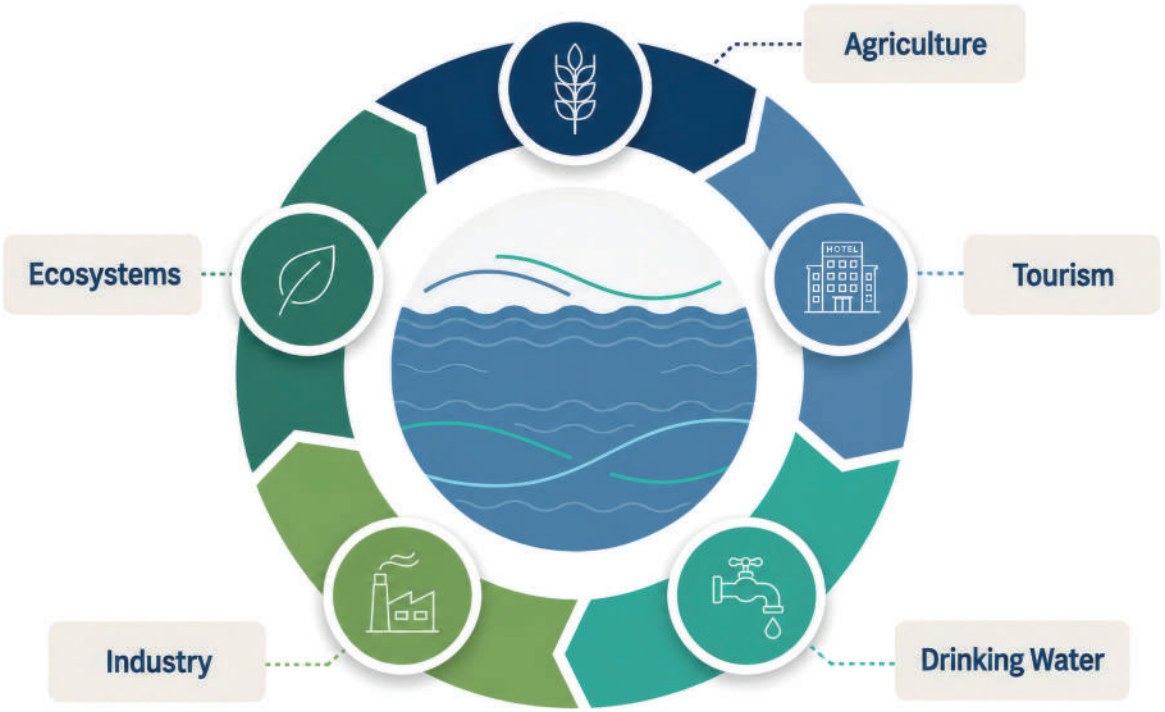
Policy Implications

Water resources management in Antalya should be conducted through a basin-based planning approach. Surface waters, groundwater, karstic systems and coastal aquifers should be assessed as a single hydrological system. Water demand scenarios should be developed by jointly analysing the needs of drinking water supply, agriculture, tourism, industry and ecosystems. Protecting water quality should be a fundamental objective alongside ensuring sufficient water quantity. **"Water abundance is measured not only by the quantity of natural resources available, but also by how resiliently these resources can be managed in the face of climate change."**

Figure 30: Antalya's Strategic Water System



Figure 31: Antalya Water Use Profile



4.3 Impacts of Climate Change on Antalya's Water Resources

A New Climate Reality Redefining Water Security

Climate change is not merely an environmental process that causes quantitative reductions in water resources. It is also a multidimensional transformation process that affects the temporal distribution, quality, storage, recharge and allocation of water among different sectors.

Considering scientific assessments indicating that the Mediterranean Basin will be among the regions most affected by climate change, Antalya's water management policies must be reshaped according to future climate scenarios rather than historical hydrological conditions. Therefore, the fundamental question for Antalya is no longer **"How much water do we have?" but "Will we be able to access water with the same level of reliability in the future?"**

4.3.1 Rising Temperatures and Evaporation

Rising temperatures associated with climate change increase evaporation from open water surfaces, water losses from dam reservoirs, soil moisture loss and plant water requirements. While this may increase Antalya's water demand during the summer months, it may also reduce the quantity of water available for use. Consequently, managing water demand will become as important as managing water supply in the future.

4.3.2 Changes in Precipitation Patterns

The distribution of precipitation throughout the year is as important as changes in total annual precipitation.

Climate projections indicate that prolonged dry periods, short-duration intense rainfall events and irregular seasonal transitions may become more frequent. This situation necessitates new planning approaches to water storage, flood management and groundwater recharge.

4.3.3 Declining Groundwater Recharge

In Antalya, where karstic systems are largely recharged by precipitation, changes in rainfall patterns may affect the rate at which groundwater reserves are replenished.

Prolonged dry periods may lead to reduced spring discharge, declining groundwater levels and an increased risk of saltwater intrusion into coastal aquifers. Therefore, groundwater management should be one of the fundamental components of climate adaptation policies.

4.3.4 Increasing Water Demand

Climate change increases not only water supply pressures but also water demand.

In particular, agricultural irrigation, tourism facilities, urban green spaces and energy consumption will generate greater water requirements as temperatures rise. Consequently, increasing demand alongside declining supply will create a multidimensional pressure on Antalya's water security.

4.3.5 Impacts on Water Quality

Rising temperatures and declining flows may affect water quality, dissolved oxygen levels, nutrient balance and biological conditions in surface waters. Furthermore, pollutant loads arising after flood events may place additional pressure on water resources. Therefore, protecting water quality will become as important as safeguarding water quantity in the future.

4.3.6 Cascading Impacts Across Sectors

Changes in water resources may simultaneously affect agriculture, tourism, industry, natural ecosystems and urban life. Consequently, water security is no longer solely the responsibility of water management institutions; it has become a common concern across all of Antalya's development policies..

Strategic Risk Assessment for Antalya

The most significant impact of climate change on Antalya is not simply the reduction of individual water resources, but the declining reliability of the water system as a whole.

Therefore, future success will depend on the coordinated implementation of measures such as alternative water resources, water reuse, seawater desalination, rainwater harvesting, demand management and digital monitoring.

Analytical Assessment

Antalya's water security can no longer be explained solely in terms of hydrological capacity. Climate change is increasingly affecting the natural water cycle through economic activities and population dynamics. Therefore, the traditional "increasing supply" approach to water management should be replaced by a model focused on risk management, demand management, resource diversification and resilience. This assessment also provides a strategic perspective on the existing framework concerning climate impacts and adaptation needs presented in the report.

Policy Implications

Climate projections should be integrated into all planning processes when developing Antalya's water policies. Dam operation strategies, groundwater management, agricultural irrigation planning, tourism investments and urban development decisions should be based on future climate scenarios rather than historical climate data. In this way, water security will depend not only on protecting existing resources but also on a dynamic management approach capable of adapting to changing climate conditions.

Figure 32: Climate Change and Antalya's Water System

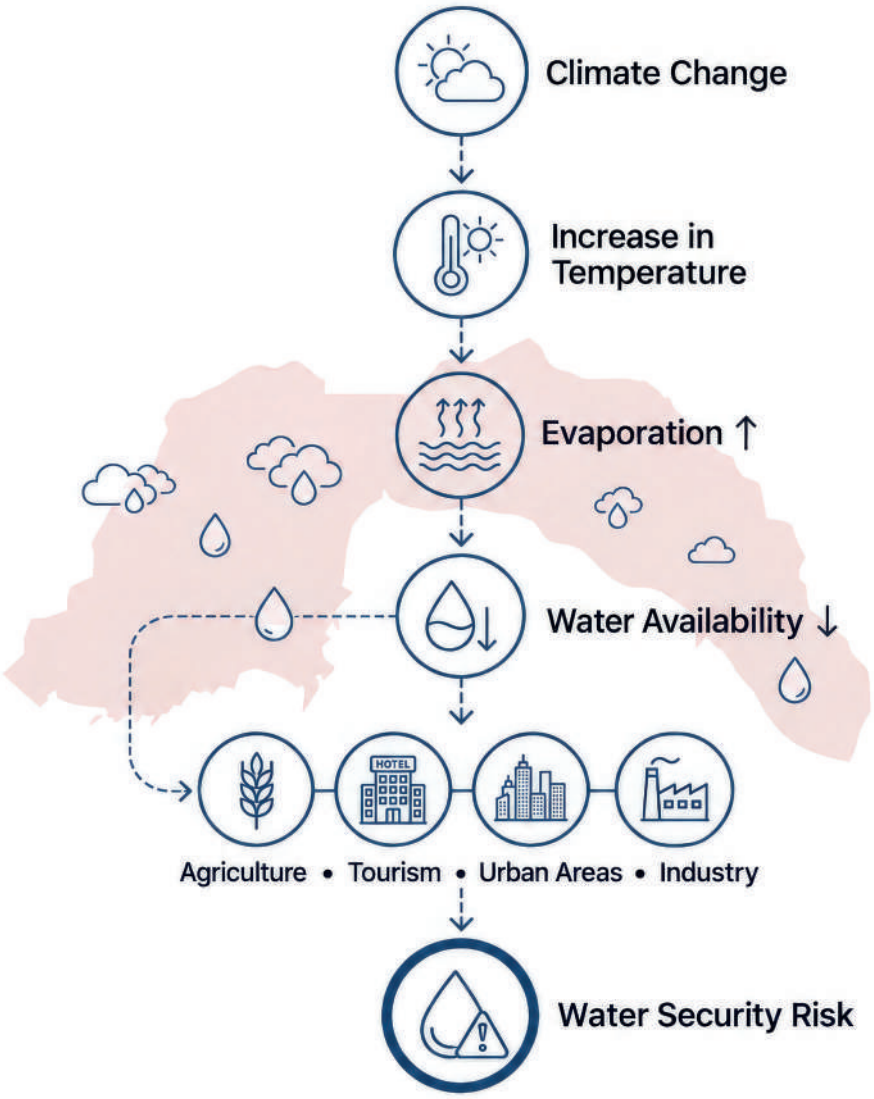


Figure 33: Antalya Water Security Risk Chain

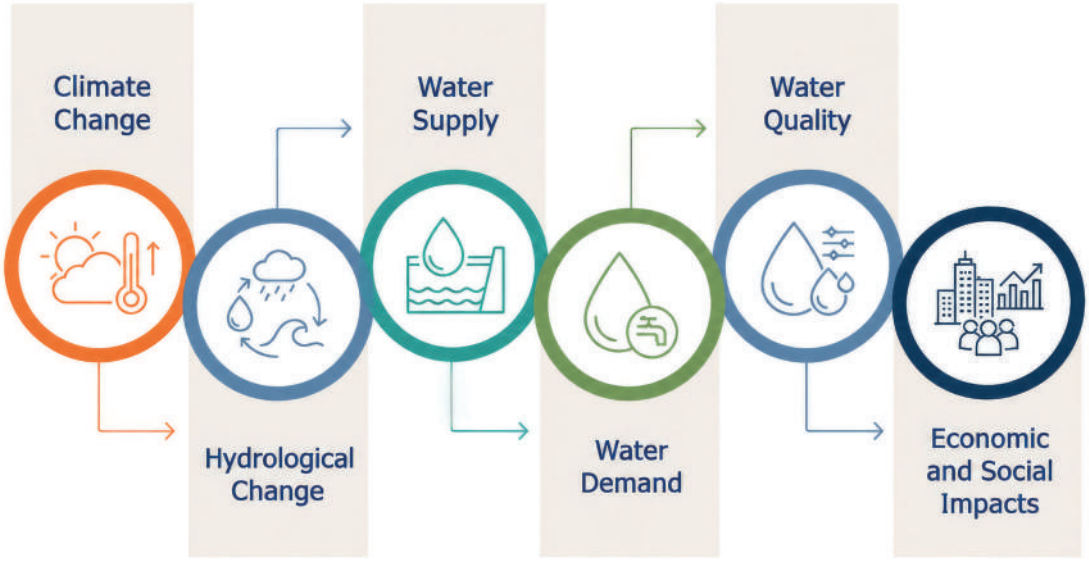


Table 13: Potential Impacts of Climate Change on Water Resource

Climate Impact	Impact on the Water System	Priority Adaptation Policy
Temperature increase	Increased evaporation	Demand management and storage efficiency
Changes in precipitation regime	Irregular flow	Basin-based planning
Drought	Reduced groundwater recharge	Groundwater protection programme
Heavy rainfall	Flooding and pollutant loads	Nature-based solutions
Sea level rise	Risk of salinization in coastal aquifers	Monitoring and controlled groundwater abstraction

4.4 A New Approach to Water Management

Antalya Water Model: Integrated, Circular and Climate-Resilient Water Management

Climate change, population growth, tourism activity and economic expansion necessitate a reassessment of traditional approaches to water management that have been implemented for many years. Historically, water management has largely focused on developing new water resources; dams, transmission pipelines and groundwater use have been regarded as the primary solutions. However, today, water security can no longer be achieved solely by increasing water supply.

The new generation of water management is based on protecting existing resources, using water efficiently, promoting its reuse and strengthening the natural water cycle. This approach is internationally defined as **Integrated Water Resources Management (IWRM)** and is recognised as a management model aligned with the United Nations Sustainable Development Goals.

For Antalya, this approach needs to be adapted to local conditions. Considering the city's intensive tourism activity, strong agricultural sector, karstic hydrogeological characteristics and coastal location, the proposed model can be defined as the **"Antalya Water Model"**.

Core Principles of the Antalya Water Model

1. Basin-Based Management: Water resources should be planned according to natural basin boundaries rather than administrative boundaries. Surface waters, groundwater, coastal aquifers and wetlands should be assessed as a single hydrological system.

2. Water Security Approach: The objective is not merely to meet current water needs. A water management system should be established that ensures sufficient water of appropriate quality, is economically accessible and protects ecosystems under all conditions.

3. Circular Water Economy: Water should not be regarded as a single-use resource, but as an economic asset that is used, treated, recovered and reused. This approach forms the foundation of the **Circular Water Economy** framework, which will be examined in detail in subsequent chapters.

4. Demand Management: Water security cannot be achieved solely by increasing supply. Reducing water losses and leakages, improving water efficiency, introducing smart metering systems and promoting more sustainable consumption habits should also be integral components of water management.

5. Integration of Alternative Water Resources: In Antalya's future, water supply should not depend solely on natural resources. Treated wastewater, rainwater, greywater and seawater desalination should be gradually integrated into the water system as alternative resources. This approach forms the basis of the alternative water resources and reuse policies that will be examined in detail in subsequent chapters of the report.

6. Ecosystem-Based Approach: Rivers, wetlands, coastal areas and groundwater recharge zones are not merely natural assets to be protected. They are also components of the natural infrastructure that ensures Antalya's water security. Therefore, water management and nature conservation policies should be implemented together.

7. Digital and Data-Driven Management: Geographic Information Systems (GIS), remote sensing, sensor networks, real-time monitoring and artificial intelligence-assisted analyses are becoming increasingly important in water management. Antalya's future water system should be supported by digital decision-support mechanisms.

Expected Benefits of the Antalya Water Model

The implementation of this model will:

- Strengthen water supply security.
- Increase resilience to drought risks.
- Reduce pressure on groundwater resources.
- Improve agricultural and urban water efficiency.
- Support the sustainability of the tourism sector.
- Contribute to ecosystem conservation.
- Facilitate access to international climate finance.

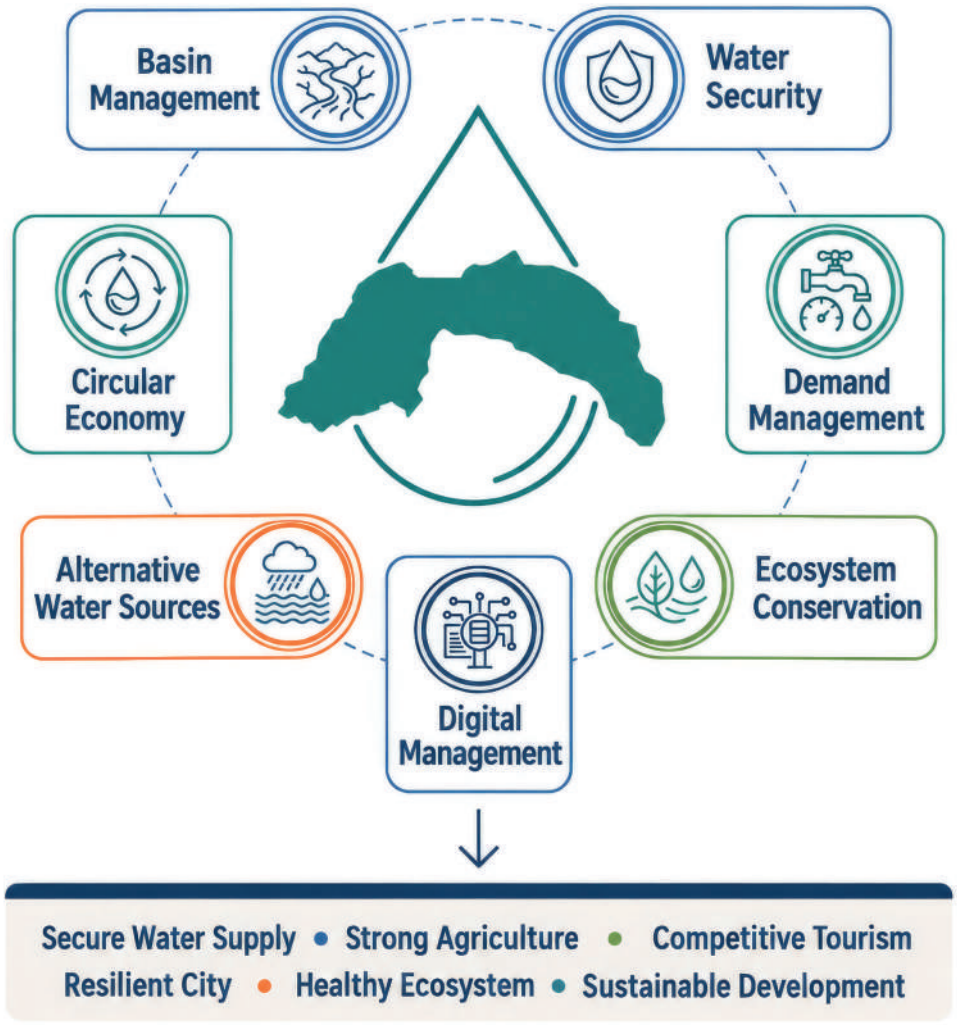
Analytical Assessment

Antalya's future success will depend not so much on finding new water resources as on managing its existing water system more intelligently, efficiently and in a more balanced manner. While Integrated Water Resources Management provides the institutional framework for this transformation, the proposed **Antalya Water Model** establishes an implementation model that adapts this approach to the city's specific hydrological, economic and social conditions. In this way, water management moves beyond being merely a technical infrastructure service and becomes one of the fundamental components of Antalya's climate-resilient development strategy.

Policy Implicationsı

All water strategies and investments developed for Antalya should be planned in accordance with the principle of **"first protect, then use efficiently, subsequently reuse, and develop new resources only as a last resort".** This hierarchy will provide a sustainable management framework that ensures the protection of natural capital, reduces investment costs and strengthens climate change adaptation capacity.

Figure 34: Climate-Resilient Antalya Water Model



4.5 Alternative Water Resources and Circular Water Management

Antalya's Future Water Supply Security

In the present century, successful water management will be achieved not merely by developing new water resources, but by extending the life cycle of existing water resources and deriving greater benefits from every drop of water.

Considering the impacts of climate change, population growth, tourism activities and agricultural production, Antalya's future water security will depend not only on protecting natural water resources but also on the reliable integration of alternative water resources into the system. Therefore, Antalya should adopt a **multi-source water supply system,** in which different resources complement one another, rather than a **single-source supply model**. This approach will not only enhance water supply security but also reduce drought risks, alleviate pressure on groundwater resources and strengthen economic resilience.

4.5.1 Reuse of Treated Wastewater

Treated wastewater is one of the reliable alternative water resources when appropriate quality standards are met. In particular, reuse is possible in areas such as landscape irrigation, agricultural irrigation, industrial processes, cooling systems and groundwater recharge. This approach reduces freshwater demand, decreases discharge loads and supports the circular water economy. In cities with high tourism activity, such as Antalya, reclaimed water obtained through advanced biological treatment and membrane technologies should be regarded as an important strategic resource.

4.5.2 Rainwater Harvesting

Increasingly irregular precipitation patterns associated with climate change make more effective rainwater utilisation essential. In new developments, rooftop storage systems, rain gardens, permeable surfaces and on-site storage practices should be encouraged. These systems reduce flood risks, increase groundwater recharge and alleviate pressure on municipal water supply networks.

4.5.3 Greywater Systems

Greywater generated from washbasins, showers and similar sources can be reused for toilet flushing, landscape irrigation and cleaning systems. Hotels, large residential complexes, hospitals and university campuses, in particular, offer significant water-saving potential.

4.5.4 Seawater Desalination

With approximately **640 km of coastline**, Antalya has a significant strategic opportunity to consider the controlled use of seawater as an alternative water resource.

However, seawater desalination must be planned with due consideration of energy consumption, investment costs, concentrated saline wastewater (brine) management and environmental impacts.

4.5.5 Artificial Groundwater Recharge Systems

To protect groundwater reserves during dry periods, treated water, floodwaters and controlled rainwater can be recharged into the ground under suitable hydrogeological conditions. These practices can contribute to limiting saltwater intrusion, particularly in coastal aquifers.

4.5.6 Multi-Source Water Supply Model

Antalya's future water system should be transformed into a multi-source structure in which the following resources are managed together: surface waters, groundwater, treated wastewater, rainwater, greywater, desalinated seawater and, where necessary, emergency reserves. This diversity will increase the overall resilience of the system by reducing dependence on any single resource.

Analytical Assessment

Alternative water resources should be developed not to replace natural water resources, but to support them and reduce pressure on them. Antalya's future water security will depend not on increasing the capacity of a single resource, but on establishing a flexible and multi-source supply system in which different resources complement one another. This approach extends the existing report's emphasis on reuse and alternative resources into a more comprehensive strategic framework.

Policy Implications

A phased implementation programme should be developed to integrate alternative water resources in Antalya.

- The order of priority could be as follows:
- Reducing water losses and leakages,
- Improving water efficiency,
- Reusing treated wastewater,
- Expanding rainwater harvesting and greywater systems,
- Introducing capital-intensive alternatives, such as seawater desalination, according to strategic and local needs.

This sequence provides a balanced transformation model that considers cost-effectiveness and water security together..

Figure 35: Antalya Multi-Source Water Supply Model

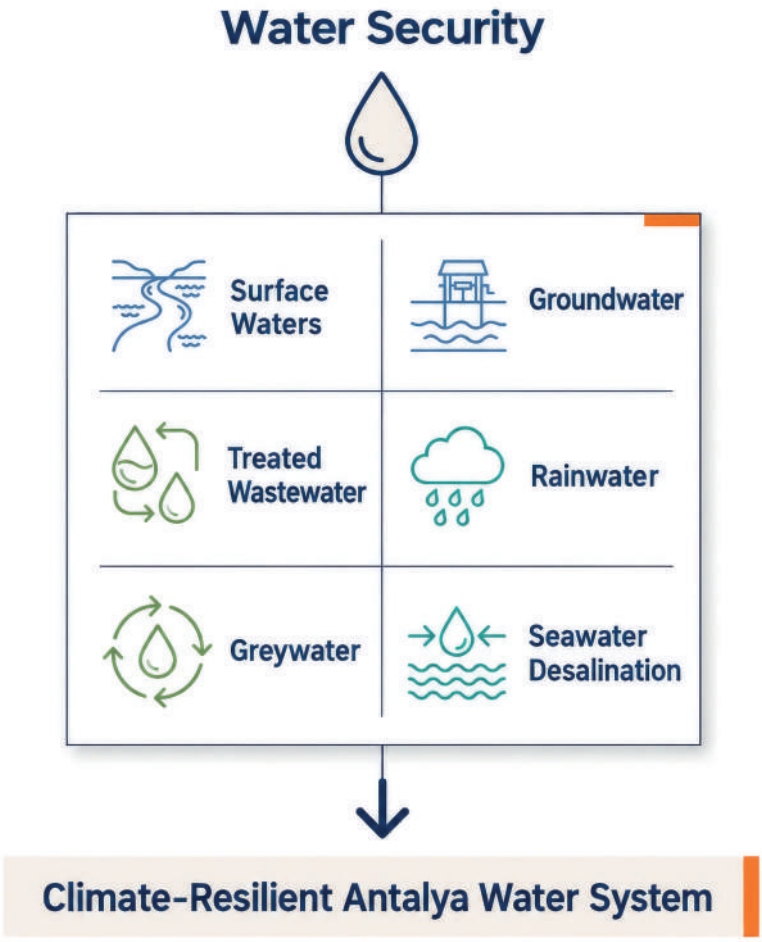
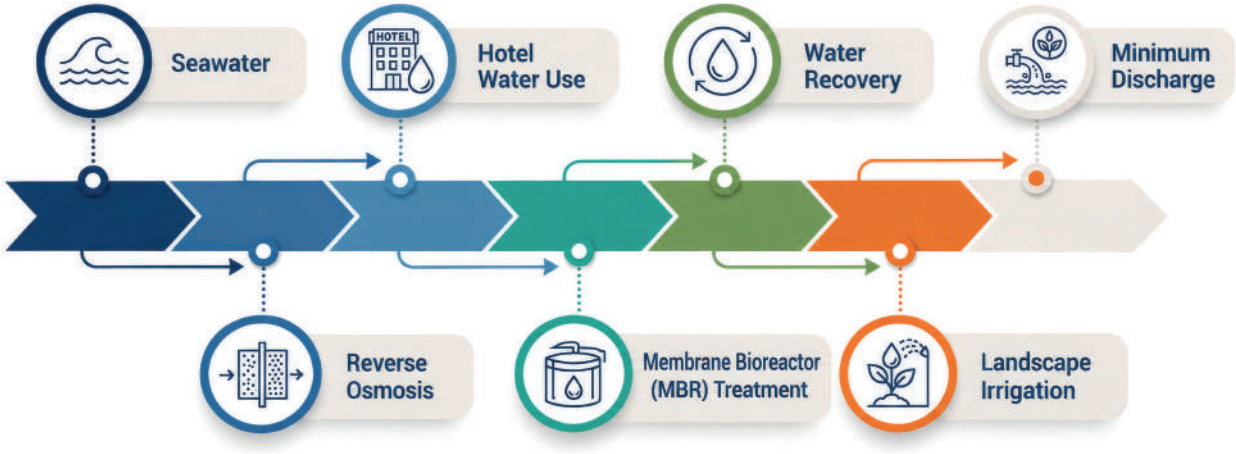


Figure 36: Case Study: Water-Resilient Tourism Facility Model



This model offers a solution tailored to Antalya's tourism sector in terms of both water security and climate adaptation. It could also serve as a "bankable" (investment-ready) pilot project for investors and international financial institutions.

4.6 Circular Water Economy

A New Water Management Paradigm for Antalya

For many years, water has been managed as a linear resource that is used and discharged. Under this traditional approach, water abstracted from natural sources is used for drinking, agriculture, tourism or industry and subsequently discharged into the receiving environment after treatment. Consequently, the economic and environmental value of water is limited to a single cycle of use.

However, climate change, population growth, drought risks and increasing water demand demonstrate that this linear model is no longer sustainable. Therefore, developed countries are increasingly adopting the Circular Water Economy approach, in which water is retained within the system for as long as possible, reused and utilised to generate economic value.

The objective of this model is not merely to conserve water. It also aims to recover the energy, nutrients and economic value contained in water. In this way, water management moves beyond being an environmental service and becomes one of the fundamental components of climate adaptation, resource efficiency and sustainable development.

Considering Antalya's intensive tourism activity, agricultural production capacity and identity as a coastal city, the implementation of the circular water economy will not only provide environmental benefits but also enhance economic competitiveness and water supply security.

4.6.1Core Principles of the Circular Water Economy

The circular water economy is based on four fundamental principles.

Efficiency at Source

The most sustainable water is water that is not consumed. Therefore, water-efficient equipment, smart meters, pressure management and leakage control constitute the first stage of the circular economy.

Reuse

Used water can be treated using appropriate technologies and reused for different purposes. This reduces the need to abstract additional water from natural resources.

Resource Recovery

Modern wastewater treatment facilities do more than produce treated water. They also enable the recovery of valuable resources such as energy, biogas, phosphorus, nitrogen and organic matter. This approach transforms wastewater treatment facilities from **"waste disposal facilities" into resource recovery facilities.**

Supporting the Natural Water Cycle

Rainwater infiltration into the soil, wetland conservation and the enhancement of groundwater recharge constitute the natural infrastructure dimension of the circular water economy.

4.6.2 Circular Water Economy Model for Antalya

The circular water economy in Antalya should be established around the following key components:

- Efficiency in drinking water supply systems,
- Water reuse in tourism facilities,
- Use of reclaimed water in agriculture,
- Process water recycling in industry,
- Rainwater harvesting,
- Greywater systems,
- Advanced biological treatment,
- Strategic use of seawater,
- Energy recovery,
- Digital water management.

This approach will establish an integrated water cycle encompassing all sectors in Antalya.

4.6.3 Circular Water Management in Tourism

The tourism sector is a fundamental pillar of Antalya's economy. Therefore, it should also be a pioneer in the transformation of water management.

Water-saving fixtures, greywater systems, rainwater storage, the use of advanced treated water for landscape irrigation and smart water management systems should be widely implemented in tourism facilities.

In addition, where appropriate environmental conditions are met in coastal areas, seawater desalination may be considered a strategic alternative, particularly for facilities with high water consumption. This approach will enhance the tourism sector's capacity to adapt to climate change.

4.6.4 Circular Water Management in Agriculture

Agriculture is one of Antalya's largest water users. Therefore, modern irrigation systems, sensor-assisted irrigation, the use of treated water, water-efficient crop patterns and digital agricultural applications should be fundamental components of the circular water economy.

4.6.5 Circular Water Management in Industry

In industrial facilities, process water recovery, closed-loop systems, rainwater utilisation and advanced treatment technologies can significantly reduce water consumption. Within the framework of the Green Organised Industrial Zones approach, water efficiency should be considered alongside energy efficiency.

4.6.6 Benefits of the Circular Water Economy for Antalya

The implementation of this model will protect natural water resources, reduce drought risks, alleviate pressure on groundwater, strengthen water security in the tourism sector, support the sustainability of agricultural production, enhance industrial competitiveness, contribute to reducing carbon emissions and facilitate access to international green finance.

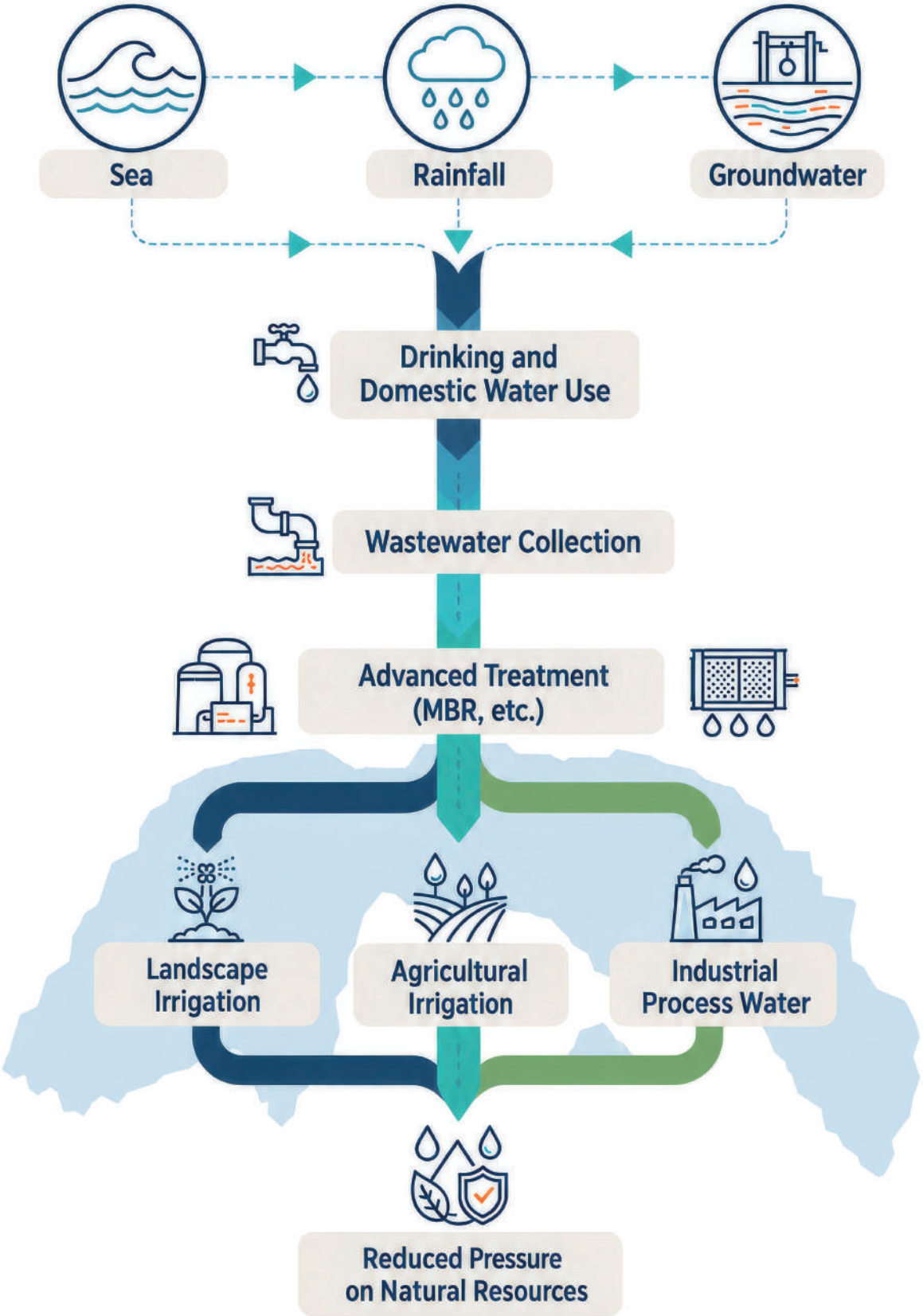
Analytical Assessment

The circular water economy envisages managing water not merely as a natural resource that is consumed, but as a strategic asset that generates economic, environmental and social value. Adopting this approach in Antalya's water policies will not only enhance the city's capacity to adapt to climate change but also strengthen resource efficiency across the tourism, agriculture and industry sectors. In particular, advanced treatment technologies, reuse practices and digital monitoring systems could contribute to the development of a water management model that serves as an example at the regional level.

Policy Implications

An **"Antalya Circular Water Economy Action Programme (2027–2035)"** should be developed in partnership with Antalya Metropolitan Municipality, ASAT, district municipalities, organised industrial zones, the tourism sector and agricultural producer associations. This programme should provide a concrete roadmap encompassing reuse targets, sector-specific water efficiency indicators, investment priorities and financing mechanisms.

Figure 37: Antalya Circular Water Economy Model



4.7 Water Efficiency and Smart Water Management

Antalya's Strategy for Conserving Every Drop of Water

In an era of increasing climate change impacts, population growth and continuously rising water demand, using existing water resources more efficiently is becoming as strategic as developing new water resources. Water efficiency is not merely a conservation policy aimed at reducing consumption. It is also an integrated management approach that protects natural water resources, reduces energy consumption, lowers operating costs and enhances climate change adaptation capacity.

In a city such as Antalya, where tourism, agriculture and urbanisation are simultaneously intensive, water efficiency should be regarded as one of the fundamental components of water security. Accordingly, Antalya's future water management strategy should combine physical infrastructure improvements, the use of digital technologies, the development of consumption habits and sector-specific efficiency practices.

4.7.1 Reducing Water Losses and Leakages in Distribution Networks

In many cities worldwide, significant quantities of drinking water are lost through physical losses and leakages in distribution networks before reaching consumers. Therefore, pressure management, active leak detection, infrastructure renewal, district metered areas (DMAs) and real-time monitoring systems should be widely implemented in Antalya. Reducing losses in distribution networks is a lower-cost and more environmentally sustainable solution than developing new water resources.

4.7.2 Smart Meters and Digital Water Management

Digital transformation offers significant opportunities in water management.

Through smart meters, consumption monitoring, early leak detection, consumer notifications, dynamic pricing and demand forecasting can be implemented more effectively. Analyses supported by Geographic Information Systems (GIS), remote sensing, sensor networks and artificial intelligence will enable more effective management of Antalya's water infrastructure.

4.7.3 Water Efficiency in Buildings

A significant proportion of urban water consumption occurs in buildings. In new residential developments, hotels, public buildings and commercial premises, low-flow fixtures, dual-flush cisterns, water-efficient sanitary fittings, rainwater harvesting and greywater systems should become standard practices. Within green building certification systems, water efficiency should be one of the fundamental assessment criteria.

4.7.4 Water Efficiency in the Tourism Sector

The tourism sector is the economic engine of Antalya. Therefore, the sector must be a pioneer in the transformation of water management. Digital water monitoring systems, room-based consumption analyses, low-flow equipment, advanced treated water reuse and smart irrigation systems should be widely implemented in tourism facilities. Water efficiency practices will not only provide environmental benefits but also reduce operating costs and enhance the competitiveness of facilities.

4.7.5 Water Efficiency in Agriculture

In Antalya, the agricultural sector accounts for a significant proportion of water consumption. Therefore, drip irrigation, sensor-assisted irrigation, irrigation planning based on meteorological data, precision agriculture practices and digital irrigation automation systems should be widely implemented. Water-efficient cropping patterns and modern irrigation techniques should be considered together.

4.7.6 Water Efficiency in Industry

In industrial facilities, closed-loop processes, reclaimed process water, water footprint assessments, the ISO 46001 Water Efficiency Management System and digital process monitoring practices should be encouraged. Water efficiency should be an integral part of the green transition of industry.

4.7.7 Public Awareness and Behavioural Change

Individual behaviour is as important as technological investments in determining the success of water management. Therefore, educational programmes, water awareness initiatives in schools, public campaigns, awareness-raising activities targeting the tourism sector and digital applications that make water consumption visible should be widely implemented. Long-term water security can be achieved not only through infrastructure investments, but also through society's collective commitment to water as a shared resource.

Analytical Assessment

Water efficiency is one of the fastest and most cost-effective ways to enhance Antalya's future water security. Significant water savings can be achieved without developing additional water resources by reducing water losses and leakages, establishing digital management systems, expanding the use of water-efficient technologies in buildings and implementing sector-specific transformation programmes. This approach will also contribute to climate change adaptation policies by reducing energy consumption and operating costs.

Policy Implications

A "**Water Efficiency Master Plan (2027–2035)**" should be developed for Antalya.

Within the scope of this plan, phased targets should be established for water loss and leakage rates in distribution networks; water efficiency standards should be made mandatory in new buildings; sector-specific water efficiency criteria should be developed for tourism facilities and organised industrial zones; digital monitoring infrastructure should be strengthened; and public institutions and local authorities should lead the transformation through exemplary practices. The success of this plan should be monitored through regular performance indicators, and the results should be shared with the public.

"Antalya's water future will be secured not merely by finding new resources, but by using existing water more intelligently, efficiently and responsibly."

Figure 38: Antalya Water Efficiency Pyramid

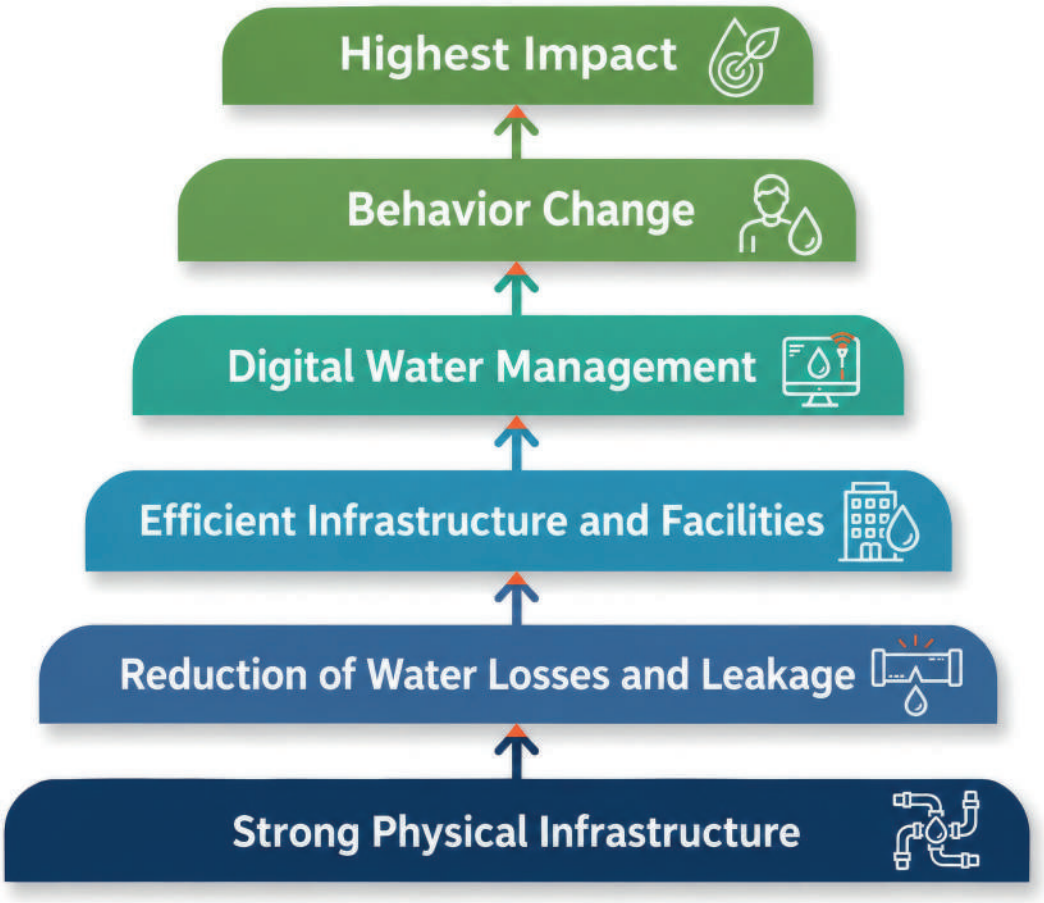


Table 14: Sector-Specific Water Efficiency Priorities

Sector	Priority Measures	Expected Benefit
Urban Areas	Network rehabilitation and smart meters	Reduction of water losses
Tourism	Greywater use, water reuse and digital monitoring	Lower operating costs
Agriculture	Drip irrigation, sensor-based irrigation	Increased productivity per unit of water
Industry	Closed-loop processes, ISO 46001	Water and energy savings
Public Sector	Demonstration projects and training	Increased public awareness

4.8 Climate-Resilient Water Management in Agriculture

Water Security Strategy for Antalya's Agricultural Sector

Antalya is one of Türkiye's most important agricultural production centres. Its capacity for greenhouse cultivation, open-field fruit and vegetable production, citrus cultivation, tropical crops and cut flower production makes a significant contribution to the national economy. However, this production capacity is directly dependent on sustainable water management.

Rising temperatures, irregular precipitation, prolonged drought periods and increasing evaporation rates associated with climate change have made water management a strategic issue in agricultural production. In the future, agricultural competitiveness will be assessed not only through increases in productivity, but also through **the economic value generated per unit of water.**

Therefore, agricultural water management in Antalya should be transformed into a system that uses existing water more efficiently, benefits from digital technologies and facilitates climate change adaptation, rather than one that consumes more water.

4.8.1 The Future of Agriculture and Water Demand

The agricultural sector accounts for a significant proportion of water consumption in Antalya. Furthermore, rising temperatures, prolonged irrigation seasons, changes in precipitation patterns and declining soil moisture will increase irrigation requirements in the future. Consequently, declining water supply alongside increasing agricultural demand makes effective planning essential.

4.8.2 Modern Irrigation Systems

To improve water efficiency, drip irrigation, micro-sprinkler irrigation, low-pressure irrigation systems and automated irrigation control should be widely implemented. When selecting irrigation methods, not only investment costs but also water savings, energy consumption and crop productivity should be evaluated together.

4.8.3 Digital Agriculture and Precision Irrigation

The use of digital technologies in the agricultural sector is becoming increasingly important. Soil moisture sensors, meteorological stations, satellite data and artificial intelligence-assisted decision-support systems can optimise irrigation scheduling and water quantities based on scientific data. This approach can reduce unnecessary water consumption while improving crop quality and productivity.

4.8.4 Use of Treated Wastewater in Agriculture

Advanced treated wastewater can serve as an important alternative water source for agricultural irrigation, provided that appropriate quality standards are met. Expanding this practice will reduce pressure on freshwater resources, support water supply security during dry periods and strengthen the circular water economy. However, its use must be planned in accordance with national legislation and scientific standards, taking into account crop type, irrigation method, soil characteristics and public health criteria.

4.8.5 Cropping Patterns and Water Efficiency

Under climate change conditions, improving irrigation systems alone is not sufficient.

Water planning should consider crop water consumption, economic value, regional climatic conditions and drought risks together. Agricultural production planning should be undertaken in accordance with the long-term sustainability of water resources.

4.8.6 Agricultural Drainage and Soil Health

Water management is not solely about irrigation.

Excessive irrigation may create risks such as rising water tables, salinity, drainage problems and deterioration of soil structure. Therefore, effective drainage systems and soil moisture management should be among the fundamental components of climate-resilient agriculture.

4.8.7 Institutional Cooperation and Basin Management in Agriculture

The success of agricultural water management depends on coordination among farmers, irrigation associations, local authorities, the State Hydraulic Works (DSİ), universities and relevant public institutions. Through a basin-based planning approach, water allocation, drought scenarios, irrigation investments and data sharing should be addressed within a common governance model.

Analytical Assessment

The future of agriculture in Antalya depends not on increased water consumption, but on a transition towards a production model based on greater water efficiency. Modern irrigation technologies, digital agriculture practices, the controlled use of advanced treated water and the planning of cropping patterns according to water availability are fundamental components of climate change adaptation. This transformation will contribute to protecting natural water resources while ensuring the continuity of agricultural production.

Policy Implications

A **"Climate-Resilient Agricultural Water Management Programme"** should be developed for Antalya.

Bu program kapsamında:

- Within the scope of this programme:
- Basin-based water allocation plans should be developed.
- The widespread adoption of pressurised irrigation systems should be supported.
- Incentive mechanisms for digital agriculture technologies should be developed.
- Pilot projects for the safe use of advanced treated water should be initiated.
- Continuous training and technical advisory services for farmers should be strengthened.

The success of the programme should be regularly monitored using measurable indicators such as water consumption, irrigation efficiency and agricultural production performance.

Figure 39: Climate-Resilient Agricultural Water Management Model

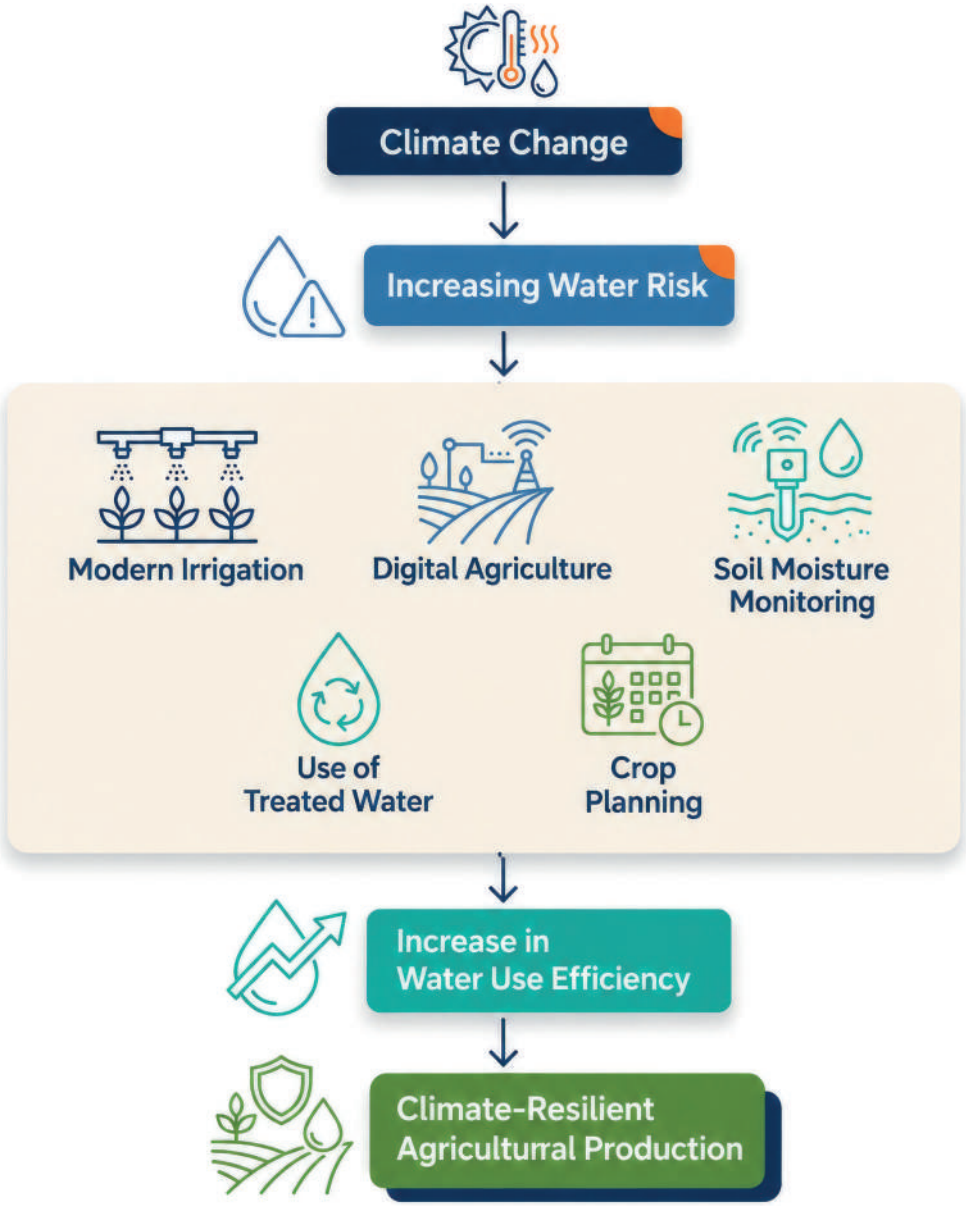


Table 15: Priority Areas for Transformation in Agriculture

Transformation Area	Strategic Objective	Expected Outcome
Irrigation Infrastructure	Reduce water losses	Higher irrigation efficiency
Digital Agriculture	Data-driven decision-making	Reduction of unnecessary water use
Treated Water	Develop an alternative water source	Reduced pressure on freshwater resources
Crop Planning	Cropping patterns adapted to water availability	Adaptation to climate risks
Institutional Cooperation	Basin-based management	More effective water allocation

4.9 Climate-Resilient Water Management in Tourism

A New Tourism Model Combining Water Security and Competitiveness

Antalya is one of the world's leading tourism destinations, with millions of visitors, an extensive accommodation capacity and well-developed tourism infrastructure. The sustainability of this strong tourism economy depends largely on a reliable, high-quality and uninterrupted water supply.

Rising temperatures, drought risks and seasonal increases in water demand associated with climate change are making water management a strategic factor in the competitiveness of the tourism sector. Today, the international tourism market evaluates not only service quality, but also environmental performance, resource efficiency and climate adaptation capacity.

Therefore, Antalya's tourism vision should evolve from a traditional operating model based on high water consumption towards a model that prioritises resource efficiency, embraces the circular water economy and facilitates climate change adaptation.

4.9.1 Strategic Relationship Between Tourism and Water Security

In the tourism sector, water is an essential input for numerous activities, including accommodation services, food production, landscaped areas, swimming pools, spas, recreational facilities and cleaning services. Particularly during the summer months, the period of highest tourism demand coincides with the dry season, when natural water resources are under the greatest pressure. This makes the tourism sector one of the sectors most vulnerable to climate change.

4.9.2 Water-Efficient Tourism Facilities

In next-generation tourism facilities, low-flow fixtures, smart water management systems, digital meters, leak detection systems and automated irrigation infrastructure should become standard practices. Water efficiency should be regarded not merely as an environmental responsibility, but also as a strategic investment that reduces operating costs.

4.9.3 Circular Water Management

Water generated within tourism facilities should be reused within the system wherever possible. This includes the widespread adoption of greywater systems, the use of advanced treated wastewater for landscape irrigation, rainwater harvesting and process water recovery. These practices will reduce freshwater consumption while providing some of the most important examples of the circular water economy within the tourism sector.

4.9.4 Seawater Desalination and Water-Resilient Tourism Facilities

Seawater desalination may be considered a strategic alternative water source for high-capacity tourism facilities located in coastal areas.

However, this practice should be planned on the basis of energy efficiency, environmental impacts, brine (concentrated saline wastewater) management and economic feasibility.

In addition, a new approach is proposed for Antalya:

Water-Resilient Tourism Facility Model

In this model:

- Seawater is desalinated using reverse osmosis technology,
- The resulting freshwater is used within the facility,
- The wastewater generated is treated in advanced biological treatment systems,
- Reclaimed water is used for landscape irrigation, technical applications and other suitable purposes,
- Discharge is reduced to the lowest possible level.

This approach is based on these principles. It can reduce tourism facilities' dependence on natural freshwater resources while strengthening operational continuity and water security in the face of climate change.

4.9.5 Green Certification and International Competitiveness

Environmental performance is becoming an increasingly important selection criterion in the international tourism sector. Therefore, tourism facilities should address water efficiency, energy efficiency, carbon reduction, waste management and green building standards as an integrated whole.

Systems such as LEED, BREEAM, DGNB, EDGE and the national YeS certification system provide important environmental assessment frameworks that also include water efficiency criteria. Encouraging tourism investments in Antalya to comply with these standards could provide a competitive advantage in the international market.

4.9.6 Digital Tourism and Water Management

In the tourism sector, digital technologies can make water management more effective through applications such as room-based consumption analysis, real-time water monitoring, leak alarm systems, artificial intelligence-assisted consumption forecasting and maintenance planning.

Digitalisation can both improve resource efficiency and reduce operating costs.

Analytical Assessment

In the tourism sector, water management is not merely a matter of environmental sustainability. It is also a strategic factor that directly affects competitiveness through service quality, operational continuity, cost management and international reputation. During Antalya's climate change adaptation process, the tourism sector can play a pioneering role by implementing water efficiency, reuse, alternative water resources and digital management practices in an integrated manner.

Policy Implications

A "Climate-Resilient Water Management Programme for Tourism (2027–2035)" should be developed in Antalya. Within the scope of the programme:

- Water management plans should be prepared for large tourism facilities,
- Water reuse projects should be encouraged,
- Rainwater harvesting and greywater systems should be widely implemented in new investments,
- Pilot projects for seawater desalination should be developed in suitable areas,
- Digital water management and performance indicators should be standardised across the sector.

This programme should be implemented through the joint participation of public institutions, local authorities, tourism sector representatives and financial institutions, and should be supported by green financing instruments.

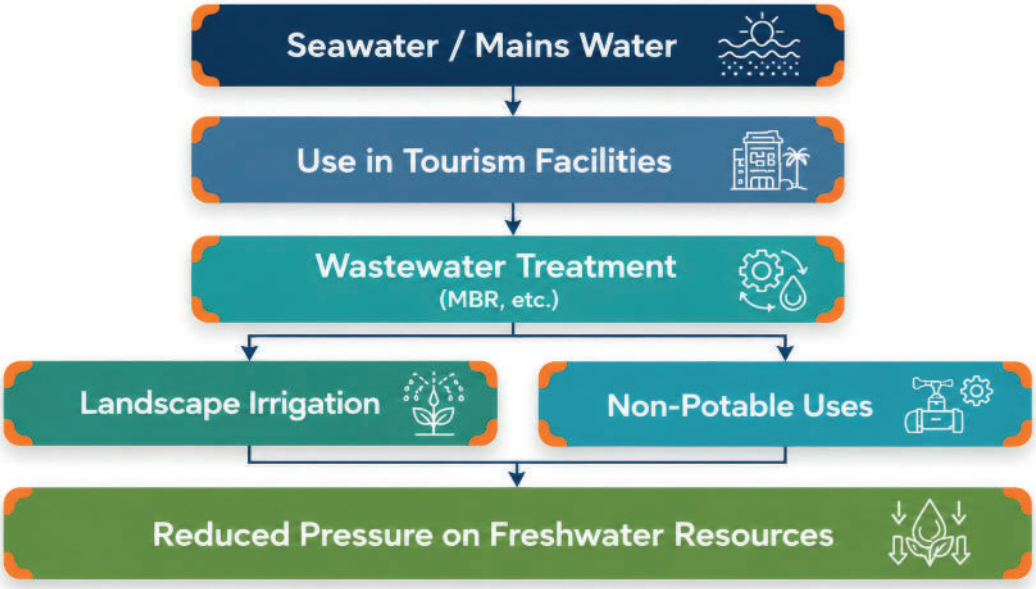
Recommendation for COP31

Antalya Water-Resilient Tourism Programme

The adoption of the **"Water-Resilient Tourism Facility"** approach could be encouraged in large-scale tourism investments and comprehensive renovation projects in Antalya. The programme could encompass the assessment of seawater as an alternative resource under suitable conditions, advanced treatment and reuse, rainwater harvesting and integrated digital water management.

This proposal aims to position Antalya not only as a tourism destination adapting to climate change, but also as **a model implementation centre for water management in the Mediterranean Basin.** This approach could become one of the prominent components of Antalya's post-COP31 international cooperation and climate finance agenda.

Figure 40: Water Cycle in Climate-Resilient Tourism



4.10 Climate-Resilient Water Management in Industry

Resource Efficiency and the Transition to Green Production

Although the industrial sector is one of the fundamental components of economic development, it is also among the major users of water resources. In Antalya, industrial water consumption is concentrated in various sectors, including food processing, agriculture-based industries, natural stone and marble processing, metal production, logistics support facilities and organised industrial zones.

Increasing pressure on water resources as a result of climate change makes it essential for the industrial sector to render its production processes more efficient and resilient. In the future, industrial competitiveness will be assessed not only in terms of production capacity, but also through water efficiency, energy efficiency and carbon performance. Therefore, industrial water management in Antalya should be restructured in accordance with the principles of **resource efficiency, the circular economy and climate adaptation.**

4.10.1 Transformation of Water Use in Industry

In traditional production models, water has generally been regarded as a single-use input.

The new generation of industrial approaches, however, is based on the efficient use of water, its reuse within production processes, resource recovery and the reduction of wastewater generation. This transformation both reduces environmental impacts and lowers operating costs.

4.10.2 Process Water Recovery

Wastewater generated in industrial facilities can be treated using appropriate treatment technologies and reused as process water. Cooling systems, washing operations, auxiliary production processes and technical applications are among the principal areas in which reclaimed water can be utilised. This approach reduces dependence on freshwater resources while strengthening the circular water economy.

4.10.3 Closed-Loop Water Systems

Closed-loop water management aims to retain and reuse the same water within industrial facilities for as long as possible. These systems reduce water consumption and discharge volumes, optimise chemical use and can improve energy efficiency. Closed-loop systems can provide significant benefits, particularly in water-intensive sectors.

4.10.4 Industrial Symbiosis and Shared Water Infrastructure

Industrial symbiosis practices based on the sharing of water and resources between enterprises can be developed in organised industrial zones and industrial clusters. Within this framework, shared advanced treatment facilities, shared recovery systems, shared rainwater storage and shared process water infrastructure can achieve significant efficiencies in resource utilisation.

The **industrial symbiosis** approach provides an integrated model that supports the efficient use of not only water, but also energy, waste and by-products.

4.10.5 Digital Water Management and Industry

The use of digital technologies in industrial facilities can make water management more effective through real-time water consumption monitoring, process optimisation, leak detection, maintenance planning and artificial intelligence-assisted decision-support systems. Industry 4.0 applications are also an important tool for achieving resource efficiency targets.

4.10.6 Green Organised Industrial Zones

In Antalya Organised Industrial Zone and other industrial areas, water efficiency, energy efficiency, renewable energy, carbon reduction, the circular economy, rainwater harvesting and advanced wastewater recovery should be addressed as an integrated whole. The Green Organised Industrial Zone approach will enhance the resilience of industrial zones to climate change.

4.10.7 Water Footprint and Corporate Reporting

Water footprint and sustainability reporting are becoming increasingly important for businesses operating in international markets. Therefore, industrial enterprises in Antalya should be encouraged to undertake water footprint assessments, water risk analyses, sustainability reporting and corporate environmental performance monitoring. These practices will not only provide a competitive advantage in export markets but also enhance investor confidence.

Analytical Assessment

Water management in the industrial sector is becoming a strategic factor in competitiveness, extending beyond compliance with environmental obligations. Water efficiency, process water recovery, digital monitoring systems and industrial symbiosis practices both reduce operating costs and strengthen climate change adaptation capacity. Antalya's industrial policies should be designed to support this transformation.

Policy Implications

The **"Industrial Water Efficiency and Circular Production Programme (2027–2035)"** should be developed for Antalya.

Within the scope of the programme:

- Sector-specific efficiency targets should be established for water-intensive industries.
- Process water recovery should be encouraged.
- Shared advanced treatment and reuse projects should be developed in organised industrial zones.
- Water footprint reporting should be widely adopted.
- The implementation of the **ISO 46001 Water Efficiency Management System** and international sustainability standards should be supported.

This programme will accelerate the alignment of Antalya's industrial sector with the European Green Deal and global sustainability expectations.

Figure 41: Circular Water Management in Industry



Table 16: Priority Areas for Transformation in Industry

Transformation Area	Strategic Objective	Expected Outcome
Process Water Recovery	Reduce freshwater consumption	Improved water supply security
Closed-Loop Systems	Reuse of the same water	Water and energy savings
Industrial Symbiosis	Shared infrastructure and resource sharing	Reduced operating costs
Digital Water Management	Real-time monitoring	Improved efficiency and early intervention
Water Footprint Reporting	Compliance with international standards	Competitiveness and investment attractiveness

4.11 Integrated Water Management Roadmap for Antalya

From Strategy to Implementation

Water is one of the most fundamental strategic resources shaping Antalya's natural capital, economic production capacity and quality of social life. As the impacts of climate change become increasingly apparent, water management should be regarded not merely as a technical infrastructure service, but as an integral component of the city's long-term development vision. The analyses presented in this chapter demonstrate that Antalya's future water security depends not only on developing new water resources. Genuine success will be achieved through the adoption of a shared management approach across all sectors, based on protecting existing resources, using water efficiently and integrating alternative resources into the system. Therefore, the water management model proposed for Antalya brings together the protection of natural water resources, the circular water economy, climate change adaptation, digital transformation, intersectoral coordination and participatory governance within a single strategic framework.

Strategic Priorities for Water Management in Antalya

It is recommended that Antalya's water policies be shaped around the following key priorities in the coming period.

1. Ensuring Water Security

A multi-source water system should be established in which surface waters, groundwater and alternative water resources are managed together.

2. Protecting Natural Water Capital

River basins, wetlands, groundwater recharge areas and coastal aquifers should be regarded not merely as environmental assets requiring protection, but as natural infrastructure supporting Antalya's economic future.

3. Expanding the Circular Water Economy

The reuse of treated wastewater, rainwater, greywater and other alternative resources should be systematically expanded.

4. Sectoral Transformation

Water efficiency policies developed for cities, agriculture, tourism and industry should be implemented simultaneously.

5. Digital Water Management

Real-time data generation, sensor networks, Geographic Information Systems (GIS), remote sensing and artificial intelligence-assisted decision-making mechanisms should become fundamental components of water management.

6. Climate-Resilient Investments

New infrastructure investments should be planned with consideration of future climate scenarios.

7. Strong Institutional Cooperation

Central government, local authorities, universities, the private sector, professional organisations and

civil society organisations should work together through shared data platforms, common objectives and joint performance indicators.

Antalya Water Management Roadmap (2027–2050)

Phase I (2027–2030)

Preparation and Quick Wins

- Reducing water losses and leakages
- Establishing digital monitoring infrastructure
- Pilot projects for rainwater harvesting and greywater reuse
- Water reuse projects in tourism and industry
- Preparing basin-based risk maps

Phase II (2030–2040)

Structural Transformation

- Expanding the circular water economy
- Integrating alternative water resources into the system
- Expanding digital irrigation systems in agriculture
- Making water efficiency standards mandatory
- Large-scale investments supported by green finance

Phase III (2040–2050)

Climate-Resilient Antalya

- Multi-source water supply system
- Smart water management infrastructure
- Minimum discharge approach
- Water-neutral tourism facilities
- Circular economy-oriented industry
- Integrated management at the basin scale

Analytical Assessment

The proposed transformation of Antalya's water management does not aim solely to improve technical infrastructure. It also establishes an integrated strategic framework that redefines governance approaches, investment priorities, intersectoral coordination and social awareness. This approach provides a management model that protects water as a limited natural resource while supporting economic development and strengthening climate change adaptation.

Policy Implications

In line with the approach proposed in this report, an **"Antalya Integrated Water Management Action Plan (2027–2035)"** should be developed.

The Action Plan should serve as an official roadmap encompassing responsible institutions, an implementation timetable, performance indicators, financing sources, and monitoring and evaluation mechanisms. Furthermore, progress should be communicated to the public through a **"Water Security and Resilience Report"** to be published at regular intervals in Antalya, and policies and practices should be updated in light of scientific data.

Water management is one of the most critical building blocks of Antalya's climate change adaptation process. However, a resilient city is not merely one that manages its water resources effectively. It is also a city that transforms its energy systems, reduces carbon emissions and builds its economic development on a low-carbon model. Therefore, the next chapter will address Antalya's energy transition, carbon management and climate-neutral development strategies.

Figure 42: Antalya Integrated Water Management Strategy Map

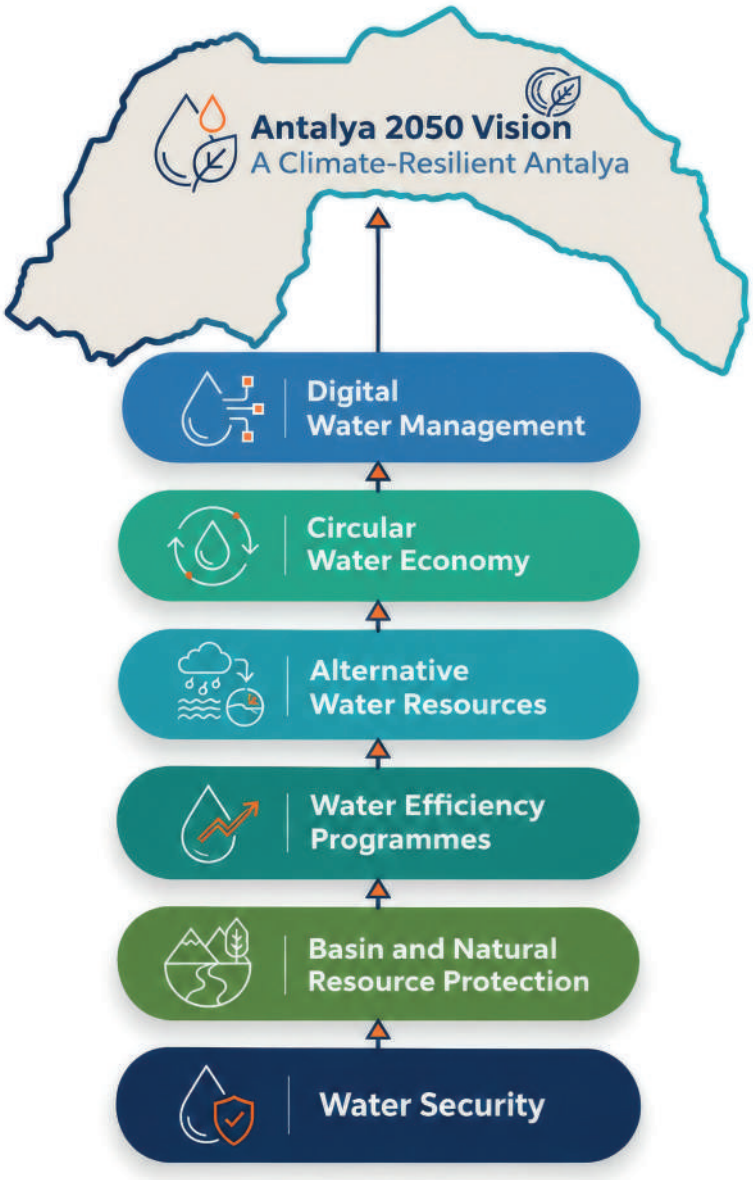


Table 17: Antalya Water Management

Period	Priority	Expected Outcome
2027–2030	Quick Wins	Reduction in water losses and leakage; pilot projects
2030–2040	Structural Transformation	Widespread adoption of the circular water economy
2040–2050	Advanced Implementation	Climate-resilient water system with diversified water sources

4.12 Integrated Water Governance and Implementation Model for Antalya

Strong Institutions, Shared Data and Sustainable Financing

Climate-adaptive water management cannot succeed through technical infrastructure investments alone. Successful implementation must be supported by strong institutional coordination, scientific data generation, participatory governance, long-term financing and regular performance monitoring mechanisms.

Antalya's water management should be built upon a multi-stakeholder governance model based on the shared responsibility of central government, local authorities, universities, professional organisations, the private sector and civil society. This approach aims not merely to bring together the powers and responsibilities of different institutions within a single framework, but to establish a governance culture based on shared objectives, data sharing and accountability.

4.12.1 Integrated Water Governance

Success in water management depends on decision-making processes being based on scientific data, stronger coordination between institutions and the adoption of basin-scale planning. Within this framework, central government, Antalya Metropolitan Municipality and ASAT, DSİ, district municipalities, universities, organised industrial zones, the tourism sector, irrigation associations, professional chambers and civil society organisations should operate within a common governance framework.

4.12.2 Antalya Water Observatory

It is recommended that a permanent **Water Observatory** be established for Antalya. This body should regularly monitor and publicly report key indicators, including water quantity, water quality, groundwater levels, climate indicators, water consumption data, drought indicators and reuse performance. The Water Observatory could also serve as a scientific decision-support centre working in cooperation with universities and research institutions.

4.12.3 Digital Decision Support System

Geographic Information Systems (GIS), remote sensing, sensor networks, real-time monitoring, artificial intelligence-assisted forecasting models and digital twin applications should be gradually introduced into Antalya's water management system. These systems would enable drought early warnings, flood forecasting, distribution network performance and water consumption projections to be managed on the basis of scientific data.

4.12.4 Financing Model

Climate-resilient water investments require long-term financial planning.

Within this framework, national public resources, municipal investments, public–private partnerships (PPPs), green bonds, international climate funds, development banks and carbon finance-related mechanisms should be considered together. Investment priorities should be determined according to environmental benefits, economic sustainability and social impact criteria.

4.12.5 Performance Monitoring System

Measurable performance indicators should be established for each strategic objective.

For example, indicators such as per capita water consumption, water loss and leakage rates in distribution networks, the volume of treated water reused, the share of alternative water resources in total supply, agricultural water efficiency, water consumption in tourism facilities and the proportion of water recovered in industry should be monitored annually and disclosed to the public.

4.12.6 Antalya Water Security Action Programme

To facilitate the implementation of the report, it is recommended that an **"Antalya Water Security Action Programme (2027–2035)"** be developed. The programme should constitute an official implementation document encompassing priority projects, responsible institutions, financing sources, an implementation timetable, performance indicators and monitoring mechanisms.

Analytical Assessment

Achieving Antalya's water security objectives depends not only on developing technical solutions, but also on strengthening the institutional capacity required to implement them. Shared data generation, transparent governance, regular performance monitoring and sustainable financing mechanisms constitute the fundamental foundations of climate-resilient water management. Therefore, governance and financing should be regarded as strategic elements that complement engineering investments.

Policy Implications

The establishment of an **"Antalya Water Management Coordination Board"** could be considered. This body could function as an advisory and coordination platform that does not alter the existing powers and responsibilities of institutions, but coordinates the identification of common objectives, data sharing, performance monitoring and annual evaluation processes.

In addition, an **"Antalya Water Security and Climate Resilience Report"** published annually would enable implementation results to be shared with the public and strategies to be updated when necessary.

Antalya's water future will be shaped by the shared responsibility of protecting natural resources, technological transformation, institutional cooperation and society as a whole. This approach represents a new understanding that regards water not merely as a resource to be managed, but as a fundamental strategic asset for the city's climate-resilient development.

Figure 43: Antalya Integrated Water Governance Model

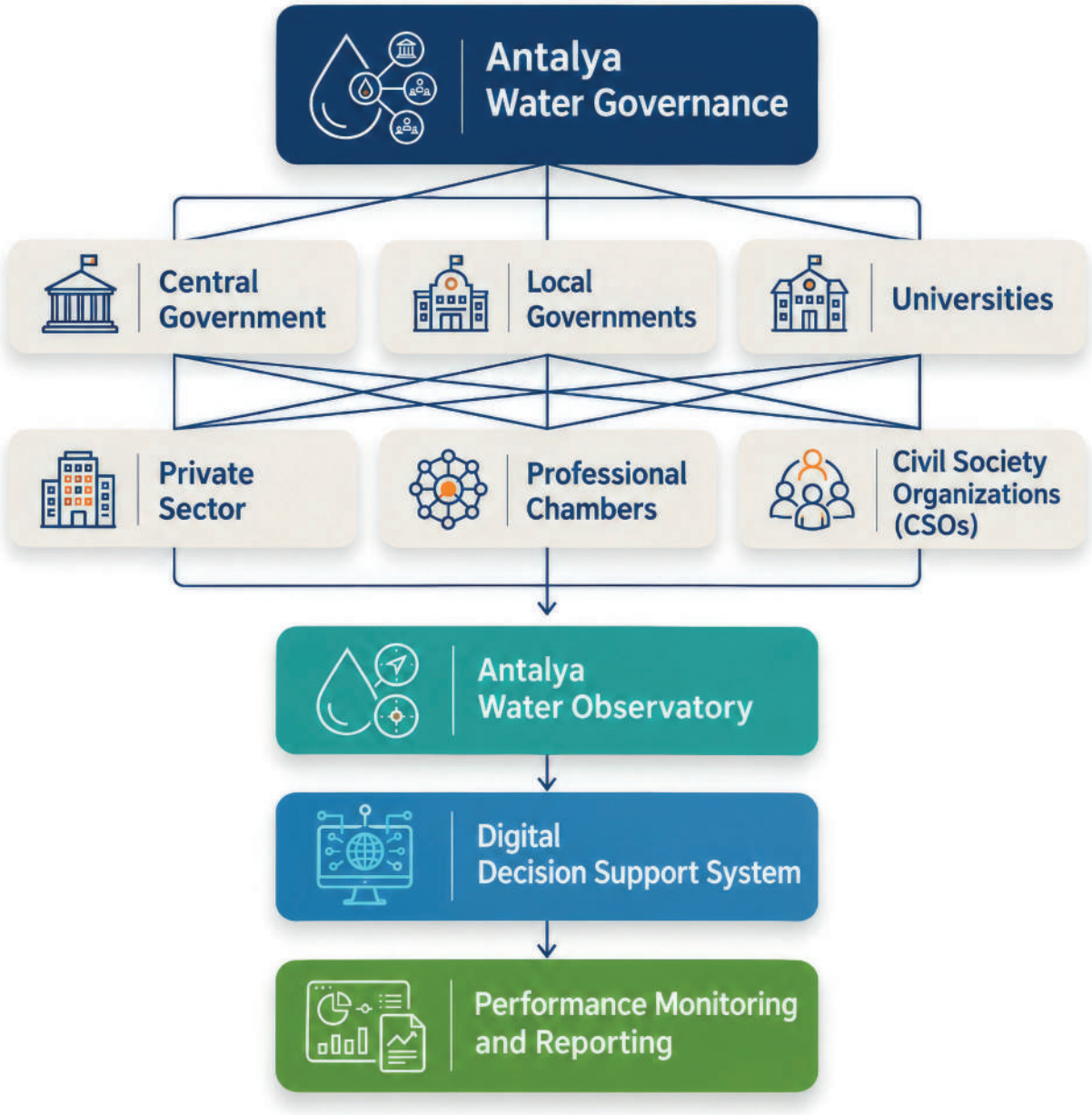


Table 18: Institutional Framework for Implementation

Component	Core Function	Expected Outcome
Water Management Coordination Board	Interinstitutional coordination	Shared objectives and coordinated implementation
Antalya Water Observatory	Data generation and analysis	Scientific support for decision-making
Digital Decision Support System	Real-time monitoring	Early warning and effective operations
Financing Mechanism	Resource mobilization	Long-term investment sustainability
Performance Monitoring	Regular evaluation	Transparency and accountability

"Success in combating climate change means creating cities that emit less carbon, use energy more efficiently and build their economic growth on the principles of sustainability. Antalya's future depends on a transformation model that can deliver low-carbon development and a high quality of life together."

CHAPTER 5

ENERGY TRANSITION, CARBON MANAGEMENT AND CLIMATE-NEUTRAL DEVELOPMENT IN ANTALYA

Low-Carbon Economy, Renewable Energy and the 2050 Net-Zero Roadmap

Chapter Overview

Combating climate change is not limited to developing adaptation policies. It also requires reducing greenhouse gas emissions, transforming energy systems and restructuring economic growth around a low-carbon development model. Antalya is one of Türkiye's most important economic centres, with its rapidly growing urban structure and expanding tourism, agriculture and service sectors. Ensuring the sustainable continuation of this growth depends on implementing integrated policies that improve energy efficiency, expand renewable energy sources, reduce carbon emissions and support climate-friendly investments.

This chapter assesses Antalya's existing energy structure, greenhouse gas emissions profile and potential for climate-neutral development, addressing energy efficiency, renewable energy, green industrial transformation, low-carbon transport, carbon markets and climate finance in an integrated manner. The objective is to establish a strategic roadmap that will help Antalya become one of the pioneering cities that not only adapt to climate change, but also successfully achieve a low-carbon economic transition and enhance their national and international competitiveness.

Chapter Scope: This chapter comprises the following main sections:

5.1 Introduction to Climate-Neutral Development
5.2 Antalya's Energy Profile
5.3 Antalya's Greenhouse Gas Emissions Inventory
5.4 Energy Efficiency and Demand Management
5.5 Renewable Energy Potential
5.6 Solar Energy and Rooftop Solar PV Strategy
5.7 Wind, Biomass and Alternative Energy Sources
5.8 Green Buildings and Low-Carbon Construction
5.9 Green Industrial Transformation and Decarbonisation
5.10 Net-Zero Carbon Approach in Tourism
5.11 Electrification and Clean Mobility in Transport
5.12 Carbon Markets and Emissions Trading System
5.13 Green Finance and Climate Investments
5.14 Antalya 2050 Net-Zero Roadmap

5.1 Introduction to Climate-Neutral Development

A Strategic Perspective on Antalya's Low-Carbon Future

Since the Industrial Revolution, the fossil fuel-based growth model has accelerated global economic development while simultaneously increasing the accumulation of greenhouse gases in the atmosphere and causing irreversible changes in the climate system. Today, climate change is regarded not merely as an environmental problem, but as a multidimensional development issue that directly affects economic growth, energy security, public health, natural resources and social welfare. For this reason, countries and cities are implementing transformation policies aimed at reducing greenhouse gas emissions while simultaneously seeking to adapt to the impacts of climate change. This approach establishes a new economic paradigm based on low-carbon development across all sectors, from energy production and transport to industry, agriculture, buildings and tourism.

Türkiye has also become part of this global transformation process. National climate policies have taken significant steps towards strengthening low-carbon development objectives through energy efficiency measures and renewable energy investments. Accordingly, the role of cities is becoming increasingly important, and strategies developed at the local level are becoming a decisive factor in achieving national targets. Antalya is one of the cities at the centre of this transformation, with its strong tourism economy, agricultural production capacity, rapidly developing urban structure and increasing energy demand. While population growth, seasonal visitor density, transport activity and economic activities increase energy consumption, the impacts of climate change make it essential to manage these resources more efficiently.

The climate-neutral development approach aims to establish a balance between economic growth and environmental sustainability. This model addresses improvements in energy efficiency, the expansion of renewable energy sources, the transformation of carbon-intensive sectors, the development of circular economy practices and the protection of natural carbon sinks together. In this way, it becomes possible to increase economic competitiveness while reducing greenhouse gas emissions and strengthening resilience to climate risks.For Antalya's future, this transformation is not merely an environmental necessity; it also represents a strategic development opportunity that creates new investment areas, encourages innovative technologies, supports employment and facilitates access to international financing resources. Energy efficiency, solar energy, sustainable tourism, electric transport and green building practices, in particular, stand out as priority areas in the city's transition towards a low-carbon economy.

This chapter assesses Antalya's existing energy structure and greenhouse gas emissions profile, while providing an integrated perspective on energy efficiency, renewable energy, low-carbon industry, sustainable tourism, clean transport, carbon management and climate finance. The objective is to establish a strategic roadmap that will support Antalya's transformation into a climate-neutral, competitive and resilient urban economy by 2050.

5.2 Antalya's Energy Profile

Current Consumption Structure, Energy Intensity and the Need for Transformation

Energy is a fundamental strategic input for the uninterrupted functioning of Antalya's urban life, tourism economy, agricultural production, commercial activities and transport system. The city's rapidly growing population, high visitor numbers, seasonal cooling requirements and expanding service sector distinguish its energy demand profile from that of many other provinces in Türkiye.

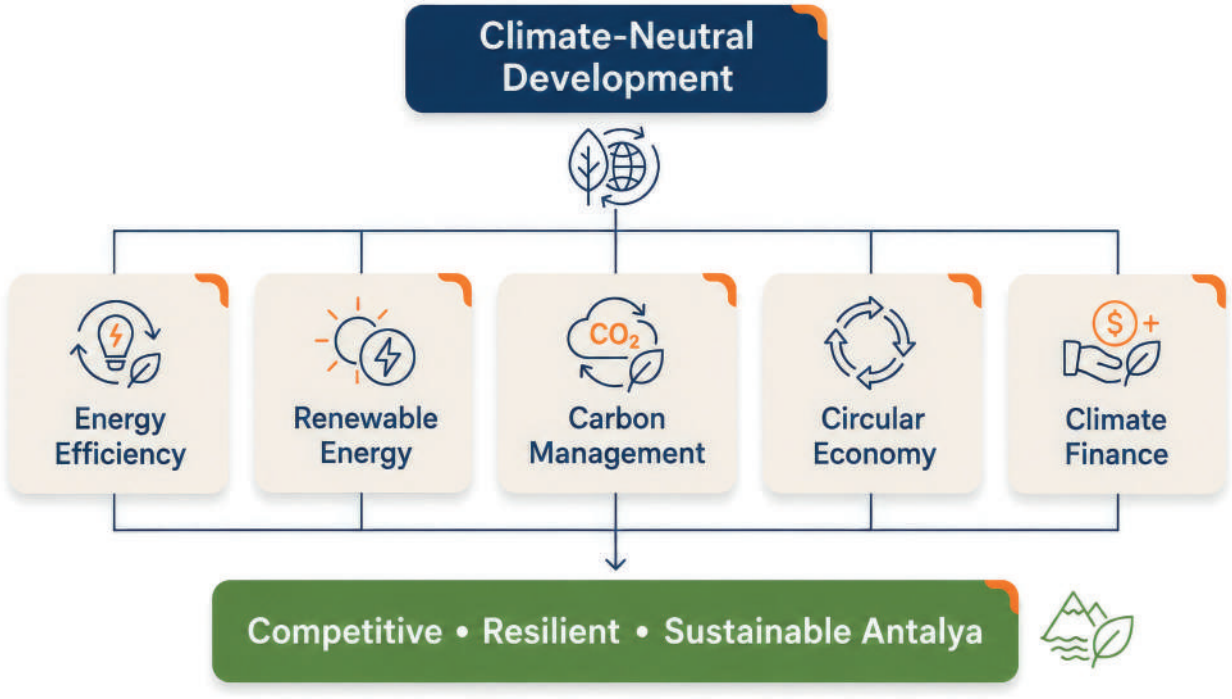
Analytical Assessment

Low-carbon development is not merely an environmental policy aimed at reducing emissions. It is also a comprehensive development approach that strengthens energy supply security, reduces operating costs, encourages innovative technologies and provides a competitive advantage in international markets. In cities such as Antalya, where tourism, agriculture and service sectors predominate, this transformation is of strategic importance for ensuring that the protection of natural resources and economic growth can be sustained together.

Policy Implications

It is recommended that all sectoral plans and investments developed for Antalya be aligned with the **2050 climate neutrality target**. Within this framework, energy efficiency, renewable energy investments, low-carbon transport, green building practices, industrial decarbonisation, sustainable tourism, climate finance and carbon management should be integrated under a common transformation strategy. In this way, Antalya can strengthen its potential to become one of the internationally recognised model cities that not only adapt to climate change but also pursue a low-carbon development model.

Figure 44: Key Components of Climate-Neutral Development



Antalya's energy system serves not only its permanent resident population. Tourists, seasonal workers, second-home users, day visitors and intensive transport activity also place a significant additional burden on energy infrastructure during certain periods of the year. Therefore, when assessing the province's energy demand, the **equivalent population served**, tourism capacity and seasonal peak consumption should be taken into account alongside the registered population.

Antalya's current energy consumption comprises electricity, natural gas, diesel, petrol, LPG, aviation fuels and, to a lesser extent, other fuels. Although electricity consumption can be monitored more systematically at the provincial level, there is no up-to-date, consolidated provincial energy balance covering all fossil fuels. Therefore, assessments of fossil fuel consumption require the combined analysis of local greenhouse gas inventories, fuel sales statistics, natural gas distribution data, transport indicators and sectoral activity data.

5.2.1 Antalya's Electricity Consumption

According to the Turkish Electricity Distribution Corporation (TEDAŞ) statistics for 2023, net electricity consumption per capita in Antalya was 3,736 kWh/year. In the same year, the average for Türkiye was **3,390 kWh/year.** Accordingly, Antalya's per capita electricity consumption was approximately 10% above the national average.

Taking Antalya's population in 2023 as approximately 2.70 million, the annual net electricity consumption calculated on the basis of per capita consumption was approximately::

2.696 million people × 3,736 kWh/person ≈ 10.1 billion kWh

In other words: **Approximately 10.1 TWh/year**

This figure is a **calculated estimate** obtained by multiplying the per capita net consumption indicator published by TEDAŞ by population data from the Turkish Statistical Institute (TurkStat). Although it does not replace a directly published table of total provincial consumption, it provides a reliable indication of the scale of Antalya's annual electricity consumption.

Table 19: Antalya's Key Electricity Indicators

Indicator	Value	Data Source / Basis
Per capita net electricity consumption, 2023	3,736 kWh/person-year	Official TEDAŞ data
Türkiye average, 2023	3,390 kWh/person-year	Official TEDAŞ data
Antalya population, 2023	Approximately 2.70 million	Official TURKSTAT data
Antalya net electricity consumption, 2023	Approximately 10.1 TWh	Calculated value
Annual Average Equivalent Power	Approximately 1,150 MW	Calculated from consumption

The average annual power demand is calculated by dividing total electricity consumption by the 8,760 hours in a year: 10.1 TWh / 8,760 hours ≈ 1,150 MW

However, this figure represents the average load throughout the year. In Antalya, the intensive use of cooling systems during the summer months, the tourism season and population movements cause the instantaneous and daily peak power demand to rise significantly above this average. Therefore, energy infrastructure must be planned not only according to annual total consumption, but also on the basis of **seasonal and hourly peak demand.**

5.2.2 Sectoral Structure of Energy Consumption

Antalya's energy consumption is concentrated primarily in six sectors:

1. Residential buildings and urban settlements
2. Tourism and accommodation facilities
3. Commerce and services
4. Agriculture and irrigation activities
5. Industry and production facilities
6. Transport

The patterns of energy use and transformation requirements of these sectors differ from one another.

Residential Buildings and Urban Structures

A significant proportion of electricity consumption in residential buildings is attributable to cooling, hot water, lighting and household appliances. With climate change, longer-lasting heatwaves pose a risk of increasing electricity demand for cooling. The existing building stock presents considerable potential for reducing consumption due to poor insulation performance, inefficient cooling systems and uncontrolled energy use.

Tourism Sector

When facilities licensed by the Ministry and municipalities are considered together, Antalya's official accommodation capacity reaches **1,885 facilities, 208,337 rooms and 460,681 beds.** This scale makes the tourism sector one of the principal determinants of the province's energy demand. Energy consumption in tourism facilities is concentrated particularly in the following areas: space cooling and ventilation, hot water production, kitchen and laundry services, swimming pools and spa facilities, landscaping and irrigation systems, lighting, pumping and pressurisation systems. The coincidence of the peak tourism season with the periods of highest temperatures and electricity demand strengthens the **tourism–climate–energy nexus** within Antalya's energy system.

Agriculture

Energy consumption in agricultural production is concentrated in activities such as irrigation pumps, groundwater abstraction, greenhouse climate control, cold storage facilities, product processing and packaging, and agricultural logistics. In particular, pumping and pressurisation in irrigation demonstrate the strong interconnection between energy and water management in Antalya. Therefore, a significant proportion of the water efficiency measures addressed in Chapter 4 will also deliver energy savings.

Industry

Antalya's industrial sector is characterised less by heavy industry and more by food processing, agriculture-based industries, natural stone, metal processing, machinery, packaging, cold-chain operations and service support activities. The principal areas for improving energy efficiency in industry are as follows: energy-efficient motor and pump systems, compressed air optimisation, waste heat recovery, process control, energy monitoring systems, rooftop solar energy and energy storage.

Transport

The transport sector in Antalya is largely dependent on fossil fuels. When urban transport, tourism transfers, intercity transport, freight movements, private car use and aviation activities are considered together, transport is one of the principal sectors in terms of the province's energy consumption and greenhouse gas emissions. Therefore, the energy transition cannot be limited to making electricity generation renewable. The electrification of transport systems, improvement of public transport and reduction of dependence on private vehicles should also be fundamental components of energy policy.

5.2.3 Antalya's Total Energy and Fossil Fuel Profile

The sustainable energy and climate action plans prepared by Antalya Metropolitan Municipality provide an important starting point for assessing the province's energy consumption and greenhouse gas emissions. The municipality has published its greenhouse gas inventory for 2019 and sectoral emissions reduction targets. However, some differences exist between the system boundaries used in the existing inventories and current energy statistics.

For example, urban road transport fuels, aviation fuels, fuels used in local electricity generation, industrial fuels and natural gas consumption may be addressed in different sources and within different system boundaries. Therefore, the total quantities of fossil fuels presented in this report should be defined not as **definitive official provincial totals**, but as an estimated energy balance derived from existing inventories and sectoral data. Initial strategic assessments indicate that the largest shares of Antalya's direct fossil fuel consumption originate from road transport and aviation, while buildings, commercial facilities and industry account for smaller but nevertheless significant shares.Antalya's current fossil fuel profile should also be examined separately by bringing together the following data groups:

Table 20: Antalya's Fossil Fuel Profile

Data Group	Main Source
Gasoline, Diesel and LPG Sales	EPDK (Energy Market Regulatory Authority) based on petroleum and LPG statistics
Natural Gas Consumption	EPDK and local distribution company data
Aviation Fuel	DHMİ (Directorate General of State Airports), airport operator and fuel supply data
Municipal Vehicle Fleet and Public Transport	Antalya Metropolitan Municipality
Industrial Fuels	Organized Industrial Zones (OIZs), industrial enterprises and energy audits
Electricity Consumption	TEDAŞ, TEİAŞ, distribution company data
Tourism Energy	Facility consumption data and sectoral studies
Agricultural Energy	Ministry of Agriculture and Forestry, irrigation associations and pump inventory

Once this data collection process is completed, it will be possible to prepare a comprehensi ve **Provincial Energy Balance for Antalya**, covering electricity, petroleum products, natural gas, and other energy carriers.

5.2.4 Structural Factors Determining Antalya's Energy Demand

The key factors that will determine the future development of Antalya's energy demand are as follows:

Population Growth

Growth in the urban population will increase energy demand associated with housing, transportation, water supply, wastewater treatment, commercial services, and public infrastructure.

Tourism Capacity and Season Length

Changes in tourist accommodation capacity, facility occupancy rates, and the extension of the tourism season throughout the year will affect energy consumption. The target of extending tourism activities to 12 months may partially offset the excessive demand concentrated in the summer months; however, total annual consumption may increase.

Climate Change

Rising temperatures and heatwaves will increase cooling demand. This increase will be particularly pronounced in residential buildings, tourism facilities, shopping centres, healthcare facilities, and public buildings.

Electrification

Electric vehicles, heat pumps, seawater desalination, wastewater recovery, and electrified industrial processes will increase electricity consumption. However, since a significant proportion of this increase will result from replacing less efficient fossil fuel use with electricity, total primary energy consumption and carbon emissions may decline.

Energy Efficiency

Building insulation, high-efficiency cooling systems, smart energy management, efficient pumps, and process improvements may offset a significant proportion of the increase in energy demand.

5.2.5 Antalya's Energy Transition Potential

Antalya's principal advantages in its energy transition include its high solar energy potential; extensive rooftop areas suitable for solar energy applications in hotels, residential buildings, and commercial properties; the potential for energy management and storage applications in tourism facilities; agricultural biomass and organic waste resources; favourable demand density to support the development of electric public transportation; and opportunities to jointly optimise water and energy infrastructure and increase energy efficiency. Despite these advantages, the main barriers to the transition include grid capacity constraints, land-use pressures, access to investment financing, fragmented energy data, insufficient interinstitutional coordination, and the low energy performance of the existing building stock.

Analytical Assessment

Antalya's energy profile cannot be explained solely by the size of its population. Tourism capacity, seasonal visitor movements, cooling requirements, agricultural irrigation, air transportation, and the service sector are distinctive factors determining Antalya's energy intensity. Data for 2023 indicate that Antalya's per capita electricity consumption is above the national average for Türkiye and that its annual net electricity demand has reached approximately 10 TWh. However, the key challenge in the future will not be limited to meeting increasing electricity demand.

The strategic issue is as follows:

How can total energy consumption and dependence on fossil fuels be reduced while electricity demand continues to increase?

Therefore, Antalya's energy transition should be structured around three simultaneous objectives:

1. Limiting uncontrolled growth in energy demand through energy efficiency,
2. Replacing fossil fuel use in transportation and buildings with electricity,
3. Meeting increasing electricity demand from low-carbon energy sources.

Policy Implication

An **"Energy Inventory and 2050 Energy Demand Model"** should be developed for Antalya.

This study should cover the following elements:

- Hourly and seasonal peak loads,
- Electricity consumption by sector,
- Gasoline, diesel and LPG consumption,
- Natural gas consumption,
- Aviation fuels,
- Energy consumption in tourism facilities,
- Agricultural energy consumption,
- Industrial energy profile,
- Existing renewable energy capacity,
- Energy storage potential,
- Energy demand projections for 2030, 2040 and 2050 based on population and tourism scenarios.

This database should serve as the primary decision-support tool for determining the technical capacity requirements, financing needs and emission reduction targets associated with Antalya's energy investments.

Methodology and Data Limitations Information Box

The 2023 electricity consumption used in this section was calculated by multiplying the per capita net electricity consumption for Antalya published by TEDAŞ by the population reported by TurkStat. Therefore, the resulting figure represents an approximate total consumption estimate. **Assessments of fossil fuel consumption** are based on existing local greenhouse gas inventories and sectoral indicators derived from energy consumption patterns. As there is no single, up-to-date official provincial energy balance covering all fuel types for Antalya, the exact quantities need to be verified using data obtained from the Energy Market Regulatory Authority (EPDK), the natural gas distribution company, the Directorate General of State Airports Authority (DHMİ), municipalities and sectoral organisations.

Energy demand in 2050 should not be calculated by simply scaling up current consumption in proportion to population growth. Population, tourism capacity, climate-induced cooling demand, electrification of transportation, water production, energy efficiency, and technological transformation should be modelled together.

Figure 45: Current Structure of Antalya's Energy System

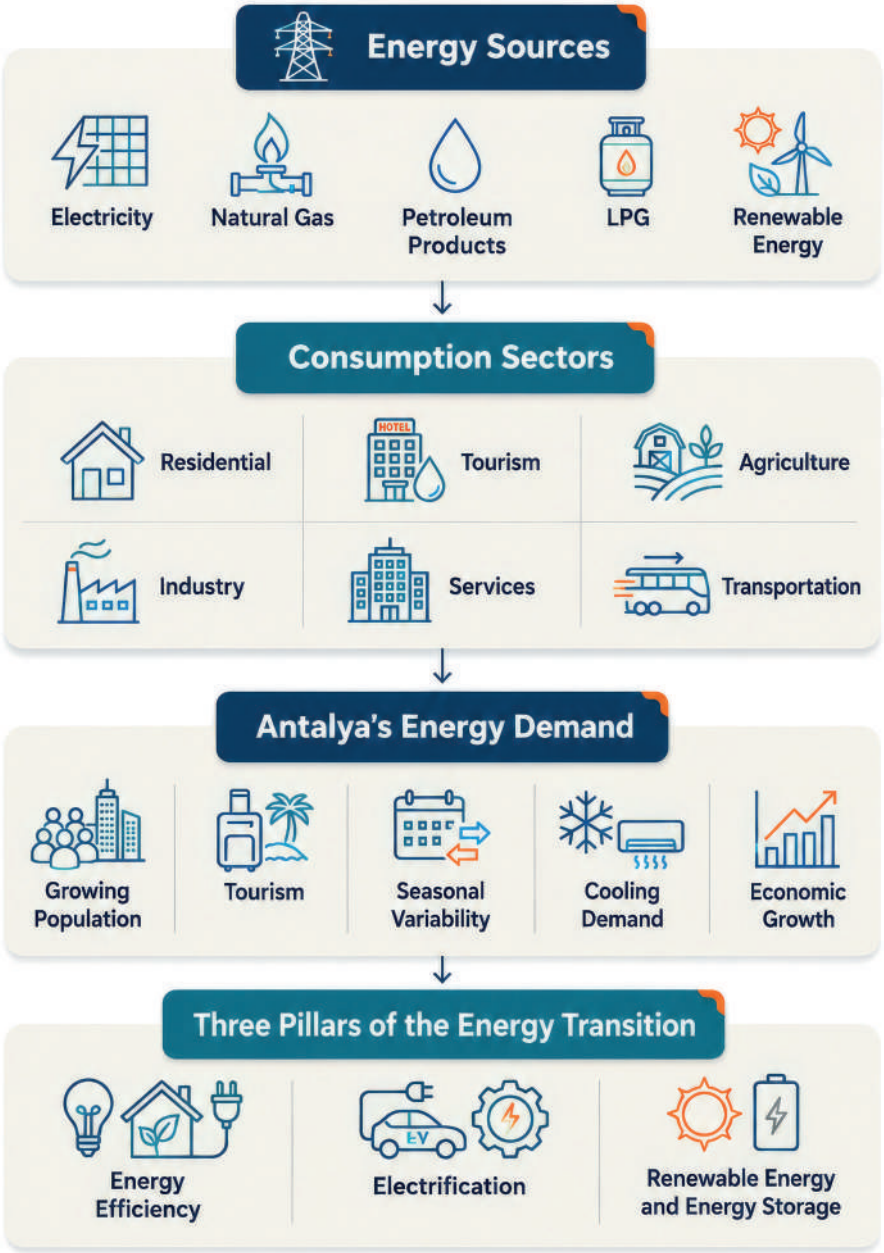


Table 21: Data Status of Antalya's Energy Profile

Indicator	Current status	Reporting approach
Electricity consumption	Can be monitored at the provincial level	Official statistics and calculations
Natural gas	Can be obtained at the provincial level	Verification with institutional data
Gasoline and diesel	Sales data are available	Consumption boundaries should be defined separately
LPG	Available at the provincial level	Autogas and other uses should be distinguished
Aviation fuel	Difficult to delineate	Airports and flight activity should be explained
Tourism energy	Limited aggregated data	Facility-level sampling should be conducted
Agricultural energy	Dispersed data	Should be modelled based on irrigation and production data
2050 demand	No official provincial projection available	Scenario model should be developed

5.3 Key Challenges in Antalya's Energy Sector

Increasing Cooling Demand, Peak Loads and Infrastructure Resilience:

Climate change is not merely an environmental issue requiring the energy sector to reduce greenhouse gas emissions. It also represents a multidimensional risk affecting every component of the energy system, from energy generation to transmission and distribution, and from consumption to infrastructure security. In Antalya, rising average temperatures, more frequent and prolonged heatwaves, changes in precipitation patterns, droughts, forest fires and extreme weather events are increasing energy demand while also making the operating conditions of energy infrastructure more challenging. Therefore, the city's energy policy should be addressed within a planning framework that encompasses not only emissions reduction but also climate change adaptation.

Antalya's distinctive economic and spatial characteristics increase the vulnerability of its energy system to climate-related impacts. The concentration of the tourism season, cooling requirements and water demand during the summer months, when these are at their highest, creates simultaneous and multidirectional pressures on electricity consumption. In addition to the permanent resident population, tourists, seasonal workers, second-home users and day visitors also increase energy demand during the summer. In this context, the principal challenge for Antalya's energy system is not simply an increase in total annual consumption. The essential risk is the concentration of demand on particular days and at particular times, the resulting peak loads on electricity infrastructure, and the need to maintain the uninterrupted provision of critical services during these periods.

5.3.1. Structural Challenges Requiring an Energy Transition

Today, energy systems are not only one of the fundamental inputs of economic development; they are also among the determining factors in combating climate change, ensuring energy security, maintaining competitiveness and improving quality of life. Antalya's rapidly growing population, expanding urban areas, tourism-oriented economic structure and increasing cooling requirements resulting from climate change are driving annual increases in the province's energy demand. However, the development of energy infrastructure, the implementation of energy efficiency measures and low-carbon transition processes are not progressing at the same pace.

Antalya's fundamental energy challenges are not limited to increasing electricity consumption. When energy generation and consumption patterns, the characteristics of the existing building stock, sectoral energy use, transport systems, data management and institutional coordination are considered together, it becomes evident that the province's energy system needs to be transformed into a more climate-resilient and sustainable structure. Based on the assessments undertaken within the scope of this report, the principal structural challenges constraining Antalya's energy transition are summarised below.

5.3.2. Increasing Electricity Demand and Seasonal Load Pressures

Electricity consumption in Antalya exhibits seasonal fluctuations above the national average due to population growth, tourism activities, the service sector and cooling requirements concentrated in the summer months. Peak demand, particularly during the summer, places significant pressure on energy infrastructure and necessitates new planning approaches in terms of security of energy supply and system flexibility.

5.3.3. Inadequate Energy Efficiency in Buildings

A significant proportion of the existing building stock across the city was not constructed in accordance with current energy efficiency standards. The limited implementation of thermal insulation, efficient mechanical systems, smart building technologies and energy management solutions leads to unnecessary energy consumption and increased operating costs. Improving the energy performance of existing buildings is therefore considered an area of transition as important as investment in new energy generation capacity.

5.3.4. Energy-Intensive Nature of the Tourism Sector

Tourism, one of the key sectors of Antalya's economy, consumes substantial amounts of energy due to its high accommodation capacity, year-round continuous service provision and intensive climate control requirements. Particularly during the summer season, increased accommodation occupancy leads to a significant rise in energy demand during certain periods. This makes energy efficiency measures and low-carbon operating models a strategic priority for the sector.

5.3.5. Transport-Related Energy Consumption and Emissions

The widespread use of private vehicles in urban transport increases fossil fuel consumption and associated greenhouse gas emissions. Population growth and urban expansion, together with rising transport-related energy demand, necessitate the strengthening of public transport systems, the development of alternative mobility models and the acceleration of the energy transition in the transport sector.

5.3.6 The Need to Strengthen the Resilience of Energy Infrastructure to C limate Change

Climate change not only increases energy demand but also creates new risks to the reliability of energy infrastructure. Extreme temperatures, forest fires, severe storms and other extreme weather events make the resilience of critical energy infrastructure, particularly electricity transmission and distribution systems, increasingly important. Therefore, security of energy supply should be addressed not only through the development of new generation capacity but also through increased grid flexibility, the strengthening of critical infrastructure, the development of distributed energy systems and the wider deployment of energy storage solutions.

5.3.7. Lack of Institutional Integration in Energy Data and Carbon Management

Data on energy consumption, energy generation and greenhouse gas emissions are monitored by different institutions and organisations, and an integrated energy data management system at the city level has not yet been sufficiently developed. This makes it difficult to establish priorities in energy planning, guide investments effectively and regularly monitor the performance of implemented policies. One of the fundamental components of climate-resilient energy management is the establishment of decision-making mechanisms based on reliable, up-to-date and comparable data.

5.3.8. Policy Assessment

Antalya's key challenges in the energy sector do not arise solely from increasing energy demand. The failure to achieve the desired level of energy efficiency, differing consumption profiles across sectors, transport-related energy dependence, the vulnerability of energy infrastructure to climate risks and the insufficient development of integrated data management systems stand out as the principal structural factors hindering the province's energy transition.

Therefore, Antalya's energy policies should not focus solely on developing new energy generation capacity. A comprehensive energy transition model should be adopted, incorporating energy efficiency, demand management, distributed renewable energy systems, energy storage technologies, smart grid applications, digital energy management and data-driven decision-making mechanisms. This approach will make a significant contribution to strengthening energy supply security, reducing greenhouse gas emissions, increasing economic competitiveness and achieving Antalya's 2050 climate-resilient development targets.

Analytical Assessment

The principal climate-related risk to Antalya's energy system is the simultaneous intensification of increasing demand and infrastructure vulnerability. During the summer months, tourism activity, the urban population, agricultural irrigation, water infrastructure and cooling requirements all increase simultaneously. This creates a critical seasonal peak-load challenge that is more significant than annual total consumption. If the energy transition is based solely on generating more electricity, uncontrolled demand growth and grid-related problems will persist. Therefore, Antalya's energy system should be built upon four complementary elements:

1. Reducing and managing demand,

2. Increasing local and low-carbon energy generation,

3. Developing energy storage and grid flexibility,

4. Providing redundancy for critical infrastructure to withstand disasters.

This approach integrates mitigation and adaptation policies within a single energy strategy.

Policy Implications

A **"Climate-Resilient Energy Infrastructure Programme"** should be developed for Antalya. Within the scope of this programme, a climate risk map of energy infrastructure should be prepared, summer temperature and peak-load projections should be developed, the continuity of energy supply to critical infrastructure should be assessed, and the resilience of transformers and distribution systems to heat, flooding, fires and storms should be analysed. Water and energy infrastructure should be planned using shared scenarios, major tourism facilities and industrial enterprises should be included in demand management programmes, renewable energy-supported microgrids should be established at critical public facilities, and social programmes addressing energy poverty and cooling poverty should be developed. The programme should be implemented with the participation of AEDAŞ, TEİAŞ, Antalya Metropolitan Municipality, ASAT, district municipalities, AFAD, universities, the tourism sector and industrial enterprises. **Antalya's energy security depends not only on increasing generation capacity, but also on managing demand, strengthening infrastructure against climate risks and ensuring the uninterrupted provision of critical services.**

5.4. Antalya's Energy Transition Vision

5.4.1. Transition to a Low-Carbon and Climate-Resilient Energy System

Antalya's energy transition vision aims to establish an energy system that meets increasing energy demand not merely through new generation investments, but through improved energy efficiency, generation at source from local and renewable energy resources, support from digital technologies and resilience to climate change.

This approach addresses energy security and economic development together, adopting the reduction of greenhouse gas emissions, lower energy costs, increased competitiveness and improved quality of life as shared objectives. Antalya's energy transition should be regarded as a comprehensive transformation process encompassing not only the energy sector but also tourism, industry, agriculture, transport, local government and the construction sector.

5.4.2. Fundamental Principles of the Energy Transition

It is recommended that Antalya's energy policies be shaped in accordance with the following fundamental principles.

Energy Efficiency as a Priority

The cleanest, most economical and most sustainable energy is energy that is not consumed. Therefore, priority should be given to efficiency measures that reduce energy demand before investing in new energy generation capacity. Improving energy efficiency in buildings, industry, tourism facilities, transport and public services should form the foundation of the energy transition.

Effective Utilisation of Local and Renewable Energy Resources

Antalya's renewable energy potential presents a significant opportunity to strengthen energy supply security. Local renewable energy resources, particularly solar energy, should be assessed in a planned manner, taking into account the protection of natural areas, land-use decisions and the requirements of the energy system. Renewable energy investments should be considered alongside energy efficiency and energy storage measures to establish a more flexible and resilient energy system.

Smart and Digital Energy Management

The energy transition requires not only changes in generation infrastructure but also the effective management of energy consumption. Through smart meters, digital monitoring systems, big data analytics and artificial intelligence-supported energy management tools, energy consumption should be monitored, analysed and continuously improved in real time. A data-driven management approach will enable energy planning to be undertaken more transparently, measurably and effectively.

Carbon Management and Climate Responsibility

One of the fundamental objectives of energy policies should be the systematic reduction of greenhouse gas emissions. To achieve this, carbon emissions should be regularly monitored and reported at the city level, and sector-specific emissions reduction targets should be established. Carbon management should be regarded not only as an environmental responsibility but also as a strategic necessity in terms of international trade, investment attractiveness and competitiveness.

Energy Security and Climate Resilience

Rising temperatures and extreme weather events associated with climate change are making the resilience of energy infrastructure increasingly important. Antalya's energy system should be developed in accordance with the principles of distributed generation, energy storage, grid flexibility and the strengthening of critical infrastructure. This will enhance energy supply security while enabling the development of an urban system that is more resilient to potential disasters and emergencies.

5.4.3. Strategic Transformation Approach for Antalya

The success of the energy transition should not be measured solely by increases in installed generation capacity. The true measure of success should be assessed in terms of reducing energy consumption per unit of economic activity, lowering carbon intensity, bringing energy costs under control and making the energy system more resilient to climate change.

Therefore, Antalya's energy vision should be built upon an integrated energy transition model that:

- Prioritises energy efficiency,
- Uses local renewable energy resources in a balanced manner,
- Is supported by digital technologies,
- Institutionalises carbon management,
- Takes climate risks into account,
- Enhances economic competitiveness.

5.4.4. Policy Assessment

Antalya's energy transition should not be based on a single technology or a single investment model. Although solar energy is one of the most important components of this transition, a genuinely sustainable energy system can only be established when energy efficiency, smart grids, energy storage, digital management, clean transport and carbon management are considered together.

Therefore, the primary objective of the energy transition is not merely to generate more energy, but to establish a more efficient, cleaner, more secure and more climate-resilient energy ecosystem.

Analytical Assessment

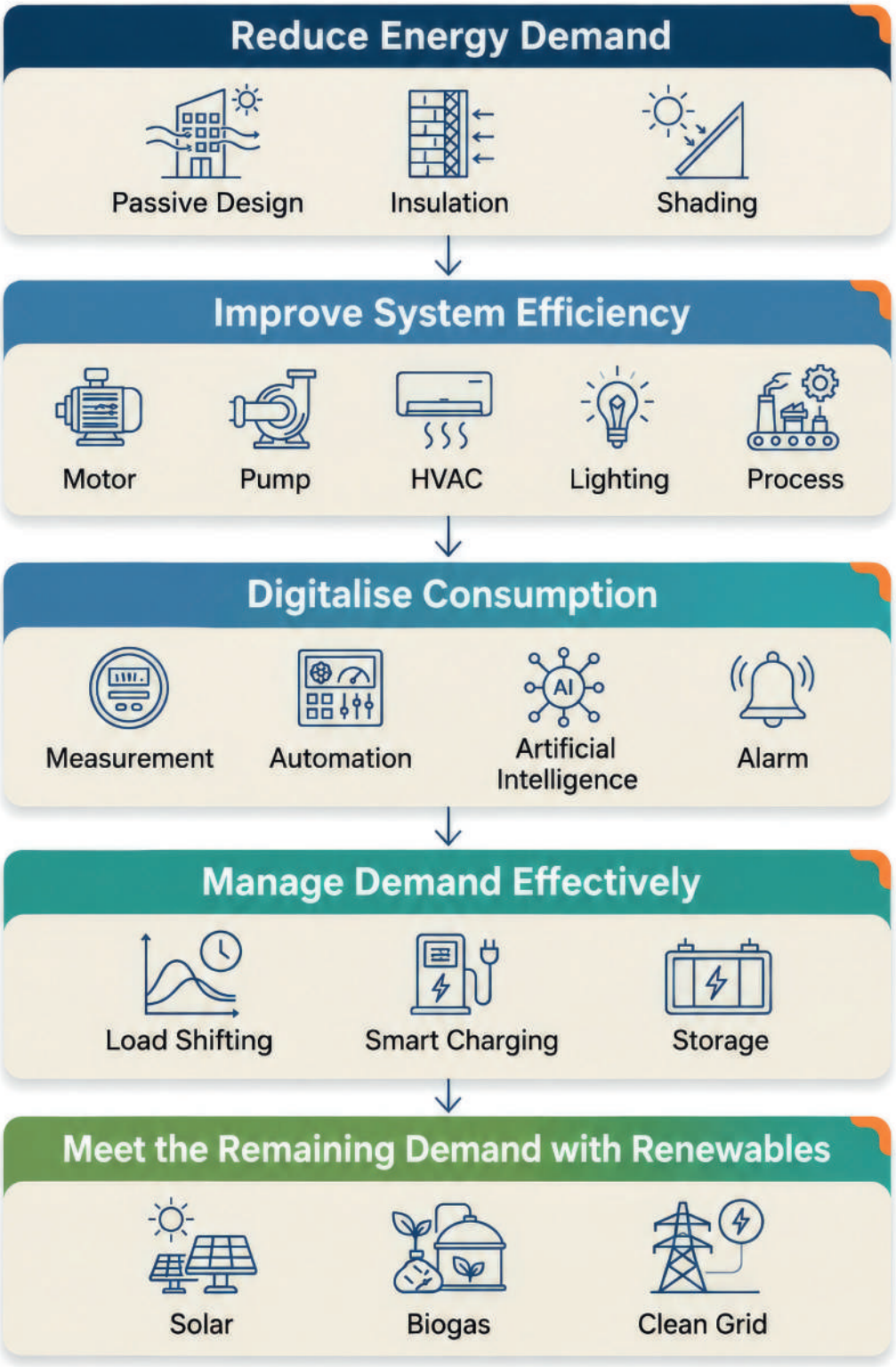
Energy efficiency is the area of Antalya's energy transition that can be implemented most rapidly and deliver economic benefits in the shortest period. While new electricity generation facilities, grid investments and large-scale energy storage systems require lengthy planning and investment processes, many energy efficiency measures can be implemented in the short and medium term. Moreover, energy efficiency is not merely a one-time replacement of equipment. It is a continuous process encompassing measurement, management, maintenance, user behaviour, financing and performance verification.

Antalya's energy efficiency strategy should be implemented at three levels:

- **Facility level:** Buildings, hotels, factories, agricultural enterprises and public facilities
- **Sector level:** Tourism, agriculture, industry, residential buildings and public services
- **Urban system level:** Electricity grid, peak demand, transport, water infrastructure and digital energy management

The success of energy efficiency should be measured not only by reductions in consumption, but also by the provision of the same economic and social services using less energy and at a higher level of quality.

Figure 46: Antalya Energy Efficiency Hierarchy



Energy generation investments undertaken without first achieving energy efficiency may result in unnecessarily oversized capacity and higher costs. The appropriate sequence for Antalya's energy transition is to first reduce energy demand, then improve energy efficiency, and finally meet the remaining demand through clean energy sources.

5.5 Renewable Energy Potential and Transition Strategy

A Distributed and Climate-Resilient Energy System Based on Local Resources

Antalya's energy transition towards 2050 should not rely solely on the development of additional generation capacity to meet increasing electricity demand. The city's energy future should be based on an integrated system in which energy efficiency, demand management, electrification, renewable energy, storage and strengthened grid infrastructure are planned together. Antalya has renewable energy potential that can be assessed at different scales, particularly in solar energy, as well as biomass, biogas, geothermal resources and, in certain areas, wind energy. However, not every renewable energy resource is technically, economically, environmentally or spatially suitable. Therefore, the primary objective is not to utilise the entire theoretical renewable energy potential, but to develop a renewable energy portfolio that does not place pressure on natural areas, agricultural land, water resources, settlements or tourism assets and that delivers the greatest social and economic benefits. Antalya's energy transition priorities should be structured as follows:

1. Reducing existing energy consumption,
2. Assessing existing built-up areas for energy generation,
3. Increasing distributed renewable energy generation close to the point of consumption,
4. Balancing generation and consumption through storage and digital systems,
5. Developing larger-scale renewable energy investments in suitable areas,
6. Meeting the remaining demand through the low-carbon national electricity system.

This approach evaluates the energy transition not solely in terms of installed power plant capacity, but also in relation to energy security, grid resilience, local development and carbon emissions reduction.

5.5.1 Antalya's Renewable Energy Resources

Antalya's renewable energy resources differ in terms of their generation characteristics and areas of application.

Solar Energy: Solar energy is Antalya's strongest and most widely available renewable energy resource. In the city, solar energy can be used in a wide range of applications, including electricity generation, hot water production, supporting cooling systems, agricultural irrigation, electric vehicle charging, and meeting the energy needs of water and wastewater facilities. One of the most significant advantages of solar energy for Antalya is the substantial overlap between daytime hours, when solar electricity generation is high, and the periods of intensive energy consumption in the tourism, commerce, cooling, irrigation and service sectors.

Biogas and Biomass: Antalya's agricultural production capacity, livestock activities, food industry, wholesale produce markets, marketplaces, hotels and municipal waste streams generate significant quantities of organic waste. These wastes can be utilised for biogas, biomethane, electricity generation and organic fertiliser production. Unlike solar and wind energy, biogas offers strategic value for balancing the energy system because it enables controlled and continuous energy generation.

Wind Energy: Wind energy potential across Antalya is not as uniform as solar energy potential. Mountainous areas, coastal transition zones and certain elevated locations may offer sites suitable for economically viable projects. However, detailed assessments of bird migration routes, protected areas, forest areas, landscape values, tourism zones, distance from settlements and grid connectivity are required for wind energy investments. Therefore, wind energy in Antalya should not be regarded as a widespread primary energy resource across the province, but rather as a complementary resource in limited areas where its suitability has been confirmed through scientific measurements.

Geothermal and Low-Temperature Heat Resources: Low- and medium-temperature geothermal resources that may be found in different parts of Antalya can be considered for direct heat generation, space heating, district heating, domestic hot water, drying, thermal tourism and heat pump systems. In the utilisation of geothermal resources, reservoir sustainability, reinjection of geothermal fluids, chemical composition and impacts on groundwater should be carefully managed.

Waste-to-Energy

Municipal solid waste, wastewater treatment sludge, wholesale market waste and organic waste generated by tourism activities can be utilised for energy recovery. However, the waste management hierarchy must be maintained in waste-to-energy approaches:

1. Prevention of waste generation,
2. Reuse,
3. Material recycling,
4. Organic recovery,
5. Energy recovery,
6. Final disposal.

Energy generation should not become a model that encourages the incineration of recyclable materials.

5.5.2 Distributed Energy System

The most suitable model for Antalya's renewable energy transition is not one based solely on large-scale, ground-mounted power plants. The city's economic and spatial characteristics present significant opportunities for **a distributed energy** system in which generation close to the point of consumption becomes widespread. Within a distributed energy system, residential rooftops, hotel and holiday village rooftops, public buildings, organised industrial zones, commercial buildings, shopping centres, car park canopies, logistics facilities, agricultural enterprise buildings, and water and wastewater facilities can be utilised for electricity generation. Rooftop solar energy, tourism facilities, agricultural irrigation, energy cooperatives and local government projects are identified as the fundamental components of an integrated renewable energy model.

The principal benefits of distributed generation include generating electricity where it is consumed, reducing transmission and distribution losses, limiting the need for land, lowering consumers' energy costs, alleviating certain loads on the grid, creating local investment and employment opportunities, and increasing resilience to power outages. However, the uncontrolled expansion of distributed generation may cause voltage fluctuations, reverse power flows, connection capacity constraints and grid balancing problems. Therefore, distributed renewable energy investments should be planned in coordination with the technical capacity of the distribution network.

5.5.3 Renewable Energy and Land Use

Although renewable energy is a low-carbon energy source, it is not without impacts in terms of land use. Large-scale energy investments may place pressure on agricultural land, pastures, forests, natural habitats, water catchment areas, archaeological sites and tourism landscapes. The spatial order of priority for renewable energy investments in Antalya should therefore be established as follows:

First Priority

- Building rooftops
- Car park canopies
- Industrial facilities
- Warehouses and logistics buildings
- Public facilities
- Treatment facilities
- Infrastructure structures

Second Priority

- Degraded areas or areas of low ecological value
- Closed mining sites
- Suitable solid waste disposal sites
- Disused industrial areas
- Transport and infrastructure corridors

Third Priority

- Shared-use models that do not hinder agricultural production and have demonstrated ecological suitability
- Agrivoltaic applications
- Solar energy installations above irrigation canals
- Limited floating solar photovoltaic (FPV) installations on suitable water surfaces

Last Resort

Large-scale power plants on extensive areas of land with high natural or agricultural value.

This prioritisation is important to prevent the energy transition from causing losses of natural capital or compromising food security. **Renewable energy investments should not automatically be considered sustainable solely because they contribute to carbon emission reductions.** Each project should be assessed in terms of its life cycle, land use, ecosystem impacts, water requirements and social benefits.

5.5.4 Renewable Energy and Grid Capacity

One of the main constraints on renewable energy investments is not so much the resource potential as the grid's capacity to accommodate new generation.

If solar energy becomes increasingly widespread, surplus generation may occur during certain hours. In contrast, electricity demand may continue during the evening hours when solar generation declines. Therefore, Antalya's renewable energy plan should consider the following grid components together:

- Transformer substation capacity,
- Distribution line carrying capacity limits,
- Voltage control,
- Bidirectional power flows,
- Real-time monitoring,
- Smart inverter systems,
- Demand-side management,
- Controlled charging of electric vehicles,
- Battery and thermal energy storage,
- Connection to the national transmission system.

An increase in installed renewable energy capacity is not, in itself, an indicator of success. **The real measure of success is the uninterrupted integration of the clean electricity generated into the system and the effective replacement of fossil fuel-based energy sources.**

5.5.5 Energy Storage and Flexibility

The main report draft indicates that, as renewable energy becomes more widespread, the deployment of energy storage systems will become critical for balancing generation and consumption, reducing grid loads and increasing resilience to power outages.

Storage systems can be used at different scales in Antalya:

Building and Facility Scale

- Residential buildings,
- Hotels,
- Public buildings,
- Commercial facilities,
- Agricultural enterprises.

Campus and District Scale

- Organised industrial zones,
- Tourism zones,
- Universities,
- Hospital campuses,
- Airports and transport hubs.

Grid Scale

- Transformer substations,
- Renewable energy generation clusters,
- Critical distribution zones,
- Grid balancing facilities.

In addition to battery systems, other flexibility options should also be considered, including:

- Cold water or ice storage,
- Hot water storage,
- Pumped storage systems,
- Controlled use of electric vehicle batteries,
- Biogas storage.

Particularly given Antalya's high cooling demand, thermal energy storage may complement electrical batteries and offer a more economical solution in certain applications.

5.5.6 Renewable Energy in Tourism

Antalya's substantial accommodation capacity makes tourism facilities one of the leading areas for implementing the renewable energy transition. In tourism facilities, rooftop and car park canopy solar photovoltaic (PV) systems, solar thermal hot water systems, heat pumps, energy storage, waste heat recovery, biogas and organic waste systems, and electric vehicle charging infrastructure can be planned together. The integrated deployment of solar energy, solar collectors, storage and building automation is expected to reduce operating costs and carbon emissions while strengthening energy supply security and sustainability tourism certification. However, assessing facilities solely on the basis of their installed solar PV capacity is insufficient. The following indicators should also be monitored: the share of renewable energy in total consumption, renewable electricity generation per guest-night, self-consumption rate, peak power drawn from the grid, energy storage capacity, the share of water supplied from renewable sources, and reductions in carbon emissions.The energy transition of tourism facilities should become an integral part of Antalya's destination brand.

5.5.7 Renewable Energy in Agriculture

Energy in agricultural production is used for irrigation pumps, greenhouse climate control, crop processing, packaging and cold storage facilities. The main report draft identifies solar-powered irrigation and the utilisation of agricultural waste for biogas or biomass production as key areas of opportunity. The fundamental principle of the renewable energy transition in agriculture is to reduce energy costs without increasing water consumption or groundwater abstraction. Therefore, solar-powered irrigation systems should be linked to water allocations, metering, crop water requirements, irrigation schedules, pump efficiency and groundwater levels.

Uncontrolled solar-powered pumping may encourage excessive water abstraction while reducing electricity costs. Therefore, incentives should be linked not only to generation capacity but also to water and energy performance.

Rooftop solar photovoltaic (PV) systems on agricultural buildings should be prioritised to reduce land-use requirements. Agrivoltaic applications should be expanded only after their effects on plant growth, shading, mechanisation and water use have been demonstrated under field conditions.

5.5.8 Renewable Energy in Industrial, Commercial and Public Facilities

Renewable energy is important for industrial and commercial enterprises in terms of cost reduction, lowering their carbon footprint and compliance with international supply chains. In particular, organised industrial zones, cold storage facilities, logistics facilities, shopping centres, large retail buildings, hospitals, universities, municipal facilities, and water and wastewater infrastructure are suitable for distributed renewable energy generation due to their extensive roof areas and high daytime electricity consumption. The public sector should play a leading role in this transition. Renewable energy generation, energy efficiency and storage projects should be implemented together in public infrastructure with regular energy consumption, such as water and wastewater facilities.

Public investments should be assessed not only in terms of annual energy generation but also by considering the investment payback period, self-consumption rate, amount of carbon emissions reduced, contribution to energy supply continuity, maintenance costs, and social and public benefits.

5.5.9 Energy Cooperatives and Local Participation

The economic benefits of the renewable energy transition should not be limited to large investors. Models should be developed that enable citizens, farmers, small businesses and local communities to participate in energy generation. Energy cooperatives and energy communities can be utilised for shared rooftop or land-based investments, agricultural irrigation facilities, rural energy projects, neighbourhood-scale generation, shared storage and electric vehicle charging systems.

These models are important for sharing investment costs, enabling small consumers to participate in the system, retaining energy revenues locally, increasing public acceptance and reducing energy poverty.

However, the cooperative model should not be regarded solely as a legal form of organisation. The technical operation, financing, revenue-sharing arrangements, grid connection capacity and long-term maintenance model should be clearly defined.

5.5.10 Antalya's Renewable Energy Role in 2050

The preliminary assessment conducted in Chapter 5.2 assumes that Antalya's electricity demand in 2050 could reach approximately 16–18 TWh/year under conditions of strong energy efficiency and controlled electrification. This figure is not a definitive official forecast, but a strategic planning range based on assumptions regarding population, tourism capacity, cooling demand, transport electrification, water systems and energy efficiency. Antalya does not need to generate all of this electricity demand within its provincial boundaries. Operating its energy system in an integrated manner with the national grid may be more appropriate from both economic and technical perspectives. Nevertheless, Antalya could meet a significant proportion of its electricity demand in 2050 from local renewable resources through rooftop and car park canopy solar energy systems, ground-mounted solar photovoltaic (PV) systems in suitable areas, biogas and waste-to-energy facilities, and limited wind energy and geothermal applications. Within the preliminary planning framework, it may be assumed that local renewable electricity generation could meet approximately 50–60% of projected demand in 2050. This proportion should be verified through a detailed resource inventory, grid analysis and spatial suitability assessment.

Table 22: Strategic Planning Range

Indicator	2050 Assessment
Annual Electricity Demand	16–18 TWh
Share of Local Renewable Energy Generation	50–60%
Local Renewable Energy Generation	Approximately 8–10 TWh/year
Portion Supplied by the National Grid	Approximately 6–8 TWh/year
Demand Avoided Through Energy Efficiency	Approximately 4–5 TWh/year
Primary Local Energy Source	Solar Energy
Balancing Resources	Storage, Biogas, Demand Management and the National Grid

This table does not represent a capacity commitment, but rather a strategic system configuration that should be tested in a detailed energy master plan.

Analytical Assessment

The fundamental challenge in Antalya's renewable energy transition is not a lack of resources, but appropriate spatial planning, grid capacity, storage, financing and interinstitutional coordination. An approach based solely on large-scale power plant investments may increase land-use conflicts, pressure on ecosystems, grid connection problems and objections from local communities. By contrast, a distributed model based on rooftops, car parks, industry, tourism and public infrastructure could enable a more balanced transition by bringing electricity generation closer to consumption.

The appropriate renewable energy model for Antalya should have the following four characteristics:

1. **Distributed:** Generation should be located as close as possible to the point of consumption.
2. **Integrated:** Energy efficiency, storage and digital management should be implemented together.
3. **Environmentally Sensitive:** Agricultural land and natural capital should be protected.
4. **Participatory:** Economic benefits should be shared among citizens, farmers, the public sector and local businesses.

Policy Implications

A **"Renewable Energy Master Plan and Spatial Suitability Atlas"** should be prepared for Antalya.

The plan should include the following:

- Existing installed renewable energy capacity should be determined,
- Rooftop and car park potential should be calculated using Geographic Information Systems (GIS),
- Transformer substation and grid connection capacities should be mapped,
- Solar, wind, biogas and geothermal resources should be assessed separately,
- Areas to be excluded on environmental and agricultural grounds should be identified,
- Energy storage requirements should be modelled,
- Capacity scenarios for 2030, 2040 and 2050 should be developed,
- Investment costs and financing requirements should be calculated,
- Energy cooperative and community models should be developed.

This study should demonstrate not only the theoretical resource potential, but also the **renewable energy potential that can be implemented and integrated into the grid.**

Antalya Renewable Energy Transition Programme

The programme should comprise six implementation pillars:

Pillar 1 — Rooftop and Car Park Energy Initiative

Enabling electricity generation on the rooftops of public, tourism, industrial, commercial and residential buildings.

Pillar 2 — Clean Energy Programme in Tourism

Integrated transformation of electricity, hot water, storage and charging systems in hotels.

Pillar 3 — Water–Energy Programme in Agriculture

Joint planning of irrigation efficiency, solar energy, water metering and biogas investments.

Pillar 4 — Renewable Energy in Public Infrastructure

Pilot projects in water and wastewater facilities, transport infrastructure, hospitals, schools and municipal facilities.

Pillar 5 — Energy Storage and Smart Grids

Safe integration of renewable electricity generation into the grid.

Pillar 6 — Energy Cooperatives and Local Financing

Participation of small-scale producers and consumers in the energy transition.

Table 23: Antalya's Renewable Energy Priorities

Resource or Model	Main Uses in Antalya	Strategic Role	Key Constraints
Solar PV	Roofs, car parks, industry, tourism, agriculture	Key local renewable energy source	Grid and storage need
Solar thermal	Hotels, residences, healthcare facilities	Reducing hot water and heating demand	Space requirements and system integration
Biogas	Agricultural, food, wholesale market, hotel and treatment facility waste	Continuous and controllable energy supply	Feedstock and logistics
Biomass	Agricultural and forestry residues	Heat and limited electricity generation	Emissions and ecosystem impact
Wind power	Suitable high-altitude areas and corridors	Complementary generation	Environmental, landscape and measurement requirements
Geothermal energy	Greenhouses, hot water, heating and thermal use	Direct heat energy	Reservoir and water management
Energy from waste	Municipal and wastewater treatment facilities	Waste management and energy recovery	Preservation of the waste hierarchy
Energy cooperatives	Rural areas and communities	Participation and local economic benefit	Legal, technical and financial capacity

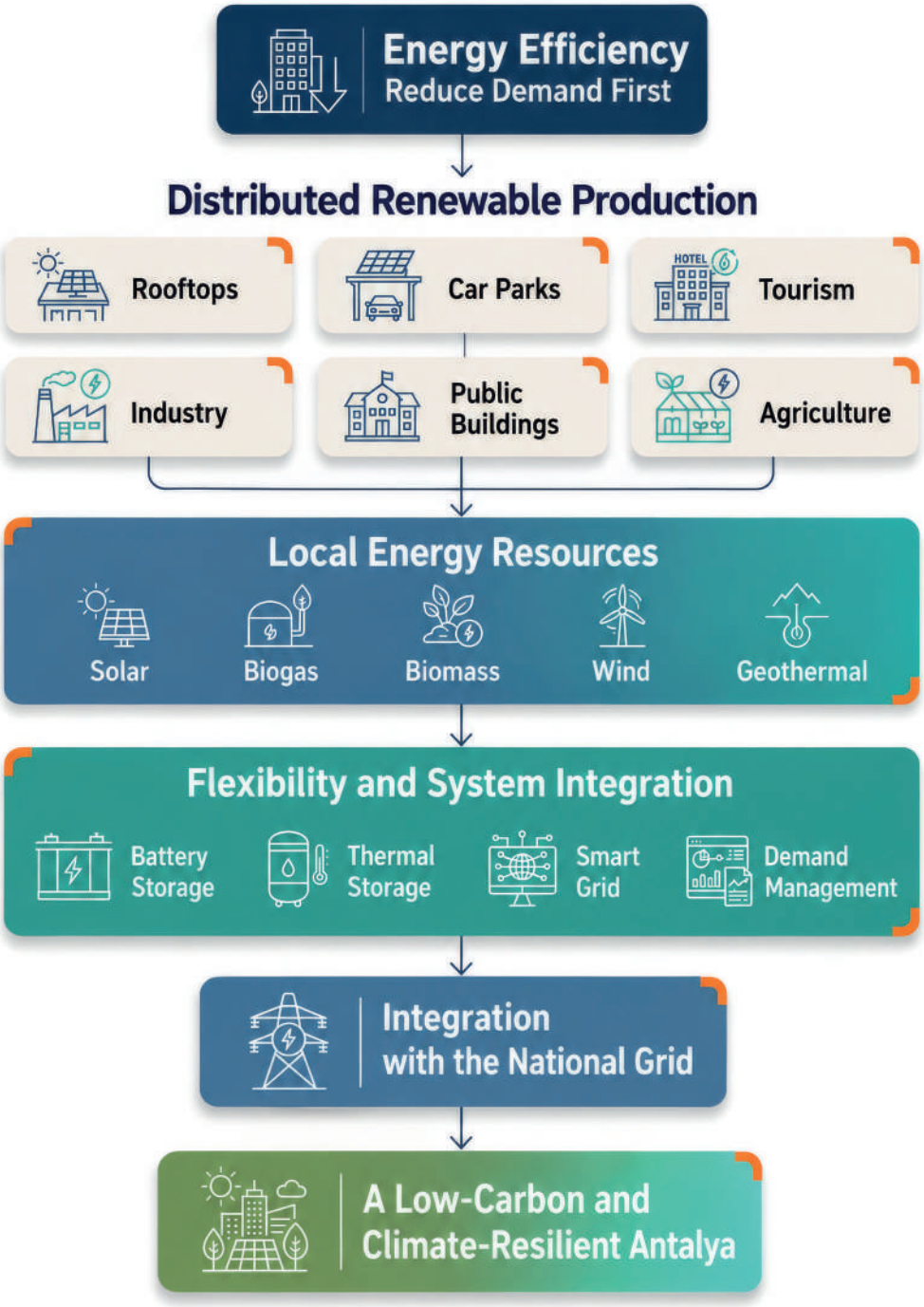
Methodology and Data Limitations Information Box

The principal renewable energy sources and sectoral applications addressed in this chapter have been derived from the framework presented in the main draft report, covering Antalya's renewable energy potential, tourism, agriculture, industry, energy storage and local governance. The source document does not contain a verified provincial energy balance that comprehensively presents Antalya's current installed renewable energy capacity, rooftop potential, grid capacity and techno-economic electricity generation potential. Therefore, no definitive installed capacity target has been specified in this chapter. The statement that local renewable energy sources could meet approximately **50–60% of electricity demand in 2050, equivalent to approximately 8–10 TWh/year,** represents a planning assumption. This estimate has been developed on the basis of a demand scenario of 16–18 TWh/year, Antalya's predominantly solar-based renewable energy resource profile and the assumption of an energy system integrated with the national grid. Definitive targets should be established only after completing a rooftop inventory, land suitability analysis, an hourly demand profile covering at least one year, transformer capacity assessment, electricity generation simulations and energy storage optimisation.

Table 24: Proposed Performance Indicators

Indicator	2030 Direction	2050 Direction
Share of renewable electricity in total electricity consumption	Rapid increase	At least 50–60% local contribution
New distributed renewable capacity	Priority expansion	Widespread system across the city
Renewable energy in public buildings	Transformation of priority facilities	Implementation in a significant share of the public building stock
Use of renewable systems in tourism facilities	Sectoral program	Standard implementation
Renewable energy in agricultural irrigation	Pilot projects and scaling up	Integrated water–energy model
Share of renewable energy facilities with storage	Incremental increase	Widespread use based on grid demand
Energy cooperatives and community models	Pilot implementations	Widespread models at district and sectoral levels
Share of roofops and degraded land used for renewable energy investments	Key priority	Primary option before land-based investments

Figure 47: Antalya's Renewable Energy System



Antalya's energy transition is not about installing energy facilities on every available plot of land; rather, it is about establishing a smart energy system that prioritises the use of already developed areas, protects natural capital, and integrates energy generation with consumption.

5.6 Strategic Policies

5.6.1. General Approach

Antalya's energy transition should be implemented through an integrated policy approach that addresses energy efficiency, renewable energy, carbon management, digitalisation and climate change adaptation objectives together. The policies proposed in this chapter aim not only to increase energy generation, but also to manage energy demand more efficiently, reduce carbon emissions, enhance economic competitiveness and strengthen the resilience of the city's energy infrastructure to climate change.

Policy 1. Antalya Carbon and Energy Management System

An integrated **Antalya Carbon and Energy Management System** should be established to jointly monitor energy consumption, greenhouse gas emissions and sector-specific performance indicators across the city. This system should support decision-making processes by enabling data obtained from public institutions, local authorities, organised industrial zones, the tourism sector and other stakeholders to be assessed on a shared platform. It will serve as a fundamental governance tool for regularly monitoring carbon management, measuring the effectiveness of energy transition policies and ensuring alignment with national and international climate targets.

Policy 2. Public Sector Energy Transition Programme

Public institutions should assume a leading role in the energy transition. Energy efficiency measures, smart building systems, efficient lighting, digital energy management and renewable energy solutions should be widely implemented in public buildings where appropriate. Public investments should aim not only to reduce energy costs, but also to develop exemplary practices for the private sector and wider society

Policy 3. Low-Carbon Energy Transition in Tourism

The energy transition in the tourism sector should be implemented through an integrated approach encompassing energy efficiency, renewable energy use, waste heat recovery and digital energy management. Measures implemented in accommodation facilities will reduce operating costs, contribute to sustainable tourism certification processes and enhance Antalya's international competitiveness.

Policy 4. Competitive and Low-Carbon Industrial Production

The energy transition in the industrial sector should be regarded not merely as a means of reducing energy costs, but as a strategic transformation process that enhances competitiveness. Energy efficiency measures, clean production technologies, carbon management, circular economy approaches and green financing opportunities should be considered together to support the transition of organised industrial zones and industrial enterprises towards low-carbon production.

Policy 5. Smart Energy and Digital Management Infrastructure

Data-driven decision-making mechanisms should be strengthened to ensure the effective management of energy systems. Energy consumption and performance should be monitored in real time through the use of smart meters, digital energy monitoring platforms, geographic information systems (GIS) and artificial intelligence (AI)-supported analytical tools. This approach will facilitate the prioritisation of energy investments and ensure more efficient use of resources.

Policy 6. Climate-Friendly and Low-Carbon Transport

The primary objective of the energy transition in the transport sector is to promote accessible, safe and low-carbon transport systems while reducing dependence on fossil fuels.

Developing electric vehicle infrastructure, strengthening public transport, supporting cycling and walking, and promoting alternative transport models will make a significant contribution to Antalya's energy and climate objectives.

Policy 7. Balanced Development of Local Renewable Energy Resources

Antalya's renewable energy potential should be assessed alongside energy efficiency and energy storage applications. Solar energy, in particular, should be prioritised in public buildings, tourism facilities, industrial buildings, agricultural enterprises and suitable rooftop areas.

The fundamental principle guiding renewable energy investments should be to utilise existing developed areas, protect natural ecosystems and productive agricultural land, and ensure that energy investments are developed in accordance with spatial planning decisions.

Policy 8. Energy Storage and Grid Resilience

In parallel with the expansion of distributed renewable energy systems, energy storage technologies and grid flexibility should be strengthened. Energy supply security should be enhanced by evaluating energy storage solutions for critical public infrastructure, organised industrial zones, and energy-intensive facilities. Enhancing the resilience of energy infrastructure to extreme weather events caused by climate change is of strategic importance for Antalya's long-term energy security.

5.6.2. Policy Assessment

The policies proposed in this chapter should not be considered independent investment areas, but rather complementary components of an integrated energy transition programme. The success of Antalya's energy transition depends on addressing energy efficiency, local renewable energy resources, digital management, carbon reduction, energy storage and climate resilience together. Within this framework, the proposed policy package aims not merely to increase energy supply, but to establish a more efficient, secure, low-carbon and climate-resilient urban energy system.

5.7. Antalya's Priority Energy Transition Project Portfolio

5.7.1. General Approach

The success of Antalya's energy transition depends not only on defining strategic objectives, but also on the effective planning of priority projects that will translate these objectives into implementation. Therefore, the energy transition should be approached through project programmes serving shared objectives, rather than through independent investments.

The project portfolio proposed in this chapter brings together energy efficiency, carbon reduction, digitalisation, renewable energy, transport and industrial transformation within an integrated approach. The proposed project categories have been developed on the basis of the priority project list in the existing report and translated into an implementation-oriented framework.

Project 1. Antalya Carbon Inventory and Energy Data Platform

The first step in the energy transition is to establish a reliable data infrastructure. In this context, an integrated Antalya Carbon Inventory and Energy Data Platform should be established to jointly monitor energy consumption, greenhouse gas emissions and renewable energy generation across the province.

This platform should support planning and monitoring processes by bringing together data from municipalities, public institutions, organised industrial zones, the tourism sector and other relevant stakeholders within a common system.

Project 2. Antalya Energy Efficiency Transformation Programme

Energy efficiency should form the foundation of the energy transition. Within the programme, public buildings, tourism facilities, industrial enterprises, commercial buildings and social facilities should be prioritised for energy audits, and efficiency investments should be implemented in a phased manner.

Reducing existing energy consumption should be adopted as a fundamental principle before investing in new energy generation capacity.

Project 3. Antalya Distributed Renewable Energy Programme

Antalya's substantial solar energy potential presents a significant opportunity for the energy transition. However, renewable energy investments should be assessed not only in terms of increasing installed capacity, but also in conjunction with energy efficiency, storage, grid capacity and spatial planning decisions. Within the programme, priority should be given to existing developed areas, including public buildings, tourism facilities, industrial rooftops, car park canopies, water and wastewater facilities, and suitable agricultural structures.

Productive agricultural land, forests, wetlands and protected areas should be regarded as priority areas for conservation when planning renewable energy investments.

Project 4. Low-Carbon Energy Programme for Tourism

The tourism sector is one of Antalya's largest energy consumers. Therefore, the energy transition should be implemented in hotels and tourism facilities through an integrated programme encompassing energy efficiency, digital energy management, waste heat recovery, renewable energy applications in suitable buildings and carbon management. This approach will reduce operating costs while strengthening Antalya's identity as a sustainable tourism destination.

Project 5. Antalya Smart Energy Management Centre

A digital management infrastructure should be established to enable real-time monitoring of energy performance across the city. This centre will provide decision-makers with continuous data by monitoring energy consumption, renewable energy generation, carbon emissions, energy efficiency investments and performance indicators through a single platform.

Project 6. Clean Transport and Electrification Programme

To enable urban transport to contribute to the energy transition, electric public transport systems, charging infrastructure, cycling infrastructure and pedestrian-oriented transport initiatives should be developed within an integrated programme. The programme should encompass not only the transition to electric vehicles, but also a planning approach aimed at reducing transport-related energy consumption and carbon emissions.

Project 7. Green Energy Transition Programme for Industry

Transformation programmes should be developed for organised industrial zones and industrial enterprises, encompassing energy efficiency, carbon management, digital energy monitoring, clean production technologies and suitable renewable energy applications.

This programme will facilitate the industrial sector's compliance with international carbon regulations, strengthen export competitiveness and improve access to green finance opportunities.

Project 8. Energy Storage and Grid Resilience Programme

Energy storage solutions and grid resilience should be planned together to ensure that increasing renewable energy capacity can be safely integrated into the energy system.

Priority should be given to assessing storage and backup systems that will ensure energy supply continuity in facilities of strategic importance, particularly those providing critical public services, water and wastewater infrastructure, healthcare services and disaster management.

5.7.2. Implementation Priorities of the Project Portfolio

The proposed projects should be considered as a phased implementation programme rather than as independent investments.

In the **short term (2026–2028),** priority should be given to establishing institutional structures, developing data infrastructure and implementing energy efficiency projects.

In **the medium term (2029–2032)**, distributed renewable energy, clean transport, industrial transformation and digital energy management applications should be expanded.

In the **long term (2033–2035 and beyond),** the integrated energy system should be completed through energy storage, smart grids and climate-resilient energy infrastructure.

This phased approach is also consistent with the implementation timetable of the report.

5.7.3. Policy Assessment

The project portfolio proposed in this chapter presents an integrated implementation model that does not rely on a single technology for Antalya's energy transition, but instead addresses energy efficiency, renewable energy, digitalisation, carbon management and energy security together.

When implemented through cooperation among public institutions, local authorities, universities, the private sector, organised industrial zones and civil society organisations, the proposed projects will accelerate Antalya's transition towards a low-carbon and climate-resilient energy system.

Table 25: Proposed Performance Indicators

Indicator	2030 Direction	2050 Direction
Share of renewable electricity in total electricity consumption	Rapid increase	At least 50–60% local contribution
New distributed renewable capacity	Priority expansion	Widespread system across the city
Renewable energy in public buildings	Transformation of priority facilities	Implementation in a significant share of the public building stock
Use of renewable systems in tourism facilities	Sectoral program	Standard implementation
Renewable energy in agricultural irrigation	Pilot projects and scaling up	Integrated water–energy model
Share of renewable energy facilities with storage	Phased increase	Widespread deployment according to grid needs
Energy cooperative and community model	Pilot implementations	Widespread model at district and sectoral levels
Share of rooftops and degraded land used for renewable investments	Key priority	Primary option before investments requiring additional land
Wind energy suitability and exclusion atlas	Completion	Continuous update
Inventory of organic waste	Completion at district and source level	Real-time material management
Separately collected organic waste from tourism	Expansion in pilot regions	Standard implementation in the tourism sector
Wastewater treatment sludge subject to energy recovery	Increase in large facilities	All suitable facilities
Livestock manure under controlled management	Programme in production clusters	Regional circular system
Biogas and biomethane production	Measurable increase	Production managed according to system needs
Waste heat inventory	Preparation in major facilities	Industrial symbiosis in industrial and tourism clusters
Geothermal direct heat projects	Resource-based pilot projects	Widespread use in suitable regions
Share of heat from renewable sources	Establishment of a monitoring system	Substantial reduction in fossil-based heat use
Green hydrogen	R&D and selective pilot projects	Use driven by technology and demand

5.8. Integration of Digitalisation and the Green Transition

5.8.1. General Approach

The success of the energy transition undertaken in pursuit of climate change mitigation and low-carbon development objectives depends not only on new energy investments, but also on the appropriate planning, effective management and continuous monitoring of these investments. Today, digital technologies have become essential tools for managing energy systems more efficiently, reliably and sustainably. Therefore, Antalya's energy transition should be addressed through an integrated approach encompassing digitalisation and data-driven decision-making processes, alongside renewable energy investments, energy efficiency measures and carbon management.

5.8.2. Digitalisation as a Complementary Component of the Energy Transition

Digitalisation is not an alternative to the energy transition; rather, it is a fundamental support mechanism that enhances its effectiveness. Real-time monitoring of energy consumption, analysis of changes in demand, identification of energy losses and measurement of investment performance are only possible through reliable data infrastructure and digital management systems. This approach will enable energy investments to be continuously monitored not only during the installation phase but also throughout their operation, ensuring more efficient use of resources.

5.8.3. Priority Areas for Digital Transformation in Antalya

Digital transformation in Antalya's energy management should encompass priority areas of implementation, including the integrated monitoring of energy consumption data, the widespread adoption of digital energy management systems in public buildings, the development of smart metering and automation applications, the integration of geographic information systems (GIS) into energy infrastructure management, the digital monitoring of energy performance indicators, and the use of big data analytics and artificial intelligence (AI)-supported assessment tools in decision-making processes.

These applications will increase transparency in energy management, facilitate the identification of investment priorities and contribute to more efficient use of public resources.

5.8.4. Integration of the Green Transition and Digital Transformation

The green transition and digital transformation are not two independent processes. The effective operation of renewable energy systems, measurement of the performance of energy efficiency investments, monitoring of carbon emissions and appropriate management of energy demand can be achieved through robust digital infrastructure.

Therefore, digital applications should be considered an integral component of all policies and projects developed within Antalya's energy transition. This will enable the energy system to become not only cleaner, but also more flexible, reliable and manageable.

5.8.5. Smart City Approach and Energy Management

The energy transition is one of the fundamental components of smart city applications. In Antalya, the integrated planning of transport, water management, waste management, public services and energy infrastructure through digital systems will contribute to optimising resource use and delivering urban services more effectively.

Through the smart city approach, the relationships between energy consumption and other urban services can be analysed more effectively, enabling applications developed across different sectors to form a mutually supportive system.

5.8.6. Strengthening Institutional Capacity

The sustainable implementation of digital energy management requires not only technological infrastructure but also the development of institutional capacity. Establishing collaborative mechanisms that support data sharing among public institutions, local authorities, universities and the private sector will strengthen integrated decision-making processes in energy management.

At the same time, it is important to provide continuous support to technical personnel working in energy management in the areas of digital technologies, data analysis and performance management.

5.8.7. Policy Assessment

In Antalya's energy transition, digitalisation is a strategic management tool that improves energy efficiency, enables the monitoring of carbon emissions and supports more effective use of public resources. Digital technologies should not be regarded as substitutes for energy investments, but rather as supporting systems that facilitate the planning, implementation and performance measurement of these investments.

Therefore, Antalya's energy transition should be based on an integrated management model that addresses renewable energy, energy efficiency and carbon management objectives alongside digitalisation policies.

Renewable energy generation is the starting point of the transition; genuine energy security is achieved by integrating generation with storage, demand management, smart grids and the resilience of critical infrastructure.

The fundamental issue for Antalya's energy future is not merely how much energy is generated, but also when it is generated, how much is consumed locally, how much is stored and whether it can be supplied to critical services without interruption.

5.9. Financing the Energy Transition

5.9.1. General Approach

The success of Antalya's energy transition depends not only on technical capacity and appropriate policies, but also on the establishment of sustainable financing models to support this transition. Investments in energy efficiency, renewable energy, energy storage, smart grids and digital energy management require long-term planning and robust financing mechanisms.

Therefore, the energy transition should not be regarded merely as an investment programme financed through public resources, but as a multi-stakeholder investment model developed through the joint participation of the public sector, private sector and international financial institutions.

5.9.2. Fundamental Principles of the Financing Approach

Financing policies for the energy transition should be developed in accordance with the following fundamental principles:

- Support for investments that prioritise energy efficiency,
- Wider adoption of low-carbon technologies,
- Encouragement of private sector investment,
- Strengthening of public–private partnerships,
- Enhancement of capacity to access international climate finance,
- Development of project preparation and implementation capacity.

This approach will support not only the initial financing of energy investments but also their long-term economic sustainability.

5.9.3. Diversification of Financing Sources

The combined use of different financing instruments is important for Antalya's energy transition. In this context, national incentive programmes, international development finance, green bonds and sustainable finance instruments, carbon markets, public–private partnerships and private sector investments should be considered complementary financing mechanisms. Detailed financing instruments and international funding mechanisms are comprehensively addressed in **Chapter 9** of this report.

5.9.4. Investment-Ready Project Approach

The most important consideration in the assessment processes of international financial institutions is not merely an investment concept, but an implementable project portfolio that has been sufficiently developed from technical, economic and environmental perspectives.

Therefore, projects developed as part of Antalya's energy transition should be prepared as investment-ready projects, with feasibility studies completed, measurable performance indicators established, implementation schedules defined, financing models specified and climate impacts assessed. This approach will increase the interest of international investors and development institutions in Antalya.

5.9.5. Strategic Value of Green Finance

Investments developed within the scope of the energy transition will not only deliver environmental benefits, but also contribute to reducing energy costs, creating new investment opportunities, supporting employment and enhancing Antalya's international competitiveness.

Therefore, green finance should be regarded not merely as a means of securing funding, but as a strategic investment instrument that supports the city's long-term development.

5.9.6. Policy Assessment

Unless Antalya's energy transition is supported by robust financing models, it will not be possible to achieve the desired scale and pace of transformation. Therefore, financing strategies must be addressed in an integrated manner alongside the planning of energy investments. Through the effective use of public resources, the promotion of private sector investment and partnerships with international financial institutions, Antalya's investment capacity for the energy transition can be significantly enhanced.

Detailed financing instruments, institutional structures and international funding mechanisms relating to the energy transition are comprehensively examined in **Chapter 9** of this report.

Analytical Assessment

The capital required for Antalya's energy transition cannot be provided by a single institution or fund. Success depends on matching different financing instruments with appropriate project types.

The financing strategy should be based on six fundamental principles:

1. **Project quality first:** Technical and economic preparation should be completed before seeking financing.
2. **Turning savings into a source of finance:** In energy efficiency projects, future savings should be linked to the repayment structure.
3. **Project bundling:** Small-scale investments should be consolidated under standardised programmes.
4. **Risk-based selection of financing instruments:** Projects with high commercial returns and infrastructure projects with substantial social benefits should not be financed using the same approach.
5. **Measurable impact:** Outcomes relating to energy, carbon, costs and resilience should be verified.
6. **Integrated green approach:** Water resources, agriculture, ecosystems and social benefits should be protected while achieving carbon emission reductions.

Antalya's most significant advantage is that its energy investments are not isolated from one another. Tourism, agriculture, industry, transport, and water and wastewater infrastructure are all components of the same transition portfolio. This scale enables the creation of a substantial and diversified investment pipeline.

The fundamental challenge in Antalya's energy transition is not merely a lack of financing sources, but also the limited number of well-prepared projects that deliver measurable benefits and present manageable risks for investors.

Figure 48: Antalya Energy Transition Financing Chain



In Antalya's energy transition, financing is not a resource sought at the end of a project, but an integral element in the design of the entire investment process, from the initial project concept to measurable outcomes.

5.10. Governance, Institutional Cooperation and Stakeholder Participation in the Energy Transition

5.10.1. General Approach

The success of Antalya's energy transition depends not only on the implementation of technical solutions or the provision of financial resources. The energy transition requires a robust governance model in which public institutions, local authorities, universities, professional organisations, the private sector, organised industrial zones, the tourism sector and civil society organisations work towards shared objectives. Energy, climate change, transport, industry, tourism, urban development and environmental policies are areas that directly influence one another. Therefore, the energy transition should be implemented through an integrated governance approach based on shared data, joint planning and common objectives, rather than through a fragmented structure in which institutions operate independently within their respective areas of responsibility.

5.10.2. Strengthening Institutional Cooperation

To ensure the effective management of the energy transition, coordination mechanisms should be established to support regular information sharing and joint decision-making processes among institutions.

Within this framework:

- Public institutions and organisations,
- Antalya Metropolitan Municipality and district municipalities,
- Universities and research centres,
- Organised industrial zones,
- Representatives of the tourism sector,
- Professional chambers,
- Energy sector stakeholders,
- Civil society organisations

should convene regularly through joint working platforms to collectively assess priorities, implementation activities and performance outcomes relating to the energy transition.

This approach will help prevent duplication of efforts among institutions, promote more efficient use of resources and support coordinated action towards shared objectives.

5.10.3. Participatory Governance Model

The energy transition is not a process undertaken solely by the public sector. A participatory governance approach that incorporates contributions from all segments of society will strengthen ownership of the transition and ensure the long-term sustainability of its implementation. Therefore, decision-making processes should draw on the private sector's investment experience, universities' scientific expertise, professional organisations' technical knowledge, civil society organisations' capacity for social representation, and citizens' local knowledge and experience. The participatory governance model should be regarded as a continuous cooperation mechanism encompassing not only decision-making, but also the monitoring, evaluation and, where necessary, revision of implementation activities.

5.10.4. The Role of the Antalya Civil Platform

Platforms that bring together different institutions and organisations in Antalya around shared objectives play an important role in fostering collective ownership of the energy transition.

In this context, the Antalya Civil Platform is regarded as a participatory governance model that strengthens collective expertise and cooperation among public institutions, local authorities, universities, professional chambers, the private sector and civil society organisations, bringing together scientific knowledge and practical implementation experience.

The platform's primary function is to contribute to the development of energy transition strategies, formulate project proposals, support inter-institutional coordination and strengthen Antalya's visibility in national and international climate policies.

In this respect, the Antalya Civil Platform is not merely a body that expresses opinions; it also serves as a coordination mechanism that supports the development of joint solutions, information sharing and multi-stakeholder cooperation.

5.10.5. Coordination and Monitoring Mechanisms

One of the most significant challenges encountered in the energy transition is that institutions operate according to different priorities and that implementation activities cannot be monitored within a common system.

Therefore, the implementation of energy transition policies and projects should be accompanied by regular coordination meetings, shared data platforms, annual monitoring reports, performance indicators and independent evaluation mechanisms.

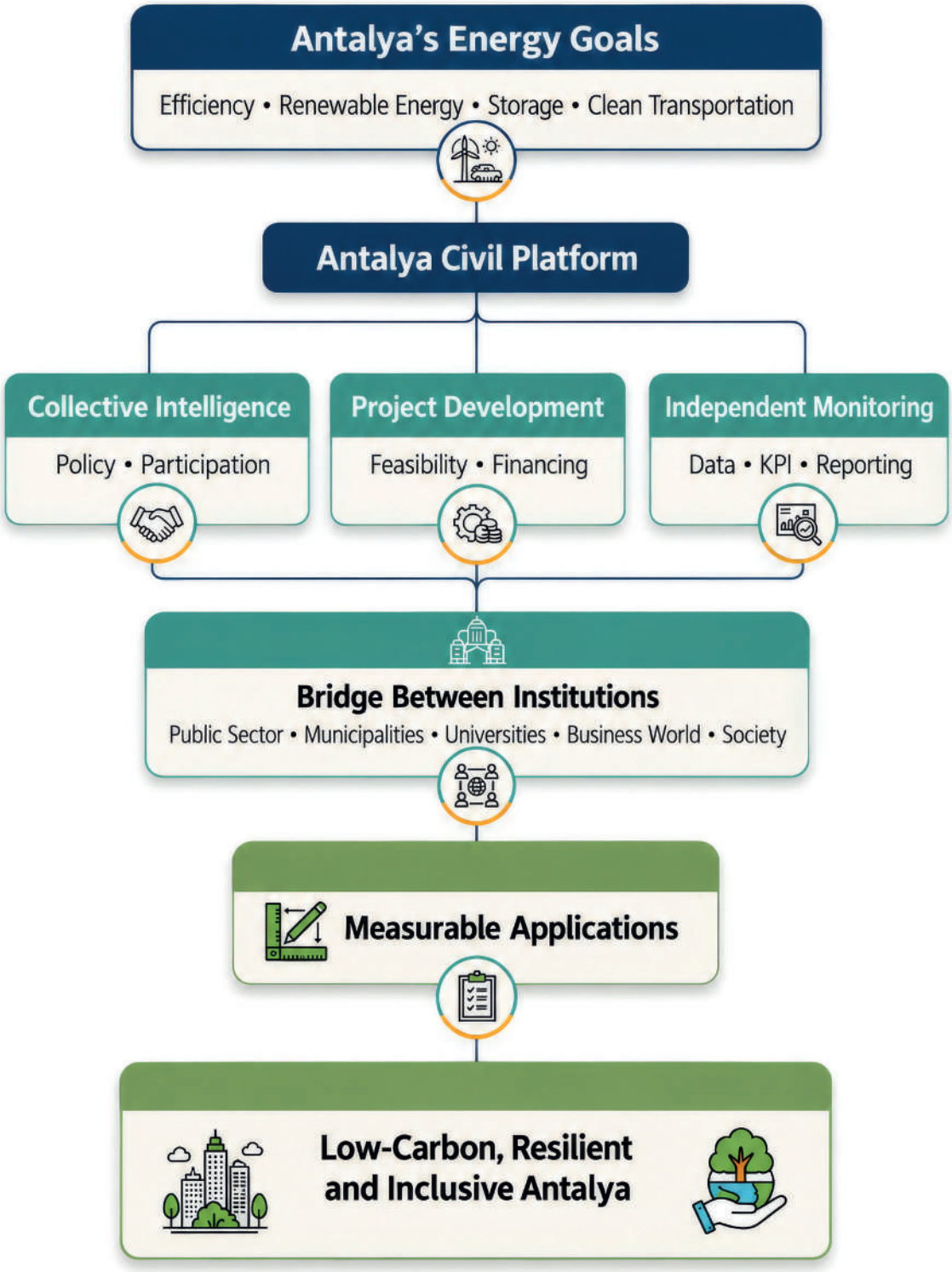
Strengthening institutional coordination will not only improve implementation outcomes but also contribute to the efficient use of public resources and the acceleration of investment processes.

5.10.6. Policy Assessment

The success of Antalya's energy transition depends less on the technologies to be developed than on the institutional capacity to manage these technologies in pursuit of shared objectives. Robust governance mechanisms, trust-based cooperation among institutions, data sharing and participatory decision-making processes are among the most important factors determining the success of the energy transition.

Therefore, the energy transition should be approached not merely as a technical and financial process, but also as a long-term governance model that develops institutional capacity and strengthens public participation.

Figure 49: Antalya Civil Platform's Role Model for Energy Transition



The success of the Antalya Civil Platform depends not on replacing public institutions, but on bringing together their knowledge, investment, and implementation capacities in pursuit of shared objectives.

5.11. Performance Indicators and Monitoring System

5.11.1. General Approach

The success of Antalya's energy transition depends not only on the implementation of the identified policies and projects, but also on the regular monitoring, measurement and, where necessary, improvement of these interventions. Performance indicators should therefore be regarded as an integral part of the energy transition process.

The monitoring system should be based on an integrated framework that considers energy efficiency, renewable energy, carbon emission reduction, energy security, digitalisation and institutional capacity development together. This will enable the impacts of implemented policies to be monitored using objective data and decision-making processes to be continuously updated.

5.11.2. Fundamental Principles of the Monitoring System

The performance monitoring system should operate in accordance with the following principles: the use of measurable and verifiable indicators, regular data collection and sharing, the adoption of a common reporting approach across institutions, annual performance assessments, and the updating of policies and the project portfolio based on implementation outcomes.

This approach will enable the energy transition to be managed as a dynamic process.

5.11.3. Key Performance Indicators

Energy Efficiency

- Reduction in energy consumption per unit of economic activity
- Improvement in energy consumption performance in public buildings
- Energy savings achieved through energy efficiency investments

Renewable Energy

- Total installed renewable energy capacity
- Extent of deployment of distributed renewable energy systems
- Proportion of electricity consumption met by renewable energy sources

Carbon Management

- Total greenhouse gas emissions
- Carbon intensity per unit of economic activity
- Changes in emissions originating from the energy sector

Energy Security and Resilience

- Continuity of energy supply to critical infrastructure
- Development of energy storage capacity
- Key performance indicators relating to grid reliability

Digitalisation

- Extent of adoption of digital energy management systems
- Number of facilities covered by smart monitoring systems
- Proportion of public institutions adopting data-driven energy management

Institutional Capacity

- Number of joint projects undertaken by institutions
- Coordination meetings held with stakeholder participation
- Energy transition projects developed and implemented
- Number of projects securing national and international financing

5.11.4. Monitoring and Evaluation Process

Performance indicators should be assessed annually, and the results obtained should be shared transparently with the public.

Monitoring results should not be used solely to assess past performance; they should also serve as a decision-support mechanism for determining new investment priorities, updating existing priorities and improving resource allocation.

Annual progress reports prepared through the joint contributions of public institutions, local authorities, universities and relevant stakeholders will serve as key reference documents demonstrating progress in the energy transition.

5.11.5. Continuous Improvement Approach

The energy transition is not an investment programme completed by a specific date; rather, it is an ongoing management process that evolves in response to changing technologies, climate conditions and economic needs.

Performance indicators and the monitoring system should therefore be reviewed at regular intervals and updated in accordance with emerging needs.

The continuous improvement approach will transform Antalya's energy transition into a dynamic system capable of adapting to changing conditions.

5.11.6. Policy Assessment

A successful energy transition requires not only the establishment of targets but also the regular measurement of the extent to which these targets are achieved. The performance monitoring system should therefore be regarded as one of the fundamental management tools ensuring accountability and institutional continuity throughout the energy transition.

Indicators regularly produced in the areas of energy efficiency, renewable energy, carbon emission reduction, digitalisation and institutional governance will enable Antalya's energy transition to be monitored in a manner that allows comparison at national and international levels.

Figure 50: Antalya Energy Performance Monitoring Cycle



Antalya's energy transition should be measured not by the amount of investment announced, but by verified outcomes in energy savings, renewable energy generation, carbon emission reductions, resilience and societal benefits.

5.12. Conclusion and Overall Assessment

5.12.1. Strategic Roadmap for Antalya's Energy Transition

As the impacts of climate change become increasingly evident, the energy transition is no longer merely a technical issue concerning the energy sector. It has become a strategic area of development directly linked to economic development, environmental sustainability, disaster resilience, competitiveness and quality of life.

In Antalya, where the tourism, agriculture, industry and service sectors have developed alongside one another, the energy transition should be addressed through an integrated approach that protects the city's natural resources, reduces carbon emissions, strengthens energy security and supports climate change adaptation.

The vision presented in this chapter is based on a transition model that prioritises energy efficiency, makes balanced use of renewable energy resources, supports energy storage and smart grid applications, utilises digital technologies and is underpinned by robust institutional governance mechanisms.

5.12.2. Integrated Energy Transition Approach

The success of the energy transition depends not only on the establishment of new energy generation facilities, but also on the effective management of energy demand, the efficient use of existing resources and the widespread adoption of low-carbon production and consumption models across all sectors.Therefore, Antalya's energy policies should address the following within a common strategic framework:

- Energy efficiency
- Renewable energy use
- Carbon management
- Energy storage
- Digital energy management
- Smart mobility
- Institutional coordination
- Financing capacity

This approach will enhance not only the environmental benefits of the energy transition but also its economic and social benefits.

5.12.3. Key Factors for Successful Implementation

For the policies and projects proposed throughout this chapter to be successfully implemented, strong political will, effective inter-institutional coordination, evidence-based decision-making processes, active participation by the private sector, the knowledge and research capacity of universities, contributions from civil society and the effective utilisation of national and international financing opportunities should all be considered together. The energy transition should not be regarded as a process undertaken solely by specific institutions, but rather as a long-term development programme advanced through the collective contributions of all stakeholders in Antalya.

5.12.4. The COP31 Process and Strategic Opportunities for Antalya

The COP31 process presents a significant opportunity to accelerate Antalya's energy transition and implement new investment models aligned with international climate policies.

This process should be regarded as a strategic catalyst for developing partnerships with international financial institutions, advancing low-carbon investment projects, promoting the adoption of innovative technologies and increasing the international visibility of Antalya's vision of becoming a climate-friendly city.

The policy and project portfolio proposed in this chapter has been designed to address not only current needs but also Antalya's long-term objective of establishing a resilient, competitive and sustainable energy system by 2050.

5.12.5. Overall Assessment

Antalya's energy transition is a comprehensive transformation process based on energy efficiency, the balanced utilisation of renewable energy resources, the reduction of carbon emissions, the strengthening of energy security and the integration of digital transformation.

When considered together, the strategies, priority project areas, financing approach, governance model and performance monitoring system presented in this chapter provide a robust roadmap for Antalya to achieve a climate-resilient, low-carbon and sustainable development model in the energy sector.

The determined implementation of this roadmap will make a significant contribution to Antalya becoming a leading city in energy transition and climate-friendly development, not only in Türkiye but also across the Mediterranean Basin.

The measure of success in Antalya's energy transition is not simply generating more electricity. Success means establishing an energy system that reduces energy demand, utilises local renewable resources in appropriate locations, manages generation and consumption digitally, protects critical infrastructure against disruptions and distributes the resulting economic benefits across society as a whole.

Figure 51: Antalya 2050 Low-Carbon Energy Transition Model



Antalya's energy transition extends beyond merely changing energy sources. The fundamental transformation involves restructuring how the city generates, consumes, stores, finances, and manages energy.

CHAPTER 6

CLIMATE-RESILIENT AGRICULTURE AND FOOD SYSTEMS

Antalya's Food Security, Agricultural Transformation and Rural Development Strategy

From Climate-Resilient Production to Food Security

Antalya's agricultural future depends not primarily on producing more, but on ensuring the continuity of production while protecting water resources, soil and rural livelihoods.

Strategic Framework of the Chapter

Agriculture in Antalya is a fundamental component of the city's food security, rural employment, export capacity, local economy, gastronomic culture integrated with tourism, and sustainable management of land and water resources.

However, climate change threatens the continuity of agricultural production through rising temperatures, drought, declining water resources, extreme weather events, soil degradation, pest and disease pressures, and increasing production costs.

This chapter addresses **climate-resilient agriculture, water efficiency, soil health, food security, low-carbon production, rural development and producer resilience** within an integrated strategic framework for Antalya.

Key Question of the Chapter

How can Antalya protect agricultural production, food security and rural livelihoods under changing climatic conditions?

Protecting agriculture means more than protecting producers. It means protecting water, soil, food, rural livelihoods and Antalya's economic future.

6.1 Introduction

Transforming Antalya's Agriculture from Production Volume to a Climate-Resilient Food System

The agricultural sector is one of the fundamental components of Antalya's economic, social and environmental structure. The city's climatic diversity, fertile plains, well-developed protected cultivation capacity, long growing season and access to markets have made Antalya one of Türkiye's leading centres of agricultural production.

Agriculture in Antalya encompasses a wide range of economic activities, including fresh vegetable and fruit production, protected cultivation, citrus fruits, tropical and subtropical crops, ornamental plants, medicinal and aromatic plants, seed production, livestock farming, agricultural processing, packaging and exports. This structure not only provides livelihoods for the rural population but also affects the entire urban economy through its links with the food industry, logistics, trade, exports, tourism and service sectors. Agricultural production forms the starting point of an extensive food system that continuously supplies products to Antalya's hotels, restaurants, markets, export businesses, processing facilities and consumers. However, it cannot be assumed that the production advantages Antalya's agriculture has enjoyed in the past will continue unchanged in the future.

Climate change is transforming the natural conditions of agricultural production through rising temperatures, changing precipitation patterns, prolonged periods of drought, an increased frequency of evaporation, more frequent extreme weather events, and changes in the distribution of plant diseases and pests.

These impacts affect not only production volumes but also product quality, harvest timing, input costs, irrigation requirements, export suitability, farmers' incomes, food prices and supply continuity. Climate change is therefore not merely an environmental risk for the agricultural sector; it is also a challenge affecting production, income, trade, employment and food security.

6.1.1 The Strategic Importance of Agriculture for Antalya

The strategic importance of agriculture in Antalya should be considered across five key dimensions.

Economic Value

Agriculture creates an extensive economic value chain through production, packaging, processing, transportation, exports and marketing activities.

Food Security

Agriculture contributes to the continuous, safe and accessible supply of food required by the city's population and tourism sector.

Rural Employment

Agriculture is one of the principal sources of income and employment for people living in rural districts.

Natural Resource Management

Agricultural activities have direct impacts on water, soil, biodiversity and landscapes.

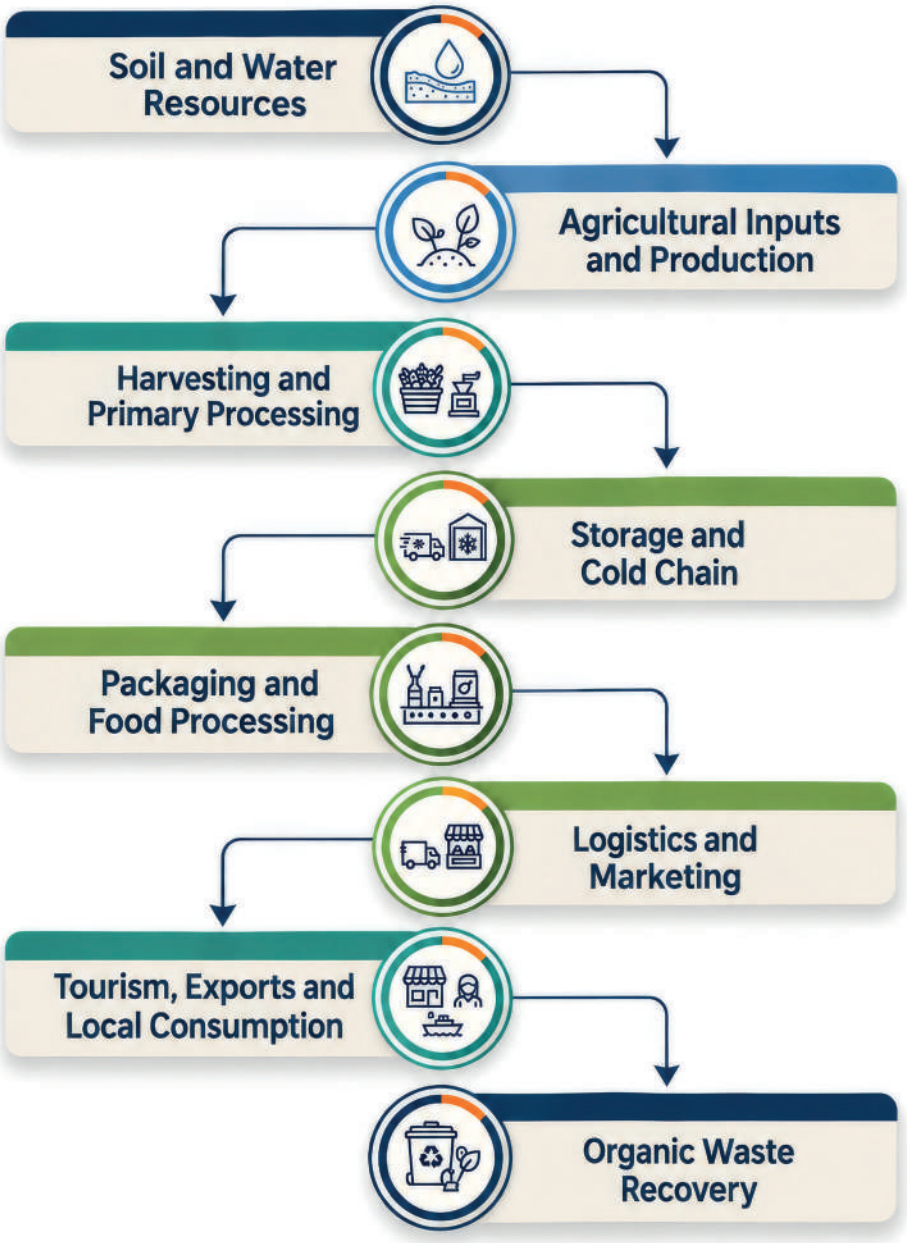
Social and Cultural Value

Local products, agricultural knowledge, traditional varieties, rural settlements and gastronomic culture are integral parts of Antalya's social identity. Therefore, agricultural policies should not be assessed solely in terms of increased production or export performance. The economic, environmental and social functions of agriculture must be protected together.

6.1.2 Figure 52: Transition from Agricultural Production to a Food System

Traditional agricultural policies predominantly focus on production volumes in fields or greenhouses. However, food security cannot be ensured solely through the cultivation of agricultural products.

Antalya's food system encompasses the entire following chain:



A disruption at any stage of this chain may prevent food from reaching consumers, even when agricultural production has taken place.

For example, extreme heat may cause crop losses, power outages may disrupt the cold chain, flooding may interrupt transport, water scarcity may reduce production, labour shortages may delay harvesting, and diseases and pests may lead to export losses. Therefore, Antalya's agricultural policies must address not only the question of "how much is produced", but also "how safely, resiliently and accessibly food is produced within the wider system".

6.1.3 Climate Change as a Systemic Risk to Agriculture

The impacts of climate change on agriculture are not limited to isolated events. They occur simultaneously across water, soil, plant health, energy, the economy and social structures.

Impacts on Water

Reduced precipitation, drought, increased evaporation and pressure on groundwater resources may threaten irrigation security.

Impacts on Soil

Erosion, loss of organic matter, salinisation, soil compaction and disruption of nutrient balance may reduce agricultural production capacity.

Impacts on Crops

High temperatures, sudden frosts, hail, extreme rainfall and heatwaves may cause losses in crop yields and quality.

Biological Impacts

Pests, invasive species and plant diseases may spread to new areas or remain active for longer periods.

Economic Impacts

Costs associated with irrigation, energy, fertilisers, pesticides, labour and insurance may increase.

Social Impacts

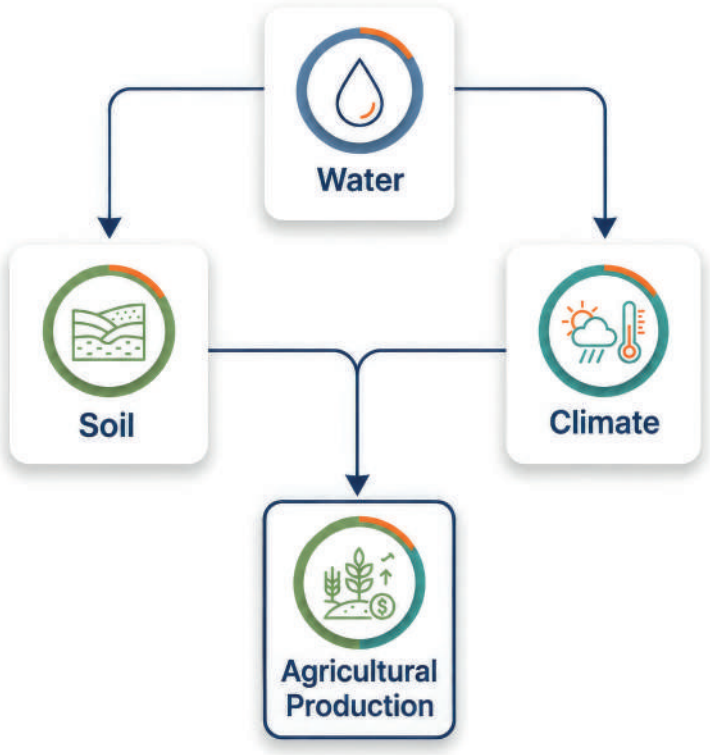
Income losses, rural-to-urban migration, declining interest in agriculture among younger generations and a reduction in the number of agricultural producers may occur.

These impacts may reinforce one another. For example, drought may increase irrigation requirements and consequently raise energy costs; higher costs may reduce producers' capacity to invest in maintenance and improvements; and inadequate maintenance may further exacerbate yield losses.

Climate change adaptation must therefore extend beyond the implementation of a single irrigation technology or a change in crop selection. The entire agricultural system must be made resilient.

6.1.4 Figure 53: The Fundamental Resource Triangle in Antalya's Agriculture

Antalya's agricultural future depends on three fundamental natural resources:



Water

One of the key determinants of irrigation, crop diversity and production volume.

Soil

The physical basis of production, a source of nutrients, a medium for water storage and an important carbon reservoir.

Climate

Determines crop development, growing seasons, disease pressure, quality, yields and harvest schedules. The carrying capacity of any one of these three resources being exceeded may undermine the long-term sustainability of agricultural production. Therefore, production planning must take into account existing water availability, the rate of water replenishment, soil quality, regional climate projections, crop water requirements and the water needs of ecosystems.

Short-term economic returns must not take precedence over the long-term capacity of natural resources.

6.1.5 Agricultural Security Cannot Be Achieved Without Water Security

Water is the most critical input for agriculture in Antalya. Therefore, this chapter on agriculture is directly linked to the report's chapter on water security. zIn agricultural water management, securing new water resources alone is insufficient. Priority must be given to the efficient use of existing water resources.

The fundamental approach should follow the sequence below:

1. Accurately determining water requirements,
2. Reducing water losses and leakage,
3. Improving the efficiency of irrigation systems,
4. Aligning crop patterns with available water resources,
5. Assessing rainwater and suitable alternative water sources,
6. Reusing advanced-treated wastewater in accordance with health and environmental standards,
7. Keeping groundwater abstraction within sustainable recharge limits.

Irrigation efficiency should not be measured solely by the installation of drip irrigation systems. Such systems should be operated with appropriate emitter selection, irrigation scheduling, soil moisture monitoring, maintenance, fertilisation management and water metering. Otherwise, excessive water consumption may continue despite the availability of modern irrigation equipment.

6.1.6 Soil Is the Invisible Capital of Agricultural Production

Agricultural assessments often emphasise production volumes and water consumption, while insufficient attention is paid to the physical, chemical and biological health of soil.

However, healthy soil retains water more effectively, provides balanced nutrient availability, supports root development, demonstrates resistance to erosion, stores carbon and mitigates the impacts of drought.

Declining soil organic matter, salinisation, inappropriate fertilisation, excessive tillage, erosion and compaction reduce long-term production capacity, even when their effects are not immediately apparent.

Increasing soil organic matter and soil carbon is important for water retention capacity, nutrient balance, erosion resistance and climate change adaptation. Therefore, Antalya's agricultural development policies should regard soil not merely as an input consumed by production, but as natural capital that must be protected and strengthened.

6.1.7 Balancing Quantity and Quality in Agricultural Production

The competitiveness of Antalya's agricultural sector cannot depend solely on high production volumes. In the future, agricultural production will need to be assessed in terms of product quality, taste and aroma, residue safety, nutritional value, shelf life, traceability, environmental footprint and market differentiation. Excessive input use or an exclusive focus on rapid growth and high yields may lead to deterioration in soil quality, declining product quality, increased pesticide residues, reduced consumer confidence and export-related challenges. Therefore, the concept of agricultural productivity must be redefined. Productivity is not merely the quantity produced per decare of land. It should also be assessed in terms of output per unit of water consumed, economic value per unit of energy used, producer income per unit of land, the proportion of marketable produce, environmental costs and product quality.

6.1.8 The Need for Transformation in Protected Cultivation

A significant proportion of Antalya's agricultural production relies on protected cultivation. This production method allows climatic conditions to be partially controlled and enables production throughout much of the year. However, protected cultivation may require intensive inputs in terms of irrigation water, energy, plastics, fertilisers, plant protection products, climate control and cold-chain management. With climate change, excessive temperatures, humidity control, ventilation, cooling, pest pressure, storms and hail may become more significant issues in greenhouses. Therefore, the future of protected cultivation depends not merely on expanding greenhouse areas, but also on intelligent climate control, water and nutrient recovery, energy efficiency, renewable energy use, resilient greenhouse design and waste plastic management.

6.1.9 The Relationship Between Agriculture and Energy

The agricultural sector consumes substantial amounts of energy for irrigation pumps, greenhouse heating and cooling, cold storage facilities, packaging facilities, product processing and transportation. Renewable energy applications can reduce agricultural production costs. However, energy investments should not be undertaken independently of production and natural resource management. In particular, solar-powered irrigation systems may increase uncontrolled water abstraction while reducing electricity costs. Therefore, agricultural energy support should be considered alongside water metering, permitted abstraction volumes, efficient pumps, irrigation based on crop water requirements and subsurface water monitoring. The objective of agricultural energy transformation should not be to extract more water, but to achieve the same level of production using less energy and less water.

6.1.10 Agricultural Biodiversity and Local Genetic Resources

Agriculture does not consist solely of commercial crops. Local seeds, traditional varieties, wild relatives, pollinators and agricultural ecosystems also support the resilience of production. Production systems based on a single crop and narrow genetic diversity are more vulnerable to diseases, pests, temperature fluctuations and drought. Therefore, identifying local varieties in Antalya, conserving genetic material, developing seed and seedling collections, preserving farmers' knowledge and traditional production experience, and developing climate-resilient varieties are of considerable importance. Agricultural biodiversity is not merely a legacy of the past that must be protected. It should also be regarded as a source of production options capable of adapting to changing climatic conditions in the future.

6.1.11 Distinguishing Food Safety from Food Security

Two different concepts should be considered together when assessing the food system.

Food Safety

Food produced and supplied to consumers must be safe for human health. In this context, biological risks, chemical residues, hygiene, storage, the cold chain and traceability are important.

Food Security

Food security refers to society's ability to access sufficient, nutritious and affordable food without interruption. In this context, production volumes, product supply, prices, logistics, income levels and access during periods of crisis are important.

Climate change may affect both areas. Rising temperatures and humidity may increase food safety risks, while drought and production losses may affect food availability and affordability. Therefore, Antalya's food policy should be based not only on agricultural production volumes, but also on ensuring that safe food is accessible to all segments of society.

6.1.12 The Strategic Link Between Agriculture and Tourism

Although Antalya's agricultural and tourism sectors operate within the same geographical area, they are often managed as separate economic structures. However, the tourism sector generates substantial and consistent demand for fresh fruit and vegetables, meat and dairy products, beverages, local produce and processed foods.

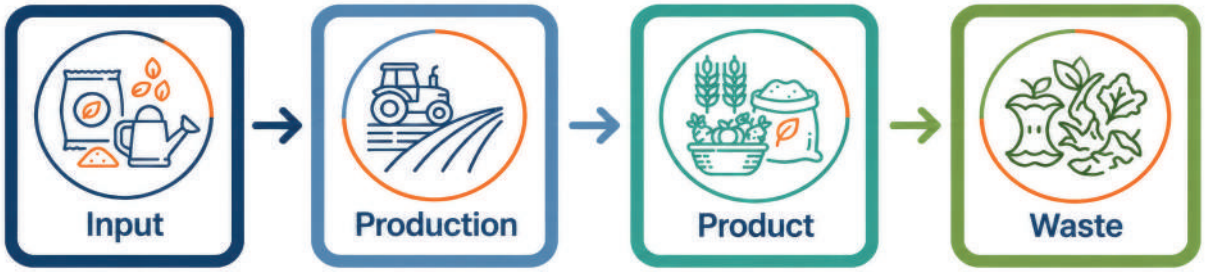
Strengthening the links between this demand and local production could create a regular market for producers, improve traceability for tourism businesses, reduce logistics-related losses, retain greater added value within the local economy and strengthen Antalya's gastronomic identity. However, this integration requires quality standards, regular supply, planned production, collective marketing, contractual relationships, cold-chain management and price stability.Agriculture–tourism integration should not simply involve adding local products to menus, but should establish a long-term and equitable supply system between the two sectors.

6.1.13 Rural Development Is a Broader Concept Than Agricultural Production

Rural development does not merely mean increasing agricultural production volumes. It should also be assessed in terms of the sustainability of rural life, income, education, healthcare, transport, digital connectivity, social services, entrepreneurship and the participation of women and young people in economic life. Instability in producer incomes, rising input costs, the small scale of agricultural enterprises, marketing challenges and difficulties in accessing social services may accelerate migration from rural areas. The movement of young people away from agriculture does not merely result in a loss of labour. It also threatens the continuity of production knowledge, local varieties and rural culture.For this reason, climate-resilient rural development policies should strengthen producer incomes, develop cooperatives and producer organisations, support women's entrepreneurship, provide young farmers with access to technology and financing opportunities, and improve the quality of rural life.It should be recognised that agricultural policies compatible with climate change must not only increase producer incomes, but also encourage young people to remain in agriculture, support women's entrepreneurship and improve the quality of rural life.

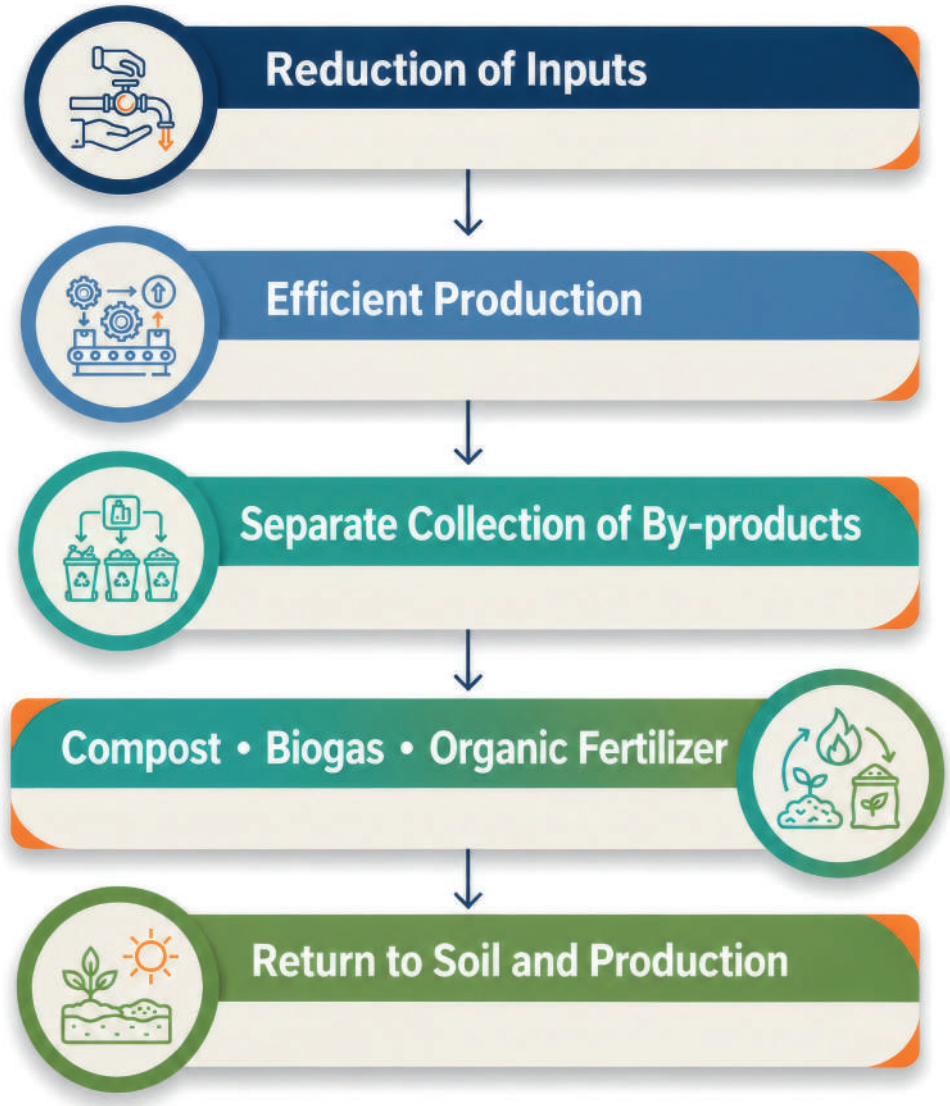
6.1.14 Circular Agriculture and Resource Efficiency

Figure 54: Traditional Linear Agricultural Model



The traditional linear agricultural model operates in this manne

Figure 55: Circular Agriculture Model



is based on this approach.

When properly managed, plant residues, animal manure, pruning residues, and organic by-products from processing facilities can be used to produce compost, biogas, organic fertilizers, and soil amendments, as well as for energy generation. However, the reuse of organic waste in agriculture must not be undertaken without appropriate controls. Risks related to pathogens, heavy metals, salinity, foreign materials, and hygiene must be assessed.

The objective of circular agriculture is not merely to dispose of waste, but to safely transform it back into a valuable resource.

6.1.15 Key Questions Addressed in This Chapter

Chapter 6 seeks to address the following key questions concerning Antalya's agricultural future:

1. What are the current production structure and strategic advantages of Antalya's agricultural sector?

2. What risks does climate change pose to different crops and regions?

3. Is the current cropping pattern compatible with the carrying capacity of water resources?

4. How can water and energy efficiency in agriculture be improved?

5. How can soil health be monitored and improved?

6. How can protected cultivation be made more resilient to climate risks?

7. How can digital and precision agriculture technologies be made accessible to small-scale producers?

8. How can the food supply chain be protected against disaster and climate risks?

9. How can agricultural biodiversity and local genetic resources be safeguarded?

10. How can income and living conditions be created that encourage rural populations to remain in agriculture?

11. How can a stronger local economic system be established between agriculture, tourism and the food industry?

12. Which financing models can support investments in climate-resilient agriculture?

6.1.16 Purpose of the Chapter

The primary purpose of this chapter is to:

- Evaluate Antalya's agricultural structure in the context of climate change,
- Examine the interrelationship between water, energy, soil and biodiversity in agricultural production,
- Assess food security and food safety through a long-term systems approach,
- Establish a balance between production efficiency and the conservation of natural resources,
- Strengthen the economic and social resilience of agricultural producers,
- Develop feasible policy and project recommendations to support Antalya's transition towards a climate-resilient agricultural and food system.

The purpose of this chapter is defined as assessing the agricultural sector in the context of climate impacts, addressing water and energy use through an integrated approach, recognising nature-based solutions as an integral part of rural development, and developing policy recommendations for a vision of climate-resilient agriculture.

6.1.17 Scope of the Chapter

The following topics will be examined in detail in Chapter 6:

- Agricultural production profile and strategic importance of Antalya,
- Agricultural vulnerability to climate change,
- Agricultural water management and drought,
- Soil health and sustainable land management,
- Cropping patterns and climate adaptation,
- Protected cultivation,
- Precision and digital agriculture,
- Energy efficiency and renewable energy,
- Agricultural biodiversity,
- Food security and resilient supply chains,
- Circular agriculture,
- Producer organisations and rural development,
- Integration of agriculture and tourism,
- Green finance,
- Performance indicators and implementation roadmap.

This scope is consistent with the identified themes of the existing agricultural structure, climate impacts, water management, soil health, digital agriculture, protected cultivation, biodiversity, nature-based solutions and rural development.

Analytical Assessment

Antalya's agricultural strength has been built over many years on favourable climatic conditions, a wide diversity of agricultural products, substantial protected cultivation capacity and strong market connections. However, its future competitive advantage will not depend solely on these natural and economic strengths.

Success will depend on the development of an agricultural system capable of using water more efficiently, preserving the productive capacity of soils, anticipating climate risks, accessing technology, ensuring product quality, recovering and reusing waste, and maintaining stability in production.

The fundamental transformation required for Antalya's agricultural future is as follows:

Table 26: Transformation of Agricultural Approaches

Traditional approach	New approach
Production quantity	Resource-efficient and high value-added production
Increasing water supply	Managing water demand
Product-based planning	Planning based on basin, water and climate
Annual economic return	Long-term soil and income security
Waste disposal	Circular resource management
Single-operator approach	Cooperative and value chain approach
General support	Measurable performance-based support
Production area	Integrated food system
Intervention after climate impacts	Proactive risk management

If this transformation is not achieved, the depletion of water, soil and production capacity will undermine long-term food security, even if agricultural production continues in the short term.

Policy Implications

Antalya's agricultural policy should shift from the objective of **"more production"** towards "more resilient, more efficient and higher-value production". This approach should be based on the following key principles:

1. Production According to Water Availability

Cropping patterns should be compatible with current and future water resources.

2. Soil Conservation

Soil organic matter, salinity, erosion and carbon indicators should be monitored regularly.

3. Planning Based on Climate Risks

Climate risk maps should be prepared for specific crops, regions and production periods.

4. Producer-Centred Transformation

Technology and financing should be accessible to small- and medium-scale producers.

5. Food Systems Approach

Production, storage, processing, logistics and consumption should be considered within a unified planning framework.

6. Added Value and Quality

Alongside production volumes, quality, traceability, branding and local processing capacity should be enhanced.

7. Circular Resource Management

Organic by-products should be safely converted into soil amendments, fertilisers and energy.

8. Strengthening Rural Livelihoods

Agricultural entrepreneurship among young people and women should be supported, and the quality of rural life should be improved.

Table 27: Key Areas of Transformation in Antalya's Agricultural Sector

Transformation area	Current pressure	Strategic approach	Expected outcome
Water management	Irregular and increasing irrigation demand	Measurement, efficient irrigation and production planning	Lower water consumption
Soil health	Organic matter loss and salinization	Soil protection and improvement	Maintained production capacity
Cropping pattern	Changes in climatic conditions	Crop selection adapted to climate and water conditions	Higher yield and income stability
Greenhouse production	Risks from heat, energy and biological factors	Smart and resilient production systems	More reliable production
Digital agriculture	Lack of access to data and technology	Integrated digital services	Precision input use
Food supply chain	Storage and logistics losses	Resilient cold chain	Reduced product loss
Rural development	Migration and ageing of agricultural producers	Income, financing and quality of life support	Sustainable production
Agriculture–tourism linkages	Fragmented local supply structure	Local and contractual supply	Added value to the local economy
Circular agriculture	Organic waste and by-products	Composting, biogas and safe reuse	Reduced waste and input use
Food security	Climate and supply risks	Integrated food system management	Uninterrupted and reliable supply

Methodology and Data Limitations Information Box

The source text identifies Antalya as one of Türkiye's leading provinces in protected cultivation, fresh fruit and vegetable production, tropical crops, greenhouse farming and export-oriented agricultural production. It considers agriculture a strategic sector in terms of rural employment, food security, natural resource management and rural livelihoods.

The scope of Chapter 6 encompasses the existing agricultural structure, climate impacts, water management, soil health, digital agriculture, protected cultivation, biodiversity, nature-based solutions, rural development and green finance. The food systems approach, resource–production–logistics–consumption chain, transformation matrix and policy principles presented in this introductory section have been developed to transform the brief introduction in the source text into an analytical framework capable of supporting the entire chapter.

The source documents do not provide a single, verified baseline dataset covering Antalya's current agricultural area, crop-specific production volumes, total agricultural water consumption, number of farmers and the economic size of the sector. Therefore, no unverified quantitative figures have been used in this chapter. Quantitative analyses should be supported in subsequent subsections by official agricultural statistics, water allocation data, soil analyses, producer records and district-level climate projections.

Figure 56: Antalya's Climate-Resilient Agriculture and Food System



Agricultural resilience in Antalya can be achieved not merely by ensuring that crops are grown in fields or greenhouses, but by maintaining the continuity of the entire system, from the conservation of water and soil to the safe delivery of agricultural products to consumers.

6.2. Analysis of Antalya's Agricultural Structure and Vulnerability to Climate Change

6.2.1. General Assessment

Antalya is one of Türkiye's most important agricultural production centres, owing to its climatic diversity, fertile agricultural plains, long growing season and well-developed protected cultivation capacity. The city has an agricultural production structure that generates high added value in fresh fruit and vegetable production, citrus fruits, tropical fruits, ornamental plants, medicinal and aromatic plants, and seed production.

Agricultural activities are not limited to primary production; they also generate a broad economic value chain encompassing the food industry, packaging, cold-chain systems, logistics, exports, tourism and local trade. In this respect, Antalya's agricultural sector constitutes a strategic production system within the province's economic structure.

However, Antalya's current production model is highly dependent on climatic conditions, irrigation water, soil quality and the sustainable use of natural resources. As the impacts of climate change intensify, this dependence increases the vulnerability of the agricultural system.

6.2.2. Antalya's Agricultural Production Profile

Antalya's agricultural production structure primarily comprises:

* Protected cultivation of vegetables and fruits,
* Open-field vegetable and fruit cultivation,
* Citrus fruit production,
* Tropical and subtropical fruit cultivation,
* Ornamental plants,
* Medicinal and aromatic plants,
* Livestock farming and fodder crop production.

In recent years, increased production of tropical crops such as avocados, mangoes, dragon fruit and papayas has demonstrated Antalya's agricultural sector's capacity to adapt to changing climatic conditions and market demands. Protected cultivation is one of Antalya's most important competitive advantages, enabling uninterrupted production throughout the year.

6.2.3. Economic Structure of Agricultural Production

Agricultural production directly supports the food industry, packaging sector, storage and cold-chain systems, logistics activities, exports, the tourism sector and local employment.

In particular, the consistent year-round demand for food generated by the tourism sector creates a strong economic relationship between agriculture and the service sector in Antalya. Consequently, potential climate-related disruptions to agricultural production could affect not only producers but also the entire value chain.

6.2.4. Dependence on Natural Resources

The sustainability of Antalya's agricultural sector largely depends on the conservation of natural resources. The production system is highly dependent on irrigation water, fertile agricultural land, favourable climatic conditions, biodiversity and healthy ecosystems. Therefore, changes in the carrying capacity of natural resources may have direct impacts on the production system.

6.2.5. Existing Areas of Vulnerability

An assessment of Antalya's current agricultural structure highlights the following key areas of vulnerability:

* High dependence on irrigation water,
* Energy-intensive operating models in protected cultivation,
* Cropping patterns sensitive to climatic conditions,
* Production pressures on natural resources,
* Economic vulnerability of small- and medium-sized enterprises,
* Pressures on land and water use arising from agriculture, tourism and urbanisation.

These vulnerabilities may become more pronounced in the future as a result of climate change.

6.2.6. General Assessment

Antalya's existing agricultural structure has significant advantages owing to its strong production capacity, high crop diversity and well-developed marketing networks. However, the production system is largely dependent on the sustainable use of natural resources and the continuity of favourable climatic conditions.

Therefore, the future of Antalya's agricultural sector depends not only on increasing production volumes but also on transforming the existing production system to adapt to changing climatic conditions.

In this context, an accurate analysis of the strengths and weaknesses of the existing structure provides an essential starting point for the problem analyses, strategic objectives and policy recommendations presented in the following sections.

6.3. Key Challenges and Structural Risk Areas in Antalya's Agricultural Sector

6.3.1. General Assessment

Although Antalya's agricultural production system benefits from strong natural resources, high production capacity and well-developed marketing networks, it faces new structural risks arising from climate change, increasing pressure on natural resources and changing economic conditions.

These risks affect not only production volumes but also production costs, product quality, export competitiveness, farmers' incomes and the sustainability of the food supply chain. The future of the agricultural system therefore requires these challenges to be assessed through an integrated approach rather than independently of one another.

6.3.2. Increasing Pressure on Water Resources

One of the most significant structural challenges facing Antalya's agricultural sector is the increasing pressure on water resources.

Rising temperatures, irregular precipitation patterns and prolonged drought periods increase irrigation requirements while limiting the availability of usable water. Furthermore, growing competition for water between agriculture, tourism, industry and urban uses may make water allocation processes more complex in the future.

Rather than focusing solely on developing new water resources, water management should prioritise the efficient use of existing water supplies, the wider adoption of water reuse practices and the strengthening of basin-scale planning.

6.3.3. Deterioration of Soil Health

Soil is the fundamental natural capital of agricultural production. However, intensive production pressures, inappropriate land use, loss of organic matter, erosion and salinity may adversely affect long-term production capacity.

The deterioration of soil health not only reduces crop yields but also diminishes water retention capacity, increases input requirements and raises production costs.

Protecting and regularly monitoring soil quality should be a fundamental component of climate change adaptation policies.

6.3.4. Rising Production Costs

In recent years, increases in energy, irrigation, fertiliser, crop protection products, labour and logistics costs have placed significant economic pressure on small- and medium-sized agricultural enterprises in particular.

The increased need for irrigation due to climate change and the requirement for additional protective measures against extreme weather events further intensify these cost pressures. This situation may limit producers' investment capacity and adversely affect the sector's competitiveness.

6.3.5. Climate-Related Production Risks

Climate change introduces numerous risks at different stages of the production process.

These include heatwaves, prolonged droughts, sudden frost events, hailstorms and severe storms, heavy rainfall, flooding, and flash floods, which may cause significant losses, particularly in open-field production and protected cultivation. The increasing frequency and severity of these risks make it essential to incorporate climate projections into production planning.

6.3.6. Pests and Plant Diseases

Changes in climatic conditions may alter the frequency and geographical distribution of pests and plant diseases. This may lead to increased crop protection costs, greater pressure to use pesticides, a growing need for biological control practices, and risks of quality deterioration and losses in export markets. The wider adoption of early warning systems, digital monitoring technologies and integrated pest management practices is therefore important.

6.3.7. Vulnerabilities in the Structure of Agricultural Producers

A significant proportion of agricultural enterprises in Antalya consist of small- and medium-sized family businesses. Difficulties in accessing finance, limited capacity for technological transformation, rising production costs, young people moving away from agriculture and differences in organisational capacity may constrain the sector's ability to adapt to climate change. Therefore, agricultural transformation should be supported not only through technical investments but also through policies that strengthen the institutional, economic and social capacities of producers.

6.3.8. Interactions Between Agriculture, Tourism and Urbanisation

Agriculture, tourism and urbanisation in Antalya share the same natural resources. Pressures on water resources, fertile agricultural land, transport infrastructure and the labour force may create competition between sectors over time. Effective management of this situation requires land-use decisions, water allocation policies and local development strategies to be planned through an integrated approach that considers the balance between sectors.

6.3.9. Policy Assessment

The fundamental challenge facing Antalya's agricultural sector is not the existence of individual risks, but the simultaneous interaction of these risks with natural resources, production, the economy and rural livelihoods. Therefore, future agricultural policies should address water, soil, energy, biodiversity, producer welfare and food security not as independent issues, but as complementary components of the same system. Accurately identifying these challenges provides the foundation for the vision, strategic objectives, policy instruments and project portfolio presented in the following sections.

6.4. Antalya's Vision for a Climate-Resilient Agriculture and Food System

6.4.1. Fundamental Approach to the Vision

Antalya's agricultural future should be addressed through an integrated agriculture and food system approach that combines the conservation of natural resources with sustainable production, adapts to climate change, generates high added value and supports a secure food supply.

This vision aims not merely to increase production, but to safeguard the continuity of production by protecting water, soil, biodiversity and agricultural producers.

Success in addressing climate change depends not on the depletion of natural resources, but on establishing a production model that respects their carrying capacity while simultaneously enhancing economic, environmental and social benefits.

6.4.2. A Production Model Based on Resource Efficiency

Antalya's future agricultural production system should adopt an approach centred on resource efficiency that uses water more efficiently, preserves soil productivity, reduces energy consumption, optimises chemical inputs, promotes organic matter recycling and reuses waste.

This approach will contribute to reducing production costs while also supporting the long-term conservation of natural resources.

6.4.3. Transition to a Climate-Resilient Production System

A production model adapted to climate change requires a management approach that:

* Assesses climate risks in advance,
* Plans cropping patterns in accordance with natural resource carrying capacity,
* Monitors water management digitally,
* Utilises early warning systems,
* Reduces disaster risks,
* Safeguards continuity of production.

This transformation will not only reduce climate risks but will also contribute to increased producer incomes and the preservation of agricultural competitiveness.

6.4.4. A Safe and Traceable Food System

Antalya's agricultural vision should aim to establish a holistic food system that considers not only the production stage but also the entire process through which products reach consumers, and that is safe and traceable.

Within this framework, quality, hygiene, traceability and sustainability principles should be applied across all stages of production, harvesting, storage, cold-chain management, processing, logistics, marketing and consumption. Food safety and food security should be addressed together to support an uninterrupted and safe food supply under Antalya's changing climatic conditions.

6.4.5. Digitalisation and Innovative Agriculture

The widespread adoption of digital technologies in agricultural production will play an important role in enhancing climate change adaptation capacity. Through smart irrigation systems, remote sensing technologies, sensor applications, geographic information systems, artificial intelligence-supported decision-making mechanisms and precision agriculture practices:

* Water consumption can be reduced,
* Input use can be optimised,
* Diseases and pests can be detected at an early stage,
* Production planning can be carried out more effectively.

Digital transformation should be supported by models that are accessible, particularly to small- and medium-sized agricultural enterprises.

6.4.6. Strong Producers and Resilient Rural Communities

Climate-resilient agriculture cannot be achieved solely through investments in technical infrastructure. Strengthening producers' access to knowledge, technology, finance, organisational models and marketing opportunities is one of the most important elements of this transformation.

Increasing the participation of women and young people in agricultural production, strengthening cooperatives and producer associations, and improving the quality of rural life are of strategic importance for Antalya's agricultural sustainability.

6.4.7. Integration of Agriculture, Tourism and Industry

Antalya's economic structure enables strong links to be established between agriculture, tourism and the food industry. Therefore, the future agricultural system should consider:

* Local production and the tourism sector,
* Agricultural production and the food industry,
* Producers and consumers,
* Rural development and local economic growth

This approach will contribute to increasing local added value, strengthening supply chains and enhancing Antalya's competitiveness in national and international markets.

6.4.8. Policy Assessment

Antalya's agricultural future is not limited to adaptation policies aimed solely at reducing the adverse impacts of climate change. It also requires a new development model based on the sustainable management of natural resources, strengthening producers and managing all components of the food system through an integrated approach.

The strategies and policies developed in line with this vision should aim to transform Antalya's agricultural sector into a more resilient, more efficient, more competitive and more sustainable structure.

6.5. Strategic Aims and Objectives

6.5.1. General Approach

Antalya's transition towards a climate-resilient agriculture and food system should be guided by long-term objectives that jointly consider the conservation of natural resources, production sustainability, producer welfare and food security.

The strategic objectives identified within this framework aim not only to address existing challenges but also to transform Antalya's agricultural sector into a system that adapts to changing climatic conditions, generates higher added value and enhances its international competitiveness.

6.5.2. Strategic Objective 1

Ensuring the Sustainability of Production by Protecting Natural Resources

Water, soil and biodiversity, which form the foundation of Antalya's agricultural sector, are indispensable forms of natural capital for the production system. Therefore, the efficient use of water resources, protection of soil health, prevention of erosion, support for agricultural biodiversity and consideration of the carrying capacity of natural resources should be among the priority objectives.

6.5.3. Strategic Objective 2

Promoting Climate-Resilient Production Systems

To establish a production model capable of adapting to climate change, the integration of climate risks into production planning, the widespread adoption of drought-resilient production practices, the enhancement of resilience in protected cultivation, the reduction of disaster risks and the development of early warning systems should be prioritised.

6.5.4. Strategic Objective 3

Increasing Resource Efficiency

Effective management of the resources used is as important as increasing production. Within this framework, improving irrigation efficiency, reducing energy consumption, ensuring the efficient use of fertilisers and crop protection products, developing circular agriculture practices and recovering agricultural waste for economic use should be among the priority objectives.

6.5.5. Strategic Objective 4

Strengthening a Safe and Traceable Food System

The sustainability of Antalya's agricultural competitiveness should be supported by ensuring safe production, maintaining quality standards, improving traceability, strengthening the cold chain, reducing product losses and enhancing supply chain resilience.

6.5.6. Strategic Objective 5

Promoting Digital and Innovative Agricultural Practices

Precision agriculture practices, sensor technologies, remote sensing systems, artificial intelligence-supported decision-making mechanisms, geographic information systems and digital production records should be widely adopted in agricultural production to support data-driven production management.

6.5.7. Strategic Objective 6

Strengthening the Economic and Social Resilience of Producers

Successful adaptation to climate change depends not only on technical investments but also on producers' capacity to adapt to the transformation. Therefore, strengthening producer organisations, developing cooperative models, supporting the entrepreneurship of women and young people, increasing access to finance and insurance instruments, and expanding technical training and advisory services should be among the key objectives.

6.5.8. Strategic Objective 7

Establishing a Strong Value Chain Between Agriculture, Tourism and the Food Industry

Considering Antalya's economic structure, the integration of local production with the tourism sector, the development of contract farming models, the branding of local products, the strengthening of the processing industry and the expansion of export capacity are key objectives for generating added value.

6.5.9. Strategic Objective 8

Strengthening Agricultural Governance and Institutional Capacity

The success of the agricultural transformation process depends on improving inter-institutional coordination, strengthening data sharing, supporting scientific research, developing university–public sector–private sector cooperation, and establishing performance-based monitoring systems. Therefore, a strong governance structure should be regarded as one of the fundamental components of a climate-resilient agricultural system.

6.5.10. Policy Assessment

Antalya's agricultural future should be shaped by integrated objectives that jointly address the conservation of natural resources, the sustainability of production, a secure food supply and producer welfare. The strategic objectives defined in this chapter provide a framework for the policy instruments, priority projects, financing models and performance indicators presented in the following sections.

Achieving these objectives will be possible to the extent that they are supported by inter-institutional cooperation, evidence-based planning and regular performance monitoring mechanisms.

6.6. Strategic Policies

6.6.1. General Approach

Antalya's transition towards a climate-resilient agriculture and food system will be possible not merely through the development of production techniques, but through the implementation of integrated policies that jointly address the conservation of natural resources, producer welfare, a secure food supply and rural development.

The strategic policies developed within this framework should be considered as part of a complementary system encompassing water, soil, production, technology, food security, producer organisations and rural development.

Policy 1

Agricultural Management Based on Water Efficiency

Water management in Antalya's agricultural sector should prioritise the efficient use of existing water resources rather than the development of new water sources.

Within this framework, basin-based water planning, aligning cropping patterns with water availability, expanding smart irrigation systems, modernising irrigation infrastructure, reusing treated water in suitable areas and regularly monitoring irrigation performance should be considered priority policy areas.

Policy 2

A Production Model that Protects Soil Health

Soil is not merely an area used for production; it is natural capital that ensures the sustainability of agricultural production.

Therefore, organic matter management, erosion reduction, salinity control, appropriate fertilisation practices, conservation tillage and soil quality monitoring systems should be widely adopted.

Policy 3

Climate-Resilient Production Planning

Agricultural production planning should be shaped by future climate projections rather than historical climatic conditions.

Within this framework, cropping pattern planning, climate risk maps, disaster risk management, early warning systems and drought-resilient production techniques should be widely adopted.

Policy 4

Promoting Digital and Precision Agriculture

A data-driven management approach should be supported in agricultural production.

Accordingly, precision agriculture practices, sensor systems, remote sensing technologies, geographic information systems, artificial intelligence-supported decision-making systems and digital production records should be expanded through applications accessible to producers.

Policy 5

A Safe and Resilient Food Supply Chain

Ensuring that products reach consumers safely is as important as the sustainability of production. Within this framework, strengthening the cold chain, improving storage infrastructure, reducing product losses, expanding traceability systems and reinforcing logistics infrastructure should be supported.

Policy 6

Circular Agriculture and Resource Recovery

Organic by-products generated from crop and livestock production should be safely recovered and reused. Within this framework, compost production, biogas applications, the use of organic fertilisers, the economic recovery of agricultural waste and resource recovery practices should be supported.

Policy 7

Producer-Centred Agricultural Transformation

The success of climate-resilient agriculture depends on producers' participation in the transformation process. Therefore, producer associations, cooperatives, women entrepreneurs, young farmers, technical training, financing and advisory services should be strengthened.

Policy 8

Integration of Agriculture, Tourism and the Food Industry

Considering Antalya's strong economic structure, supply chains between local production and the tourism sector should be strengthened, contract farming models should be developed, the branding of local products should be supported, and the added value generated by the food processing industry should be increased.

This approach will strengthen both producer incomes and Antalya's gastronomy and tourism brand.

Policy 9

Agricultural Governance and Institutional Cooperation

To enable the implementation of climate-resilient agricultural policies, inter-institutional coordination, shared data management, university–public sector–private sector cooperation, producer representation mechanisms and regular performance assessments should be strengthened. Participatory governance is one of the fundamental elements that will enhance the effectiveness of policy implementation.

6.6.10. Policy Assessment

Antalya's agricultural transformation can be achieved not through fragmented approaches focusing on a single policy area, but through integrated policies that jointly address natural resource management, production processes, technology use, economic sustainability and rural development. The policy framework proposed in this chapter sets out the fundamental instruments required to translate the strategic objectives defined in Section 6.5 into practice. The success of these policies should be supported by measurable performance indicators, regular monitoring mechanisms and strong institutional cooperation.

6.7. Priority Transformation Projects and Implementation Programme

6.7.1. General Approach

Antalya's transition towards a climate-resilient agriculture and food system will be possible not merely through the preparation of strategic objectives and policy documents, but through the planned implementation of concrete projects and investments. The priority transformation projects proposed within this framework aim to conserve natural resources, improve production efficiency, strengthen producers' capacity to adapt to climate change and develop the agricultural value chain in an integrated manner. The projects should be considered as a flexible investment portfolio that can be implemented through cooperation between public institutions, local authorities, universities, producer organisations, the private sector and international financial institutions.

Project 1

Antalya Smart Irrigation and Water Efficiency Programme

Digital water management systems should be established across the province to reduce water losses in agricultural irrigation and utilise existing water resources more efficiently. Within the programme, smart irrigation automation systems, sensor-based irrigation control, remote monitoring systems, water consumption analyses and basin-based digital management platforms should be widely adopted.

Project 2

Agricultural Treated Water Reuse Programme

Regional water reuse projects should be developed to enable treated water of suitable quality from municipal wastewater treatment plants to be safely utilised for agricultural irrigation.

Within this framework, quality monitoring systems, conveyance infrastructure and water use standards should be established to introduce alternative water resources into agricultural production.

Project 3

Antalya Soil Health Monitoring and Rehabilitation Programme

A soil information system should be established to regularly monitor the physical, chemical and biological properties of agricultural soils across the province.

Within the programme, organic matter maps, salinity analyses, erosion risk maps, carbon storage capacity assessments and soil quality indicators should be regularly updated.

Project 4

Climate-Smart Agricultural Technologies Centre

A centre should be established to facilitate producers' access to new technologies through practical training, demonstration activities and technology transfer. The centre should serve as a regional centre of expertise in precision agriculture, artificial intelligence applications, remote sensing, digital agriculture, greenhouse automation and climate risk management.

Project 5

Agricultural Early Warning and Decision Support System

Meteorological data, satellite imagery and field observations should be used to identify frost, drought, extreme heat, hail, pest and disease risks in advance, and timely information should be provided to producers through digital platforms.

Project 6

Circular Agriculture and Organic Resource Management Programme

Regional facilities should be supported to convert biological materials originating from crop and livestock production into economic value.

Within the programme, composting, biogas production, organic fertiliser use, biochar production and agricultural biomass recovery practices should be widely adopted.

Project 7

Antalya Local Food and Short Supply Chain Programme

Short supply chain models should be developed to connect local producers directly with the tourism sector, consumers and public institutions.

Within this framework, digital marketplaces, farmers' markets, cooperative networks, gastronomic routes and local product branding should be supported.

Project 8

Young Farmer and Women's Entrepreneurship Support Programme

Special support mechanisms should be established to increase the participation of young people and women in agricultural production and ensure the sustainability of the agricultural sector. Within the programme, entrepreneurship training, financial support, mentoring, digital agriculture practices and cooperative development should be encouraged.

Project 9

Antalya Agricultural Data and Monitoring Centre

Water use, cropping patterns, climate indicators, crop productivity, diseases and pests, carbon emissions and natural resource indicators across the province should be monitored through a centralised system, and regular reports should be provided to decision-makers. This centre will establish the scientific data infrastructure for Antalya's climate-resilient agricultural policies.

6.7.10. Prioritisation and Implementation Approach

The proposed projects should not be considered as independent investments, but as an integrated project portfolio supporting Antalya's transition towards a climate-resilient agriculture and food system.

During implementation, projects should be prioritised by considering climate risks, pressures on natural resources, economic contributions, social benefits, feasibility and financing opportunities. This approach will ensure that limited resources are directed towards areas where they can generate the greatest impact. Furthermore, regularly reviewing and updating the project portfolio in line with emerging technologies, climate projections, and national and international financing opportunities will strengthen the report's role as a living strategic document.

6.8. Governance, Implementation and Monitoring Framework

6.8.1. General Approach

Antalya's transition towards a climate-resilient agriculture and food system depends not only on identifying appropriate strategies but also on implementing these strategies through effective governance mechanisms. Therefore, the implementation process should be based on a participatory governance model in which public institutions, local authorities, universities, producer organisations, the private sector, civil society organisations and international stakeholders share responsibility.

The governance framework should be based on transparency in decision-making processes, inter-institutional coordination, data-driven management and regular performance assessment. This will enable the policies and projects developed not only to be planned, but also to be implemented effectively and continuously improved.

6.8.2. Institutional Coordination Mechanism

The success of climate-resilient agricultural policies depends on the coordinated implementation of the duties and responsibilities of different institutions in line with shared objectives.

Within this framework, the coordination mechanism to be established should bring together:

* Relevant central government institutions,
* The Governorship of Antalya,
* Antalya Metropolitan Municipality and district municipalities,
* Units affiliated with the Ministry of Agriculture and Forestry,
* The General Directorate of State Hydraulic Works,
* Universities and research institutions,
* Producer associations and cooperatives,
* Chambers of commerce and industry,
* The tourism sector,
* Civil society organisations

within a joint implementation platform. This structure should function as a permanent coordination mechanism that clarifies the division of responsibilities and supports joint decision-making processes.

6.8.3. Regional Agriculture and Climate Coordination Board

The establishment of a **Regional Agriculture and Climate Coordination Board** at the Antalya level should be considered to guide the implementation of policies and projects.

The Board's main responsibilities should be to:

* Determine strategic priorities,
* Ensure inter-institutional coordination,
* Assess implementation performance,
* Update investment priorities,
* Direct financing opportunities,
* Prepare annual progress reports.

This structure should operate within a flexible and participatory governance model supported by technical working groups.

6.8.4. Financing and Resource Mobilisation Approach

To ensure the sustainability of the transition towards climate-resilient agriculture, public resources should be considered alongside national and international financing opportunities.

Within this framework, the following should be considered together:

* Central government investment programmes,
* Local government budgets,
* Development agencies,
* National support programmes,
* International climate funds,
* Multilateral development banks,
* European Union financial instruments,
* Public–private partnerships,
* Green finance and sustainable investment mechanisms.

The financing model should be designed as a flexible and diversified structure capable of responding to investment needs at different scales.

6.8.5. Data Management and Digital Monitoring System

The success of the implementation process depends on establishing decision-making mechanisms based on reliable and up-to-date data. For this purpose, water use, soil health, climate indicators, cropping patterns, crop productivity, natural resource use, project progress and financing performance should be regularly monitored through a shared digital monitoring system. It is important that the data infrastructure operates in accordance with national information systems and enables data sharing between institutions.

6.8.6. Performance Monitoring and Evaluation System

The implementation of the strategy document should be measured at regular intervals, and necessary updates should be made in accordance with the results obtained. The performance system to be established within this framework should regularly assess:

* The extent to which strategic objectives have been achieved,
* The effectiveness of policy implementation,
* The impact of project outputs,
* Changes in natural resource indicators,
* Economic and social outcomes.

The monitoring process should focus not only on the completion rate of activities but also on measuring the environmental, economic and social impacts generated.

6.8.7. Participation and Stakeholder Cooperation

The long-term success of the transition towards climate-resilient agriculture depends not only on the efforts of public institutions but also on the active participation of all stakeholders in the process. Therefore, the following stakeholders should be regularly involved in implementation processes:

* Producers,
* Cooperatives,
* Academic institutions,
* Professional chambers,
* The private sector,
* Financial institutions,
* Civil society organisations,
* Local community representatives.

Their views, suggestions and feedback should be reflected in policy development processes. A participatory governance approach will enable implementation measures to respond more effectively to local needs.

6.8.8. Adaptive Management Approach

Climate change is a dynamic process whose impacts may vary over time. Therefore, the strategy document should not be regarded as a fixed and unchangeable plan, but as a living policy document that can be regularly updated in line with scientific data, climate projections and implementation experience. Periodic review processes will enable new technologies, changing climatic conditions and national or international policy developments to be integrated into the implementation programme.

6.8.9. General Assessment

Antalya's transition towards a climate-resilient agriculture and food system will succeed not only through a strong vision and appropriate policy choices, but also through effective governance, reliable financing, regular monitoring and participatory implementation mechanisms. The governance framework presented in this chapter defines the institutional infrastructure required to implement the strategic objectives and policy instruments identified in the preceding sections. In this way, the report will go beyond being a policy document that merely sets out objectives and will establish the foundation for an implementable and accountable transformation programme.

6.9. Expected Outcomes and Transformation Impacts

6.9.1. General Approach

When the strategic objectives, policies, implementation programmes and governance model presented in this chapter are considered as a whole, the aim is not only to address existing challenges in Antalya's agriculture and food system, but also to establish a new production structure that adapts to future climatic conditions, is economically competitive and environmentally sustainable. The expected impacts are not limited to changes in agricultural production volumes. A broad range of impacts is envisaged, extending from natural resource management to rural development, and from food security to export capacity.

6.9.2. Contributions to the Conservation of Natural Resources

With the implementation of the policies and projects proposed within the strategy, significant progress is expected in:

* Improving water use efficiency,
* Protecting soil health,
* Reducing erosion and land degradation,
* Supporting biodiversity,
* Respecting the carrying capacity of natural resources.

These developments will contribute to the long-term preservation of Antalya's agricultural production capacity and enhance the resilience of natural ecosystems to climate change.

6.9.3. Agricultural Production and Economic Competitiveness

Through the widespread adoption of resource efficiency, digitalisation and climate-adapted production practices, improvements are expected in production planning, optimisation of input use, enhancement of product quality, reduction of production losses and expansion of high-value-added production models. This transformation is expected to enhance the competitiveness of Antalya's agricultural sector in national and international markets and strengthen the agricultural value chain.

6.9.4. Producer Welfare and Rural Development

The implementation of climate-resilient agricultural policies aims to strengthen producers' capacity to adapt to changing climatic conditions, reduce production risks and support income stability. The wider adoption of cooperatives, digital agriculture practices, training programmes and financing instruments will enable small- and medium-sized agricultural enterprises, in particular, to participate more effectively in the transformation process. Increasing the participation of women and young people in agricultural production will also be an important factor in supporting the social and economic sustainability of rural areas.

6.9.5. Food Security and Social Resilience

Reducing the impacts of climate change on agricultural production will contribute to strengthening Antalya's food supply security. Through resilient structures established across production, storage, logistics and distribution processes, the following will be strengthened:

* Continuity of food supply chains,
* Preservation of product quality,
* Consumers' access to safe food,
* Continuity of the production system during emergencies.

6.9.6. Enhancing Climate Change Adaptation Capacity

One of the most significant outcomes of this strategy is the strengthening of Antalya's institutional, technical and economic capacity to adapt to climate change.

Through water management, early warning systems, digital monitoring infrastructure, climate risk analyses and an adaptive management approach, the agricultural sector is expected to become better prepared for future uncertainties. This will positively influence not only agricultural production but also the province's overall resilience.

6.9.7. Contribution to Antalya's National and International Standing

If the transition towards a climate-resilient agriculture and food system is successfully implemented, Antalya is expected to become one of the leading example cities in sustainable agricultural practices.

This approach will support:

* The development of practices that can contribute to national policymaking processes,
* Stronger cooperation with international climate and development programmes,
* Diversification of investment and financing opportunities,
* Greater visibility for Antalya in the field of sustainable development.

6.9.8. Long-Term Transformation Perspective

Climate-resilient agriculture should not be regarded as a temporary transformation limited to a specific project period or investment programme.

This strategy represents a long-term development approach encompassing the conservation of natural resources, the strengthening of production systems, support for rural development and the sustainability of a secure food supply.

Therefore, it is important that the strategy is regularly updated and adapted to new developments in light of the experience gained during implementation.

6.9.9. General Assessment

Antalya's transition towards a climate-resilient agriculture and food system represents a new development model that integrates environmental sustainability with economic development, producer welfare with the conservation of natural resources, and technological innovation with social benefits.

When considered alongside the strategic objectives, policies, projects and governance model defined in the preceding subsections, the expected outcomes presented in this chapter demonstrate the fundamental impacts of a comprehensive transformation programme designed to prepare Antalya's agricultural sector for future climatic conditions.

CHAPTER 7

NATURAL CAPITAL AND ECOSYSTEM RESILIENCE

Antalya's Biodiversity, Ecosystem Restoration and Nature-Based Development Strategy

Chapter Introduction

Antalya's natural capital, including its forests, mountain ecosystems, river basins, wetlands, coastal areas, shorelines, marine habitats and rich biodiversity, is not merely a collection of natural assets that need to be protected. These systems constitute strategic development infrastructure underpinning the city's water security, agricultural production, tourism economy, disaster resilience and quality of life.

As climate change places increasing pressure on natural ecosystems each year, droughts, forest fires, habitat fragmentation, biodiversity loss and the degradation of coastal ecosystems are becoming risks that directly affect Antalya's sustainable development. Therefore, protecting natural capital is not merely an environmental responsibility, but a strategic public policy that safeguards economic competitiveness, social well-being and climate resilience.

This chapter assesses Antalya's natural capital through an integrated approach, analyses ecosystem risks, and presents nature-based solutions and ecological restoration approaches. It also develops implementable policy and project recommendations supported by green and blue infrastructure systems, science-based governance models and international climate finance instruments.

The aim is to transform Antalya from a city that grows by consuming its natural resources into one that develops by protecting its natural capital, manages ecosystem services as an integral part of economic development, and becomes one of the leading cities in climate-resilient development in the Mediterranean Basin.

7.1 Introduction

Climate change mitigation and adaptation policies have now moved beyond an approach focused solely on reducing greenhouse gas emissions. The IPCC Assessment Reports, the United Nations Convention on Biological Diversity, the Kunming–Montreal Global Biodiversity Framework and the European Union's nature restoration policies recognise the protection of natural ecosystems as one of the fundamental conditions for climate-resilient development. This new approach regards nature not as a heritage asset that merely needs to be protected, but as strategic capital that supports societal well-being and economic sustainability. With its unique geography extending from the Taurus Mountains to the Mediterranean coast, Antalya possesses multifaceted natural capital comprising forests, river basins, wetlands, coastal areas, marine ecosystems and rich biodiversity. These natural assets are not merely of environmental significance; they constitute strategic infrastructure underpinning water security, agricultural production, the tourism economy, disaster resilience and quality of life. Consequently, Antalya's future is directly linked to its capacity to protect and enhance its natural capital.

However, rising temperatures, prolonged droughts, forest fires, increasing sea surface temperatures and extreme weather events associated with climate change, combined with unplanned urbanisation, habitat fragmentation, development pressures on coastal areas, invasive species and the unsustainable use of natural resources, are progressively weakening Antalya's ecological resilience. The degradation of natural systems not only causes environmental losses but also generates cascading economic and social costs, ranging from water management and agricultural production to tourism and public infrastructure. Therefore, the protection of natural capital should be regarded as a strategic investment area extending beyond conventional environmental conservation approaches, encompassing climate change adaptation, disaster risk reduction, sustainable development and access to international climate finance. Nature-based solutions, ecological restoration initiatives, and green and blue infrastructure practices stand out as integrated instruments that simultaneously strengthen carbon sinks, protect biodiversity and enhance the climate resilience of cities.

This chapter assesses Antalya's natural capital and ecological richness from an integrated perspective, analyses the risks facing natural systems, and examines nature-based solutions and ecological restoration approaches. It also presents green and blue infrastructure strategies, governance models and implementable policy recommendations. In doing so, the transformation perspective initiated through water management (Chapter 4), the energy transition (Chapter 5) and climate-resilient agriculture (Chapter 6) is complemented by a focus on natural capital conservation, establishing the fourth fundamental pillar of Antalya's climate-resilient development model.

7.2 Antalya's Natural Capital and Ecological Richness

Antalya is one of the regions with the greatest natural capital potential in the Mediterranean Basin. Its topographical diversity, extending from sea level to the peaks of the Taurus Mountains at elevations exceeding 3,000 metres, creates an interconnected ecological system comprising forests, mountain ecosystems, river basins, wetlands, coastal areas and marine habitats. This richness is one of Antalya's most important strategic assets, not only in terms of biodiversity but also in relation to water security, agricultural production, the tourism economy, climate regulation capacity and quality of life. Today, the concept of natural capital encompasses not only natural areas requiring protection but also all the ecosystem services provided by these areas to society. The carbon storage capacity of forests, water production within river basins, flood regulation by wetlands, erosion reduction by coastal ecosystems and the maintenance of ecological balance through biodiversity are regarded as integral components of cities' economic and social sustainability. Accordingly, natural capital has become one of the fundamental elements of development plans and investment decisions, extending beyond conventional environmental policies.

The principal components of Antalya's natural capital include the forest ecosystems of the Taurus and Beydağları Mountains, national parks and nature conservation areas, the Aksu, Köprüçay, Manavgat and Alara river basins, sand dunes and coastal systems, seagrass meadows formed by Posidonia oceanica, nesting sites of Caretta caretta and Chelonia mydas, caves, karst formations, groundwater reserves, and numerous endemic plant and wildlife habitats. These systems are not independent of one another; rather, they form part of an interconnected ecological network linked through the water cycle, food chains and climatic processes. Antalya's economic structure is largely dependent on this natural capital. The competitiveness of the tourism sector depends on the preservation of natural landscapes, the sustainability of agricultural production depends on river basins, the health of fisheries depends on marine ecosystems, and the city's water security depends on the continuity of forests and groundwater systems. Consequently, any degradation of natural assets directly affects not only the environment but also economic growth, employment and social well-being. For this reason, Antalya's future development model should be built on an approach that does not consume natural capital but instead protects, strengthens and integrates it into economic planning processes. Regular monitoring of natural capital, determination of the economic value of ecosystem services and incorporation of these findings into investment decisions will be among the fundamental components of Antalya's climate-resilient development vision. The principal ecosystems constituting natural capital are addressed separately in the following sections.

7.3 Risks Facing Antalya's Ecosystems

Antalya's natural capital is becoming increasingly vulnerable as the accelerating impacts of climate change combine with human-induced pressures. Environmental challenges that were previously assessed independently have now become interconnected risk areas that simultaneously affect ecosystems, economic activities and social well-being. Therefore, the conservation of natural capital should be regarded as one of the fundamental components not only of environmental policies but also of water security, food security, tourism, disaster management and sustainable development policies. Rising temperatures associated with climate change, irregular precipitation patterns, droughts, forest fires and increasing sea surface temperatures, combined with unplanned urbanisation, habitat fragmentation, excessive use of natural resources and other human-induced pressures, are weakening Antalya's ecological resilience. These pressures not only threaten wildlife but also directly affect numerous sectors, from agricultural production to tourism revenues and from drinking water security to the coastal economy, by reducing ecosystem services.

Although ecosystems can adapt to certain levels of change, critical thresholds may be exceeded when pressures increase simultaneously and continuously, potentially resulting in irreversible ecological losses. For this reason, the fundamental approach to risk management is to develop an adaptive management model that identifies and monitors risks in advance using scientific data and integrates preventive measures into planning processes before damage occurs.

The principal risks facing Antalya can be summarised as the direct impacts of climate change on ecosystems, forest fires, habitat fragmentation, degradation of aquatic ecosystems, changes occurring in marine ecosystems, the spread of invasive species and cumulative environmental pressures. These risks are interconnected, triggering and reinforcing one another and creating a chain of impacts. For example, prolonged drought increases the risk of forest fires, while fires accelerate erosion, and erosion adversely affects water resources and biodiversity. Similarly, degradation occurring in coastal ecosystems causes not only environmental losses but also economic losses in tourism, fisheries and maritime economic activities. This chapter assesses the principal risk areas threatening Antalya's natural capital in detail. By considering the ecological, economic and social impacts of each risk together, it establishes an analytical framework for the nature-based solutions and policy recommendations presented in subsequent sections.

7.4 Nature-Based Solutions and Ecosystem Restoration

As the impacts of climate change intensify, it is becoming increasingly evident that conventional adaptation policies relying solely on engineering-based infrastructure investments are insufficient on their own. Although flood protection structures, coastal defences, drainage systems and similar physical solutions remain important, approaches developed without considering the protective and adaptive capacities of natural ecosystems are inadequate for achieving sustainable long-term outcomes. Therefore, the **Nature-based Solutions (NbS)** approach, which places natural processes at the centre of planning, is becoming increasingly widespread in international climate policies.

Nature-based solutions are integrated interventions that strengthen climate change adaptation by protecting, restoring and reactivating forests, wetlands, coastal systems, river basins and marine ecosystems, while supporting biodiversity and simultaneously generating economic and social benefits. This approach regards nature not merely as an asset requiring protection, but as a natural infrastructure system that reduces disaster risks, increases carbon sequestration, enhances water security and improves quality of life.

For Antalya, nature-based solutions represent a strategic development instrument extending beyond environmental conservation policies. Practices such as natural restoration following forest fires, rehabilitation of river basins and wetlands, strengthening coastal dunes and seagrass meadows, and expanding urban green and blue infrastructure can generate multiple benefits across numerous sectors, from water security and agricultural production to tourism and disaster management. Such investments strengthen both climate adaptation and economic resilience.

International experience demonstrates that nature-based solutions are among the most effective investment areas for simultaneously achieving carbon mitigation, biodiversity conservation and climate change adaptation objectives. Consequently, nature-based solutions are receiving increasing priority in climate projects supported by the European Union, the United Nations and multilateral development finance institutions. Considering Antalya's natural capital, this approach presents an important opportunity not only for environmental objectives but also for accessing international climate finance.

This chapter assesses potential nature-based solution areas and ecosystem restoration practices for Antalya, and presents policy recommendations and implementable project approaches aimed at strengthening natural capital. The objective is to implement an integrated governance model that not only protects Antalya's natural assets but also makes them an active component of climate-resilient development.

7.5 Strategic Aims and Objectives

The conservation of Antalya's natural capital is not merely an environmental policy aimed at ensuring the continuity of biodiversity. It is also a strategic development policy that directly affects water security, food production, tourism competitiveness, disaster risk reduction, carbon management and quality of life.

Accordingly, the strategic objectives proposed in this chapter have been developed in alignment with the United Nations Sustainable Development Goals, the Kunming–Montreal Global Biodiversity Framework, the European Union's Nature Restoration Policies and Türkiye's climate change mitigation and adaptation objectives. The aim is to establish an integrated ecosystem management model that protects and enhances Antalya's natural capital, transfers it to future generations and simultaneously supports economic development.

7.5.1 Strategic Objective 1

Protecting and Enhancing Antalya's Natural Capital

Antalya's forests, river basins, wetlands, coastal areas, marine ecosystems and biodiversity constitute valuable natural assets for the province. The conservation of this natural capital should encompass not only the preservation of existing assets but also the restoration of degraded ecosystems and the strengthening of natural processes. In line with this objective, the natural capital inventory should be updated, critical ecosystems should be managed as priority conservation areas, ecosystem restoration programmes should be expanded, and the loss of natural areas should be regularly monitored.

7.5.2 Strategic Objective 2

Protecting Biodiversity and Ecological Connectivity

Preventing habitat fragmentation and strengthening ecological corridors are fundamental priorities for the sustainability of Antalya's biodiversity. Within this framework, ecological corridor spatial plans should be developed, sensitive habitats should be protected, action plans should be prepared for endemic and threatened species, and invasive species should be managed on a scientific basis.

7.5.3 Strategic Objective 3

Enhancing Carbon Sinks and Natural Climate Solutions

Forests, wetlands, seagrass meadows and healthy soil ecosystems constitute Antalya's natural carbon sinks. Protecting and enhancing these areas will contribute simultaneously to greenhouse gas mitigation and climate change adaptation objectives. In line with this objective, carbon sink areas should be expanded, blue carbon ecosystems should be protected, carbon storage capacity should be monitored, and natural climate projects compatible with carbon markets should be developed.

7.5.4 Strategic Objective 4

Integrating Nature-Based Solutions into Spatial Planning and Infrastructure

Urbanisation and infrastructure investments should be planned in harmony with natural systems. Green and blue infrastructure elements should become an integral part of transport, water management and urban development decisions. Within this framework, stream corridors and floodplains should be protected, green and blue infrastructure standards should be developed, climate-adapted urban design principles should be implemented, and nature-based solutions should be prioritised in public investments.

7.5.5 Strategic Objective 5

Enhancing Ecosystem Resilience

Strengthening ecological resilience is one of the most effective ways to reduce the adverse impacts of climate change. In line with this objective, post-fire restoration activities should be accelerated, wetlands should be rehabilitated, coastal ecosystems should be strengthened, and basin-based adaptation programmes should be implemented.

7.5.6 Strategic Objective 6

Integrating Natural Capital into Economic and Financial Decision-Making Processes

Natural capital should be recognised as a measurable asset in investment decisions, budget planning and development policies. Within this framework, natural capital accounting should be established, ecosystem services should be economically valued, ecological cost–benefit analyses should be conducted for investment projects, and green finance instruments should be widely adopted.

7.5.7 Strategic Objective 7

Strengthening Science-Based and Data-Driven Ecosystem Management

Effective ecosystem management requires a governance model that continuously generates and monitors data and bases decision-making processes on scientific evidence.

Within this framework, a biodiversity monitoring network should be established, remote sensing and geographic information systems should be used effectively, artificial intelligence-supported ecosystem monitoring systems should be developed, and data sharing between universities, public institutions and civil society should be strengthened.

7.6 Policies

Protecting Antalya's natural capital and strengthening ecosystem resilience cannot be achieved solely by increasing the number of protected areas or tightening environmental inspections. Success depends on making natural assets an integral part of all public policies, from spatial planning to investment decisions, from water management to tourism, and from agriculture to disaster management. Therefore, natural capital management should be addressed as a strategic governance area requiring cross-sectoral and inter-institutional coordination.

The policies proposed in this chapter aim to protect Antalya's natural ecosystems while simultaneously enhancing climate change adaptation capacity, strengthening biodiversity, developing carbon sink areas and integrating nature-based solutions into investment processes. Accordingly, rather than making a choice between environmental protection and economic development, the objective is to recognise natural capital as one of the fundamental factors of production underpinning sustainable development. In developing the policy recommendations, national development objectives and international climate and biodiversity policies have been considered together, with feasibility, institutional coordination, scientific data generation, financing opportunities and local governance capacity adopted as key criteria.

This approach will support Antalya in making more effective use of international climate finance following COP31 and becoming one of the leading examples of climate-resilient cities in the Mediterranean Basin. The policy framework developed in this context presents an integrated transformation programme based on the conservation and restoration of natural capital, strengthening biodiversity, expanding carbon sink areas and nature-based solutions, establishing science-based monitoring systems, creating strong governance mechanisms and ensuring the active participation of all segments of society. Each policy establishes the institutional and strategic foundation for the project proposals presented in the following chapter.

7.7 Priority Projects

The projects presented in this chapter are priority implementation programmes aimed at protecting Antalya's natural capital, enhancing its climate change adaptation capacity and strengthening ecosystem services. These projects are designed not merely as environmental improvement initiatives, but as strategic development investments that simultaneously support water security, agricultural production, tourism competitiveness, carbon management, disaster risk reduction and quality of life.

Each project has been developed within an integrated approach based on natural capital conservation, ecosystem restoration, scientific monitoring, the development of green and blue infrastructure, and public participation. Their combined implementation will accelerate Antalya's transition towards a sustainable management model that not only protects natural resources but also generates economic and social value. Three fundamental criteria have been adopted in identifying the projects:

- **Climate impact:** Enhancing the capacity of ecosystems to adapt to climate change.
- **Multiple benefits:** Generating environmental, economic and social benefits from the same investment.
- **Financing potential:** Eligibility for support through international climate finance, nature restoration funds and public–private sector partnerships, alongside national resources.

Within this framework, the proposed projects constitute an integrated investment portfolio encompassing all of Antalya's ecological systems, from forests to coastal areas and from wetlands to urban centres. Each project should be regarded not merely as an individual intervention, but as a complementary component of **Antalya's Natural Capital Management System.** The resulting project portfolio will thus provide a strong implementation framework for international partnerships and climate finance programmes to be developed following COP31.

7.8 Green and Blue Infrastructure Strategy

Climate change makes it necessary for cities to redesign not only their energy, transport and technical infrastructure systems, but also their natural infrastructure. Today, climate-resilient cities are planned by treating built infrastructure and natural systems not as alternatives, but as complementary components. The **green and blue infrastructure approach** developed in line with this understanding is recognised as a strategic infrastructure system that enhances urban resilience through natural ecosystems. Green infrastructure refers to an ecological network comprising forests, parks, urban woodlands, green corridors, agricultural land, natural habitats and permeable surfaces. Blue infrastructure, meanwhile, refers to an integrated water infrastructure system encompassing rivers, lakes, wetlands, coastal areas, marine ecosystems and stormwater management systems. When considered together, these systems function as natural infrastructure that reduces flood risks, increases carbon sequestration capacity, supports biodiversity, lowers urban temperatures and improves quality of life.

Antalya's natural characteristics provide significant advantages for the integrated planning of green and blue infrastructure. The Taurus Mountains, forest ecosystems, agricultural land, river basins, coastal areas and marine habitats are not independent areas, but components of a single natural system that ensures the city's ecological continuity. Therefore, the continuity of natural infrastructure should be one of the fundamental planning principles when designing new investments, transport projects, urban development areas and tourism zones. The green and blue infrastructure approach is not merely an environmental choice for Antalya. It is also a multifunctional development instrument that strengthens water security, reduces disaster risks, lowers energy consumption, enhances the attractiveness of tourism destinations and supports climate change adaptation. Therefore,

investments in natural infrastructure should be regarded as strategic investments that reduce long-term technical infrastructure costs and continuously generate value for the urban economy. The green and blue infrastructure system proposed in this chapter aims to protect natural capital, develop spatial planning decisions in accordance with ecological principles and strengthen Antalya's climate-resilient urban identity. The practices presented within the chapter constitute an integrated transformation programme encompassing green infrastructure networks, blue infrastructure systems, stormwater management, coastal zones, measures to combat the urban heat island effect, smart infrastructure management and financing models.

7.9 Antalya Civil Platform and Multi-Stakeholder Ecosystem Governance

Climate change, biodiversity loss and pressures on natural capital have become challenges that cannot be addressed by a single institution, sector or level of government. The protection of Antalya's natural assets and their transfer to future generations require a participatory governance approach in which central government, local authorities, universities, the private sector, professional organisations, civil society and citizens assume shared responsibility. Therefore, the sustainable management of natural capital depends as much on strong cooperation as it does on strong institutions. An examination of successful climate policies worldwide demonstrates that lasting outcomes are achieved not only through technical solutions, but also through governance models that establish a shared vision, encourage information sharing and bring different stakeholders together around common objectives. For Antalya to achieve its climate-resilient development objectives, a sustainable cooperation mechanism is needed that brings together scientific knowledge production, public participation and institutional coordination under a common framework. Within this context, the Antalya Civil Platform should be regarded not as a structure assuming the duties and powers of public institutions, but as a strategic cooperation platform that supports collaborative thinking, strengthens coordination among stakeholders, encourages project development and contributes to Antalya's long-term climate vision. The platform's fundamental value lies in bringing together the knowledge and experience of different institutions around shared objectives, thereby strengthening policy development processes.

The success of the Antalya Civil Platform depends not merely on organising meetings, but on developing a working model that produces tangible outcomes. Accordingly, the platform should operate as a dynamic structure that develops policy recommendations through thematic working groups, establishes project partnerships, facilitates access to national and international funding sources, shares examples of good practice and contributes to monitoring Antalya's sustainable development objectives.CIn this way, the platform can transform natural capital conservation from a solely environmental concern into a governance model that simultaneously strengthens economic development, social participation and climate resilience. The governance model proposed in this chapter is based on participation, transparency, scientific evidence, accountability and shared responsibilities. The following subsections examine in detail the participatory governance model, the strategic role of the Antalya Civil Platform, thematic working groups, scientific advisory mechanisms, international cooperation and the performance monitoring system.

7.10 Financing Mechanisms and Investment Model

Protecting Antalya's natural capital and strengthening ecosystem resilience depend not only on implementing appropriate policies and projects, but also on establishing robust and diversified financing mechanisms capable of sustaining these projects over the long term. Today, the conservation of natural ecosystems has moved beyond conventional environmental expenditure and has become one of the priority areas of the international investment agenda within the framework of climate change mitigation and adaptation, biodiversity conservation, carbon management and sustainable development objectives.

The global climate finance landscape is also undergoing a significant transformation. Investments that not only reduce greenhouse gas emissions but also strengthen natural capital, restore ecosystems, expand nature-based solutions and enhance communities' capacity to adapt to climate change are increasingly being prioritised by international financial institutions. This approach is enabling the development of new financing models that recognise natural capital as an integral component of economic development. Antalya is among the cities best positioned to benefit from this transformation, owing to its natural assets, strong tourism economy, agricultural production capacity and international visibility. Forest restoration, wetland rehabilitation, coastal ecosystem conservation, green and blue infrastructure investments and nature-based solutions are initiatives that could attract substantial support from international climate and nature finance, alongside national resources, provided that appropriate project development approaches are adopted. In this way, natural capital conservation can move beyond being an area of public expenditure and become a strategic development field that generates new investment and financing opportunities.

This chapter examines the financing instruments, public–private sector partnership models, national and international funding sources, and innovative investment approaches that can be used for investments aimed at protecting Antalya's natural capital. The objective is to establish an integrated financing model that ensures projects protecting natural capital are not only technically feasible but also financially sustainable.

7.11 Monitoring, Evaluation and Performance Indicators

A successful strategy document should not merely set out objectives and policy recommendations; it should also establish a dynamic governance system that regularly monitors the extent to which these objectives are achieved, evaluates outcomes and can update itself when necessary. Therefore, the success of initiatives aimed at protecting Antalya's natural capital depends on the regular monitoring of implemented projects and policies through concrete, measurable and comparable indicators.

The monitoring and evaluation system aims to generate reliable data in key areas such as natural capital conservation, biodiversity enhancement, ecosystem restoration, climate change adaptation, the strengthening of green and blue infrastructure, financing capacity and governance performance. This will enable decision-makers to assess the effectiveness of interventions based on scientific evidence and implement timely improvements and policy updates where necessary.

The performance indicators proposed in this chapter provide an integrated assessment framework that monitors not only environmental outcomes but also the economic, social and institutional dimensions of natural capital. Accordingly, the effects of natural resource conservation on water security, agricultural productivity, tourism competitiveness, carbon management, access to international finance and public participation can be assessed together.

The monitoring system should be designed in accordance with the principles of transparency, accountability and continuous improvement. The shared use of generated data by public institutions, local authorities, universities, the private sector and civil society will strengthen cooperation in Antalya's natural capital management and ensure that policy development processes are grounded in scientific evidence.

The proposed set of indicators aims to establish a performance management system aligned with national and international reporting standards, supported by digital data infrastructure and regularly updated. The following subsections present in detail the performance indicators proposed for monitoring natural capital, biodiversity, climate resilience, carbon management, green and blue infrastructure, financing and governance.

7.12 Conclusion and Overall Assessment

Antalya's natural capital, comprising its forests, river basins, wetlands, coastal areas, marine ecosystems and rich biodiversity, is not merely a collection of natural assets requiring protection, but a strategic development asset that shapes the city's economic competitiveness, social well-being and resilience to climate change. Therefore, the conservation of natural ecosystems should be regarded as a fundamental development policy that extends beyond the boundaries of environmental policy and directly influences water management, agriculture, tourism, energy, disaster management and spatial planning.

The analyses presented in this chapter demonstrate that Antalya's natural capital faces significant risks arising from climate change, habitat fragmentation, increasing pressures on natural resources and biodiversity loss. At the same time, however, nature-based solutions, ecosystem restoration, green and blue infrastructure practices, and science-based governance models offer effective instruments for reducing these risks. When properly planned, natural systems will not only be protected but will also significantly strengthen the city's climate resilience and capacity for sustainable development.

The strategic objectives, policies and priority projects proposed in this chapter aim to make the conservation of natural capital an integral component of investment decisions, spatial planning and public policies. This approach regards natural assets not as obstacles to economic growth, but as fundamental resources that support long-term development, reduce risks and create new investment opportunities.

Antalya's natural capital also holds considerable potential for international climate and nature finance. High-quality projects developed in ecosystem restoration, blue carbon, green and blue infrastructure, and nature-based solutions could attract support from international funds, development banks and private sector investments, alongside national resources, thereby establishing a strong project portfolio. Therefore, the conservation of natural capital should be regarded not merely as an environmental obligation, but as a strategic investment area that supports the city's sustainable economic development.

Antalya's 2050 vision is to become a city that does not grow by depleting its natural resources, but instead develops by protecting its natural capital, manages ecosystem services as an integral part of economic and social development, adapts to climate change and passes its biodiversity on to future generations. Realising this vision depends on the combined operation of strong political commitment, institutional cooperation, scientific knowledge, public participation and sustainable financing mechanisms.

Thus, Chapter 7 complements the water security, energy transition and climate-resilient agriculture strategies addressed in the preceding chapters of the report, establishing the fourth fundamental pillar of Antalya's Climate-Resilient Development Model. The following chapter examines how this natural capital can be protected while being transformed into economic value from the perspective of sustainable tourism, bringing together Antalya's environmental, economic and social development objectives through an integrated approach.

CHAPTER 8

CLIMATE-RESILIENT AND SUSTAINABLE TOURISM

Antalya's Tourism Transformation Strategy Based on Natural Capital, Low Carbon Emissions and High Added Value

Chapter Introduction

Tourism is not only a cornerstone of Antalya's economic development but also a strategic sector directly dependent on the quality of natural resources, water and energy consumption, carbon emissions, waste management, coastal planning and the local environment. As the impacts of climate change become increasingly apparent, managing the tourism sector through a conventional approach focused solely on economic growth is no longer sustainable. Antalya's future competitiveness requires a transition towards a new tourism model that protects natural capital, increases resource efficiency, reduces its carbon footprint and adapts to climate change.

International tourism policies also support this transformation. The new approaches developed by the United Nations World Tourism Organization (UN Tourism), the Global Sustainable Tourism Council (GSTC), the European Union's Green Deal and the Paris Agreement envisage the integrated management of environmental, economic and social sustainability in tourism destinations. Within this framework, **climate-resilient destinations, regenerative tourism, nature-positive tourism and net-zero-emission tourism** are becoming new standards at the global level. Antalya is one of the Mediterranean destinations best positioned to achieve this transformation, owing to its strong tourism infrastructure, international brand value, rich natural and cultural heritage, year-round tourism potential and substantial investment capacity. However, preserving this potential depends on the sustainable management of natural capital, accurate assessment of climate risks, more efficient resource use and the reduction of the tourism sector's environmental impacts.

This chapter presents an integrated transformation model that enables Antalya's tourism sector to adapt to climate change, protect natural capital, reduce carbon emissions, use digital technologies effectively and support local development. It assesses the sector's current situation, analyses climate-related risks and sets out strategic objectives, policy recommendations, priority projects, financing mechanisms and performance indicators. The aim is to transform Antalya from a destination distinguished primarily by visitor numbers into a sustainable tourism centre that protects its natural capital, generates high added value, operates with low carbon emissions, demonstrates climate resilience and serves as an international model. In this way, the tourism sector will integrate the **conservation, energy transition, climate-resilient agriculture and natural capital management** strategies presented in the preceding chapters of the report, becoming one of the key sectors driving the economic transformation envisaged under **Antalya's 2050 Climate-Resilient Development Model.**

8.1 Introduction

Tourism is not only one of the main drivers of Antalya's economic development but also a strategic sector that directly influences the city's natural capital, cultural heritage and quality of life. With its climate, approximately 640 kilometres of coastline, rich biodiversity, historical and cultural assets, and strong tourism infrastructure, Antalya is one of the leading tourism destinations not only in Türkiye but also in the Mediterranean Basin. While this strong position has made tourism one of the driving sectors of Antalya's economy, it has also made the conservation of natural resources an indispensable priority for the sector's future.

However, global climate change is fundamentally altering the operation and competitive conditions of the tourism sector. Rising temperatures, prolonged heatwaves, droughts, forest fires, changes in sea surface temperatures, biodiversity loss and the increasing frequency of extreme weather events directly affect the attractiveness of destinations, operating costs and visitor preferences. Success in tourism is no longer measured solely by visitor numbers or accommodation capacity, but by the ability of destinations to adapt to climate change, protect their natural capital, use resources efficiently and provide low-carbon services.

For Antalya, this transformation presents both significant risks and substantial opportunities. Climate change may reduce comfort during the summer season, increase pressure on water resources and adversely affect coastal and natural ecosystems. Conversely, the strengthening of sustainable tourism practices offers new opportunities to enhance Antalya's competitive advantage in alternative tourism segments that generate high added value, including nature tourism, cultural tourism, gastronomy tourism, health tourism, sports tourism and rural tourism.

In this new era, tourism should be regarded as one of the fundamental instruments not only of economic growth but also of natural capital conservation, enhanced climate resilience and local development. Integrating strategies developed in water management, the energy transition, climate-resilient agriculture and ecosystem management into the tourism sector will play a critical role in achieving Antalya's sustainable development objectives. In this way, tourism can move beyond being a sector that consumes natural resources and become a development model that finances natural capital conservation and accelerates environmental transformation.

This chapter provides an integrated assessment of Antalya's tourism sector from the perspectives of climate change, natural capital, resource efficiency, low-carbon transition and international competitiveness. By considering the current situation analysis, climate-related risks, strategic objectives, policy recommendations, priority projects, financing mechanisms and performance indicators together, it presents a comprehensive roadmap for **Antalya's climate-resilient and sustainable tourism transformation.**

The fundamental aim of this approach is to transform Antalya from a destination distinguished solely by visitor numbers into a leading Mediterranean city that grows while protecting its natural capital, successfully achieves a low-carbon transition and sets an example in sustainable tourism policies.

8.2 Current State of Tourism in Antalya and Sustainability Analysis

Antalya is one of the leading tourism destinations in Türkiye and the Mediterranean Basin, owing to its natural capital, rich cultural heritage, developed tourism infrastructure and international accessibility. With its substantial accommodation capacity, strong service sector, skilled workforce and recognition in global markets, tourism occupies a central position in the city's economic structure and is one of its most important sources of employment.

However, the global tourism sector has entered a significant transformation process driven by climate change, the depletion of natural resources, changing consumer expectations and new international standards focused on sustainability. The success of destinations is now assessed not only in terms of visitor numbers, overnight stays or tourism revenues, but also according to their capacity to protect natural resources, reduce their carbon footprint, adapt to climate risks and contribute to local development.

Within this framework, assessing Antalya's current situation requires an integrated analysis of its strengths alongside its vulnerabilities to climate change, resource consumption patterns and sustainability performance. Such an assessment will contribute to shaping future policy and investment decisions on a scientific basis. One of Antalya's most significant advantages is its natural and cultural diversity. The sea, coastal areas, forests, mountains, plateaus, canyons, caves, national parks and rich biodiversity constitute the fundamental assets that distinguish the city's tourism products. In addition, its cultural heritage extending from the Lycian, Pamphylian, Pisidian, Roman, Byzantine, Seljuk and Ottoman periods to the present day represents an important asset supporting Antalya's competitiveness in international tourism markets.

Tourism infrastructure is also among Antalya's strengths. Its international airport, developed road transport network, marinas, high-standard accommodation facilities, healthcare services and experience in international event organisation enable the city to serve different tourism segments throughout the year. In addition to coastal sand-and-sun tourism, the diversification of tourism products in areas such as culture, sports, golf, health, congresses, yachting, gastronomy and nature tourism strengthens Antalya's competitive advantage at the global level.

Nevertheless, the existing tourism structure also presents several significant vulnerabilities. The concentration of tourism activities largely in the summer season increases water and energy consumption, creates seasonal pressures on transport and infrastructure systems, and places strain on the carrying capacity of natural areas. Rising temperatures, drought risks and increasing pressures on natural resources associated with climate change may make these vulnerabilities even more pronounced in the coming years.

Water and energy management, in particular, are of strategic importance for the future of tourism in Antalya. The high water and energy consumption of accommodation facilities makes it essential to expand the use of resource-efficient technologies, renewable energy investments, circular water management and environmental performance practices. Similarly, the conservation of natural areas, development of visitor management systems and adoption of planning approaches based on carrying capacity are among the critical priorities for the long-term sustainability of the tourism sector. In recent years, many tourism businesses have begun implementing sustainability practices such as energy efficiency, solar energy systems, water conservation, greywater recovery, waste separation and environmental certification. Nevertheless, this transformation has not yet spread across the entire sector. In the coming period, a more comprehensive and integrated transformation will be required in areas such as carbon management, climate risk analysis, nature-positive tourism, the circular economy, sustainable supply chains and environmental performance reporting.

Antalya's strong natural capital, tourism experience and international brand value present a significant opportunity for this transformation. Through sound planning, effective governance and sustainable tourism policies, Antalya has the potential to become not merely a destination distinguished by visitor numbers, but a leading sustainable tourism centre that grows while protecting its natural capital, adapts to climate change and generates high added value.

Within this framework, the following sections provide a detailed assessment of Antalya's tourism profile, strengths, existing vulnerabilities, sustainability performance and global competitiveness, establishing the strategic framework that will guide its climate-resilient tourism transformation.

8.3 Impacts of Climate Change on Tourism in Antalya

Tourism is one of the economic sectors most closely connected to the natural environment. Antalya's climatic conditions, coastal areas, natural landscapes, biodiversity and cultural heritage are fundamental elements that distinguish the city internationally. Consequently, the impacts of climate change on natural systems directly or indirectly affect the tourism sector's competitiveness, investment structure and economic sustainability.

The Mediterranean Basin is recognised as one of the regions where the impacts of climate change are expected to be most pronounced. Rising average temperatures, longer-lasting heatwaves, irregular precipitation patterns, droughts, forest fires, increasing sea surface temperatures and the growing frequency of extreme weather events create new areas of risk for tourism in Antalya. These developments have not only environmental consequences but also economic, social and operational implications.

One of the most significant risks facing the tourism sector is water stress and increasing pressure on water resources. Accommodation facilities, swimming pools, landscaped areas, recreational facilities, kitchens and laundries consume substantial quantities of water. Increasing drought risks and growing pressure on water resources may raise operating costs, increase the need for alternative water sources and make water management one of the principal competitive factors in the tourism sector. Therefore, circular water management, greywater use, the reuse of treated wastewater, rainwater harvesting and the development of alternative water resources are of strategic importance for the future of tourism in Antalya.

Climate change is also significantly altering energy consumption patterns. Rising summer temperatures are increasing the intensive use of air-conditioning systems, thereby raising the energy demand and operating costs of accommodation facilities. This makes energy efficiency practices, renewable energy investments and low-carbon operating models not merely an environmental choice, but an economic necessity.

Forest fires are another growing risk for tourism in Antalya. Rising temperatures and prolonged droughts are extending the fire season and increasing the likelihood of large-scale fires. Forest fires affect not only forest assets but also natural landscapes, national parks, recreational areas, air quality and destination perceptions. Given that a substantial part of Antalya's international brand value depends on its natural environment, forest conservation is also a strategic priority for the tourism sector.

Changes occurring in marine ecosystems also directly affect coastal tourism. Rising sea surface temperatures, changes in biodiversity, the spread of invasive species, coastal erosion and the potential narrowing of beach areas may create long-term pressures on coastal tourism, one of Antalya's most important tourism products. The protection of coastal areas and the sustainable management of marine ecosystems are therefore not only environmental responsibilities but also economic necessities.

Climate change is also altering visitor expectations. In the international tourism market, destinations that demonstrate strong environmental performance, reduce their carbon footprint, protect natural resources and adopt sustainability principles are increasingly preferred. Major tour operators, international travel platforms and corporate clients are incorporating sustainability criteria into their destination selection and procurement assessments. This trend presents both a new competitive pressure and a significant opportunity for transformation in Antalya.

All these developments demonstrate that the future of tourism in Antalya depends on a new destination management model that accurately analyses the impacts of climate change, manages risks proactively and strengthens adaptive capacity. The transformation undertaken by the tourism sector in water management, energy transition, carbon reduction, natural capital conservation and climate risk adaptation will enhance not only environmental sustainability but also international competitiveness, investment attractiveness and economic resilience.

Therefore, climate change should be regarded not merely as a risk to be managed by Antalya's tourism sector, but also as a strategic opportunity for transformation that must be addressed to make the sector more resilient, more efficient and capable of generating higher added value. Accordingly, the following section presents a vision for sustainable and climate-resilient tourism that will shape Antalya's future.

8.4 A New Vision for Tourism in Antalya

Antalya's international success in tourism has long been assessed largely through indicators such as visitor numbers, accommodation capacity and seasonal economic performance. However, climate change, increasing pressure on natural resources, changing international market expectations and new sustainability-oriented competitive conditions make it necessary to reconsider this approach. Successful destinations of the future will be those that not only attract more tourists but also generate higher added value while protecting their natural capital, using resources efficiently and adapting to climate change.

In this context, Antalya's new tourism vision should be built around **"a climate-resilient and sustainable tourism model that generates higher added value rather than attracting more tourists, reduces environmental impacts and extends tourism across all four seasons."** This approach considers economic growth, the conservation of natural resources, environmental sustainability and competitiveness as two mutually reinforcing elements.

The new tourism model is based on an approach that protects and enhances natural capital rather than depleting it. Antalya's coastlines, forests, water resources, biodiversity, historic cities and cultural heritage constitute the fundamental productive assets of its tourism sector. Therefore, protecting natural assets is not merely an environmental responsibility but also a prerequisite for the sector's long-term economic sustainability.

One of the principal objectives of this vision is to extend tourism activities throughout the year, reduce seasonal concentration and increase the economic resilience of destinations. Strengthening alternative tourism areas such as health, sports, congress, culture, gastronomy, rural tourism, nature tourism and maritime tourism will contribute both to diversifying the visitor profile and to achieving more balanced development of the local economy. The new tourism approach also regards the low-carbon transition as an integral part of the sector. Improving energy efficiency in accommodation facilities, expanding renewable energy use, implementing circular water management, reducing waste generation, measuring carbon emissions and developing sustainable supply chains are fundamental areas of transformation that will strengthen Antalya's competitiveness in international markets.

Ensuring that the economic benefits generated by tourism contribute more strongly to local development is also an important component of this vision. Greater participation of local producers in tourism supply chains, support for geographically indicated products, preservation of cultural heritage, promotion of local entrepreneurship and improvements in employment quality will enable tourism revenues to be distributed more widely across society.

Antalya's future success will be assessed not only by the number of international visitors it attracts, but also by the extent to which it protects its natural capital, adapts to climate change, uses its resources efficiently and provides visitors with high-quality, sustainable experiences. Therefore, the new tourism vision should be adopted as an integrated development model that addresses environmental, economic and social sustainability together. In line with this vision, the following sections examine in detail the strategic objectives, policy recommendations and priority areas for implementation that will enable Antalya to achieve its sustainable and climate-resilient tourism transformation.

8.5 Strategic Objectives and Targets

Antalya's sustainable tourism transformation is not limited to sector-specific practices aimed solely at improving the environmental performance of tourism businesses. This transformation encompasses the conservation of natural capital, adaptation to climate change, enhancement of economic competitiveness, support for local development and the establishment of a new destination management model that complies with international sustainability standards.

The strategic objectives established in this context have been developed in alignment with the United Nations Sustainable Development Goals, the Paris Agreement, the Glasgow Declaration on Climate Action in Tourism, the criteria of the Global Sustainable Tourism Council (GSTC) and Türkiye's net-zero emissions target. The aim is to transform Antalya into a sustainable tourism destination that adapts to the impacts of climate change, protects its natural capital, generates high added value and serves as an example at both national and international levels.

These objectives are based on an integrated destination management approach encompassing not only the tourism sector but also water management, energy transition, natural capital, agriculture, transport, cultural heritage, digitalisation and urban quality of life. In this way, tourism becomes one of the most important areas of implementation for the climate-resilient development policies presented in the preceding chapters of the report, generating economic value.

8.5.1 Strategic Objective 1

To Establish Antalya as the Mediterranean's Leading Sustainable Tourism Destination

The primary objective of tourism policies is not merely to increase visitor numbers, but to establish a high-quality destination that achieves environmental, economic and social sustainability together. To achieve this objective:

* A sustainable destination management model should be established,

* International sustainability standards should be widely adopted,

* Environmental performance should be monitored regularly at destination level,

* Antalya's visibility in international sustainable tourism indices should be strengthened.

8.5.2 Strategic Objective 2

To Develop Climate-Resilient Tourism Infrastructure

Tourism facilities and destination infrastructure should be made more resilient to the impacts of climate change. Climate risks should be an integral part of planning processes for new investments.

To achieve this objective:

* Climate risk assessments should be integrated into investment processes,
* Disaster-resilient tourism infrastructure should be developed,
* Adaptation plans should be prepared for coastal areas and critical tourism zones,
* Early warning and crisis management capacities should be strengthened.

8.5.3 Strategic Objective 3

To Achieve a Low-Carbon and Resource-Efficient Tourism Transformation

The tourism sector should transition towards an operating model that reduces carbon emissions and prioritises resource efficiency.

To achieve this objective:

* Energy efficiency practices should be widely adopted,
* Investments in renewable energy should be increased,
* Circular water use should be supported,
* Carbon footprint measurement and reporting should be widely adopted.

8.5.4 Strategic Objective 4

To Protect Natural and Cultural Capital as the Core Value of Tourism

Antalya's natural ecosystems, historical heritage and cultural assets constitute the tourism sector's most significant competitive advantage. Therefore, tourism activities should be conducted in a manner that not only avoids depleting natural and cultural heritage but also actively protects and enhances it.

Within this framework, coastal ecosystems, forest areas, wetlands, marine habitats, biodiversity, and historical and cultural heritage sites should be regarded as conservation priorities. Nature-based solutions and conservation-oriented tourism practices should be integrated into all investment processes.

8.5.5 Strategic Objective 5

To Strengthen a High-Value-Added Tourism Model Operating Throughout All Four Seasons

To increase tourism revenues sustainably, dependence on seasonal tourism should be reduced and

the diversity of tourism products should be enhanced.

Priority areas for development should include:

* Sports tourism,
* Health tourism,
* Gastronomy tourism,
* Agritourism,
* Cultural tourism,
* Congress tourism,
* Nature and highland tourism,
* Maritime and cruise tourism.

This approach will both increase economic resilience and reduce seasonal pressures on natural resources.

8.5.6 Strategic Objective 6

To Strengthen the Integration of Tourism and Local Development

The economic benefits generated by tourism should be distributed across all districts of Antalya and different segments of society.

To this end:

* Local producers,
* Women's cooperatives,
* Rural enterprises,
* Young entrepreneurs,
* Traditional handicrafts,
* Local gastronomy and geographically indicated products

should be more strongly integrated into the tourism value chain. In this way, tourism will become an inclusive development model that supports not only the accommodation sector but also Antalya's entire economic and social structure.

8.5.7 Strategic Objective 7

To Promote Digital and Smart Destination Management

Tourism destinations of the future will be characterised by management approaches that make data-driven decisions and use digital technologies effectively.

To achieve this objective:

* A real-time destination data system should be established,
* AI-supported visitor analytics should be utilised,
* Smart transport and wayfinding systems should be developed,
* Open-data-based destination management should be widely adopted,
* Applications that enhance the digital visitor experience should be supported.

Through this transformation, Antalya could become one of the Mediterranean's leading cities not only in sustainable tourism practices but also in digital destination management.

8.6 Strategic Policies and Implementation Mechanisms

The successful realisation of Antalya's sustainable tourism vision requires not only the identification of strategic objectives but also the development of effective policy instruments, strong institutional structures and practical governance mechanisms to implement these objectives. Therefore, tourism policies should be addressed within an integrated destination management approach encompassing environmental policies, water management, energy transition, transport, cultural heritage, disaster management, digitalisation and local development.

International experience demonstrates that successful sustainable tourism destinations share common characteristics, including strong governance structures, data-driven decision-making processes, long-term investment planning and implementation models based on cooperation between the public sector, private sector, universities and civil society. Antalya should adopt a similar governance approach to become a destination that adapts to climate change, protects its natural capital and strengthens its international competitiveness. The policies proposed in this chapter aim to reduce the environmental impacts of the tourism sector, improve resource efficiency, protect natural and cultural heritage, support local development and strengthen Antalya's international position in sustainable tourism. The policy framework has been designed to address not only the sector's current needs but also the objective of establishing a climate-resilient, low-carbon destination towards 2050.

8.6.1 Policy 1

Establishment of the Antalya Sustainable Tourism Management System

An institutional coordination system should be established to manage all tourism policies in Antalya within a common strategic framework. This structure should coordinate destination management, sustainability standards, climate adaptation policies, investment priorities, performance indicators and international certification processes through a centralised mechanism.

8.6.2 Policy 2

Climate Risk-Based Tourism Planning

Climate risk assessments should become a mandatory planning criterion for new tourism investments and the renovation of existing facilities. Climate adaptation scenarios should be prepared for coastal areas, water resources, regions exposed to forest fire risks and tourism areas that may be affected by

extreme weather events. Investments should be directed in accordance with these assessments.

8.6.3 Policy 3

Green and Low-Carbon Tourism Transformation

Energy efficiency, renewable energy use, carbon management and resource efficiency should become fundamental operating standards in the tourism sector. Large-scale tourism enterprises, in particular, should regularly measure their carbon footprints, establish emission reduction targets and comply with international sustainability standards.

8.6.4 Policy 4

Circular Water and Waste Management

The circular economy approach should be widely adopted in tourism facilities. Greywater use, the reuse of treated wastewater, rainwater harvesting, smart water systems, waste separation at source, waste recovery and the reduction of food waste should become standard practices throughout the sector.

8.6.5 Policy 5

Strengthening the Year-Round Tourism Model

Cultural, gastronomic, nature, sports, health, congress, rural and maritime tourism should be supported to distribute tourism demand more evenly throughout the year. This will both diversify economic activity and reduce the intense pressure on natural resources during the summer season.

8.6.6 Policy 6

Local Development and Sustainable Supply Chains

Stronger links should be established between the tourism sector and the local economy. Local producers, cooperatives, women entrepreneurs, rural enterprises and geographically indicated products should be integrated more effectively into tourism supply chains. This approach will support the wider distribution of tourism revenues throughout the local economy while strengthening Antalya's distinctive destination identity.

8.6.7 Policy 7

Smart Destination and Digital Tourism Management

A digital destination management system that generates real-time data should be established. AI-supported visitor analytics, crowd management, environmental performance monitoring, smart wayfinding systems and open-data platforms should be used to improve both the visitor experience and decision-making processes.

8.6.8 Policy 8

Antalya Tourism Innovation and Sustainability Centre

The Antalya Tourism Innovation and Sustainability Centre should be established to support the transformation of the tourism sector. The Centre should undertake applied research, pilot projects, sustainable tourism technologies, training programmes, international project partnerships, investment consultancy and climate finance development activities. This will strengthen Antalya's capacity for knowledge generation, innovation and international cooperation.

8.6.9 Policy 9

Antalya Tourism Observatory

An Antalya Tourism Observatory should be established in alignment with the UN Tourism approach. This structure should continuously monitor visitor movements, environmental impacts, water and energy consumption, carbon emissions, pressures on biodiversity and economic indicators, and provide regular reports to decision-makers. In this way, Antalya will become a model tourism city that institutionalises data-driven destination management and develops its policies on the basis of measurable indicators.

8.7 Priority Projects and Transformation Programmes

The translation of Antalya's sustainable and climate-resilient tourism vision into tangible outcomes depends on supporting strategic objectives with feasible, financially structured and measurable projects. Therefore, the proposed projects should not be regarded merely as new investments in the tourism sector, but as an integrated transformation programme addressing water management, energy transition, natural capital conservation, digitalisation, transport, cultural heritage and local development together. Priority projects should be designed to enable Antalya to benefit more effectively from international climate finance mechanisms and should be supported through public resources, private sector investments, development banks, international funds and public–private partnership models. Each project should be assessed not merely as a physical investment, but also in terms of reducing greenhouse gas emissions, strengthening climate change adaptation capacity, protecting natural capital and supporting sustainable economic growth. The priority transformation programmes proposed within this framework are presented below.

8.7.1 Antalya Green Tourism Transformation Programme

A comprehensive incentive and financing programme should be established to support the transition of accommodation facilities towards energy efficiency, renewable energy use, water conservation, waste management and carbon reduction. Under the programme, international certification processes should be supported for businesses improving their environmental performance, and their access to sustainability investments should be facilitated.

8.7.2 Circular Water Management and Water Independence Programme

Regional initiatives based on alternative water resources should be developed to meet the tourism sector's increasing water demand sustainably. The desalination of seawater, reuse of treated wastewater, greywater systems, rainwater harvesting and smart water management technologies should be widely adopted to strengthen the water security of tourism facilities against climate change.

8.7.3 Carbon-Neutral Tourism Zones Programme

Low-carbon tourism zones should be established in pilot areas where carbon emissions are measured, reduced and offset. This model, which integrates energy, transport, waste management and natural carbon sinks, will contribute to positioning Antalya among internationally recognised carbon-neutral destinations.

8.7.4 Antalya Smart Tourism Data Platform

A digital data platform should be established to monitor tourism activity, environmental indicators, water and energy consumption, visitor density, transport data and climate indicators in real time. AI-supported analyses will strengthen destination management while improving the visitor experience and the effectiveness of public services.

8.7.5 Nature-Based Tourism Corridors Project

National parks, forest areas, highlands, wetlands, coastal ecosystems and priority areas for biodiversity should be transformed into sustainable tourism routes while maintaining a balance between conservation and use. This project will support ecosystem restoration and local development alongside the development of nature tourism.

8.7.6 Cultural Heritage and Historic Cities Revitalisation Programme

Antalya's historic city centres, ancient cities and cultural heritage sites, particularly Kaleiçi, should be reconsidered within a sustainable tourism framework. Conservation-oriented restoration, digital visitor management, cultural routes and initiatives supporting the night-time economy should enhance the economic and cultural value of historic areas.

8.7.7 Year-Round Tourism Development Programme

New destination investments should be planned to support sports, health, gastronomy, congress, cultural, agritourism, rural tourism and maritime tourism. By utilising the distinctive potential of individual districts, tourism activities should be distributed throughout the year, regional development should be supported and seasonal dependence should be reduced.

8.7.8 Antalya Sustainable Tourism Academy

A continuous training and capacity-building centre should be established through cooperation between public institutions, universities, professional chambers and the private sector to support the green transition of the tourism sector. The Academy will strengthen the sector's human resources by delivering training programmes in sustainable business management, climate change adaptation, carbon management, the circular economy, digital tourism and international certification.

8.7.9 Antalya Climate Finance and Tourism Investment Centre

A specialised investment centre should be established to facilitate access to international financing sources for Antalya's sustainable tourism projects. The Centre will provide technical support to the public and private sectors in project development, feasibility studies, carbon markets, green bonds, climate funds and international investment partnerships.

When considered together, these projects will not only transform Antalya's tourism sector into a structure that reduces its environmental impacts, but will also lead the development of a new-generation destination model that adapts to climate change, protects natural capital, uses digital technologies effectively and generates high added value. In this way, Antalya will strengthen its potential to become one of the cities in the Mediterranean Basin that successfully achieves a sustainable tourism transformation and serves as an example internationally.

8.8 Antalya Sustainable Tourism Declaration

Antalya is one of the world's leading tourism destinations, owing to its natural assets, historical heritage, cultural diversity and tourism infrastructure. However, climate change, increasing pressure on natural resources, biodiversity loss and global sustainability expectations make it necessary to shape the future of the tourism sector through a new approach.

In this regard, the Antalya Civil Platform invites public institutions, local authorities, the tourism sector, universities, professional organisations, civil society organisations and all stakeholders to act together around the following shared principles.

Our Shared Commitment to Sustainable Tourism in Antalya

1. Principle of Natural Capital Conservation

Antalya's forests, coastlines, seas, water resources, agricultural areas and biodiversity are fundamental assets of the tourism sector. Protecting these values will be a priority objective of all tourism policies.

2. Climate-Resilient Tourism Approach

Tourism investments and businesses will be developed through a planning approach that takes into account the impacts of climate change, reduces disaster risks and strengthens adaptive capacity.

3. Low-Carbon Tourism Transformation

Energy efficiency, renewable energy use, carbon emission reduction and resource efficiency will be recognised as fundamental competitive elements of tourism in Antalya.

4. Circular Water Management

To protect water resources, water conservation, the use of alternative water sources, the reuse of treated wastewater, rainwater harvesting and circular water management practices will be widely adopted.

5. Circular Economy and Zero Waste

Efforts to prevent waste generation, increase resource recovery, reduce food waste and expand circular economy practices throughout the tourism sector will be supported.

6. Conservation of Natural and Cultural Heritage

Historic cities, archaeological sites, cultural heritage assets and traditional ways of life will be protected as a shared heritage to be passed on to future generations.

7. Supporting Local Development

Local producers, women entrepreneurs, cooperatives, rural enterprises and geographically indicated products will be supported to ensure that tourism revenues make a greater contribution to the local economy.

8. Year-Round Tourism Model

Expanding tourism activities throughout the year and developing alternative tourism segments, including sports, health, gastronomy, culture, congress, nature and rural tourism, will be fundamental objectives.

9. Smart and Digital Destination Management

Data-driven decision-making processes, digital technologies and AI-supported applications will be used to enhance the visitor experience and improve the effectiveness of destination management.

10. Compliance with International Sustainability Standards

Antalya aims to become an internationally recognised model destination that complies with international sustainable tourism standards and continuously improves its environmental performance.

11. Participatory Governance

Strong cooperation mechanisms will be established among public institutions, the private sector, universities, professional organisations and civil society in the development and implementation of tourism policies.

12. Climate Finance and Green Investments

National and international climate finance resources will be utilised effectively, and green investments will be encouraged to accelerate the sustainable tourism transformation and strengthen Antalya's capacity for transformation.

A Call for a Shared Future

Antalya's future can be secured through a shared vision that protects natural resources, adapts to climate change, preserves cultural heritage and builds economic development upon the principles of sustainability. This declaration is not merely a statement of intent concerning the tourism sector; it represents a shared commitment to development that guides Antalya's 2050 vision.

In accordance with this declaration, the Antalya Civil Platform invites all public institutions, local authorities, the private sector, academia, civil society organisations and citizens to act with a shared sense of responsibility.

Because sustainable tourism is not merely about the future of tourism; it is a strategic development model that safeguards Antalya's natural capital, economic prosperity, quality of life and the shared heritage it will pass on to future generations.

8.9 Governance, Monitoring and Performance Management

The successful implementation of Antalya's vision for sustainable and climate-resilient tourism depends not only on identifying appropriate strategies, but also on establishing a strong governance model and a continuous monitoring and evaluation system to ensure their effective implementation. Today, successful destinations are managed not merely through promotion and marketing activities, but through an integrated approach that regularly measures environmental, economic and social performance, enables data-driven decision-making and ensures the participation of all stakeholders. Accordingly, Antalya's sustainable tourism policies should be implemented through a participatory governance model involving central government, local authorities, the tourism sector, universities, professional organisations and civil society. Transparency, accountability, a scientific approach and collective decision-making should be adopted as fundamental principles.

Antalya Sustainable Tourism Coordination Board: An Antalya Sustainable Tourism Coordination Board should be established to guide the implementation of the policies proposed in this report.

The Board's principal responsibilities should be to:

* Develop and update regional sustainable tourism strategies.
* Ensure coordination among public institutions.
* Guide the tourism sector's climate change adaptation efforts.
* Evaluate and prioritise investment projects.
* Support access to national and international financing sources.
* Monitor performance indicators and publish annual evaluation reports.

The Board's secretariat should operate under the coordination of the relevant public institutions, with the active participation of local authorities, universities and sector representatives.

Data-Driven Destination Management: Reliable and up-to-date data form the foundation of sustainable tourism management. Therefore, a digital decision-support system should be established in Antalya to regularly monitor environmental, economic and social indicators.

The key indicators to be monitored should include:

* Visitor numbers and profiles / tourism revenue per capita,
* Length of stay / water consumption,
* Energy consumption / share of renewable energy use,
* Carbon emissions / recycling rates,
* Condition of natural areas / coastal and seawater quality,
* Biodiversity indicators / visitor satisfaction,
* Quality of life of local residents / number of businesses holding sustainability certification.

These performance criteria should be included in the monitoring system. The indicators should be shared with the public at regular intervals and used as a primary source of data for policy development processes.

Performance Monitoring System: Measurable performance indicators should be established for each strategic objective, and implementation outcomes should be evaluated annually.

Performance assessments should be conducted under the following categories: environmental indicators, economic indicators, social impacts, climate change adaptation capacity, natural capital conservation, resource efficiency, investment performance and international competitiveness. This will enable the effectiveness of implementation measures to be assessed regularly and necessary policy updates to be made in a timely manner.

International Reporting and Transparency: Antalya's sustainable tourism performance should be reported in accordance with international standards.

The proposed **Antalya Sustainable Tourism Monitoring Report** should be published annually and should include the following key sections:

* Progress towards achieving strategic objectives,
* Climate change adaptation measures,
* Carbon emission reduction performance,
* Water and energy efficiency outcomes,
* Progress in natural capital conservation,
* Economic performance of the tourism sector,
* Progress achieved in priority projects,
* Financing and investment indicators,
* Priorities for the forthcoming period.

This report will serve as an important reference document for Antalya in international sustainability indices and destination assessment processes.

Continuous Improvement Approach: Climate change, tourism trends, technological developments and international sustainability standards are constantly evolving. Therefore, Antalya's tourism strategy should be regarded as a living policy document, reviewed at regular intervals and updated in response to emerging needs.

Through participatory governance, scientific knowledge, digital technologies and a performance-oriented management approach, Antalya can become not only a destination that implements sustainable tourism practices, but also a model tourism city capable of rapidly adapting to changing global conditions, continuously learning and improving.

This governance model will establish an important institutional foundation for ensuring the long-term success of the vision, strategic objectives, policies and projects presented in Chapter 8.

8.10 Conclusion and Overall Assessment

Tourism is not only one of the principal driving forces of Antalya's economy, but also a strategic component of development that directly influences employment, exports, investment, the service sector, agriculture, transport and trade. However, as the impacts of climate change become increasingly evident, the success of the tourism sector can no longer be measured solely by visitor numbers and accommodation capacity. The competitive destinations of the future will be cities that protect their natural capital, use their resources efficiently, manage climate risks and make sustainable development a fundamental component of economic growth.

With its natural assets, well-developed tourism infrastructure, international brand recognition and entrepreneurial capacity, Antalya is one of the Mediterranean cities with the greatest potential to achieve this transformation. However, realising and maintaining this potential depends on the sustainable management of water resources, accelerating the energy transition, protecting natural and cultural heritage, reducing carbon emissions and adopting a new approach to destination management that enables adaptation to climate change.

The vision, strategic objectives, policy recommendations and priority projects presented in this chapter aim not only to transform Antalya's tourism sector into a more environmentally sustainable structure, but also to establish a more resilient, innovative and higher-value-added economic model. The proposed transformation approach considers tourism not as an activity operating independently of other sectors, but as a strategic development ecosystem integrated with water management, energy, agriculture, transport, natural capital, cultural heritage and digitalisation policies.

In the coming period, sustainability, carbon management and environmental performance will become increasingly decisive criteria for competitiveness in the international tourism market. Travel preferences, investment decisions, financing mechanisms and international certification processes are being reshaped around environmental responsibility and climate change adaptation capacity. If Antalya implements this transformation in a timely manner, it will not only maintain its existing market share but also become one of the leading destinations for sustainable tourism at the global level.

The **Antalya Sustainable Tourism Declaration** proposed in this context is not merely a roadmap for the sector; it is also a strategic declaration of commitment that strengthens the principle of shared responsibility among public institutions, local authorities, the private sector, universities, professional organisations and civil society. The determined implementation of the principles set out in the Declaration will make an important contribution to accelerating Antalya's climate change adaptation process and achieving its sustainable development objectives.

The future of the tourism sector will depend not simply on welcoming more visitors, but on providing higher-quality visitor experiences, preserving natural resources for future generations and improving the well-being of local communities. Therefore, Antalya's tourism policies should be built upon a development approach that balances economic growth with environmental conservation and strengthens natural capital rather than depleting it.

Antalya's natural and cultural heritage represents not only an economic asset for the present, but also one of the most important forms of shared capital to be passed on to future generations. Protecting and sustainably managing this capital will provide the fundamental basis for the tourism sector's long-term success.

Antalya has the potential to become a leading global city distinguished by its effective management of climate change risks, protection of natural capital, efficient use of digital technologies, commitment to a low-carbon economic transition and high-value-added tourism model. Realising this potential will, however, require a shared vision, strong governance, a science-based approach and determined implementation.

Developed within this framework, Chapter 8 considers tourism not merely as an economic activity, but as one of the most powerful drivers of Antalya's vision for climate-resilient development. It establishes a comprehensive strategic framework for the transformation process required to achieve the city's 2050 objectives.

CHAPTER 9

SUSTAINABLE BLUE ECONOMY AND MARINE RESILIENCE

Antalya's Marine Economy, Coastal Areas and Blue Development Strategy

Antalya, which has one of the longest coastlines in the Mediterranean, is one of Türkiye's most important blue economy centres, with its tourism, maritime transport, fisheries, aquaculture, yachting, cruise tourism, coastal recreation and marine-based innovation sectors. For Antalya, the sea is not merely a natural asset; it is also one of the fundamental components of economic development, social well-being and international competitiveness. However, climate change is placing increasing pressure on Antalya's marine ecosystems through rising sea temperatures, sea-level rise, coastal erosion, biodiversity loss, marine pollution and unplanned coastal development. These developments not only threaten environmental values but also directly affect a wide range of economic activities, from tourism and fisheries to port operations and coastal settlements.

Traditional coastal management approaches are increasingly inadequate in addressing the complex interactions between marine and terrestrial systems. However, contemporary sustainable blue development approaches recognise coastlines, seas, river basins, cities and economic activities not as independent entities, but as interconnected components of a single ecological system. Therefore, protecting Antalya's seas is not merely an environmental responsibility; it is also one of the fundamental prerequisites for economic growth and climate resilience.

The blue economy approach considers the conservation of marine resources not as an obstacle to economic development, but as a fundamental safeguard for long-term prosperity and competitiveness. Resource efficiency, the circular economy, low-carbon maritime activities, sustainable fisheries, innovative marine technologies, clean port practices and the protection of coastal ecosystems constitute the main elements of this approach. With its ports, marinas, fishing harbours, cruise tourism potential, water sports infrastructure and marine tourism capacity, Antalya is among the cities in the Mediterranean Basin that could lead the blue economy transition.

However, the sustainable realisation of this potential requires the integrated implementation of coastal zone management, marine spatial planning, ecosystem-based decision-making processes and climate change adaptation policies. This chapter assesses the current state of Antalya's marine and coastal areas, analyses the impacts of climate change on marine ecosystems, and presents strategic objectives, policy recommendations, priority projects and a governance model within a sustainable blue economy framework. The aim is to position Antalya as a leading Mediterranean city that achieves economic growth while protecting its seas, strengthens the resilience of its coastlines and reinforces the blue economy as a fundamental driver of sustainable development.

9.1 Introduction

Seas and coastlines are of strategic importance not only for the sustainability of natural ecosystems, but also for economic development, food security, transport, tourism, trade, energy and climate resilience. A significant proportion of the world's population lives in coastal regions, much of global trade is conducted by sea, and the marine economy is assuming an increasingly prominent role in national development policies. Consequently, the **Blue Economy** approach has emerged in recent years as one of the most important components of sustainable development and has gained prominence in international policy documents.

With approximately 640 kilometres of coastline, one of the richest marine ecosystems in the Mediterranean, a strong tourism infrastructure, commercial ports, marinas, fishing activities and marine tourism potential, Antalya is one of Türkiye's most important cities in terms of the blue economy. The sea is a fundamental determinant of Antalya's economic development, international recognition and quality of life. Therefore, the protection of marine ecosystems and the balance between economic growth and conservation will directly shape the city's future.

However, climate change is placing increasing pressure on Antalya's marine and coastal systems through rising sea temperatures, changes in sea level, coastal erosion, biodiversity loss, the spread of invasive species, marine pollution and unplanned coastal development. At the same time, population growth, increasing tourism intensity, coastal development and demand for maritime transport are creating new areas of risk that place additional pressure on the carrying capacity of natural ecosystems.

The impacts of climate change are not limited to environmental losses. Numerous economic activities, including coastal tourism, fisheries, port operations, maritime transport, water sports, yachting and coastal settlements, are directly affected by these developments. Therefore, marine conservation is no longer merely a matter of environmental policy; it has become one of the fundamental components of economic resilience, disaster risk management and sustainable development.

Today, developed coastal cities regard their seas not merely as natural areas requiring protection, but as strategic development assets that, when properly managed, can support economic growth, innovation and the green transition. This approach addresses the sustainable use of marine resources, integrated coastal zone management, marine spatial planning, low-carbon maritime practices, ecosystem restoration and climate change adaptation within a common policy framework.

A similar transformation is essential for Antalya's future. Without establishing a governance model that balances the protection of marine and coastal areas with economic development, it will not be possible to ensure the long-term sustainability of the port, fisheries and maritime sectors. Furthermore, the blue economy approach offers new opportunities in innovative technologies, green port practices, sustainable aquaculture, maritime clusters and climate finance.

This chapter assesses the current state of Antalya's marine and coastal areas, analyses the risks arising from climate change, and presents strategic objectives, policy recommendations, priority projects and a governance model within a sustainable blue economy framework. The principal objective is to make Antalya one of the leading Mediterranean cities that achieves economic growth while protecting its seas, strengthens the climate resilience of its coastlines, and transforms its marine economy into a high-value-added and sustainable development model.

9.2 Antalya's Blue Economy Potential and Current Situation

As one of the most strategically important coastal cities in the Mediterranean Basin, Antalya is among Türkiye's leading blue economy centres, owing to its natural, economic and geographical advantages. With approximately 640 kilometres of coastline, internationally recognised marinas, commercial ports, fishing harbours, aquaculture production capacity, marine tourism infrastructure and globally recognised coastal destinations, Antalya is one of the few regions where marine-based economic activities have developed across a wide range of sectors.

The blue economy is a new-generation development approach that aims to generate economic value sustainably from marine and coastal resources while prioritising their conservation. This approach encompasses not only fisheries and maritime transport, but also a broad range of activities, including cruise tourism, yachting, marinas, coastal recreation, water sports, aquaculture, marine biotechnology, renewable marine energy, coastal ecosystem restoration and blue carbon initiatives.

Tourism is one of the strongest components of Antalya's blue economy. Its coastlines, beaches, marinas, yacht harbours, diving sites and water sports centres attract millions of visitors annually, while the sea constitutes a fundamental element of the city's international tourism brand. In addition, the Port of Antalya operates as an important logistics centre for the region's foreign trade, while fisheries and aquaculture contribute to the rural economy and food security.

Nevertheless, it is difficult to suggest that Antalya's existing potential has yet been assessed within a comprehensive blue economy strategy. Maritime activities, tourism, environmental management, transport, fisheries, coastal planning and port investments are often addressed as separate processes, while insufficient interinstitutional coordination undermines integrated planning. A new governance approach is therefore required to assess decisions concerning the economic use of marine and coastal areas alongside ecosystem capacity and the impacts of climate change.

Increasing development pressure in coastal areas, fragmentation of natural habitats, marine pollution, microplastic pollution, irregular coastal use and coastal erosion observed in certain areas pose significant risks to the sustainability of marine ecosystems. Furthermore, rising sea temperatures, the spread of invasive species and changes in marine biodiversity associated with climate change directly affect both ecological balance and fisheries and tourism activities.

Cruise tourism is also one of the significant but insufficiently utilised areas of Antalya's blue economy potential. Strategically located between destinations in the eastern and western Mediterranean, Antalya has the capacity to generate considerably greater economic benefits from cruise tourism through appropriate planning and well-targeted port investments. However, this development must take place within an integrated planning framework that protects natural and historical assets, is compatible with urban life and is supported by sustainable transport systems.

Similarly, yachting and marina services offer significant opportunities to strengthen Antalya's international competitiveness. Serving higher-income market segments, this sector generates substantial added value through maintenance and repair services, maritime equipment, technical services and associated industries, while also contributing to the development of skilled employment. In the coming period, the development of the blue economy will be shaped not only by the expansion of existing activities but also by the emergence of innovative sectors. Marine biotechnology, marine-based renewable energy systems, the conservation of carbon sink areas, smart port technologies, digital maritime applications and marine environmental monitoring systems should be regarded as strategic areas capable of creating new opportunities for Antalya's sustainable development.

To fully realise Antalya's blue economy potential, an integrated development approach must be adopted that regards marine and coastal areas not merely as spaces for economic activities, but also as natural capital requiring protection, ecological systems that enhance climate resilience, and a shared heritage to be passed on to future generations. This approach will provide the foundation for Antalya to become one of the leading cities pioneering the sustainable blue economy transition in the Mediterranean.

9.3 Impacts of Climate Change on Marine and Coastal Areas

Climate change has become one of the most significant global environmental threats directly affecting marine and coastal ecosystems. The Mediterranean Basin is among the regions highly vulnerable to climate change, making Antalya's marine and coastal areas particularly exposed to its impacts. Rising sea temperatures, sea-level rise, changes in ocean and marine chemistry, coastal erosion, extreme weather events and biodiversity loss have the potential to significantly affect both Antalya's natural ecosystems and its marine-based economic activities in the long term.

Rising sea temperatures are among the principal factors altering the ecological balance of the Mediterranean. Temperature changes affect the distribution of fish populations and the structure and species diversity of marine habitats, placing pressure on native species while accelerating the spread of invasive species. This process has wide-ranging impacts, from fisheries and aquaculture to coastal tourism and the health of marine ecosystems.

Another significant consequence of climate change is sea-level rise. Rising sea levels accelerate coastal erosion, expose low-lying coastal areas to flood risks and create additional pressures on coastal infrastructure. Antalya's beaches, recreational areas, marinas, fishing harbours, tourism facilities and coastal transport infrastructure, extending along its extensive coastline, are among the critical assets that could be directly affected by these changes.

Coastal erosion is not merely a physical process that causes the loss of natural areas. It is also an economic risk factor affecting tourism revenues, coastal investments and natural coastal landscapes. In particular, dune systems, deltas, lagoons and natural beaches are becoming increasingly vulnerable due to the combined pressures of climate change and unplanned coastal development. Therefore, coastal protection practices should not be limited to engineering solutions but should also be supported by ecosystem-based approaches and nature-based solutions.

Pressures on marine biodiversity are also increasing. Seagrass meadows, coral-like sensitive habitats, coastal wetlands and breeding grounds face the risk of losing their ecological functions due to rising temperatures and human-induced pressures. Damage to these habitats adversely affects not only ecological balance, but also the sustainability of fish stocks, carbon storage capacity and the natural protection mechanisms of coastlines.

Climate change is also increasing the frequency and intensity of extreme weather events. Severe storms, sudden heavy rainfall and high-wave events create operational risks for port infrastructure, marinas, coastal structures and maritime transport. This makes it essential to incorporate climate risk assessments as a fundamental criterion in coastal planning.

Marine pollution is another major issue that must be considered alongside the impacts of climate change. Land-based pollutants, plastic waste, microplastics, uncontrolled discharges and pressures arising from maritime traffic are reducing the resilience of marine ecosystems. Ecosystems weakened by climate change become more vulnerable to these environmental pressures, and their recovery processes take longer.

These developments demonstrate that Antalya's marine and coastal areas are not merely natural assets requiring protection, but also critical life-support systems at the heart of climate change adaptation strategies. The conservation of marine ecosystems is one of the fundamental prerequisites for the long-term sustainability of tourism, fisheries, maritime transport, coastal settlements and the regional economy.

Therefore, Antalya's blue economy policies should be built upon a new governance approach that prioritises integrated coastal zone management, marine spatial planning, ecosystem restoration, coastal resilience and natural capital conservation while taking climate risks into account. In this way, seas and coastlines can be safeguarded not only as areas supporting present-day economic activities, but also as some of Antalya's most important strategic assets for a climate-resilient future.

9.4 Blue Economy Vision for Antalya

Antalya's future will be shaped not only by its success in protecting its seas, but also by its capacity to make this natural capital a fundamental component of sustainable development. Therefore, the blue economy vision regards marine and coastal areas not merely as spaces in which economic activities take place, but as strategic development areas that enhance climate resilience, strengthen natural capital, generate high added value and improve quality of life.

The principal objective of this vision is to establish Antalya as **a sustainable blue economy hub in the Mediterranean.** This approach aims to advance the conservation of natural ecosystems, innovation in marine-based sectors, the use of technology and international competitiveness together, recognising the protection of natural ecosystems as a prerequisite for economic growth.

Antalya's blue economy model should be built upon an integrated planning approach based on the carrying capacity of coastal and marine areas. All activities, including marine tourism, port operations, fisheries, aquaculture, marina operations, cruise tourism, water sports and coastal recreation, should be managed within a framework in which they support one another and develop in harmony with natural systems. This will enable a sustainable balance to be established between economic growth and ecological conservation.

One of the key components of this vision is the adoption of an **integrated coastal zone management** approach. Planning processes undertaken without considering interactions between marine and terrestrial environments create significant long-term risks for both natural systems and economic activities. Coastal planning in Antalya should therefore be addressed through a multidisciplinary approach that considers transport, tourism, ports, protected natural areas, recreation, fisheries and residential areas together.

The blue economy vision also envisages the **development of high-value-added maritime sectors.** Alongside traditional activities, innovative sectors such as yacht manufacturing and maintenance services, maritime technologies, smart port systems, marine biotechnology, underwater research, environmental monitoring technologies and digital maritime applications should be supported, with the aim of transforming Antalya into a maritime centre that generates knowledge and technology.

Antalya's cruise tourism and marina infrastructure should also be reassessed in line with this vision. The objective should not merely be to accommodate more ships or yachts, but to establish a sustainable marine tourism model that integrates the city's historical, cultural and natural assets, attracts visitors with high spending potential and contributes more substantially to the local economy. This approach requires port investments to be planned through a combined assessment of their environmental impacts, transport connections, urban life and coastal ecosystems.

Climate change adaptation is an integral part of the blue economy vision. Coastal infrastructure should be made more resilient by taking into account changes in sea levels, coastal erosion, extreme weather events and changes in marine ecosystems. Nature-based solutions, coastal restoration and ecosystem-based adaptation practices should be regarded as priority investment areas.

The success of this vision will depend not only on public investment but also on the active participation of the private sector, universities, research centres, professional organisations and civil society. Every investment undertaken in Antalya's blue economy sector should be assessed against criteria relating to environmental sustainability, economic efficiency, social benefits and climate resilience.

In conclusion, Antalya's blue economy vision aims to **establish a sustainable coastal city that grows by protecting its seas, makes its coastlines resilient to climate change, generates high added value in marine-based sectors, supports innovation and serves as a model for the Mediterranean.** This vision constitutes a shared roadmap not only for the maritime sector but also for Antalya's economic, environmental and social future.

9.5 Antalya's Maritime Identity and Strategic Specialisation Model

Antalya's blue economy vision is not limited to environmental policies aimed at protecting marine resources. This vision represents an integrated development model that brings together the city's millennia-old maritime heritage, natural capital, ports, tourism potential, logistics capacity, cultural richness and climate-resilient development objectives under a common strategy.

An examination of successful blue economy examples worldwide reveals that cities which do not regard their relationship with the sea merely in terms of coastal use, but instead make the sea a fundamental component of economic, social, cultural and environmental development, achieve sustainable competitive advantages. Cities such as Rotterdam, Singapore, Barcelona, Copenhagen and Vancouver manage their ports, coastlines, maritime transport, tourism and natural ecosystems as a single, mutually complementary system.

With its approximately **640-kilometre coastline**, strategic location in the Eastern Mediterranean, strong tourism infrastructure, international ports, marinas, historic coastal towns and rich biodiversity, Antalya possesses all the advantages required to become one of the Mediterranean Basin's leading blue economy centres. However, fully realising this potential requires the sea to be reconsidered not merely as a resource used to support tourism, but as a fundamental component of economic production, technological development, cultural identity, climate resilience and sustainable development.

Therefore, Antalya's blue economy strategy should be built upon three fundamental pillars:

* Strengthening Antalya's maritime identity.

* Planning ports as an integrated, mutually complementary system based on specialisation.

* Establishing the Antalya Blue Corridor encompassing the entire coastline.

This approach transforms Antalya's blue economy vision from a set of policies consisting solely of sectoral objectives into a strategic development model that shapes the city's future.

9.5.1 Antalya's Maritime Identity

Antalya's historical, geographical and economic development has been shaped by its relationship with the sea. From the ancient Lycian and Pamphylian civilisations to the present day, the region's trade, cultural interactions and international connections have been established through the Mediterranean. Port cities have served not only as centres of trade but also as meeting points for different civilisations.

Today, Antalya is one of Türkiye's strongest maritime cities, with its approximately **640-kilometre coastline,** international ports, marinas, fishing harbours, Blue Flag beaches, bays, sea caves, underwater archaeological heritage and rich biodiversity. However, this maritime identity has largely been assessed within the context of tourism, without adopting an integrated approach that adequately considers the sea's economic, scientific, technological and logistical potential.

Yet Antalya's maritime identity has a much broader significance. The city is also:

- One of the major logistical transit points in the Eastern Mediterranean,
- A natural stopover on international yachting routes,
- A destination with considerable potential for cruise tourism,
- A heritage area of global significance in terms of underwater archaeology and maritime culture,
- A natural centre for the development of marine sports and recreational activities,
- Home to some of the Mediterranean's most valuable ecosystems in terms of marine biodiversity.

The Kaş–Kekova Special Environmental Protection Area, Beydağları Coastal National Park, Caretta caretta nesting sites, Posidonia oceanica (seagrass) meadows, coastal wetlands and rich underwater habitats are not merely natural assets that Antalya must protect; they also constitute the fundamental natural capital underpinning its future sustainable development model. Therefore, Antalya's maritime identity should be redefined through a new development approach that does not merely use its coastlines but creates economic value by protecting the sea, sustains maritime culture and passes it on to future generations. **For Antalya, the sea is not merely a geographical feature. The sea is the city's history, economy, culture, way of life and future.**

9.5.2 Antalya's Port System and Strategic Specialisation Model

Antalya's ports, marinas and coastal settlements possess different natural, economic and cultural characteristics. Nevertheless, port investments have largely been assessed independently of one another, each port has been expected to undertake similar functions, and Antalya's overall maritime potential has not been planned through an integrated systems approach.

However, the fundamental approach in contemporary port planning is not for ports within the same coastal basin to compete with one another, but for them to specialise in different areas and complement each other. In this way, ports can make the most effective use of their natural advantages while contributing to balanced regional development. Antalya's future port policy should also be established on this understanding. **The fundamental objective is not to expand a single large port, but to establish a specialised port network that undertakes different functions, supports its constituent ports and operates in accordance with a shared visio**

In line with this approach, the proposed specialisation model is presented below:

Table 28: Ports / Regions and Key Areas of Specialisation

Port / Region	Primary Area of Specialization
Antalya Port	International trade, container shipping, Ro-Ro transport, logistics and regional cargo hub
Kaleiçi Marina	Cruise tourism, urban marina, cultural heritage and urban tourism
Kemer	Marina operations, megayacht tourism and water sports
Kaş	Diving tourism, boutique yachting and tourism targeting high-income visitors
Demre	Cultural tourism, yachting routes and Eastern Mediterranean connections
Side	Heritage-focused boutique cruise tourism and cultural tourism
Alanya	Cruise tourism, marina operations and international maritime tourism
Gazipaşa	Regional maritime transport, fisheries and supporting coastal economic activities

Through this model, ports will cease to be competitors and become complementary components of Antalya's shared maritime ecosystem. In particular, strengthening the commercial and logistical functions of Antalya Port; developing Kaleiçi as a cruise and city port in a manner consistent with its historical character; establishing Alanya as a secondary centre for cruise tourism; and positioning Demre as an important stopover for cultural tourism and international yachting routes will ensure the balanced development of the coastal economy across the province. This specialisation model will not only improve economic efficiency. It will also:

* Reduce pressures arising from coastal land use,

* Balance transport demand,

* Distribute tourism activity across different destinations,

* Support the development of local economies,

* Enable each region to develop while preserving its own identity.

Antalya's maritime future lies not in a centralised growth model, but in a polycentric and balanced coastal development model based on a network of complementary ports.

9.5.3 Antalya Blue Corridor Vision

One of the most important spatial objectives of Antalya's blue economy transition is to establish the **Antalya Blue Corridor**, transforming the coastline extending from east to west into a single strategic coastal system. The Blue Corridor is an integrated development model that connects coastal towns, ports, marinas, cruise destinations, yachting routes, nature conservation areas, cultural heritage sites and maritime transport. Under this approach, Antalya's coastlines are considered not as independent tourism centres, but as a single coastal system whose components complement one another economically, environmentally and culturally. Within the scope of the Blue Corridor, the following locations should be considered under a shared planning vision:

- Gazipaşa,
- Alanya,
- Side,
- Belek
- Kaleiçi,
- Antalya Limanı,
- Kemer,
- Phaselis,
- Olympos,
- Adrasan,
- Finike,
- Demre,
- Kekova,
- Kaş

The main objectives of the corridor are as follows:

* To improve urban and regional maritime transportation,
* To integrate cruise and yachting routes,
* To diversify the coastal economy,
* To transform cultural heritage sites into an integrated destination network,
* To manage nature conservation areas in accordance with sustainable tourism principles,
* To develop climate-resilient coastal infrastructure,
* To promote balanced local development along the coastline.

In the long term, the Antalya Blue Corridor should be implemented not merely as a transportation or tourism project, but as one of the Mediterranean's most comprehensive sustainable coastal management and blue economy programmes. This vision redefines Antalya's relationship with the sea. The sea is not merely a natural area along the coastline; it is also a strategic development axis that generates economic value through its ports, connects marinas with international trade routes, enhances cultural mobility through cruise ports, facilitates urban life through maritime transportation, strengthens climate resilience through natural ecosystems, and supports shared prosperity along the entire coastline.

Within Antalya's 2050 vision, the Blue Corridor constitutes the spatial backbone of a sustainable coastal city that grows while protecting its seas, enhances competitiveness through port specialization, manages its coastlines through an integrated planning approach, and serves as a model for the Mediterranean..

9.6 Strategic Objectives and Targets

For Antalya's blue economy potential to contribute to sustainable development, it is necessary to protect marine and coastal areas, diversify economic activities, strengthen climate resilience, and establish a new economic structure that generates high added value in maritime sectors. Accordingly, the strategic objectives identified are based on a development approach that integrates environmental protection with economic growth and is aligned with scientific evidence and international sustainability principles. These objectives aim to establish an integrated blue economy ecosystem encompassing not only the maritime sector but also tourism, port operations, fisheries, coastal management, transportation, environmental protection, disaster management, technological development, and local development. Thus, Antalya's seas will become not merely natural areas requiring protection, but also a fundamental pillar of sustainable prosperity and climate-resilient development.

9.6.1 Strategic Objective 1

Strengthening Natural Capital by Protecting Marine and Coastal Ecosystems

The foundation of the blue economy is formed by healthy marine and coastal ecosystems. Therefore, Antalya's coastlines, marine biodiversity, wetlands, seagrass meadows, and sensitive habitats must be managed as a priority for conservation. In line with this objective, effective management of marine protected areas, support for the restoration of coastal habitats, reduction of marine pollution, regular monitoring of biodiversity, and enhancement of the adaptive capacity of natural ecosystems to climate change are essential.

9.6.2 Strategic Objective 2

Implementing Climate-Resilient Coastal and Marine Management

Science-based adaptation policies should be developed to address the impacts of climate change on marine and coastal areas. In this context, coastal erosion risk maps should be prepared, sea-level changes should be monitored, the climate resilience of coastal infrastructure should be enhanced, nature-based coastal protection practices should be promoted, and disaster risk management should be integrated into coastal planning.

9.6.3 Strategic Objective 3

Developing High-Value-Added Blue Economy Sectors

Antalya's maritime economy should not remain limited to traditional activities; it should be diversified through innovative and technology-oriented sectors. Accordingly, marina and yacht services should be developed, maritime technologies should be supported, research and development activities in marine biotechnology should be encouraged, smart port applications should be expanded, and the marine-based entrepreneurship ecosystem should be strengthened.

9.6.4 Strategic Objective 4

Strengthening Sustainable Port Operations and Maritime Transportation

Antalya's port and maritime transportation infrastructure should be developed in line with an approach that reduces environmental impacts, improves energy efficiency, and enhances international competitiveness. Within this framework, green port practices should be expanded, alternative fuel infrastructure should be planned, digital port management systems should be established, and the integration of maritime transportation with urban and regional transportation systems should be strengthened.

9.6.5 Strategic Objective 5

Developing Sustainable Marine Tourism and the Cruise Economy

Marine tourism should be developed in accordance with a sustainable model that protects natural and cultural assets, makes a significant contribution to the local economy, and extends tourism activities throughout the year. In this context, marina and yacht tourism should be strengthened, cruise tourism should be planned in harmony with the urban identity, diving, sailing, water sports, and marine recreation activities should be diversified, and the environmental carrying capacity of coastal destinations should be taken into account.

9.6.6 Strategic Objective 6

Supporting Sustainable Fisheries and Aquaculture Management

A balanced management approach should be adopted to reconcile the conservation of marine biological resources with economic production. Accordingly, sustainable management of fish stocks should be ensured, selective fishing methods should be encouraged, environmental standards in aquaculture should be strengthened, and efforts to combat illegal fishing should be reinforced.

9.6.7 Strategic Objective 7

Institutionalizing Integrated Coastal Zone Management

Coastal zone planning should be carried out through an integrated governance model that jointly considers environmental protection, tourism, transportation, port operations, disaster management, and nature conservation policies. In this context, interinstitutional coordination in coastal areas should be strengthened, marine spatial planning should be implemented, a planning approach based on carrying capacity should be adopted, and public interest and ecological sustainability should be considered together in coastal land use.

9.6.8 Strategic Objective 8

Positioning Antalya as a Mediterranean Hub for Blue Innovation and Collaboration

International knowledge accumulation, technological development capacity, and investment potential in blue economy sectors should be leveraged to enhance Antalya's global competitiveness.To achieve this objective, university–industry partnerships should be strengthened, participation in international research programmes should be increased, blue economy clusters should be established, climate finance and European Union programmes should be utilized more effectively, and Antalya should be positioned as one of the Mediterranean's leading cities in generating knowledge and developing policies in the field of sustainable blue economy. These strategic objectives establish the core framework of a new-generation transformation vision that protects Antalya's marine environments while fostering economic growth, increasing economic diversification, supporting climate change adaptation, and positioning the blue economy as a key driver of sustainable development.

9.7 Strategic Policies and Implementation Mechanisms

The realization of Antalya's blue economy vision depends on the implementation of integrated policy instruments that protect marine and coastal areas, support economic development, and prioritize climate change adaptation. These policies should be based not solely on environmental conservation but on a multisectoral governance approach that jointly addresses investment, transportation, tourism, trade, port operations, fisheries, energy, technology, and local development. The fundamental principle of the blue economy approach is to ensure that the conservation of marine resources and economic growth are mutually reinforcing processes. Accordingly, the policies to be developed should aim for a transformation that does not deplete natural capital but instead strengthens it, improves resource efficiency, and generates long-term economic value.

9.7.1 Policy 1: Implementation of an Integrated Coastal Zone Management Model

Antalya's coastal areas should be managed through a coordinated planning and governance approach based on joint planning rather than independent decisions made by different institutions. Within this framework:

* An integrated coastal zone management plan should be prepared.

* Coastal land uses should be planned based on carrying capacity.

* Nature conservation areas and zones designated for economic activities should be managed in a balanced manner.

* Data sharing and coordination among public institutions should be strengthened.

9.7.2 Policy 2: Implementation of Marine Spatial Planning

Decisions regarding the use of the sea surface and seabed should be planned based on scientific data. For this purpose, marine tourism, port activities, fisheries, aquaculture, marine protected areas, transportation corridors, and recreational areas should be planned in a coordinated manner, and potential conflicts between different uses should be minimized.

9.7.3 Policy 3: Green Port and Sustainable Maritime Transport Policy

Transformation programmes should be implemented to improve the environmental performance of ports in Antalya. Within this framework:

* Energy-efficient port infrastructure should be developed.
* Shore-side electricity supply (shore power) should be expanded.
* Waste reception facilities should be strengthened.
* Digitalization of port operations should be enhanced.
* Low-carbon maritime transport practices should be supported.

This transformation will contribute both to reducing environmental impacts and to enhancing the international competitiveness of ports.

9.7.4 Policy 4: Sustainable Marine Tourism Policy

Marine tourism activities should be managed in accordance with sustainability principles that protect natural and cultural assets. Accordingly, marina management standards should be improved, environmentally friendly yacht tourism practices should be supported, cruise tourism should be planned with due consideration for urban integrity, and water sports and recreational activities should be regulated in line with ecosystem sensitivity

9.7.5 Policy 5 : Prevention of Marine Pollution and Protection of Marine Ecosystems

Preventing marine pollution at its source should be the fundamental policy approach. Within this framework:

* Controls on land-based pollutants should be strengthened.
* Practices aimed at reducing plastic and microplastic pollution should be expanded.
* Seawater quality monitoring systems should be developed.
* Marine biodiversity should be monitored regularly.
* Ecosystem restoration projects should be supported.

9.7.6 Policy 6: Blue Economy Investment and Innovation Programme

Dedicated investment programmes should be established to support the development of high-value-added maritime sectors. The following should be identified as priority areas:

- Maritime technologies,
- Smart port systems,
- Marina services,
- Marine biotechnology,
- Environmental technologies,
- Underwater robotic systems,
- Digital maritime solutions.

9.7.7 Policy 7: Climate-Resilient Infrastructure Policy for Coastal Cities

Coastal settlements and maritime infrastructure should be planned to withstand the impacts of climate change. Within this framework:

- Coastal flood risk maps should be prepared,
- Nature-based solutions should be prioritized in coastal protection projects,
- Marinas and port infrastructure should be strengthened against climate-related risks,
- Adaptation plans should be prepared for critical coastal facilities.

9.7.8 Policy 8 : Sustainable Fisheries and Marine Resource Management

A science-based management model prioritizing the conservation of marine living resources should be implemented. Accordingly, the following should be addressed as priority policy areas:

- Monitoring fish stocks,
- Preventing illegal fishing,
- Promoting selective fishing techniques,
- Supporting sustainable aquaculture,
- Effective management of marine protected areas.

9.7.9 Policy 9: Blue Economy Governance and International Cooperation

Antalya's blue economy transformation should be carried out through the joint participation of public institutions, the private sector, universities, professional organizations, and civil society.

Within this framework:

- **The Antalya Blue Economy Coordination Board** should be established,
- Joint research programmes should be developed in collaboration with universities,
- Knowledge sharing among Mediterranean cities should be enhanced,
- Project partnerships with the European Union and international organizations should be strengthened,
- International climate finance and development funds should be utilized more effectively for blue economy investments.

This policy framework will establish the institutional foundation for a sustainable blue economy model that not only protects Antalya's marine and coastal areas but also transforms them into sources of economic value, supports climate change adaptation, and serves as a model for the Mediterranean Basin.

9.8 Priority Projects and Transformation Programmes

The realization of Antalya's blue economy vision requires not only the identification of strategic objectives but also the development of feasible projects that translate these objectives into concrete investments. Accordingly, the proposed projects are designed as a transformation programme that integrates the conservation of marine and coastal ecosystems with economic development, strengthens climate change adaptation, and facilitates access to international financing resources.

Supported by public investments, private sector initiatives, local government practices, university–industry partnerships, and international climate finance mechanisms, these projects will contribute to positioning Antalya as one of the Mediterranean's leading cities in the field of sustainable blue economy.

9.8.1 Antalya Blue Economy Master Plan

A long-term **Blue Economy Master Plan** covering Antalya's marine and coastal areas should be prepared. The plan should address ports, marinas, cruise tourism, fisheries, marine tourism, coastal protected areas, aquaculture, transportation, and recreational areas within a shared vision. The Master Plan should serve as the principal reference document for marine spatial planning and integrated coastal zone management.

9.8.2 Antalya Smart Port Transformation Programme

A transformation programme based on digitalization, energy efficiency, and low-carbon port operations should be implemented at Antalya Port and other coastal facilities.

Within the scope of the programme:

- Within the scope of the programme:
- Smart logistics management,
- Shore-side electrification,
- Renewable energy systems,
- Digital cargo management,
- Zero-emission port operations,
- Smart security and environmental monitoring systems

should be implemented. This transformation will significantly enhance Antalya's logistics competitiveness in the Eastern Mediterranean.

9.8.3 Antalya Marine and Coastal Ecosystem Restoration Programme

Comprehensive restoration projects should be implemented to protect and rehabilitate degraded coastal habitats, seagrass meadows, wetlands, and sensitive coastal ecosystems. Within the scope of the programme, natural coastal barriers should be strengthened, nature-based solutions should be implemented to prevent coastal erosion, marine biodiversity should be monitored, carbon sink areas should be protected and enhanced, and ecological rehabilitation efforts should be supported.

9.8.4 Antalya Cruise and Marine Tourism Development Programme

A new development model should be established to increase the economic added value Antalya derives from cruise tourism. Within this framework:

- Cruise destination planning should be undertaken,
- Port–city integration should be strengthened,
- Tourism routes connected to cultural heritage sites should be developed,
- Urban maritime transportation should be supported,
- Marine tourism products targeting high-income visitors should be diversified.

The primary objective of the programme is to establish a sustainable cruise tourism model that **increases economic value per visitor** rather than merely increasing visitor numbers.

9.8.5 Antalya Marina and Yachting Development Programme

Antalya's marina infrastructure should be strengthened in accordance with international standards, while yacht tourism, maintenance and repair services, and maritime ancillary industries should be developed in an integrated manner. Within the scope of the programme, environmentally friendly marina standards should be implemented, technical maintenance centres should be established, Blue Flag and Green Marina practices should be expanded, and Antalya's visibility on international yachting routes should be increased.

9.8.6 Antalya Maritime Transportation Integration Project

Maritime transportation should be established as a complementary component of the urban transportation system. Accordingly, urban maritime transportation routes should be planned, regular maritime transportation services should be developed between coastal districts, electric and low-emission passenger vessels should be encouraged, and maritime transportation should be integrated with road and rail transportation systems. This project will contribute to sustainable transportation objectives while reducing road traffic congestion.

9.8.7 Antalya Marine Technologies and Blue Innovation Centre

The **Marine Technologies and Blue Innovation Centre** should be established through collaboration among universities, technology parks, and the private sector. The Centre should support research, product development, and entrepreneurship activities in the following areas:

- Maritime technologies,
- Underwater robotic systems,
- Environmental monitoring technologies,
- Smart port applications,
- Marine biotechnology,
- Artificial intelligence-supported marine management.

9.8.8 Antalya Marine Monitoring and Early Warning System

A digital observation network should be established to monitor seawater quality, temperature changes, sea level, currents, biodiversity, microplastic concentrations, and pollution parameters in real time.

The system should aim to:

- Monitor the impacts of climate change,
- Detect environmental risks at an early stage,
- Support science-based decision-making processes,
- Ensure public access to accurate information.

9.8.9 Antalya Blue Economy Financing and Investment Platform

A dedicated investment platform should be established to facilitate the development of blue economy projects and access to international financing. The Platform should provide technical support to the public and private sectors in the following areas:

- Project development,
- Feasibility studies,
- Investment matchmaking,

- European Union programmes,
- Cooperation with the World Bank, the European Bank for Reconstruction and Development (EBRD), and other development finance institutions,
- Development of blue bonds and sustainable financing instruments.

When evaluated collectively, these projects constitute an integrated **Blue Economy Transformation Programme** that protects Antalya's marine and coastal areas, transforms port operations and marine tourism into high-value-added sectors, supports climate change adaptation, promotes the effective use of technology, and enhances the capacity to attract international investment. This programme will establish the foundation for a strategic transformation that positions Antalya as **one of the leading cities in sustainable blue economy development in the Mediterranean Basin**, not only in Türkiye.

9.9 Antalya Blue Economy Declaration

With its seas, coastlines, ports, biodiversity, and maritime culture, Antalya is one of the most significant blue economy centres not only in Türkiye but also in the Mediterranean. Our seas form the foundation of economic development, tourism, trade, fisheries, transportation, and quality of life. Establishing a strong and sustainable balance between marine conservation and economic development is a strategic necessity for Antalya's future. Climate change, sea-level rise, coastal erosion, marine pollution, biodiversity loss, and unplanned coastal development increasingly threaten our seas and coastlines. The most effective response to these threats is a shared governance approach that protects natural capital, embraces science-based decision-making, and builds economic development upon sustainability principles. In this context, the Antalya Civil Platform invites public institutions, local governments, the private sector, universities, professional organizations, civil society organizations, and all citizens to act collectively around the following shared principles.

Our Shared Commitment to Antalya's Blue Economy

1. We Will Protect Our Seas as Shared Natural Capital.

Seas, coastlines, wetlands, and marine biodiversity are part of Antalya's shared heritage. Protecting these assets will be a fundamental principle of all investment and planning processes.

2. We Will Adopt Integrated Coastal Zone Management.

Our coastlines will be managed through a science-based and participatory planning approach that jointly considers environmental protection, tourism, port operations, transportation, fisheries, and settlement policies.

3. We Will Develop Climate-Resilient Marine and Coastal Infrastructure.

We will prioritize investments that enhance the resilience of our coastal areas to sea-level changes, coastal erosion, extreme weather events, and other impacts of climate change.

4. We Will Prevent Marine Pollution at Its Source.

We will establish effective management systems to prevent plastic waste, microplastics, uncontrolled discharges, and other pollutants from entering our seas, ensuring that clean seas are preserved for future generations.

5. We Will Protect Marine Biodiversity.

We will recognize the protection of seagrass meadows, fish spawning grounds, coastal habitats, and sensitive ecosystems as an integral part of our blue economy policies.

6. We Will Develop Sustainable Marine Tourism.

We will develop marinas, yacht tourism, cruise tourism, water sports, and coastal recreational activities in harmony with natural and cultural assets, adopting a sustainable approach that generates high added value.

7. We Will Promote Green Ports and Low-Carbon Maritime Practices.

We will improve the environmental performance of our ports, support energy efficiency, and accelerate the transition to low-carbon maritime technologies.

8. We Will Strengthen Maritime Transportation.

We will develop urban and regional maritime transportation as a key component of a sustainable transportation system and promote environmentally friendly maritime transport.

9. We Will Support Science, Technology, and Innovation.

We will support marine technologies, smart port systems, environmental monitoring technologies, artificial intelligence applications, and blue economy initiatives, positioning Antalya as one of the Mediterranean's innovative maritime centres.

10. We Will Protect Sustainable Fisheries and Marine Resources.

We will support production models based on the conservation of fish stocks, responsible fishing practices, and environmental sustainability, ensuring that marine resources are preserved for future generations.

11. We Will Strengthen International Cooperation and Climate Finance.

We will develop cooperation with Mediterranean countries, international organizations, and development finance institutions, supporting Antalya's blue economy transformation through global partnerships.

12. We Will Adopt Participatory and Transparent Governance.

We will establish a participatory governance model based on the collective expertise of public institutions, local governments, universities, the private sector, professional organizations, and civil society in all policies and investments concerning marine and coastal areas.

A Call for a Shared Future

Our seas are not merely economic resources for today; they are among the most valuable natural assets we will leave to future generations. Antalya's blue economy vision represents a new vision for the future that fosters growth while protecting its seas, enhances the resilience of its coastlines to climate change, transforms its natural capital into economic value, and builds sustainable development in harmony with the marine environment.

This declaration is not merely a policy document for the maritime sector; it represents a shared commitment to development that redefines Antalya's relationship with the sea.

As the Antalya Civil Platform, we invite all public institutions, local governments, the private sector, universities, professional organizations, civil society organizations, and all citizens to join this shared vision and work together to protect Antalya's seas, strengthen its blue economy, and achieve the goal of becoming a model sustainable coastal city in the Mediterranean.

9.10 Governance, Monitoring and Performance Management

The successful realization of Antalya's sustainable blue economy vision depends not only on identifying appropriate strategies but also on establishing a robust governance model and a continuous monitoring and performance evaluation system to ensure their effective implementation. The management of marine and coastal areas is a highly multidisciplinary field involving numerous stakeholders, including environmental protection, transportation, tourism, fisheries, port operations, local governments, security, scientific research, and the private sector. Therefore, it is essential that decision-making processes be conducted through an approach that strengthens interinstitutional coordination, is based on scientific evidence, and prioritizes participation. To ensure the effective implementation of blue economy policies in Antalya, a strong governance model should be established in which central government institutions, local governments, universities, port operators, the maritime sector, tourism representatives, fisheries cooperatives, professional organizations, and civil society collectively participate. This model should have a dynamic governance structure that not only responds to problems after they arise but also anticipates risks, guides investment decisions based on scientific evidence, and rapidly adapts to changing conditions.

Antalya Blue Economy Coordination Board

The **Antalya Blue Economy Coordination Board** should be established to coordinate the implementation of the policies and projects proposed in this report.

- The main responsibilities of the Board should include:
- Coordinating the implementation of the Antalya Blue Economy Strategy.
- Strengthening interinstitutional cooperation and data sharing.
- Identifying investment priorities for marine and coastal areas.
- Monitoring the implementation of climate change adaptation policies.
- Supporting access to national and international financing resources.
- Preparing annual performance evaluation reports.
- Coordinating partnerships and joint projects developed across the Mediterranean region.

The Board should conduct regular assessments through technical working groups and transparently communicate progress to the public.

Marine and Coastal Monitoring System

Reliable data constitute the foundation of sustainable blue economy management. Therefore, an integrated Marine and Coastal Monitoring System should be established in Antalya to continuously monitor marine and coastal areas. Within this system, seawater quality, sea temperature, sea-level changes, coastal erosion, biodiversity, the condition of seagrass meadows, microplastic concentrations, fish stocks, marine pollution, coastal land use, marine tourism activities, and port performance should be regularly monitored and reported through digital platforms.

This system will make a significant contribution to the development of early warning mechanisms and the strengthening of science-based decision-making processes.

Performance Indicators

The success of the blue economy strategy should be regularly assessed using measurable performance indicators. Key indicators to be monitored should include:

- Seawater Quality Index,
- Extent of marine protected areas,
- Changes in coastal erosion,
- Biodiversity indicators,
- Prevalence of sustainable fisheries practices,
- Number of facilities holding Green Port certification,
- Marina and cruise tourism capacity,
- Revenue generated from marine tourism,
- Number of passengers using maritime transportation,
- Volume of blue economy investments,
- New employment generated,
- Reduction in carbon emissions,
- Amount of financing secured from international funds.

Annual targets should be established for each indicator, and progress towards these targets should be regularly reported and disclosed to the public.

International Reporting and Cooperation

Antalya's blue economy performance should be regularly monitored and reported in accordance with international standards. In this context, an **Antalya Blue Economy Progress Report** should be prepared and published annually, covering the following areas:

Progress towards strategic objectives,

Status of marine and coastal ecosystems,

Climate change adaptation activities,

Developments in port operations and maritime transportation,

Marine tourism performance,

Fisheries and aquaculture indicators,

This report will contribute to Antalya's ability to conduct comparative assessments with other coastal cities in the Mediterranean Basin, enhance its international visibility, and strengthen investor confidence.

Continuous Improvement and Adaptive Governance

Marine ecosystems, climate change, technological developments, and economic dynamics are constantly evolving. Therefore, Antalya's blue economy strategy should not be regarded as a static document but as a living governance model that is regularly updated and adapted to changing conditions.

Policies and projects developed in line with scientific research, digital technologies, artificial intelligence-supported analyses, and international best-practice examples should be continuously reviewed, and necessary improvements should be made based on the results obtained.

Through this governance model, Antalya will make steady progress towards becoming a model Mediterranean city that protects its seas, strengthens the climate resilience of its coastlines, manages its blue economy in accordance with scientific evidence, and integrates sustainable development with marine conservation.

9.11 Conclusion and Roadmap

Antalya's future depends on a governance approach that protects its seas, enhances the climate resilience of its coastlines, and transforms its marine-based economic potential into a driving force for sustainable development. The blue economy is not merely a concept describing the development of the maritime sector; it is a new-generation development model that integrates the conservation of natural capital, economic growth, social well-being, and environmental sustainability.

With approximately 640 kilometres of coastline, a strong tourism infrastructure, international ports, marinas, fisheries activities, aquaculture potential, and a strategic location within the Mediterranean Basin, Antalya is one of Türkiye's leading centres in the blue economy. However, this potential must be utilized sustainably. Marine and coastal areas must move beyond fragmented management approaches and be supported by integrated planning, scientific evidence, strong governance, and long-term investment policies.

The strategies proposed in this report present an integrated transformation approach encompassing the protection of marine and coastal ecosystems, the green transformation of ports, the development of sustainable cruise and yacht tourism, the strengthening of urban maritime transportation, the establishment of a marine technologies and blue innovation ecosystem, the reduction of marine pollution, and the effective utilization of international climate finance opportunities. Through this approach, Antalya's blue economy will not be limited to improving existing activities but will evolve into a new economic structure that generates high added value, is technology-oriented, and is climate-resilient.

The success of this transformation depends on public institutions, local governments, universities, the private sector, professional organizations, and civil society acting with a shared sense of responsibility. Protecting the seas is not merely an environmental obligation; it is a strategic development issue that directly affects the future of all economic sectors, from tourism and trade to fisheries and transportation. Therefore, blue economy policies must become an integral component of all planning processes in Antalya.

Priorities for the 2026–2030 Period

During the initial implementation period, it is recommended that priority be given to the following areas:

- Preparation and implementation of the Antalya Blue Economy Master Plan.
- Institutionalization of marine spatial planning and integrated coastal zone management.
- Establishment of the Antalya Blue Economy Coordination Board.
- Initiation of green port transformation programmes and widespread adoption of low-carbon practices in port infrastructure.
- Development of sustainable maritime transportation systems within the city and between coastal settlements.
- Establishment of the Marine and Coastal Monitoring System and development of real-time environmental monitoring infrastructure.
- Implementation of integrated action plans for the prevention of marine pollution.
- Development of new investment models focused on high added value in marina operations, yachting, and cruise tourism.
- Launch of research, entrepreneurship, and clustering programmes in marine technologies and blue innovation.
- Preparation of a project portfolio targeting international climate finance, blue finance, and development funds.

Priorities for the 2030–2040 Period

The key medium-term objectives aimed at advancing Antalya's blue economy transformation are as follows:

- Positioning Antalya as one of the leading green and smart port hubs in the Eastern Mediterranean.
- Transforming marine tourism into a diversified, year-round sector that generates high revenues.
- Completing the conservation of marine biodiversity and the restoration of sensitive coastal ecosystems.
- Modernizing coastal infrastructure to ensure climate change adaptation.
- Establishing international research and investment centres in maritime technologies, underwater systems, and marine biotechnology.
- Positioning Antalya as one of the leading model cities for sustainable blue economy development in the Mediterranean region.

2040–2050 Vision

By 2050, Antalya aims to become:

- A city that protects its marine and coastal ecosystems,
- A city with coastal infrastructure resilient to climate change,
- A city that has fully implemented green port practices,
- A city that has made maritime transportation an integral part of urban life,
- One of the Mediterranean's leading destinations for sustainable cruise, marina, and yacht tourism,
- A city that attracts international investment in blue technologies and innovation,
- A city that has established its natural capital as a fundamental pillar of economic development,
- A model **blue economy capital of the Mediterranean** that protects its seas through science-based governance.

This vision represents a new development approach that prioritizes not only economic growth but also ecological integrity, social well-being, and climate resilience.

Antalya's seas are among the most significant natural assets that have shaped the city's past and will play a defining role in building its future. Therefore, the blue economy should not be regarded merely as a narrow subcategory of environmental policy but as a fundamental area of transformation at the heart of Antalya's sustainable development vision.

Antalya will grow stronger as it protects its seas, become more competitive as it manages its coastlines sustainably, and confidently advance towards becoming one of the Mediterranean's model cities as it develops its blue economy through a science-based, technology-driven, and climate-focused approach.

CHAPTER 10

SUSTAINABLE TRANSPORTATION, LOGISTICS AND SMART MOBILITY

Antalya's Low-Carbon, Integrated and Resilient Transportation System Strategy

Purpose of the Chapter

Sustainable transportation refers not merely to the movement of people and goods from one location to another, but to an integrated mobility system that enhances economic efficiency, reduces carbon emissions, improves quality of life, and supports climate change adaptation. With its rapidly growing population, tourism activity, agricultural production centres, organized industrial zones, international airport, commercial port, and extensive coastline, Antalya is one of Türkiye's cities with the highest transportation demand. However, increasing vehicle ownership, traffic congestion, dependence on fossil fuels, insufficient integration of public transportation systems, and deficiencies in logistics infrastructure reduce economic efficiency, increase carbon emissions, and heighten vulnerability to climate change.

This chapter aims to transform Antalya's transportation system into an integrated structure that is low-carbon, energy-efficient, supported by digital technologies, resilient to disasters, and characterized by the complementarity of all transportation modes. This approach, in which road transport, rail systems, maritime transportation, air transportation, cycling and pedestrian networks, and logistics infrastructure are planned together, constitutes one of the fundamental components of Antalya's sustainable development vision. Within this framework, the chapter analyses the existing transportation structure, assesses the impacts of climate change on transportation and logistics systems, presents a sustainable mobility vision, and outlines strategic objectives, policy recommendations, priority projects, a governance model, and an implementation roadmap for Antalya's low-carbon transportation transformation through 2050.

10.1 Introduction

Transportation systems are among the most fundamental infrastructure components that directly influence the economic competitiveness, social quality of life, and environmental sustainability of cities. Today, the concept of sustainable transportation aims not only to ensure the safe movement of people and goods but also to reduce carbon emissions, improve energy efficiency, conserve natural resources, and develop cities that are resilient to climate change. Therefore, transportation policies have become an integral component of climate change mitigation and sustainable development strategies. With its rapidly growing population, tourism sector hosting millions of domestic and international visitors annually, developing industrial base, strong agricultural production infrastructure, international airport, commercial port, and extensive coastline, Antalya is one of Türkiye's cities with the highest mobility demand. This dynamic structure makes transportation and logistics systems strategic elements that directly affect not only urban life but also regional development, international trade, and the tourism economy.

However, rapid urbanization, the continuous increase in the number of motor vehicles, a road-oriented transportation approach, limited integration of public transportation systems, capacity constraints in logistics infrastructure, and insufficient development of alternative transportation modes have led to increasing traffic congestion, higher energy consumption, air pollution, and significant growth in greenhouse gas emissions. Furthermore, climate-related hazards such as extreme heat, wildfires, floods, and inundation increasingly threaten the resilience of transportation infrastructure.

Antalya's future requires a transition away from traditional approaches that regard transportation merely as a traffic management issue towards an integrated mobility model in which road, maritime, air, and rail transportation systems complement one another; pedestrian and cycling mobility are supported; and low-carbon mobility solutions managed through digital technologies are prioritized. This transformation will also make significant contributions to strengthening energy security, increasing economic efficiency, improving quality of life, and developing an urban structure resilient to climate change. The fundamental objective of sustainable transportation is to establish smart transportation systems that enable the safe, accessible, economically efficient, and environmentally compatible movement of people, goods, and services. Within this framework, electric mobility technologies, rail system investments, urban maritime transportation, cycling and micromobility networks, intelligent traffic management systems, alternative fuel infrastructure, and green logistics practices constitute the fundamental components of future transportation policies.

For Antalya, sustainable transportation means more than addressing traffic problems in the city centre. It also involves establishing an integrated transportation ecosystem that strengthens economic competitiveness by creating robust connections among tourism centres, organized industrial zones, agricultural production areas, ports, the airport, and logistics centres; ensures uninterrupted services during disasters; and provides accessible mobility for all citizens. This chapter comprehensively evaluates Antalya's existing transportation and logistics structure, analyses the impacts of climate change on transportation infrastructure, and presents a sustainable mobility vision. It also addresses strategic objectives, policy recommendations, priority projects, and implementation mechanisms focusing on low-carbon mobility, smart transportation systems, green logistics, maritime transportation, rail systems, and resilient infrastructure.

Accordingly, Antalya's 2050 vision aims to establish a transportation system that supports economic growth, reduces carbon emissions, integrates all transportation modes, utilizes digital technologies, and is resilient to climate change. This transformation will play a decisive role not only in the development of the transportation sector but also in achieving Antalya's sustainable development, quality of life, and international competitiveness objectives.

10.2 Antalya's Sustainable Transportation and Logistics Potential and Current Status

As one of Türkiye's leading centres for tourism, agriculture, trade, and services, Antalya experiences intensive passenger and freight mobility throughout the year. Its rapidly growing population, international tourism flows, developing industrial zones, agricultural production centres, and strategic geographical location make transportation and logistics infrastructure a critical factor not only for urban mobility but also for regional development and international competitiveness. Therefore, restructuring the transportation system in accordance with sustainability principles is one of the fundamental priorities of Antalya's climate-resilient development vision.

Antalya's transportation system is largely based on its road network. Although private vehicle use is widespread in urban transportation, this leads to increasing traffic congestion, energy consumption, air pollution, and carbon emissions. Particularly during the summer months, tourism-related mobility creates significant pressure on transportation system capacity in the city centre and along the coastal corridor. Considering seasonal population growth, existing infrastructure must be planned not only to meet current needs but also to accommodate future mobility demand.

Although the public transportation system has improved through significant investments in recent years, integration between different transportation modes has not yet reached the desired level. There is a need to strengthen an integrated mobility approach that plans rail systems, buses, minibuses, cycling, pedestrian transportation, and private vehicle use within a unified transportation network. Similarly, transportation planning should be more closely aligned with land use, new settlement areas, and economic development strategies.

Antalya is home to one of Türkiye's busiest international airports. Antalya Airport is among the city's most important transportation infrastructures, not only in terms of tourism but also regarding international trade, the service sector, and global connectivity. In addition, Antalya Port plays a significant role in international trade and logistics activities while providing important opportunities for the development of cruise tourism and marina infrastructure. However, a fully integrated logistics system connecting road, air, and maritime transportation has not yet been established.

Considering the city's economic structure, the importance of logistics activities continues to increase. Freight movements between organized industrial zones, agricultural production centres, exporting enterprises, the free trade zone, the port, and the airport are predominantly carried out by road. This situation increases both costs and carbon emissions. Planning logistics centres, developing digital freight management systems, and expanding intermodal transportation are among the fundamental transformation areas that will enhance Antalya's competitiveness.

Antalya's coastline offers significant opportunities not only for tourism but also for sustainable transportation. Maritime transportation systems to be developed between the city centre and coastal districts could reduce the burden on the road network, increase transportation diversity, and contribute to more balanced mobility management, particularly during the tourism season. Integrating maritime transportation with rail systems and land-based public transportation would introduce a new dimension to Antalya's transportation system.

Although cycling infrastructure, pedestrian-oriented transportation areas, and micromobility applications have developed in recent years, a continuous and safe network has not yet been established across the city. Meeting short-distance transportation needs through active mobility methods rather than private vehicles offers significant potential for both reducing carbon emissions and improving urban quality of life.

Digitalization and smart city applications are creating new opportunities in the transportation sector. Smart intersection systems, real-time traffic management, public transportation information systems, digital payment infrastructure, artificial intelligence-supported traffic analysis, and big data applications are important tools that can enable more efficient management of transportation networks. Supporting Antalya's transportation infrastructure with these technologies during its digital transformation will significantly improve resource efficiency and service quality.

On the other hand, climate change poses increasing risks to transportation infrastructure. Extreme heat shortens the service life of asphalt pavements, sudden heavy rainfall and flooding disrupt transportation networks, wildfires threaten rural transportation connections, and sea-level rise creates new risks for coastal transportation infrastructure. Therefore, all future transportation investments must be planned in accordance with climate change adaptation principles.

One of Antalya's most significant advantages in its sustainable transportation transformation is its strong economic structure, international transportation connections, developed tourism sector, high potential for technological adoption, and capacity for innovative investment. If this potential is utilized through appropriate planning and effective governance, Antalya could become one of the leading Mediterranean cities implementing low-carbon transportation systems, improving logistics efficiency, integrating maritime, road, air, and rail transportation, expanding smart mobility solutions, and developing transportation infrastructure resilient to climate change. Therefore, Antalya's transportation policies should not be limited to short-term measures focused solely on resolving traffic problems; they should instead be addressed within the framework of an integrated sustainable mobility strategy that supports economic growth, improves quality of life, contributes to carbon neutrality objectives, and enhances the city's international competitiveness. Such a transformation will elevate transportation from being merely a service sector within Antalya's 2050 vision to becoming one of the strategic drivers of sustainable development.

10.3 Impacts of Climate Change on Transportation and Logistics Systems

Climate change has become one of the most significant global risks affecting transportation and logistics systems. Rising temperatures, extreme precipitation, floods and inundation, wildfires, drought, sea-level rise, and extreme weather events directly affect the safety, continuity, and economic efficiency of transportation infrastructure. Therefore, transportation systems should be regarded not only as a sector contributing to the reduction of carbon emissions but also as critical infrastructure that must adapt to climate change. Antalya is among the cities in the Mediterranean Basin expected to be most affected by climate change. Its extensive coastline, intensive tourism activity, strategic transportation infrastructure, and seasonal population growth make its transportation systems increasingly vulnerable to climate-related risks. Particularly during the summer months, rising temperatures, heavy rainfall, coastal flooding, and wildfires are among the major risks threatening transportation continuity.

Rising air temperatures cause deformation of asphalt pavements, performance losses in bridge expansion joints, technical problems in rail infrastructure, and increased energy consumption in transportation vehicles. Particularly during the summer months, prolonged exposure to high temperatures significantly increases maintenance and operating costs for transportation infrastructure. This directly affects the economic sustainability of transportation systems. One of the most significant impacts of climate change is the alteration of extreme precipitation patterns. Short-duration but high-intensity rainfall can cause urban transportation networks to flood, disrupt transportation at underpasses, and damage highways and road infrastructure. In coastal cities such as Antalya, which experience intensive seasonal population fluctuations, the integrated planning of stormwater drainage systems and transportation infrastructure is of critical importance.

Wildfires also pose an increasing risk to Antalya's transportation system. Major wildfires in recent years have demonstrated that rural transportation connections may be disrupted, evacuation processes may become more difficult, and access to tourism destinations may be adversely affected. Therefore, disaster scenarios and alternative transportation corridors must be taken into account in transportation planning.

Sea-level rise and coastal flooding pose long-term risks to transportation infrastructure located near the coastline, ports, marinas, and coastal roads. In particular, plans developed without considering future flood pressure, coastal erosion, and wave impacts on transportation investments along the coastline may result in significant economic losses. Therefore, risk assessments based on climate projections should become standard practice in new transportation investments.

The logistics sector is also directly affected by climate change. Extreme weather events may cause delays in freight transportation, disruptions in supply chains, increased operating costs, and economic losses. Considering Antalya's economic structure, which is centred on agriculture, tourism, and exports, the uninterrupted operation of logistics networks is of strategic importance not only for economic value but also for food security and the continuity of tourism activities.

On the other hand, the transportation sector is one of the major sources of greenhouse gas emissions, which contribute to climate change. Transportation systems dependent on fossil fuels lead to increased carbon emissions, air pollution, and energy consumption. In Antalya, high levels of private vehicle use and the predominance of road freight transportation are among the key factors increasing the carbon footprint of the transportation sector. Therefore, electrification of transportation systems, the use of alternative fuels, strengthening public transportation, and promoting active mobility modes are of considerable importance for climate change mitigation.

Climate change is also transforming transportation planning approaches. Infrastructure investments based on historical climate data alone may be insufficient to address future risks. Therefore, climate projections, disaster risk assessments, resilience criteria, and life-cycle costs should be considered together in the design of new transportation investments. This will enable the development of resilient transportation systems capable of providing safe and uninterrupted services not only for current needs but also over the coming decades.

Antalya's sustainable transportation vision should be based on a dual transformation approach that reduces carbon emissions, improves energy efficiency, and supports adaptation to the impacts of climate change. While reducing the environmental impacts of the transportation sector, the resilience of transportation infrastructure to climate-related disasters should also be strengthened. This approach will support Antalya's objective of becoming a climate-resilient city by protecting not only transportation performance but also economic continuity, tourism security, and quality of life.

10.4 Sustainable Transportation and Smart Mobility Vision for Antalya

Antalya's sustainable transportation vision aims to establish an integrated mobility system that enables the safe, rapid, accessible, and environmentally compatible movement of people, goods, and services; integrates all transportation modes; and is low-carbon, supported by digital technologies, and resilient to climate change.

This vision regards transportation not merely as an investment in physical infrastructure but as a strategic development instrument that supports economic growth, improves quality of life, conserves natural resources, and enhances urban competitiveness. In the future, Antalya's mobility system should be built upon an integrated framework in which public transportation, rail systems, maritime transportation, active mobility, and smart technologies operate together, rather than a transportation model predominantly dependent on private vehicles.

The concept of **"accessibility"** lies at the core of sustainable transportation. The objective is not merely to build more roads but to ensure that people can access education, healthcare, employment, tourism, commerce, and social activities in less time, at lower cost, and with reduced environmental impacts. This approach requires transportation investments to be evaluated in conjunction with urban planning, land use, and economic development policies.

Antalya's transportation vision should be based on a **multimodal transportation system** that connects different modes of transport. Road transportation, rail systems, maritime transportation, air transportation, cycling networks, pedestrian corridors, and logistics networks should not be planned as independent infrastructure systems but as complementary components of an integrated transportation ecosystem. This will improve transportation efficiency, reduce travel times, and achieve significant reductions in carbon emissions.

Within this framework, one of the most important priorities in Antalya's transportation transformation is to establish public transportation as the backbone of urban mobility. The rail network should be expanded to improve access to developing residential areas, organized industrial zones, universities, tourism centres, and the airport. Full integration between bus and rail systems should be ensured, and transfer hubs should be transformed into modern mobility centres.

Antalya's approximately 640-kilometre coastline offers significant but underutilized potential for sustainable transportation. **Maritime transportation systems** to be developed between the city centre and coastal districts will reduce pressure on the road network, diversify mobility options during the tourism season, and introduce a new transportation alternative. The integration of maritime transportation with rail systems and land-based public transportation should be one of the fundamental components of Antalya's multimodal transportation vision.

Cycling and pedestrian transportation are also indispensable components of sustainable mobility. Continuous cycling networks, safe pedestrian corridors, shaded walking routes, and micromobility solutions will significantly improve urban quality of life while reducing private vehicle use for short-distance journeys. Antalya's climate and topographical characteristics offer important natural advantages for the development of active mobility.

Smart city technologies are among the key areas of transformation shaping the future of transportation systems. Real-time traffic management, artificial intelligence-supported traffic signal control systems, smart intersections, digital public transportation management, big data analytics, smart parking systems, and integrated payment infrastructure will enable transportation networks to be managed more safely, efficiently, and in a user-oriented manner. Antalya's digital transformation process should be planned in an integrated manner with its transportation infrastructure.

Logistics systems are also an integral part of the sustainable transportation vision. Strong connections between Antalya Port, Antalya Airport, organized industrial zones, the free trade zone, agricultural production areas, and logistics centres will facilitate the transition towards more efficient, cost-effective, and low-carbon freight transportation. Digital logistics management systems, intermodal transportation solutions, and green logistics practices should be regarded as strategic investments supporting Antalya's international trade capacity.

One of the key components of the sustainable transportation vision is **climate-resilient transportation infrastructure**. New roads, bridges, rail systems, ports, and other transportation investments should be designed with consideration for climate-related risks such as extreme temperatures, heavy rainfall, flooding, wildfires, and sea-level rise. This will enable the development of transportation infrastructure that ensures service continuity during disasters, minimizes economic losses, and strengthens the city's resilience.

Antalya's 2050 transportation vision aims not merely to expand transportation infrastructure but to establish a **smarter, cleaner, more accessible, safer, and more resilient** mobility system. Through this transformation, Antalya has the potential to become a model **Mediterranean city for sustainable transportation** that supports economic development, enhances the competitiveness of the tourism sector, reduces carbon emissions, and improves quality of life. In line with this vision, transportation will evolve from a service that merely accommodates urban growth into a strategic investment area that guides Antalya's sustainable development. Accordingly, transportation systems will become an integrated development mechanism that strengthens not only passenger and freight mobility but also economic productivity, social inclusion, environmental sustainability, and climate resilience.

10.5 Antalya's Mobility Corridors and Integrated Transportation Backbone

Antalya's sustainable transportation vision must move beyond an approach focused solely on solving existing traffic problems. The city's future depends on an integrated planning approach that recognizes transportation as a fundamental pillar of economic development, tourism mobility, logistics efficiency, social inclusion, and climate resilience. Accordingly, Antalya's transportation system should be developed based on an **Integrated Mobility Corridors Model** that brings together all transportation modes within a unified network rather than treating them as independent investments. This model provides a spatial planning approach that integrates road transportation, rail systems, maritime transportation, air transportation, cycling networks, and logistics centres within a shared transportation ecosystem while also supporting the city's economic development axes.

10.5.1 East–West Main Mobility Corridor

Antalya's busiest transportation axis is the coastal corridor extending from Gazipaşa through Alanya, Manavgat, Serik, Aksu, Muratpaşa, Konyaaltı, Kemer, Kumluca, Finike, and Demre to Kaş. This corridor accommodates a significant proportion of the population, tourism investments, and economic activities. Therefore, future priorities should include:

- Therefore, future priorities should include:
- Phased development of rail systems along this corridor,
- Establishment of express public transportation systems,
- Planning maritime transportation as a complementary mode along the coastline,
- Strengthening cycling and green mobility corridors.

These measures should be among the fundamental priorities of Antalya's transportation transformation.

10.5.2 North–South Economic Connectivity Corridors

Antalya's transportation system should be strengthened not only along the coastline but also through its connections with inland regions.

Organized industrial zones, agricultural production areas, logistics centres, universities, and developing residential areas should be strongly integrated with the coastal transportation system. This approach will support rural development while reducing transportation pressure on the city centre.

10.5.3 Airport–Port–Free Trade Zone–Organized Industrial Zone Integration

One of the most important transportation backbones determining Antalya's economic competitiveness is the high-capacity logistics connection to be established between Antalya Airport, Antalya Port, Antalya Free Trade Zone, and the Organized Industrial Zones.

This corridor should enable export activities, tourism logistics, agricultural product transportation, and industrial production to be carried out at lower costs and within shorter timeframes. In the long term, the corridor should be supported by smart logistics management systems and strengthened through high-capacity public transportation connections.

10.5.4 Antalya Maritime Transportation Backbone

Antalya's approximately 640-kilometre coastline represents one of the city's most significant yet underutilized transportation assets. In the future, maritime transportation should be planned not merely as a tourism-oriented excursion activity but as an integral part of everyday life.

A phased maritime transportation system connecting Kaleiçi, Konyaaltı, Kemer, Kumluca, Finike, Demre, Kaş, Belek, Side, and Alanya should be developed and integrated with rail systems and land-based public transportation to establish an alternative transportation backbone along the coastline.

This approach will also constitute the transportation component of the Antalya Blue Economy Vision defined in **Chapter 9.**

10.5.5 Tourism Mobility and Thematic Transportation Corridors

Antalya's transportation system should be planned not only according to daily urban travel demand but also in consideration of tourism mobility.

Thematic transportation corridors should be developed to connect cultural routes, ancient cities, cruise ports, marinas, highland tourism destinations, golf regions, and nature tourism destinations.

This approach will enhance the visitor experience while contributing to a more balanced distribution of tourism revenues across the province.

10.5.6 Antalya's 2050 Mobility Backbone

By 2050, Antalya's transportation system should evolve into a model mobility network in which road, maritime, air, and rail transportation systems complement one another; logistics centres are managed through digital technologies; cycling and pedestrian mobility become an integral part of urban life; electric transportation infrastructure is widely deployed; and all transportation modes are integrated under a unified smart management system.

In line with this vision, Antalya should establish a **human-centred transportation ecosystem that accelerates economic development, reduces carbon emissions, and is resilient to climate change,** rather than focusing transportation investments solely on constructing new roads and intersections.

In this way, Antalya will make a significant contribution to its sustainable development objectives by becoming **one of the cities with the strongest integrated transportation and mobility networks in the Mediterranean Basin.**

10.6 Strategic Objectives

Antalya's sustainable transportation and smart mobility strategy aims to establish a transportation system that supports economic growth, improves quality of life, reduces carbon emissions, and is resilient to climate change. Accordingly, the identified strategic objectives seek to achieve an integrated transformation encompassing not only the development of the transportation sector's physical infrastructure but also governance, technology, energy transition, logistics, disaster management, and social inclusion.

10.6.1 Establishment of an Integrated and Multimodal Transportation System

The objective is to plan road transportation, rail systems, maritime transportation, air transportation, cycling routes, and pedestrian networks in Antalya as a single, complementary transportation system. By strengthening physical, digital, and operational integration between transportation modes, the aim is to reduce travel times, facilitate transfers, and make transportation services more accessible.

10.6.2 Strengthening Public Transportation and Reducing Dependence on Private Vehicles

Establishing public transportation as the backbone of urban mobility is among the strategic priorities. By expanding rail system investments, modernizing bus systems, developing transfer hubs, and improving public transportation accessibility, the objective is to reduce private vehicle use and alleviate traffic congestion.

10.6.3 Accelerating the Transition to Low-Carbon and Clean Transportation Systems

The objective is to reduce greenhouse gas emissions from the transportation sector by promoting electric vehicles, developing alternative fuel technologies, expanding charging infrastructure, and encouraging energy-efficient transportation solutions. This will establish a low-carbon transportation system that contributes to Antalya's climate-neutral city vision.

10.6.4 Integrating Maritime Transportation into Urban Mobility

With its approximately 640-kilometre coastline, Antalya aims to develop maritime transportation not only for tourism purposes but also as a significant component of the daily urban transportation system. Integrating maritime transportation with rail systems and land-based public transportation is intended to reduce traffic pressure along the coastal corridor and expand alternative mobility options.

10.6.5 Expanding Smart Transportation Technologies and Digital Mobility Infrastructure

The objective is to manage transportation infrastructure more efficiently through real-time traffic management, artificial intelligence-supported traffic signal control systems, big data analytics, smart intersection applications, digital public transportation management, and integrated payment systems. Through digital transformation, the aim is to optimize resource utilization while improving the safety of transportation services and user satisfaction.

10.6.6 Promoting a Culture of Pedestrian- and Bicycle-Oriented Mobility

The objective is to establish safe and continuous transportation networks that encourage short-distance urban journeys through active mobility modes such as walking and cycling. Within this framework, the expansion of cycling infrastructure, the development of pedestrian-priority public spaces, and the promotion of micromobility solutions are envisaged.

10.6.7 Strengthening Green Logistics and Sustainable Supply Chains

The objective is to develop integrated freight transportation systems connecting Antalya Port, Antalya Airport, organized industrial zones, the free trade zone, agricultural production centres, and logistics facilities. Digital logistics infrastructure, intermodal transportation practices, and low-carbon freight solutions are intended to enhance economic competitiveness.

10.6.8 Developing Climate-Resilient Transportation Infrastructure

One of the fundamental objectives is to ensure that new transportation investments are planned with consideration for the long-term impacts of climate change. Roads, bridges, rail systems, ports, and other transportation infrastructure should be designed to withstand risks such as extreme heat, floods, wildfires, and sea-level rise.

10.6.9 Developing Disaster-Ready and Emergency-Resilient Transportation Networks

The objective is to establish alternative transportation corridors that ensure uninterrupted mobility during disasters, strengthen critical infrastructure, and integrate evacuation planning with transportation systems. This approach aims to enhance Antalya's institutional and physical resilience to disasters.

10.6.10 Ensuring an Accessible, Inclusive, and Human-Centred Mobility System

The objective is to ensure that transportation services are accessible to all segments of society, particularly children, older adults, persons with disabilities, and individuals with reduced mobility. The widespread adoption of universal design principles in transportation infrastructure will constitute one of the fundamental policy areas for strengthening social inclusion and quality of life.

10.6.11 Strengthening Institutional Coordination and Transportation Governance

The objective is to establish a strong governance model involving central government institutions, local governments, universities, the private sector, professional chambers, and civil society organizations to ensure the effective implementation of sustainable transportation policies. Data-driven decision-making mechanisms, participatory planning processes, and performance-oriented governance approaches will enhance the effectiveness of transportation investments.

10.6.12 Transforming Antalya into a Model City for Sustainable Mobility in the Mediterranean

The common objective of all these strategic goals is to enable Antalya to become **a model sustainable mobility** hub in the Mediterranean Basin through low-carbon transportation systems, smart city applications, integrated logistics infrastructure, a strong public transportation network, advanced maritime transportation, and climate-resilient transportation investments. In this way, the transportation sector will shape the city's future as a strategic area of transformation that supports Antalya's economic development, improves quality of life, and contributes to combating climate change.

10.7 Policies

The success of Antalya's sustainable transportation and smart mobility transformation depends not only on new transportation investments but also on an integrated policy approach that manages transportation demand, utilizes technology effectively, considers climate change, and encompasses all stakeholders. The policies developed within this framework aim to transform Antalya's transportation system into an economically, environmentally, and socially sustainable structure in line with the city's 2050 vision.

10.7.1 Strengthening Integrated Transportation Planning

Road transportation, rail systems, maritime transportation, air transportation, cycling routes, and pedestrian networks should be planned as a single transportation system. Transportation investments should be evaluated in conjunction with population projections, tourism mobility, industrial development, agricultural production areas, and new residential zones. Physical, digital, and operational integration should be established among all transportation modes to support seamless mobility throughout the city.

10.7.2 Prioritizing Public Transportation

Rail system investments should be expanded along Antalya's urban growth corridors. Bus systems, tram lines, and other public transportation modes should operate within a unified operational framework. Public transportation accessibility should be improved, transfer hubs should be strengthened, smart ticketing systems should be expanded, and incentive mechanisms should be developed to reduce private vehicle use.

10.7.3 Integrating Maritime Transportation into the Urban Transportation System

Antalya's coastal potential should be utilized not only for tourism but also for daily transportation. Maritime transportation routes connecting Kaleiçi, Konyaaltı, Kemer, Belek, Side, Alanya, Demre, Kaş, and other suitable coastal centres should be integrated with rail systems, buses, and other public transportation modes. Maritime transportation should be supported as an alternative mode that reduces traffic pressure along the coastal corridor.

10.7.4 Expanding Electric and Clean Transportation Systems

Infrastructure supporting the use of electric cars, buses, service vehicles, taxis, and micromobility vehicles should be rapidly developed. Charging stations should be distributed equitably throughout

the city, the transition to electric vehicles in public fleets should be accelerated, and alternative fuel technologies should be promoted.

10.7.5 Promoting Bicycle- and Pedestrian-Priority Urban Policies

Cycling routes should be planned as a continuous network, ensuring safe connections to education, healthcare, tourism, commercial, and public transportation centres.

Pedestrian-priority streets, shaded walking routes, accessible mobility infrastructure, and micromobility solutions should be promoted to reduce dependence on motorized vehicles for short-distance journeys.

10.7.6 Expanding Intelligent Transportation Systems

Real-time traffic management, artificial intelligence-supported traffic signal control, smart intersection applications, digital public transportation management, traffic congestion analysis, and big data-driven decision-support systems should be widely implemented.

Through the digitalization of transportation management, traffic flow should be optimized, energy consumption reduced, and user satisfaction improved.

10.7.7 Developing Green Logistics and Integrated Freight Transportation Policies

Strong connections should be established between Antalya Port, Antalya Airport, organized industrial zones, the free trade zone, agricultural production areas, and logistics centres. Digital tracking systems should be utilized in logistics processes, intermodal transportation should be supported, and low-carbon freight transportation models should be promoted.

Freight transportation to the city centre should be regulated through smart logistics planning to reduce traffic congestion.

10.7.8 Planning Climate-Resilient Transportation Infrastructure

New transportation investments should be designed with consideration for climate change projections.

Risks such as extreme temperatures, heavy rainfall, flooding, wildfires, and sea-level rise should be incorporated into the design criteria of transportation projects.

Resilience assessments for critical transportation infrastructure should be regularly updated.

10.7.9 Developing Disaster Transportation and Emergency Mobility Plans

Alternative transportation corridors for use during disasters and emergencies should be identified in advance. Evacuation routes, critical transportation infrastructure, logistics support centres, and emergency response points should be integrated into comprehensive disaster planning.

Business continuity plans should be developed to ensure that transportation infrastructure can resume operations as quickly as possible following a disaster.

10.7.10 Supporting Smart Logistics and Digital Supply Chain Management

Freight movements should be monitored in real time, digital logistics platforms should be widely adopted, and artificial intelligence-supported planning systems should be utilized.

A regional data infrastructure should be established to jointly manage the logistics requirements of the agriculture, tourism, and industrial sectors.

This approach should reduce logistics costs while improving resource efficiency.

10.7.11 Supporting Sustainable Finance and Green Transportation Investments

National and international climate finance mechanisms should be utilized more effectively for sustainable transportation projects.

The financing capacity of transportation investments should be strengthened through green bonds, carbon finance, public–private partnerships, and international development funds.

Investment priorities should be determined in accordance with carbon reduction, energy efficiency, and climate adaptation criteria.

10.7.12 Strengthening Participatory and Data-Driven Transportation Governance

Active participation by central government institutions, local authorities, universities, professional chambers, the private sector, civil society organizations, and citizens should be ensured throughout the formulation and implementation of transportation policies. Decision-making processes should be based on scientific evidence, performance indicators, and regular monitoring and evaluation mechanisms.

All transportation policies should be continuously updated in alignment with **climate change mitigation, economic competitiveness, quality of life, and sustainable development objectives,** thereby establishing a dynamic transportation governance model that guides Antalya's future.

10.8 Priority Projects

The projects to be implemented to realize Antalya's sustainable transportation and smart mobility vision must simultaneously support the objectives of reducing carbon emissions, integrating transportation systems, advancing digitalization, strengthening disaster resilience, and enhancing economic competitiveness. Within this framework, the proposed priority projects aim not merely to improve transportation infrastructure but also to establish an integrated mobility ecosystem that enhances Antalya's quality of life, strengthens tourism, and supports climate change adaptation.

10.8.1 Antalya Integrated Transportation Master Plan 2050

A next-generation **Antalya Integrated Transportation Master Plan** should be developed, encompassing all transportation modes and jointly evaluating population projections, tourism mobility, industrial development, logistics requirements, and climate change scenarios. This plan will serve as a common reference document for transportation decisions by integrating road, maritime, air, and rail system investments under a unified vision.

10.8.2 Strategic Rail Network Expansion Programme

Existing rail lines should be expanded to establish stronger connections with new residential areas, organized industrial zones, universities, hospitals, tourism centres, and Antalya Airport.

Rail transport should become the backbone of Antalya's public transportation system.

10.8.3 Antalya Maritime Transportation and Coastal Mobility Project

Antalya's approximately **640-kilometre coastline** should be utilized not only for tourism but also for daily transportation.

A phased maritime transportation system should be established connecting Kaleiçi, Konyaaltı, Kemer, Belek, Side, Alanya, Finike, Demre, and Kaş.

Piers, transfer hubs, and electronic ticketing systems should be integrated with land-based public transportation.

This project should also be directly linked to Antalya's **Blue Economy Strategy.**

10.8.4 Antalya Smart Traffic Management Centre

A **Smart Traffic Management Centre** should be established to centrally manage intersections, traffic signal systems, traffic cameras, public transportation vehicles, and parking systems throughout the city.

Artificial intelligence-supported analytics should enable real-time traffic congestion management, reduced travel times, and optimized energy consumption.

10.8.5 Antalya Electric Mobility Transformation Programme

Fast-charging stations should be expanded throughout the city to support the adoption of electric vehicles. Incentive mechanisms should be implemented to support the transition to electric vehicles in municipal fleets, public transportation fleets, taxis, and service vehicles.

Low-carbon transportation infrastructure should be established in tourism facilities and organized industrial zones.

10.8.6 Bicycle- and Pedestrian-Priority Antalya Project

Continuous bicycle lanes should be established throughout the city; universities, schools, public institutions, tourism areas, and public transportation hubs should be interconnected through safe cycling networks.

Pedestrian-priority streets should be expanded in urban centres, shading systems should be developed, and universal accessibility standards for transportation should be widely implemented.

10.8.7 Antalya Green Logistics Centre

A **Smart Green Logistics Centre** should be established to connect Antalya Port, Antalya Airport, organized industrial zones, the free trade zone, and agricultural production centres. Within this centre, the following components should operate in an integrated manner:

- Digital freight management,
- Intermodal transportation,
- Cold chain management,
- Carbon monitoring system,
- Logistics data centre.

10.8.8 Smart Public Transportation and Digital Mobility Platform

A digital mobility application should be developed to integrate all public transportation systems operating in the city into a single platform. Real-time service information, electronic payment, route planning, bicycle sharing, maritime transportation, and parking services should be accessible and manageable through the same application.

10.8.9 Climate-Resilient Transportation Infrastructure Strengthening Programme

The resilience of critical transportation infrastructure should be enhanced by considering climate-related risks such as floods, inundation, extreme heat, coastal flooding, and wildfires. Priority bridges, intersections, coastal roads, port connections, and evacuation routes should be redesigned based on climate risk assessments.

10.8.10 Antalya Disaster Transportation and Evacuation Corridors Project

Alternative transportation corridors for use during earthquakes, floods, wildfires, and other disasters should be identified in advance. Logistics support centres, emergency assembly areas, helicopter landing sites, and critical transportation corridors should be integrated into a comprehensive disaster mobility plan.

10.8.11 Antalya Transportation Data Centre and Digital Twin Platform

An **Antalya Transportation Digital Twin Platform** should be established to monitor the city's transportation infrastructure in real time.

Through this system, traffic congestion, road maintenance requirements, carbon emissions, public transportation performance, disaster risks, and logistics mobility should be analysed simultaneously to provide scientific evidence-based support to decision-makers.

10.8.12 Antalya Sustainable Mobility Innovation Centre

An innovation centre should be established through collaboration among universities, technology companies, entrepreneurs, and public institutions to develop sustainable transportation technologies.

Electric mobility, hydrogen technologies, artificial intelligence-based traffic management, autonomous transportation systems, and smart city applications should be supported within this centre.

The centre should also coordinate pilot projects funded through international funds, European Union programmes, and climate finance resources, thereby contributing to Antalya's emergence as **one of the leading cities in sustainable transportation and smart mobility in the Mediterranean Region.**

10.9 Antalya Sustainable Transportation and Smart Mobility Declaration

Antalya recognizes transportation not merely as an infrastructure service but as one of the fundamental determinants of sustainable development, climate resilience, and quality of life, in order to preserve and pass on its natural, historical, economic, and cultural assets to future generations. In an era of increasingly severe climate change impacts, transforming transportation systems into structures that reduce carbon emissions, improve energy efficiency, withstand disasters, utilize technology effectively, and deliver human-centred solutions is a strategic imperative.

In line with this approach, Antalya adopts the shared objectives of establishing an integrated mobility model in which road, maritime, air, and rail transportation systems complement one another; planning transportation investments alongside climate change mitigation and adaptation policies; and becoming one of the Mediterranean's model cities for sustainable transportation. Within this framework, a commitment is made to act in accordance with the following fundamental principles.

1. Transportation Systems Will Be Planned in Accordance with Low-Carbon Transition Principles.

Reducing greenhouse gas emissions, improving energy efficiency and decreasing dependence on fossil fuels shall be fundamental priorities in all transportation investments.

2. Public Transportation Will Become the Backbone of Urban Mobility.

Rail systems, bus networks, maritime transportation, and other public transportation systems will be developed in an integrated manner, and policies aimed at reducing private vehicle use will be supported.

3. Antalya Will Implement a Multimodal Transportation Model.

Road transportation, rail systems, maritime transportation, air transportation, cycling networks, and pedestrian networks will be planned as a single transportation system, while transfer hubs and digital integration will be strengthened.

4. Maritime Transportation Will Become an Integral Part of Daily Life in Antalya.

The approximately 640-kilometre coastline will be utilized not only for tourism but also for urban transportation, regional connectivity, and sustainable mobility.

5. Intelligent Transportation Systems Will Be Expanded.

Artificial intelligence-supported traffic management, real-time data analytics, digital mobility platforms, and smart city applications will be widely implemented to improve transportation efficiency.

6. Electric and Clean Transportation Technologies Will Be Supported.

Electric vehicles, alternative fuel technologies, charging infrastructure, and low-emission public transportation systems will constitute fundamental components of Antalya's transportation transformation.

7. The Pedestrian- and Bicycle-Priority Urban Approach Will Be Strengthened.

Active mobility will be encouraged for short-distance travel, while safe cycling routes, accessible pedestrian areas, and micromobility solutions will be expanded.

8. Green Logistics and Smart Supply Chains Will Be Developed.

Low-carbon, digital, and integrated logistics systems will be established between Antalya Port, Antalya Airport, organized industrial zones, the free trade zone, and agricultural production areas.

9. Climate-Resilient Transportation Infrastructure Will Be Developed.

New transportation investments will be planned and constructed with consideration for climate-related risks, including floods, inundation, extreme heat, wildfires, and sea-level rise.

10. Uninterrupted Mobility Will Be Ensured During Disasters.

Evacuation corridors, emergency transportation plans, and critical transportation infrastructure will be developed in an integrated manner with disaster management systems.

11. Digital Transformation and Data-Driven Governance Will Be Adopted in Transportation.

Transportation planning will be guided by big data analytics, digital twin technologies, and performance indicators, while decision-making processes will be based on scientific evidence.

12. Antalya Will Become a Sustainable Mobility Hub in the Mediterranean.

Antalya aims to become one of the model cities in the Mediterranean Basin by developing pioneering practices in sustainable transportation, smart city applications, green logistics, maritime transportation, and low-carbon mobility.

Concluding Declaration

This declaration recognizes transportation not merely as a service that meets present-day needs but as a strategic area of transformation that supports Antalya's economic development, strengthens environmental sustainability, improves social quality of life, and enhances resilience to climate change.

Through the shared responsibility of public institutions, local governments, universities, the private sector, professional chambers, civil society organizations, and all stakeholders, Antalya will be transformed into **a model global city with a safe, accessible, low-carbon, digital, resilient, and human-centred transportation system.**

In line with this collective commitment, the determined implementation of sustainable transportation policies will make significant contributions to **Antalya's 2050 Climate-Resilient City Vision, Türkiye's Net Zero Emissions Targets, and the United Nations Sustainable Development Goals.**

10.10 Governance Model

The success of Antalya's sustainable transportation and smart mobility transformation depends not only on the implementation of new transportation investments but also on the coordinated efforts of all institutions towards shared objectives. Transportation systems have a multisectoral structure directly linked to urban planning, environmental management, energy policies, tourism, logistics, disaster management, digital transformation, and economic development. Therefore, a participatory, data-driven, and robust governance model should be established to ensure the effective implementation of sustainable transportation policies. Transportation governance in Antalya should be carried out within a framework of shared responsibility involving central government institutions, metropolitan and district municipalities, public institutions, universities, professional chambers, the private sector, logistics operators, the tourism sector, civil society organizations, and citizens. A governance approach that strengthens the allocation of responsibilities among institutions, enables shared data utilization, and establishes investment priorities collaboratively will constitute the foundation of the transportation transformation. Within this framework, the **"Antalya Sustainable Transportation and Mobility Coordination Board"** should be established. The Board should function as a high-level advisory and coordination mechanism responsible for formulating transportation policies, evaluating investment priorities, ensuring interinstitutional coordination, monitoring performance indicators, and guiding implementation processes.

Active participation in the Board's activities should be ensured from Antalya Metropolitan Municipality, district municipalities, relevant departments of the Ministry of Transport and Infrastructure, the Ministry of Environment, Urbanization and Climate Change, Antalya Governorship, the General Directorate of Highways, the General Directorate of State Airports Authority, the Turkish State Railways (TCDD), port operators, organized industrial zones, universities, professional chambers, chambers of commerce and industry, and relevant civil society organizations. Decision-making processes in transportation governance should be based on scientific evidence and measurable performance indicators. Key indicators, including traffic congestion, public transportation modal share, carbon emissions, road safety, cycling and pedestrian mobility, electric vehicle adoption rates, logistics performance, and citizen satisfaction, should be monitored regularly. Transportation policies should be continuously updated in accordance with the data obtained. For this purpose, the **Antalya Transportation Data Centre** should be established to consolidate transportation data from across the city within a unified framework. Data obtained from traffic management systems, public transportation operators, maritime transportation, logistics movements, parking management, and smart city applications should be analysed through a shared digital platform. Artificial intelligence and big data technologies should be utilized to forecast transportation demand, plan infrastructure investments on a scientific basis, and optimize resource utilization.

Strong partnerships should be established with universities and research institutions to ensure the success of sustainable transportation policies. The knowledge and expertise of higher education institutions in Antalya should be systematically integrated into decision-making processes in areas such as transportation modelling, climate risk assessments, emerging transportation technologies, energy efficiency, and smart city applications. The private sector is also among the key stakeholders in the transportation transformation. Logistics operators, public transportation operators, technology companies, energy firms, tourism sector representatives, and industrial organizations should actively contribute to the transformation process through innovative transportation solutions, electric vehicle infrastructure, digital applications, and green logistics investments. Public–private partnerships should be considered an important mechanism, particularly for financing and operating large-scale transportation projects.

The participation of civil society organizations, professional chambers, and citizens in decision-making processes should also constitute one of the fundamental principles of the governance model. Participatory consultation processes should be conducted during the preparation of transportation master plans, large-scale infrastructure projects, and mobility policies, and the perspectives of different segments of society should be incorporated into planning processes. This will strengthen public ownership of transportation policies and enhance the effectiveness of implementation processes. Financial sustainability is another essential component of the governance model. Transportation investments should not rely solely on public budgets but should also be supported through international development banks, climate finance mechanisms, European Union funds, green bonds, carbon markets, and public–private partnership models. This approach will contribute to the uninterrupted implementation of Antalya's long-term transportation projects.

Transparency and accountability should serve as guiding principles for the success of the governance model. Action plans, investment programmes, and performance indicators should be publicly disclosed at regular intervals, while implementation outcomes should be monitored through independent evaluation mechanisms. This will enable the establishment of a dynamic transportation governance system capable of continuous learning, improvement, and adaptation to changing conditions. In conclusion, Antalya's sustainable transportation vision should be built upon strong institutional cooperation, evidence-based planning, digital transformation, participatory governance, and sustainable financing. Through this governance model, transportation policies will evolve beyond measures addressing immediate challenges into a strategic development mechanism that supports **Antalya's 2050 Climate-Resilient City Vision**, enhances economic competitiveness, and improves quality of life.

10.11 Conclusions and Evaluation

Transportation is not merely an infrastructure system that enables physical mobility within a city; it is also one of the fundamental determinants of economic development, social cohesion, environmental sustainability, and quality of life. For a city such as Antalya, characterised by continuous population growth, an increasingly prominent position in international tourism, and ongoing expansion in the agricultural, commercial, and service sectors, restructuring transportation systems in accordance with sustainability principles is no longer a matter of choice but a strategic necessity. Climate change is one of the major global dynamics directly shaping the future of the transportation sector. Rising temperatures, extreme precipitation, forest fires, sea-level rise, and other climate-related hazards necessitate a reassessment of the resilience of transportation infrastructure. At the same time, the transportation sector remains one of the priority areas requiring transformation in climate change mitigation efforts due to its high energy consumption and greenhouse gas emissions. Therefore, Antalya's transportation policies should be planned through an integrated approach that addresses both climate change mitigation and adaptation.

Antalya's future success will be measured not by the construction of more roads alone, but by its ability to establish an integrated transportation system that enables people and goods to move more intelligently, safely, rapidly, and with lower carbon emissions. An approach that plans road, rail, maritime, and air transportation, together with cycling and pedestrian mobility, within a unified mobility network will form the foundation of the city's sustainable growth. In particular, considering Antalya's approximately **640-kilometre coastline,** strong tourism economy, international airport, commercial port, organized industrial zones, and strategic geographical location, it becomes evident that the transportation system is a fundamental determinant not only of urban mobility but also of regional development, logistics capacity, and international competitiveness. Therefore, sustainable transportation policies should be developed in parallel with strategies for tourism, trade, industry, agriculture, and the blue economy.

The strategic objectives, policy recommendations, priority projects, and governance model presented in this chapter aim to transform Antalya's transportation system into an **integrated, low-carbon, digitalized, accessible, and climate-resilient** structure. Strengthening rail system investments, integrating maritime transportation into urban life, expanding smart transportation technologies, developing electric mobility infrastructure, supporting green logistics practices, and promoting a culture of active mobility constitute the fundamental pillars of this transformation.

However, sustainable transportation cannot be achieved through engineering projects alone. Success depends on central government institutions, local authorities, universities, the private sector, professional organizations, and civil society working towards a shared vision. Strong governance mechanisms, evidence-based planning, data-driven decision-making processes, and sustainable financing models will be among the most important factors accelerating Antalya's transportation transformation.

Transportation investments also offer significant opportunities for climate finance. Electric public transportation systems, rail infrastructure projects, zero-emission vehicle fleets, smart transportation technologies, cycling infrastructure, and green logistics practices are considered priority investment areas by international development banks, climate funds, and sustainable financing mechanisms.

Antalya's effective utilization of these resources will enable its transportation transformation to be implemented more rapidly and effectively.

In line with its 2050 vision, Antalya's objective is not merely to become a city that reduces traffic congestion, but to become **a model Mediterranean metropolis that transforms mobility into a driving force for sustainable development.** Through a human-centred transportation approach, low-carbon technologies, robust logistics infrastructure, maritime and rail system integration, digital governance capacity, and climate-resilient investments, Antalya has the potential to become one of Türkiye's and the Mediterranean Basin's leading cities in sustainable transportation.

Through policies developed and implemented with determination, transportation will evolve beyond an infrastructure service into **a strategic development instrument that supports Antalya's economic growth, strengthens environmental sustainability, improves social quality of life, and enhances resilience to climate change.**

Thus, by 2050, Antalya will make steady progress towards becoming **one of the Mediterranean's model sustainable cities, with integrated road, maritime, air, and rail systems, effective utilization of smart transportation technologies, green logistics infrastructure that enhances international competitiveness, an established low-carbon mobility approach, and transportation systems resilient to climate change.**

CHAPTER 11

SUSTAINABLE GOVERNANCE, FINANCING AND IMPLEMENTATION MECHANISMS

Institutional Transformation and Joint Action Strategy for Antalya's Climate-Resilient Future

Purpose of the Chapter

Achieving climate change mitigation and adaptation objectives depends not only on developing appropriate policies and projects but also on supporting these policies through robust governance mechanisms, sustainable financing models, and effective implementation systems. In this context, institutional capacity, stakeholder cooperation, data-driven decision-making processes, and long-term financing instruments emerge as fundamental components of climate-resilient development. Antalya is among the cities directly affected by climate change due to its natural resources, strong tourism economy, developing industrial infrastructure, agricultural production capacity, and rapidly expanding urbanization dynamics. Nevertheless, with its accumulated institutional expertise, local governance experience, universities, private sector, and strong civil society structure, Antalya also possesses significant potential to become a model for climate governance in Türkiye. Mobilizing this potential towards shared objectives represents one of the most critical stages of Antalya's sustainable development journey. Climate action should be undertaken through a framework of shared responsibility involving central government institutions, local authorities, public institutions, the private sector, universities, professional organizations, civil society organizations, and citizens. Where strong interinstitutional coordination is lacking, financial resources are not utilized effectively, and implementation processes are not regularly monitored, even well-intentioned strategic documents may fail to achieve their intended impact. Therefore, governance in Antalya should be structured around a dynamic framework based on participation, transparency, accountability, and evidence-based planning. Furthermore, as global climate finance mechanisms continue to expand rapidly, it is increasingly important for Antalya to make more effective use of international funds, development banks, green bond markets, carbon financing instruments, and public–private partnership models. Through the development of a high-quality project portfolio and strong institutional coordination, Antalya has the potential to become not only a city adapting to climate change but also a regional centre capable of financing green transformation and attracting international investment. This chapter comprehensively addresses Antalya's climate governance framework, institutional coordination model, financing strategies, implementation mechanisms, performance monitoring system, stakeholder participation, and project management approach. The objective is to ensure that the policy recommendations and project proposals presented throughout the report are translated into an implementable, measurable, and sustainable governance framework. Antalya's 2050 Climate-Resilient City Vision can only be achieved through strong institutions, collective action, evidence-based governance, and a sustainable financing approach. Accordingly, this chapter establishes a strategic framework outlining the institutional roadmap required to translate the report's findings into action.

11.1 Introduction

Climate change mitigation and adaptation are not processes that can be successfully achieved solely through technical projects and infrastructure investments. The effectiveness of this transformation depends on strong institutional structures, effective governance mechanisms, sustainable financing models, evidence-based decision-making processes, and the collective commitment of all stakeholders. Therefore, governance and financing are among the most critical strategic components of climate-resilient development. In recent years, the focus of global climate policies has shifted from emission reduction targets alone towards how these targets will be implemented and financed. The Paris Agreement, the United Nations Framework Convention on Climate Change, the European Green Deal, and the United Nations Sustainable Development Goals recognize strong institutional capacity, multi-stakeholder governance, and sustainable financing mechanisms as essential prerequisites for climate action. Antalya, with its rapidly growing population, expanding tourism sector, agricultural production capacity, industrial investments, natural ecosystems, and extensive coastline, is among the cities experiencing the impacts of climate change particularly intensely. Nevertheless, through its established public institutions, local authorities, universities, professional chambers, private sector, and strong civil society structure, Antalya also possesses significant advantages that could position it among Türkiye's leading cities in climate governance. However, climate-related initiatives undertaken by different institutions, shortcomings in data sharing, fragmented use of financial resources, coordination gaps in implementation processes, and limited long-term joint planning mechanisms may reduce the effectiveness of climate policies. Therefore, Antalya's climate action should be restructured within a governance framework that strengthens interinstitutional cooperation and establishes a shared, transparent, accountable, and impact-oriented approach.

Financing is one of the most important components of climate transformation. Investments in water management, renewable energy, sustainable transportation, the circular economy, ecosystem restoration, and resilient urban infrastructure require long-term, large-scale projects. Such investments cannot be implemented solely through public resources. Antalya must therefore make more effective use of international climate funds, development banks, green bonds, carbon markets, sustainable financing instruments, and public–private partnership models alongside national budgetary resources. In the coming period, climate finance in particular will become one of the key factors determining the competitiveness of cities. Cities capable of attracting financing will implement transformation projects more rapidly, while those unable to access sufficient financing will become increasingly vulnerable to the economic and social impacts of climate change. Accordingly, Antalya's objective should not be limited to project development; it should also establish project portfolios that are credible, implementable, and capable of generating substantial impact from the perspective of international investors and financial institutions.

A data-driven governance approach is also of considerable importance in this process. Climate indicators, greenhouse gas emissions, natural resource use, energy consumption, disaster risks, and implementation performance should be regularly monitored, and the resulting data should be directly incorporated into decision-making processes. This will enable the effectiveness of implemented policies to be measured, timely revisions to be undertaken when necessary, and resources to be directed towards priority areas. Participation is another fundamental principle of successful climate governance. Climate policies cannot achieve broad public ownership without the active involvement of central government institutions, local authorities, universities, the private sector, professional organizations, civil society organizations, and citizens in collective decision-making processes. Antalya's climate transformation should therefore be guided by an inclusive governance approach that strengthens collective action, encourages knowledge sharing, and enables all stakeholders to become part of the solution.

This chapter comprehensively addresses Antalya's climate governance model, institutional coordination mechanisms, financing strategies, implementation instruments, performance monitoring system, stakeholder participation, and project management processes. However, the main objective of this report is to establish an institutional framework that will enhance the implementability of the proposed objectives and policies and support **Antalya's 2050 Climate-Resilient City Vision** through a robust governance model. Ultimately, the measure of success in combating climate change will not be determined solely by the strategic documents prepared, but by the extent to which these strategies can be implemented in practice. Antalya's future will be shaped by a strong leadership approach, a shared vision, evidence-based planning, sustainable financing, and participatory governance. In this way, the city can transform the risks posed by climate change into opportunities and establish a model of climate-resilient development.

11.2 Current Status of Antalya's Climate Governance and Financing Capacity

An examination of cities that have successfully addressed climate change demonstrates that the fundamental determinant of success is not merely the availability of strong technical projects, but also effective governance mechanisms capable of planning, financing, implementing, and continuously improving these projects. Although Antalya possesses significant advantages in climate governance and climate finance due to its institutional structure, economic capacity, and international visibility, it needs to utilize its existing potential more effectively. In Antalya, climate change-related activities are undertaken at various levels by the provincial organizations of central government institutions, Antalya Metropolitan Municipality, district municipalities, public institutions, universities, professional chambers, development agencies, the private sector, and civil society organizations. Significant initiatives are being implemented in areas such as water management, energy efficiency, waste management, sustainable transportation, coastal management, biodiversity, agriculture, and disaster management. However, these activities need to be integrated within a common strategic framework. Strategic documents, action plans, and sectoral projects prepared by different institutions have generated a substantial body of knowledge. Nevertheless, limited interinstitutional data sharing, differing implementation priorities, and the absence of common performance indicators make the efficient utilization of resources more challenging. Strengthening institutional coordination in a multidisciplinary field such as climate change will significantly improve the effectiveness of implementation.

One of Antalya's major advantages is its strong economic structure and international investment potential. As one of Türkiye's leading tourism destinations, the city has the economic scale to generate substantial financing capacity for green transformation investments through its tourism, trade, logistics, renewable energy, and service sectors. Antalya's international recognition also represents an important source of confidence for foreign investors and development institutions. Nevertheless, significant opportunities in climate finance remain to be explored. International climate funds, multilateral development banks, European Union financial programmes, green bonds, carbon markets, sustainable financing instruments, and public–private partnership models are among the major resources that could accelerate Antalya's climate investments. More effective utilization of these resources requires strengthening institutional capacity for project development in accordance with international standards and enhancing institutional coordination. Antalya's increasing visibility on the international climate agenda in recent years also provides an important advantage. In particular, the COP processes, the European Union's green transition policies, and international sustainability networks offer new opportunities for cooperation that could facilitate Antalya's access to global climate finance. These processes should be considered not only from an environmental perspective but also within the broader framework of economic development and investment strategies.

Data management is another area requiring further development for successful climate governance. Information on greenhouse gas emissions, water consumption, energy use, waste quantities, natural ecosystems, transportation data, and climate risks should be collected on a shared digital platform to enable more evidence-based decision-making processes and faster implementation. A common data infrastructure is also of considerable importance for identifying investment priorities, monitoring project performance, and facilitating international reporting processes. Antalya also possesses significant potential in terms of human resources and institutional capacity. Universities, research centres, professional chambers, engineering and consultancy organizations, and the private sector have accumulated substantial knowledge and expertise in climate change, sustainability, and green transformation. Bringing these capacities together through shared platforms will improve the quality of project development and implementation processes.

The role of the private sector in the transformation process is also becoming increasingly important. Tourism facilities, organized industrial zones, agricultural enterprises, and service sector organizations are making significant investments in energy efficiency, renewable energy, water efficiency, the circular economy, and carbon management. Supporting this trend through appropriate incentives, mechanisms, and financing instruments will substantially accelerate Antalya's transition towards a green economy. Civil society organizations and professional associations are also important actors in the city's climate governance. In recent years, collaborative working models developed through various platforms have demonstrated growing public awareness of climate policies. These organizations are key stakeholders capable of strengthening participatory governance by serving as a bridge between the public sector, private sector, and wider society.

Overall, Antalya is among the cities in Türkiye with the greatest potential for climate governance and climate finance, owing to its strong economic structure, institutional expertise, international visibility, qualified human resources, and developing culture of cooperation. In the coming period, mobilizing this potential towards a shared vision will enhance not only environmental sustainability but also investment capacity, international competitiveness, and quality of life. Therefore, Antalya's primary objective should be to establish a model of climate governance that not only develops projects but also secures financing for them; enables institutions to act towards shared objectives rather than operating independently; and regards climate change not merely as an environmental challenge but also as an opportunity for economic development and international competitiveness. This approach will represent one of the most important steps towards institutional transformation, enabling the implementation of the strategies presented throughout the report.

11.3 Key Challenges in Governance and Financing for Addressing Climate Change

Achieving successful outcomes in combating climate change requires not only the development of robust policies but also the establishment of governance and financing mechanisms that ensure their effective implementation. Although Antalya possesses significant advantages owing to its economic strength and institutional capacity, it also faces structural challenges that must be addressed in the process of climate-resilient development. Accurately analysing these challenges is a prerequisite for developing feasible and sustainable solutions. One of the most significant challenges is the fragmentation of climate change-related duties and responsibilities across numerous institutions. Areas such as water management, energy, transportation, agriculture, the environment, urban planning, disaster management, tourism, and industry fall under the authority and responsibility of different institutions. This situation may occasionally lead to policy inconsistencies, duplication of efforts, and inefficiencies in resource utilization. Strengthening interinstitutional coordination is therefore critically important in addressing a cross-cutting issue such as climate change.

Another significant challenge encountered in planning processes is the continued predominance of sectoral approaches. Many investments and initiatives are planned according to the priorities of individual sectors, while the interrelated impacts of climate change may not be assessed comprehensively. However, water management, energy transition, transportation, agriculture, ecosystem conservation, and disaster management are directly interconnected. Therefore, stronger cross-sectoral integration is required in strategic planning processes.

One of the fundamental challenges in financing is the establishment of sustainable funding sources for long-term, high-cost climate investments. Infrastructure transformation, renewable energy systems, water efficiency projects, green transportation investments, coastal protection measures, and nature-based solutions require substantial financing. Given the limitations of public resources, developing alternative financing models has become essential. Although international climate finance mechanisms continue to expand each year, not all institutions possess the project development, technical preparation, and internationally compliant reporting capacities required to access these resources. Preparing projects in accordance with the requirements of financing institutions, demonstrating their economic feasibility, and managing implementation processes according to international standards require considerable institutional expertise.

Data management and monitoring systems are also among the areas requiring further development. The absence of standardized collection of environmental, economic, and social data generated by different institutions, the monitoring of performance indicators through different methodologies, and the lack of up-to-date and comparable datasets complicate decision-making processes. In particular, critical data such as greenhouse gas emissions, carbon sinks, water consumption, energy efficiency, disaster risks, and climate adaptation indicators should be managed through a shared digital infrastructure. The accelerating impacts of climate change are also making planning processes increasingly complex. Traditional planning approaches may not adequately reflect future risks in many investments undertaken today. Therefore, the systematic integration of climate projections, scenario analyses, and risk assessments into all investment decisions is of considerable importance.

There is also a need to strengthen institutional capacity. Climate change necessitates a new governance approach requiring collaboration across multiple disciplines, including environmental engineering, urban planning, finance, law, energy, economics, disaster management, and data science. Increasing expertise within public institutions, local authorities, and the private sector, while supporting continuous professional development, is essential.

The insufficient institutionalization of public participation represents another significant challenge. When climate policies are implemented solely under the responsibility of public institutions, public ownership of these initiatives may remain limited. Conversely, the regular and systematic participation of citizens, professional chambers, universities, civil society organizations, and the private sector in decision-making processes significantly enhances implementation outcomes.

Although private sector participation in the green transition is increasing, access to finance, technical consultancy, and transformation costs continue to pose significant challenges, particularly for small and medium-sized enterprises (SMEs). To ensure that the green transition is not limited to large enterprises, financing models, technical guidance programmes, and incentive mechanisms supporting SMEs need to be developed. Another important issue is the insufficient visibility of the economic returns generated by climate investments. Climate adaptation projects are often assessed as cost items; however, long-term economic benefits such as reduced disaster losses, energy savings, water efficiency, lower healthcare expenditures, the preservation of tourism revenues, and increased investment security are not adequately reflected in decision-making processes. Therefore, investment appraisal processes should also consider life-cycle costs and the economic value of climate resilience.

All these assessments indicate that the fundamental challenge facing Antalya is not merely to develop more projects. Rather, the primary need is to establish an integrated climate governance model that ensures **strong coordination among institutions, supports decision-making based on scientific data, facilitates access to international financing sources, regularly monitors implementation, and involves all segments of society in the process.** Once this transformation is achieved, Antalya will not only be capable of managing the risks posed by climate change but will also become a model city for Türkiye and the Mediterranean Region in green investment, sustainable financing, and innovative governance.

11.4 Climate Governance and Sustainable Finance Vision for Antalya

Antalya's climate-resilient future should be built upon an integrated governance model in which strong institutions, collective intelligence, scientific planning, and sustainable financing mechanisms operate together. This vision considers climate change not merely as an environmental issue but as a strategic area of transformation that directly affects economic development, social well-being, natural resource management, and international competitiveness. Antalya's objective is to move beyond becoming a city that merely adapts to the impacts of climate change and instead become a climate governance hub that manages the green transition, effectively utilizes international climate finance, and serves as a model for other cities through investment-generating and development-oriented practices. This transformation can only be achieved through the shared responsibility of public institutions, the private sector, universities, professional organizations, civil society, and citizens. The foundation of this vision is participatory governance. In Antalya, the formulation, implementation, and monitoring of climate policies should be carried out through a multi-stakeholder governance model incorporating the knowledge, experience, and contributions of all stakeholders. This approach will strengthen public acceptance of decisions, enhance implementation effectiveness, and ensure the sustainability of long-term policies. The second fundamental component of climate governance is scientific and data-driven management. Antalya's natural resources, greenhouse gas emissions, water consumption, energy use, biodiversity, transportation systems, disaster risks, and economic indicators should be monitored regularly. Decision-support systems developed using digital technologies, artificial intelligence applications, and big data analytics will enable more efficient resource utilization and the accurate prioritization of investments. The third pillar of the vision is the establishment of a sustainable financing ecosystem. Antalya's green transition projects should be supported not only through public budgets but also through international climate funds, development banks, European Union programmes, green bonds, carbon markets, impact investment funds, and public-private partnerships. This approach will accelerate climate investments and diversify the financing required for large-scale transformation projects.

Antalya's strong tourism economy, developed service sector, agricultural production capacity, and private sector dynamism offer significant opportunities for implementing green financing models. In particular, investments in water efficiency, renewable energy, circular economy, sustainable transportation, nature-based solutions, and climate-resilient infrastructure are considered areas with substantial potential for international investors. In line with this vision, one of Antalya's primary objectives should be not merely to develop projects, but to create a project portfolio capable of attracting investment. Investment processes should be accelerated by establishing implementation-ready project pipelines supported by feasibility studies conducted in accordance with international standards, assessments of environmental and economic impacts, and well-defined financing models. This will establish an institutional framework capable of mobilizing financing opportunities.

Another important element of climate governance is strengthening local capacity. The technical capacities of public institutions, municipalities, the private sector, and civil society organizations in project development, climate finance, carbon management, sustainability reporting, and access to

Strengthening Antalya's international partnerships is another important component of this vision. Partnerships with Mediterranean cities, active participation in international city networks, sister-city programmes, research collaborations between universities, and effective representation on global climate platforms will enhance knowledge exchange and strengthen Antalya's international visibility.

This vision is also based on the principles of **transparency and accountability.** Climate targets, implementation outcomes, investment performance, and the use of financial resources should be regularly disclosed to the public, while progress indicators should be monitored through independent evaluation mechanisms. This approach will both increase public confidence and strengthen Antalya's institutional credibility among international investors.

In conclusion, Antalya's climate governance and sustainable financing vision should be built upon **collective intelligence, strong institutions, scientific management, innovative financing, international cooperation, and participatory governance.** Once implemented, this vision will enable Antalya to become not merely a city adapting to climate change, but a **globally competitive city capable of managing climate investments, attracting international financing, accelerating the green transition, and serving as a model for the Mediterranean Basin through its sustainable governance framework.**

11.5 Strategic Objectives

The primary objective of Antalya's climate governance and sustainable financing strategy is to realize the city's **2050 Climate-Resilient City Vision** by supporting climate change mitigation and adaptation efforts through strong institutional structures, effective coordination mechanisms, innovative financing instruments, and participatory governance. The strategic objectives established in this context are presented below.

11.5.1 Establishment of a Strong and Integrated Climate Governance System

The objective is to establish institutional coordination mechanisms that ensure all climate change-related policies, plans, and practices are implemented in alignment with common objectives. Strong cooperation among central government institutions, local authorities, universities, the private sector, professional organizations, and civil society will be established to develop an integrated climate governance framework.

11.5.2 Establishment of the Antalya Climate Action Management System

The objective is to establish a digital management system through which all climate projects implemented in the city are planned, monitored, and evaluated under a unified framework.

This system will enable the identification of investment priorities, monitoring of implementation processes, and enhanced information sharing among institutions.

11.5.3 Enhancing Access to International Climate Finance

The objective is to enable Antalya to make more effective use of international climate funds, development banks, European Union programmes, green bonds, carbon markets, and sustainable financing instruments. To this end, institutional capacities for project development and financial management in accordance with international standards will be strengthened.

11.5.4 Establishment of the Antalya Green Project Portfolio

An investment-ready project portfolio will be developed, comprising projects in water management, energy transition, sustainable transportation, circular economy, ecosystem restoration, disaster resilience, and climate adaptation. This will establish a pipeline of implementation-ready projects that can be mobilized when financing opportunities become available.

11.5.5 Development of Science- and Data-Based Decision-Making Mechanisms

To ensure that climate policies are based on reliable data, an integrated data infrastructure will be established to monitor greenhouse gas emissions, energy consumption, water use, natural resources, disaster risks, and project performance.

The use of artificial intelligence, big data analytics, and digital decision-support systems in decision-making processes will be promoted.

11.5.6 Strengthening Local Institutional Capacity

The objective is to enhance the technical capacities of public institutions, municipalities, the private sector, and civil society organizations in climate change, carbon management, sustainability reporting, project development, and international fund management. Continuous training programmes and knowledge-sharing mechanisms will serve as essential instruments in this process.

11.5.7 Promoting a Culture of Participatory and Transparent Governance

The objective is to ensure the active participation of citizens, academic communities, professional organizations, the private sector, and civil society in the formulation and implementation of climate policies. Transparency, accountability, and regular public communication will constitute the fundamental principles of the governance framework.

11.5.8 Development of Public–Private Partnership Models

The objective is to promote public–private partnerships in green infrastructure investments, renewable energy projects, water management, sustainable transportation, and climate adaptation investments.

This approach will increase investment capacity while diversifying the financing burden.

11.5.9 Strengthening Antalya’s International Climate Diplomacy

The objective is to enhance Antalya’s participation in international city networks, climate platforms, sister-city programmes, and global sustainability initiatives.

Efforts will focus on increasing the city’s international visibility and developing new financing and cooperation opportunities.

11.5.10 Regular Monitoring and Reporting of Climate Performance

The implementation progress of the strategies developed will be regularly monitored through performance indicators and reported to the public. The monitoring and evaluation system will enable continuous improvement of implementation processes and policy revisions when necessary.

11.5.11 Supporting the Green Economy and Sustainable Investment Ecosystem

The objective is to evaluate climate investments not only in terms of environmental benefits but also in relation to economic growth, employment, innovation, and international competitiveness.

Antalya's green economy capacity will be strengthened by supporting green entrepreneurship, clean technology investments, and sustainable business models.

11.5.12 Positioning Antalya as a Mediterranean Centre for Climate Governance and Finance

The overarching objective of these strategic goals is to transform Antalya into **one of the Mediterranean Basin's leading climate governance centres, capable not only of adapting to climate change but also of managing climate finance, attracting international investment, developing innovative governance models, and successfully implementing green transition projects.** The strong governance and sustainable financing system to be established in pursuit of this objective will provide the essential institutional infrastructure required for the effective implementation of the water, energy, agriculture, ecosystem, tourism, industry, blue economy, and transportation policies outlined in the preceding chapters of this report.

11.6 Policies

Antalya's climate governance and sustainable financing policies are structured around strong institutional coordination, participatory governance, science-based decision-making, innovative financing mechanisms, and international partnerships. These policies aim to establish a common governance framework that will facilitate the implementation of the cross-sectoral objectives presented in the preceding chapters of this report.

11.6.1 Establishment of the Antalya Climate Governance Council

A permanent **Antalya Climate Governance Council** will be established, bringing together representatives of public institutions, local authorities, universities, professional organizations, the private sector, and civil society. The Council will be responsible for strategic decision-making, interinstitutional coordination, project prioritization, and monitoring implementation processes.

11.6.2 Establishment of the Antalya Climate Coordination Centre

A professional **Climate Coordination Centre** will be established to oversee the planning, technical coordination, data management, and international relations of all climate projects implemented across the city.

The Centre will provide services to all institutions in project development, technical assistance, international fund management, and investment coordination.

11.6.3 Establishment of the Antalya Climate Finance Office

A specialized **Climate Finance Office** will be established to manage relations with international financial institutions, prepare funding applications, develop investor relations, and design financing models.

This structure aims to increase Antalya's share of international climate funding.

11.6.4 Establishment of the Antalya Green Project Bank

All climate projects planned for implementation across the city will be consolidated into a digital **Green Project Bank**, incorporating technical feasibility studies, investment costs, financing models, environmental impacts, and economic returns.

This system will function as a dynamic investment platform connecting investors with project developers..

11.6.5 Implementation of the International Climate Finance Access Strategy

Institutional application procedures for the Green Climate Fund, Global Environment Facility, development banks, European Union financing programmes, carbon markets, and other sustainable financing sources will be standardized.

Applications for international financing will be prepared annually for identified priority projects.

11.6.6 Promotion of Public–Private Partnership Models

Public–private partnership models will be developed for investments in water management, renewable energy, sustainable transportation, circular economy, and climate-resilient infrastructure.

Risk-sharing arrangements, long-term financing, and performance-based investment models will be encouraged.

11.6.7 Establishment of the Antalya Climate Data Platform

An integrated digital data platform will be established to monitor climate indicators, greenhouse gas emissions, energy consumption, water resources, natural ecosystems, disaster risks, and project performance. All institutions will contribute data to the system using common data standards, supporting decision-making processes with real-time information.

11.6.8 Development of a Digital Monitoring and Performance Management System

The implementation performance of the strategies and projects developed will be monitored through digital dashboards, performance indices, and regular evaluation reports.

Measurable performance indicators will be established for each policy area, and annual progress reports will be published.

11.6.9 Implementation of Local Capacity-Building Programmes

Continuous training programmes will be organized for public institutions, municipalities, the private sector, professional organizations, and civil society representatives. Specialized human resources will be developed in climate finance, carbon management, sustainability reporting, project development, and international fund management.

11.6.10 Strengthening Participatory Decision-Making Mechanisms

Digital platforms, workshops, advisory councils, and thematic working groups will be established to ensure the active participation of all segments of society in the formulation and implementation of climate policies.

Participatory governance will constitute one of the fundamental principles of all initiatives.

11.6.11 Supporting Antalya's Climate Innovation and Entrepreneurship Ecosystem

Innovative initiatives in clean technologies, artificial intelligence applications, carbon management, energy efficiency, and the circular economy will be supported through collaboration among universities, technology parks, research centres, and the private sector.

Green entrepreneurship programmes and investment acceleration mechanisms will be developed.

11.6.12 Strengthening Transparency and Accountability Mechanisms

Climate investments, the use of financial resources, implementation outcomes, and performance indicators will be regularly disclosed to the public.

Independent evaluation mechanisms will be established to periodically assess the effectiveness of implementation and the efficiency of resource utilization.

11.6.13 Development of Regional and International Partnerships

Antalya's cooperation with Mediterranean cities, international city networks, development organizations, and global climate platforms will be strengthened.

Joint projects, knowledge sharing, and international investment programmes will enhance Antalya's engagement in global climate diplomacy.

11.6.14 Implementation of the Post-COP31 Antalya Climate Action Programme

The **Antalya Climate Action Programme** will be established to ensure that the policies and projects presented in this report are implemented not only within the scope of COP31 preparations but also as part of a long-term transformation programme. The Programme will be continuously updated through a governance model incorporating short-, medium-, and long-term implementation schedules, performance indicators, responsible institutions, financing sources, and monitoring mechanisms.In this way, Antalya will establish a climate governance system with strong institutional capacity that translates the vision outlined in this report into tangible investments and measurable outcomes and serves as an internationally recognized model.

11.7 Priority Projects

To realize Antalya's vision for climate governance and sustainable financing, it is recommended that the following priority projects be implemented through short-, medium-, and long-term implementation programmes. These projects will serve as key instruments of transformation by strengthening institutional capacity, improving access to international financing sources, and ensuring the effective management of climate investments.

11.7.1 Antalya Climate Governance Centre Project

A central structure will be established in Antalya to coordinate all institutions and organizations involved in climate change, overseeing strategic planning, data management, project development, and implementation processes.

The Centre will operate as a collaborative platform ensuring continuous coordination among public institutions, local authorities, universities, the private sector, and civil society.

11.7.2 Antalya Climate Finance and Project Development Centre

A specialized centre will be established to undertake project development, financial modelling, feasibility studies, and investor relations to facilitate access to international climate funds.

The Centre will establish a professional project development infrastructure to enhance Antalya's capacity to benefit from international funding sources.

11.7.3 Antalya Green Project Portfolio Programme

An investment-ready project pipeline will be developed in water management, energy, sustainable tourism, agriculture, transportation, blue economy, ecosystem restoration, and climate-resilient urban development.

For each project, technical feasibility assessments, economic analyses, carbon emission reduction potential, contributions to climate adaptation, and financing models will be developed.

11.7.4 Antalya Climate Data and Decision Support Platform

A digital data platform will be established to consolidate all environmental, economic, and social data across the city within a centralized system. The platform will monitor greenhouse gas emissions, energy consumption, water management, disaster risks, carbon sink areas, and climate indicators in real time, providing science-based support to decision-makers.

11.7.5 Antalya Climate Observatory

The **Antalya Climate Observatory** will be established in collaboration with universities and research institutions to monitor the long-term impacts of climate change on the city.

The Centre will coordinate climate scenarios, risk assessments, early warning systems, and scientific research.

11.7.6 Antalya Green Finance Summit

An annual international summit will bring together investors, development banks, climate funds, the private sector, and public institutions in Antalya.

Through this event, Antalya's green investment projects will be presented to international investors, and new financing partnerships will be developed.

11.7.7 Antalya Carbon Management and Emissions Monitoring System

A digital carbon management system will be established to regularly measure and report greenhouse gas emissions across the city and guide emission reduction policies. The system will conduct sector-specific emissions analyses and continuously monitor progress towards carbon neutrality targets.

11.7.8 Antalya Green Investment Portal

A digital investment platform will be established to connect green investment projects developed by the public and private sectors with potential investors.

The portal will consolidate project information, financing requirements, investment opportunities, and international funding calls in a single platform.

11.7.9 Antalya Climate Academy

The **Antalya Climate Academy** will be established to provide continuous training programmes for public sector employees, municipalities, the private sector, civil society organizations, and young people.

The Academy will develop specialized human resources in climate finance, carbon management, sustainability reporting, project management, green economy, and circular development.

11.7.10 Antalya Smart Governance and Digital Transformation Programme

Antalya's climate governance infrastructure will be digitalized through the use of artificial intelligence, big data analytics, geographic information systems, and digital decision-support applications.

This programme will enable faster, more transparent, and data-driven planning, investment management, and performance evaluation processes.

11.7.11 Antalya International Climate Cooperation Programme

Joint research and investment programmes will be developed in collaboration with Mediterranean cities, international organizations, universities, and development agencies.

Within the scope of this programme, joint funding applications will be prepared, technical knowledge sharing will be enhanced, and Antalya's global visibility will be strengthened.

11.7.12 Antalya Climate Entrepreneurship and Green Innovation Centre

An entrepreneurship centre will be established to operate in the fields of clean technology, circular economy, energy efficiency, water technologies, carbon management, and sustainable tourism.

The Centre will support the development of innovative business ideas, facilitate connections with investors, and contribute to the growth of the green economy.

11.7.13 Antalya Climate Finance Readiness Programme

A project preparation fund and technical advisory programme will be established to support the technical readiness of institutions seeking to access international funding. The programme will facilitate the preparation of feasibility studies, environmental impact assessments, financial analyses, and international funding applications.

11.7.14 Antalya COP31 Legacy Programme

A long-term implementation programme will be established to ensure the continuity of the policies and projects proposed in this report beyond COP31.

This programme will transform Antalya's climate change mitigation and adaptation efforts from a one-time initiative into a permanent development model, strengthen the city's position in international climate diplomacy, and establish Antalya as **one of the Mediterranean Basin's leading cities in climate governance, project development, and sustainable finance.**

11.8 Antalya Declaration on Sustainable Governance and Climate Finance

Antalya recognizes that climate change is not merely an environmental threat but a global transformation process that directly affects economic development, social welfare, natural resource security, and quality of life. In line with this understanding, Antalya accepts the pursuit of climate change mitigation and adaptation efforts based on strong governance, scientific planning, participatory decision-making, innovative financing models, and international cooperation as a shared responsibility.

This declaration sets out a common vision for the future on behalf of Antalya's public institutions, local authorities, universities, private sector, professional organizations, civil society organizations, and all citizens. Within this framework, Antalya declares its commitment to the following fundamental principles.

1. Principle of Collaborative Governance

Addressing climate change is a shared responsibility of all institutions, the private sector, academia, and society. Antalya adopts **participatory, transparent, and accountable governance** as a fundamental principle of all its climate policies.

2. Principle of Science- and Data-Based Decision-Making

All planning and investment decisions will be guided by scientific research, reliable data, climate scenarios, and performance indicators. Scientific knowledge will serve as the primary reference for Antalya's climate policies.

3. Principle of Sustainable Financing

Effective utilization of national and international financing sources will be a fundamental priority for the long-term success of climate investments.

Green financing instruments, climate funds, development banks, carbon markets, and public–private partnerships will constitute the principal financing mechanisms for Antalya's transformation process.

4. Principle of Intergenerational Equity

The protection of natural resources is not only a responsibility towards the present generation but also a right of future generations. Antalya embraces a sustainable development approach that preserves its natural capital and leaves a more liveable city for future generations.

5. Principle of Transparency and Accountability

Climate investments, the use of financial resources, and implementation outcomes will be regularly disclosed to the public. Performance indicators will be monitored through independent evaluation mechanisms and continuously improved.

6. Principle of International Cooperation

Antalya commits to developing strong partnerships with Mediterranean cities, international organizations, development banks, and global climate networks. Through knowledge sharing and joint projects, Antalya will actively contribute to global efforts to address climate change.

7. Principle of Innovation and Digital Transformation

Artificial intelligence, big data, digital decision-support systems, and innovative technologies will become integral components of climate governance. Technological transformation will be recognized as one of the fundamental instruments supporting sustainability in public administration and private sector practices.

8. Principle of Green Economy and Just Transition

Climate policies will be implemented through a green transition approach that supports economic growth, generates employment, and enhances social welfare. Ensuring that no sector or segment of society is left behind during the transition process will be a fundamental principle.

9. Principle of Local Action for Global Impact

Successful practices developed in Antalya are intended to serve as models for Türkiye and the Mediterranean Basin.

Solutions developed at the local level will be transformed into implementation models that contribute to global efforts to address climate change.

10. Antalya 2050 Shared Future Commitment

Antalya regards climate change not merely as a risk to be managed, but as a strategic opportunity to accelerate sustainable development. In this context, the city aims to become a model city that protects its water resources, uses energy efficiently, strengthens its natural ecosystems, develops resilient infrastructure, expands the green economy, and effectively utilizes international climate finance.

With this declaration, Antalya embraces a firm commitment to becoming a **climate-resilient, low-carbon, sustainable and inclusive world city with a high quality of life by 2050.**

This shared commitment represents not merely a response to today's needs, but a strong determination to build an Antalya that safeguards natural resources, enhances economic competitiveness and serves as an international model for future generations. Accordingly, Antalya, together with all stakeholders, declares its determination to realize its vision of becoming **one of the Mediterranean Basin's leading cities in sustainable governance, climate finance and green development.**

11.9 Governance Model

The successful realization of Antalya's 2050 Climate-Resilient City Vision depends not only on the formulation of appropriate strategies but also on the establishment of a strong, participatory and sustainable governance model capable of implementing these strategies. Accordingly, the proposed governance model is designed as a dynamic management system that ensures interinstitutional coordination, supports evidence-based decision-making, promotes transparency, strengthens financing capacity and continuously monitors implementation performance. The proposed model adopts a multistakeholder governance structure based on the shared responsibility of central government, local authorities, universities, the private sector, professional organizations, civil society organizations and citizens. This approach will enable climate change mitigation and adaptation policies to be effectively implemented, widely embraced and continuously improved.

11.9.1 Antalya High-Level Climate Council

The **Antalya High-Level Climate Council** shall be established as the highest decision-making body within the governance model. The Council shall comprise senior representatives of relevant central government institutions, Antalya Metropolitan Municipality, district municipalities, universities, professional organizations representing public institutions, organized industrial zones, chambers of commerce and industry, tourism sector representatives, agricultural organizations, financial institutions and civil society platforms. The Council's primary responsibilities shall include:

- Defining Antalya's climate vision.
- Approving strategic priorities.
- Ensuring interinstitutional coordination.
- Establishing priorities for large-scale investments.
- Evaluating annual performance reports.
- Guiding international cooperation.

The Council shall hold ordinary meetings at least twice a year, with extraordinary meetings convened when necessary.

11.9.2 Antalya Climate Coordination Centre

The **Antalya Climate Coordination Centre** shall be established as a professional executive unit responsible for implementing the decisions of the High-Level Council. The Centre shall undertake responsibilities including project development, technical coordination, data management, international relations, financing processes, performance monitoring and stakeholder coordination.

The Centre shall undertake responsibilities including project development, technical coordination, data management, international relations, financing processes, performance monitoring and stakeholder coordination. The Centre shall also serve as a joint secretariat for Antalya's climate projects and facilitate information exchange among institutions. The Centre shall also serve as a joint secretariat for Antalya's climate projects and facilitate information exchange among institutions.

11.9.3 Thematic Working Committees

Permanent thematic working committees shall be established for all sectors covered in the report. These committees shall operate in the following areas:

- Water Management
- Energy and Carbon Emission Reduction
- Agriculture and Food Security
- Ecosystems and Biodiversity
- Sustainable Tourism
- Industry and Circular Economy
- Blue Economy
- Transport and Mobility
- Climate-Resilient Urban Development
- Climate Finance and Governance

Each committee shall comprise representatives of relevant public institutions, universities, sectoral stakeholders and civil society organizations. The committees shall develop policy recommendations and monitor implementation processes.

11.9.4 Antalya Climate Finance Platform

The **Antalya Climate Finance Platform** shall be established to bring together public institutions and national and international investors.

- The Platform shall:
- Promote investment opportunities,
- Develop financing models,
- Manage investor relations,
- Coordinate funding applications,
- Maintain continuous communication with international financial institutions.

This structure shall become one of the most important financing mechanisms for accelerating Antalya's climate investments.

11.9.5 Antalya Climate Data and Monitoring System

All activities carried out across the city shall be monitored through a shared digital infrastructure. This system shall track greenhouse gas emissions, carbon emission reductions, water consumption, energy efficiency, natural areas, project performance, financing utilization and implementation indicators in real time. Accordingly, decision-making processes shall be supported by continuously updated scientific data.

11.9.6 Antalya Climate Project Portfolio Management System

All projects proposed in the report shall be monitored through a unified digital project management system. The following information shall be defined separately for each project:

- Responsible institution
- Implementation timeline
- Financing model
- Investment amount
- Contribution to carbon emission reduction
- Contribution to climate change adaptation
- Performance indicators

This approach shall enable investment processes to be managed transparently.

11.9.7 Stakeholder Participation Mechanism

The governance model shall not consist solely of public institutions. Mechanisms shall be established to ensure the regular participation of citizens, young people, women, professional chambers, the private sector, universities and civil society organizations in decision-making processes. Digital participation platforms, annual climate forums, thematic workshops and public consultation meetings shall constitute the principal instruments of this process.

11.9.8 Performance Monitoring and Evaluation System

Measurable performance indicators shall be established for each policy and project. Implementation shall be regularly assessed through annual performance reports, independent evaluations, sustainability indicators, carbon emission reduction outcomes, economic contributions and social impacts. Policy revisions shall be undertaken based on the findings of these assessments.

11.9.9 International Cooperation and Representation Mechanism

A permanent international representation mechanism shall be established to enhance Antalya's international visibility. This mechanism shall foster continuous cooperation with COP processes, Mediterranean city networks, international associations of municipalities, development banks, investment institutions and university networks. Antalya's capacity to develop international projects and attract investment shall be strengthened through this mechanism.

11.9.10 Continuous Improvement and Institutional Learning Model

As climate change is a dynamic process, the governance model shall remain open to continuous improvement. Emerging technologies, scientific developments, international regulations and financing instruments shall be regularly monitored, and Antalya's strategies shall be updated at defined intervals. Through this approach, which prioritizes institutional learning, Antalya shall establish a resilient governance structure capable of rapidly adapting to changing global conditions.

Overall Assessment

The proposed governance model integrates decision-making, implementation, financing, monitoring and continuous improvement processes within a unified system. Accordingly, the governance, energy, agriculture, ecosystems, tourism, industry, blue economy, transport and climate-resilient urban development policies presented in this report shall be implemented through a common governance model in which these sectors complement one another.

Through the implementation of this model, Antalya shall establish a strong institutional framework capable of achieving its ambition to become **a city that not only formulates climate policies but also implements them; not only prepares projects but also realizes investments; not only monitors international funding opportunities but also actively directs them; and serves as a reference city for climate governance across the Mediterranean Basin.**

11.10 Conclusion and Assessment

Climate change is one of the most significant global transformation processes reshaping the future of cities, not only through its environmental impacts but also through its economic, social and governance dimensions. Therefore, building a climate-resilient future requires not only the development of appropriate policies but also the establishment of strong institutions capable of implementing these policies, sustainable financing mechanisms and a shared culture of governance. The strategies presented in the preceding chapters of this report concerning Antalya's water management, energy transition, sustainable agriculture, ecosystem conservation, climate-resilient urban development, circular economy, sustainable tourism, blue economy and transport can deliver lasting outcomes only through a robust governance model and an effective financing framework. Therefore, governance and finance are not merely standalone topics addressed in the final chapter of the report; rather, they constitute the fundamental implementation mechanism connecting all strategic objectives.

With its strong economy, internationally recognized tourism identity, advanced service sector, agricultural production capacity, universities, entrepreneurial potential and active civil society, Antalya is among the cities in Türkiye with the greatest capacity to manage the climate transition. Mobilizing this potential around a shared vision will significantly enhance not only environmental sustainability but also economic growth, investment capacity and international competitiveness. In the coming years, the success of cities will be assessed not so much by the natural resources they possess, but by how effectively they manage these resources, their ability to attract international investment and their capacity to manage climate risks. Accordingly, one of Antalya's most important objectives is to move beyond being a city that merely develops projects and establish an institutional ecosystem capable of accessing international finance, managing investment processes and accelerating green development. The governance model proposed in this report envisages an integrated structure that strengthens interinstitutional coordination, supports evidence-based decision-making, prioritizes stakeholder participation and operates through a performance-oriented approach. Through this model, public institutions, local authorities, the private sector, universities, professional organizations and civil society will work towards shared objectives and manage Antalya's climate transition based on a collective sense of responsibility.

From a financing perspective, it is essential for Antalya to make effective use of international climate funds, development banks, green bonds, carbon markets, impact investment funds and public–private partnership models, rather than relying solely on national resources. This approach will ensure the continuity of climate investments, facilitate the implementation of large-scale projects and strengthen the city's position within global investment networks.

Throughout this process, project preparation capacity, technical expertise, digital data management and performance monitoring systems should become among Antalya's most important competitive advantages. Ensuring that every proposed investment is supported by feasibility studies meeting international standards, that its environmental and economic impacts are measurable, and that it is structured in accordance with the requirements of financing institutions will directly influence investment success. At the same time, the climate transition is a shared responsibility not only of public institutions but of society as a whole. The active participation of citizens, young people, women, entrepreneurs, academia and the private sector will strengthen the acceptance, implementation and long-term sustainability of climate policies. A robust governance model is one that brings together not only institutions but all segments of society around a shared vision for the future.

Antalya has a historic opportunity ahead. When effectively managed, climate change can become a strategic instrument for development that not only reduces risks but also creates new investment opportunities, fosters high-value-added sectors, increases green employment and enhances international competitiveness. Therefore, climate policies should be regarded not merely as environmental policies but as fundamental components of economic development, social resilience and quality of life.

The vision presented in this report aims not only to enable Antalya to adapt to climate change but also to establish the city as **a leading centre for climate governance, green finance, sustainable investment and climate-resilient development in the Mediterranean Basin.** This objective provides a realistic and actionable roadmap that can be achieved through strong leadership, collective wisdom, a science-based approach and a firm commitment to implementation. In conclusion, Antalya's future will be shaped by a robust governance approach that safeguards its natural assets, supports economic growth in accordance with sustainability principles, effectively utilizes international financing resources, manages climate risks and brings together all segments of society around shared objectives.

On the path towards its 2050 vision, Antalya's greatest strength lies not only in its natural and economic potential, but also in the determination to plan for the future demonstrated by its institutions working together through collective wisdom. This determination will transform Antalya into one of the exemplary cities characterized by climate resilience, sustainability and a high quality of life, not only in Türkiye but also across the Mediterranean region.

CHAPTER 12

CONCLUSION, SHARED VISION AND ROADMAP

A Shared Transformation Perspective Towards Antalya's Climate-Resilient Future in 2050

Purpose of the Chapter

This chapter presents Antalya's climate-resilient development vision within a shared future perspective by comprehensively evaluating all assessments, policies and project proposals presented throughout the report. It also summarizes the report's strategic conclusions, identifies priority areas for implementation and sets out the roadmap required to achieve Antalya's 2050 targets.

This chapter is not merely the concluding section of the report; it also constitutes a call for collective action addressed to public institutions, local governments, the private sector, universities, professional organizations, civil society and all stakeholders involved in Antalya's climate change mitigation and adaptation efforts.

Scope of the Chapter

This chapter covers:

* Overall assessment of the report,
* Shared framework of Antalya's 2050 vision,
* Integrated assessment of strategic priorities,
* Short-, medium- and long-term implementation roadmap,
* Allocation of institutional responsibilities,
* Monitoring and updating approach,
* Call for a shared future,
* Concluding declaration.

Core Message of the Chapter

Antalya's future will be shaped by an integrated development approach that considers its water, land, sea, forests, agriculture, tourism, industry and human resources together. The vision presented in this report aims not only to build an Antalya that adapts to climate change, but also to establish a resilient Mediterranean city that transforms climate change into a driving force for sustainable development and serves as an international model.

12.1 Introduction

This report has been prepared to assess Antalya's current and future climate change risks through a holistic approach and to establish a shared roadmap that supports sustainable development while preserving the city's natural, economic and social structure. From energy transition to agriculture, ecosystem conservation, tourism, industry, the blue economy, sustainable transportation, governance and climate finance, the assessments presented offer a broad perspective. This approach establishes a long-term development vision for Antalya that considers not only today's needs but also the right of future generations to a sustainable quality of life. The analyses conducted throughout the report demonstrate that climate change is no longer a distant risk for Antalya. Pressure on water resources, increasing temperatures, drought, forest fires, extreme weather events, vulnerability in coastal areas, biodiversity loss and impacts on economic sectors show that climate change has become a multidimensional reality affecting everyday life. Therefore, Antalya's future requires its existing development approach to be reshaped around the principle of climate resilience.

However, this situation presents not only risks but also significant opportunities. Antalya is among the cities with considerable advantages in the green transition process thanks to its strong tourism economy, agricultural production capacity, renewable energy potential, developed industry, rich natural assets, strategic geographical location and international recognition. When this potential is evaluated through appropriate planning and a strong governance approach, Antalya can move beyond being a city that merely adapts to the impacts of climate change and become an internationally recognized model for sustainable development.

One of the most important characteristics of this report is that it does not address climate change solely as an environmental issue. The policy proposals developed are based on an integrated approach that considers economic development, investment strategies, social resilience, natural resource management, technological transformation and international competitiveness together. Accordingly, climate policies and development policies are addressed within a single strategic framework as complementary components.

The preparation process of the report is as important as the vision it presents. Led by the Antalya Civil Platform, this study was shaped by the contributions of numerous stakeholders, including public institutions, local governments, universities, professional organizations, private sector representatives, civil society organizations and experts from various fields. In this respect, the report is not merely a technical assessment document but also a participatory declaration of a shared future prepared through Antalya's collective wisdom and sense of shared responsibility. The strategies proposed throughout the report are not independent policy recommendations but complementary components of an integrated transformation model. Water security is directly related to energy efficiency, energy transition to industrial policies, agricultural ecosystem conservation, transportation to tourism and urbanization, and governance to the implementation of all these areas. Therefore, success will depend not merely on implementing individual projects but on the simultaneous and coordinated implementation of all policy areas.

In the coming years, competition among cities will be shaped not only by economic size but also by their capacity to adapt to climate change, sustainable investment environment, success in protecting natural resources and quality of life. In this new era, Antalya must make climate resilience a fundamental component of all planning processes in order to preserve and further develop its existing advantages.

This chapter brings together the policies and strategies presented in the previous sections of the report within a shared perspective and sets out the fundamental roadmap to be followed to achieve **Antalya's 2050 Climate-Resilient Development Vision.** At the same time, this study is not merely a strategic document addressed to public institutions; it also represents a shared call for the future directed towards investors, academia, civil society and all residents of Antalya.

In conclusion, this report is not merely a projection of Antalya's future but a comprehensive transformation programme built upon achievable objectives, concrete policy recommendations and realistic projects. From this point onward, the measure of success will be the extent to which the vision developed is translated into coordinated action and implementation. Antalya's climate-resilient future will be made possible through strong institutions, scientific approaches, sustainable financing, social participation and determined leadership. This shared commitment will position Antalya among the leading cities in sustainable development and climate resilience not only in Türkiye but also across the Mediterranean Basin.

12.2 Antalya 2050 Shared Future Vision

Antalya's future must be built upon an integrated development approach that effectively manages the risks posed by climate change, protects natural resources, achieves economic growth in accordance with sustainability principles and continuously improves quality of life. This vision represents a long-term development perspective that addresses not only environmental sustainability but also economic competitiveness, social welfare, technological transformation and institutional capacity together. This shared future vision extending to 2050 aims to evaluate Antalya's natural, cultural and economic assets not merely as values to be preserved for future generations but also as opportunities created by climate change. This approach seeks to further develop the city's existing strengths, reduce climate-related vulnerabilities and make sustainable development a permanent feature.

In line with this vision, Antalya aims to become a model city that has ensured water security, uses water resources efficiently, promotes advanced treatment and recycling technologies, and effectively manages alternative water resources. Water management will be regarded not merely as an environmental service but as a strategic component that safeguards the sustainability of agriculture, tourism, industry and urban life. In the energy sector, Antalya will become one of the leading cities that increase renewable energy production, integrate energy efficiency into all areas of life, invest in low-carbon technologies and make the clean energy transition a fundamental component of economic development. From public buildings and industrial facilities to tourism establishments and housing, energy efficiency and carbon reduction will become fundamental policies across all sectors. In the agricultural sector, the objective is to establish a sustainable production structure that uses water more efficiently, adopts climate-resilient production models, protects biodiversity and supports high-value-added production. Antalya will increase its international competitiveness not only through its production volume but also through high-quality, reliable and sustainable agricultural production. The protection of natural ecosystems is one of the indispensable elements of this shared vision. Forests, wetlands, coastal areas, marine ecosystems and biodiversity will be regarded not merely as natural assets requiring protection but also as the city's strongest natural defence mechanisms against climate change. Nature-based solutions will become an integral part of urban planning.

The tourism sector will be restructured in line with sustainability principles. Antalya aims to become one of the world's leading destinations in sustainable tourism transformation by adopting a four-season, low-carbon and environmentally responsible tourism model that highlights local values and prioritizes resource efficiency.

In the fields of industry and production, the circular economy approach will be promoted, resource efficiency will be increased, waste generation will be reduced and innovative technologies will be supported. Antalya's economic growth will be sustained through a green production approach that uses resources more efficiently rather than increasing natural resource consumption.

From a blue economy perspective, Antalya's coasts, ports and marine resources will be managed in accordance with sustainable use principles. Marine tourism, fisheries, maritime transport, coastal protection and marine ecosystem restoration will be addressed as complementary policies, and Antalya's maritime heritage will be integrated into its future development strategies.

The approach to urbanization will also be transformed in line with this vision. Antalya's quality of life will be improved by creating disaster-resilient, energy-efficient, green infrastructure-supported, walkable, accessible and liveable neighbourhoods. Climate change adaptation will become one of the fundamental principles of all spatial planning processes.

One of the most important components of this shared future vision is strong governance. Antalya will develop an exemplary governance model that ensures effective coordination among institutions, makes decisions based on scientific data, uses digital technologies, accesses international financing sources and includes all segments of society in decision-making processes. Thus, combating climate change will become a shared responsibility of society as a whole, rather than solely that of public institutions.

By 2050, Antalya aims to become **one of the reference cities for sustainable development in the Mediterranean Basin, resilient to the impacts of climate change, protecting its natural resources, reducing its carbon footprint, expanding its green economy, attracting international investment and providing a high quality of life.**

This vision represents not merely a set of objectives but Antalya's shared determination, shared responsibility and shared future. All strategies, policies and projects presented throughout the report serve to realize this common vision. Success will depend not only on institutions but also on the ability of public administration, the private sector, universities, civil society and all residents of Antalya to act together towards the same objective.

Antalya's 2050 vision is a concrete expression of its determination to become **a world city that protects its nature, strengthens its economy, prepares its society for the future and transforms climate change into a driving force for sustainable development.** This vision will not only prepare Antalya for the future but will also establish a development model that inspires, sets an example and leads the way for Türkiye and the Mediterranean region.

12.3 Strategic Roadmap for Antalya

Achieving Antalya's climate-resilient development objectives depends not only on a long-term vision but also on implementing an applicable, measurable and phased roadmap. Therefore, it is of great importance that the policy and project recommendations presented in the report are planned according to their order of priority, the necessary institutional capacity is established and financial resources are used effectively. The proposed strategic roadmap consists of three main implementation periods: **short term (2026–2030), medium term (2030–2040) and long term (2040–2050).** Each period has been designed to establish the foundation for the subsequent phase.

12.3.1 First Phase: Institutionalization and Preparation Period (2026–2030)

The main objective of the first phase is to establish the governance model proposed in the report, ensure institutional coordination and develop the technical infrastructure required to manage the transformation process. During this period, the following should be prioritized:

* Establishment of the Antalya Climate Governance Board,
* Operationalization of the Antalya Climate Coordination Centre,
* Establishment of the Antalya Climate Finance Office,
* Development of the Antalya Climate Data Platform,
* Preparation of the Antalya Green Project Portfolio,
* Updating sectoral greenhouse gas inventories,
* Completion of climate risk maps,
* Establishment of an interinstitutional data-sharing system,
* Initiation of international financing applications.

These objectives should be achieved. This period will also be characterized by the intensive implementation of capacity-building and training programmes for public institutions, local governments and the private sector.

12.3.2 Second Phase: Transformation and Investment Period (2030–2040)

The second phase is the period during which the institutional infrastructure established during the preparation phase is translated into large-scale investments. During this process, the following should be implemented:

* Water management investments,
* Advanced water recycling systems,
* Renewable energy projects,
* Energy efficiency applications,
* Sustainable transportation systems,
* Circular economy investments,
* Resilient urban infrastructure,
* Coastal protection projects,
* Ecosystem restoration,
* Sustainable agricultural practices,
* Blue economy projects.

These initiatives should be implemented simultaneously. During this period, Antalya's capacity to access international climate finance should be significantly increased, and the volume of green investments should be expanded through the promotion of public-private partnerships.

12.3.3 Third Phase: Global Leadership and Sustainability Period (2040–2050)

The final phase is the period during which Antalya completes its climate-resilient development model and becomes one of the internationally recognized model cities. During this period, the following objectives are envisaged:

* Significant reduction of carbon emissions,
* Full achievement of water security,
* Widespread use of renewable energy,
* Adoption of circular economy practices across all sectors,
* Strengthening of natural ecosystems,
* Completion of the sustainable tourism model,
* Expansion of climate-resilient urban infrastructure,
* Becoming one of the international investment and financing centres.

These objectives are to be achieved. At this stage, Antalya aims to become not merely an implementing city but a global reference city that generates knowledge, shares experience and provides guidance to other cities.

12.3.4 Prioritization Approach

The following prioritization principles should be adopted when implementing the projects proposed in the roadmap:

* Giving priority to projects that reduce the highest climate risks,
* Accelerating investments that ensure water security and the protection of natural resources,
* Supporting practices with the highest carbon reduction potential,
* Encouraging green investments with high economic returns,
* Prioritizing projects with high social benefits,
* Preparing projects with a high probability of securing international financing in the initial phase,
* Integrating nature-based solutions across all sectors.

12.3.5 Monitoring, Evaluation and Updating Process

The roadmap should be regarded not as a static document but as a dynamic governance system. In this context:

* Implementation performance should be evaluated annually,
* A strategic review should be conducted every five years,
* New scientific data and climate projections should be taken into account,
* Targets should be updated in line with technological developments and financing opportunities,
* International commitments and changes in national policies should be integrated into the roadmap.

Through this approach, Antalya will have a dynamic governance model capable of adapting to changing conditions.

12.3.6 Shared Responsibility and Shared Success Approach

The success of this roadmap cannot be achieved solely through the efforts of public institutions.

Central government, local governments, universities, the private sector, professional organizations, financial institutions, civil society organizations and citizens will build Antalya's climate-resilient future by working together towards shared objectives.

The responsibilities undertaken by every institution, every sector and every individual throughout this transformation process will be a fundamental determinant of Antalya's success.

Overall Assessment

This strategic roadmap is a concrete transformation plan that enables all objectives presented in the report to be translated into implementation. The roadmap is not merely a timetable listing the activities to be undertaken; it presents **an integrated development model that protects Antalya's natural capital, enhances its economic competitiveness, strengthens social resilience and develops its international investment capacity.**

When implemented with determination, this roadmap will take Antalya beyond merely becoming a city that has adapted to climate change by 2050, positioning it as **a globally recognized model city in the Mediterranean Basin that leads green development, effectively utilizes international climate finance, and offers a high quality of life and sustainability.**

CHAPTER 13

SHARED COMMITMENT AND CLOSING

Antalya's Joint Declaration of Commitment to a Climate-Resilient Future

Purpose of the Chapter

This chapter presents the shared commitment and final message of the **Antalya 2050 Climate-Resilient Development Strategy – COP31 Joint Policy Report.**

The policy recommendations, strategic objectives and implementation instruments developed throughout the report are brought together in this chapter around a shared vision for the future; Antalya's commitment to its sustainable development journey is expressed through a strong declaration of institutional and societal determination.

Beyond technical analyses, this chapter serves as a strategic conclusion reflecting the shared sense of responsibility of Antalya's public institutions, local governments, universities, professional organizations, private sector, civil society organizations and all stakeholders.

Scope of the Chapter

This chapter addresses:

* Antalya Shared Future Commitment,
* COP31 Antalya Declaration,
* Antalya 2050 Manifesto.

Under these headings, Antalya's climate-resilient development vision is presented as a declaration of shared commitment.

Core Message of the Chapter

The greatest asset in combating climate change is collective wisdom, shared determination and shared responsibility.

Achieving Antalya's 2050 objectives depends not only on the strategies developed but also on the ownership and determined implementation of these strategies by all stakeholders.

13.1 Antalya Shared Future Commitment

Antalya, with its natural wealth, historical heritage, production capacity, tourism potential, agricultural capacity, maritime culture and entrepreneurial spirit, is a shared asset not only of today but also of future generations. Protecting and developing this shared asset is not the responsibility of a single institution or a single sector, but a shared duty of everyone living in Antalya and connected to the city.

Climate change is no longer a prediction about the future but a tangible reality affecting every aspect of life. Declining water resources, rising temperatures, drought, forest fires, biodiversity loss, pressures on coastal areas and economic vulnerabilities make it necessary to reshape Antalya's development approach. In this new era, success will depend not only on the pace of growth but also on the sustainability of growth, effective resource management and social solidarity.

This report is the product of a shared vision developed through the contributions of different institutions, experts, professional organizations, universities, private sector representatives and civil society organizations. Therefore, the objectives presented here are not merely recommendations; they represent a shared determination regarding Antalya's future and a commitment to acting together.

In line with this understanding, we adopt the following fundamental principles as our shared commitment:

* To adopt a development approach that ensures the healthy preservation of Antalya's natural assets, water resources, forests, agricultural lands, coasts and marine ecosystems for future generations,

* To make climate change mitigation and adaptation policies an integral part of all planning and investment processes,

* To strengthen a governance approach based on scientific data, participatory governance and transparent decision-making processes,

* To develop continuous cooperation among public institutions, local governments, universities, the private sector, professional organizations and civil society,

* To recognize water efficiency, energy transition, circular economy and resource efficiency as fundamental elements of Antalya's economic competitiveness,

* To transform agriculture, tourism, industry, transportation and urbanization policies in accordance with climate-resilient development principles,

* To support the active participation of young people, women and local communities in decision-making and implementation processes,

* To strengthen Antalya's transformation capacity by making the greatest possible use of national and international climate finance opportunities,

* To regularly monitor progress, measure performance and continuously update policies in response to changing conditions,

* To position Antalya as a model city in the Mediterranean Basin in the fields of climate resilience, innovation and sustainable development,

we accept these principles as our shared responsibility.

This commitment aims not only to meet today's needs but also to leave a more liveable, more resilient and more prosperous Antalya for our children and future generations. Therefore, we regard developing the necessary cooperation, strengthening collective wisdom and actively participating in implementation processes to achieve the objectives set out in the report as our shared duty.

Antalya's future will be secured to the extent that we can come together around shared objectives while preserving our differences. The success of the vision presented in this report will only be possible through mutual trust among institutions, social participation and a strong commitment to implementation based on sustainable cooperation.

The shared commitment we present today is not merely a declaration of intent. It also marks the beginning of a long-term transformation journey that will enhance Antalya's resilience to climate change and establish its economic and social development on sustainable foundations.

With this awareness and sense of responsibility, we adopt and embrace this Shared Future Commitment, determined to protect Antalya's natural heritage, strengthen its economic development in line with sustainability principles, enhance social welfare and resolutely implement the shared vision that will enable Antalya to achieve its 2050 objectives.

13.2 COP31 Antalya Declaration

Joint Declaration for a Climate-Resilient Antalya

We, as participants representing public institutions, local governments, universities, professional organizations, the private sector, civil society organizations, producers, entrepreneurs and all stakeholders contributing to Antalya's shared future;

Recognizing that climate change is not merely an environmental issue but a global transformation process that directly affects economic development, social welfare, food and water security, energy systems, urbanization, biodiversity and quality of life;

Accept the responsibility of preserving Antalya's natural, cultural and economic values and leaving a strong, resilient and sustainable city for future generations as a shared duty.

In line with this understanding, we declare the following principles as our shared commitment.

1. Collective Wisdom and Participatory Governance

We support decisions concerning Antalya's future being made in accordance with the principles of transparent, participatory, science-based and accountable governance. We believe that solutions jointly developed by the public sector, private sector, academia and civil society constitute the city's greatest strength.

2. Water Security Is Our Shared Priority

We regard the protection of water resources, their efficient use, the widespread adoption of water reuse and the implementation of an integrated river basin management approach as one of the fundamental conditions for Antalya's sustainable future.

3. A Low-Carbon and Competitive Economy

We support increasing energy efficiency, promoting renewable energy investments, adopting circular economy principles and establishing production models that reduce the carbon footprint as the foundation of Antalya's economic transformation.

4. Protection of Natural Capital

We recognize the protection of forests, coastlines, seas, wetlands, biodiversity and agricultural lands not only as an environmental responsibility but also as an indispensable element of economic and social development.

5. Climate-Resilient Cities

We advocate placing an urban development approach that reduces disaster risks, strengthens green infrastructure, supports sustainable transportation, improves quality of life and ensures adaptation to climate change at the centre of Antalya's development policies.

6. Sustainable Tourism and Blue Economy

We prioritize the development of tourism through an approach that protects natural resources, strengthens the local economy and places environmental sustainability at its core, as well as supporting innovative practices in maritime activities, coastal management and the blue economy.

7. Science, Technology and Innovation

We believe that scientific research, data-driven decision-making processes, digital technologies and innovative solutions are fundamental instruments of Antalya's climate-resilient development.

8. Green Finance and International Cooperation

We support the effective utilization of national and international climate finance resources, the strengthening of the green investment ecosystem and the enhancement of Antalya's global visibility through international cooperation.

9. Social Participation and Intergenerational Responsibility

We support the active participation of young people, women, children and all segments of society in the formulation and implementation of climate policies, and place our responsibility towards future generations at the centre of all our decisions.

10. Antalya 2050 Shared Vision

We commit to working together to ensure that Antalya becomes a Mediterranean city that has achieved water security, protects its natural assets, adapts to climate change, develops a low-carbon economy, leads in sustainable tourism and agriculture, strengthens its blue economy, achieves resilient urbanization and serves as an internationally recognized model.

Common Call

We regard the COP31 process not merely as an international conference, but as a strategic turning point that will strengthen Antalya's long-term development vision, expand international cooperation and accelerate its climate-resilient transformation.

Therefore, we invite all public institutions, local governments, universities, professional organizations, the private sector, civil society organizations, international institutions and all stakeholders wishing to contribute to Antalya's future to become part of this shared vision.

Antalya's future will be shaped by collective wisdom, shared responsibility and common determination. This declaration represents not the conclusion of the COP31 process, but the shared commitment of all stakeholders who recognize it as the beginning of a collective journey towards Antalya's climate-resilient, competitive and sustainable future.

13.3 Antalya 2050 Manifesto

A Shared Promise for the Future of a City

The cities of every era are remembered not only for the structures they build, but also for the collective determination they demonstrate for the future.

Today, Antalya stands at such a turning point.

On one side are the impacts of climate change, increasing water stress, pressures on natural resources, rapid urbanization and global competition; on the other are its strong human capital, production capacity, unique natural heritage, agriculture, tourism, industry, maritime potential and entrepreneurial culture.

The choice made between these two realities will determine not only Antalya's quality of life over the coming years, but also that of future generations.

As all stakeholders who have prepared and contributed to this report, we believe that Antalya's future will not be left to chance.

We believe that:

Antalya's future lies not in consuming more,

but in managing its resources more wisely.

Not in building more,

but in developing in harmony with nature.

Not in growing more,

but in becoming more resilient as it grows.

Not in competing more,

but in creating value through cooperation.

True development is measured not merely by economic indicators, but by people's quality of life, the protection of natural assets, social justice and the legacy left to future generations.

Therefore, Antalya's new development approach must be a holistic one that protects water resources, uses energy efficiently, strengthens the soil, keeps its seas clean, sustains biodiversity, preserves its cultural heritage and builds economic development on the principles of sustainability.

This manifesto has been prepared not only to address today's challenges, but also to create tomorrow's opportunities today.

Because we know that:

Climate change is not merely a risk.

When properly managed, it can also mark the beginning of new technologies, new investments, new employment opportunities and a stronger economic structure.

Antalya possesses the knowledge, experience and potential to lead the Mediterranean's climate-resilient transformation.

The most important strength we need for this is collective wisdom.

Collective wisdom means different institutions thinking together,

shared determination means making decisions together,

and shared responsibility means implementing them together.

When these three elements come together, there is no goal beyond Antalya's reach.

Every recommendation, strategy and project presented throughout this report is not merely a technical proposal, but also part of a shared vision for the future.

What matters now is:

moving from discussion to implementation,

from planning to action,

and from statements of good intentions to measurable results.

The coming years will be a period in which cities capable of adapting to climate change will rise, while those that remain unprepared will lose their competitiveness.

Antalya's choice is clear.

Antalya will be:

a city that plans for the future rather than waiting for crises.

A city that grows by protecting its resources rather than consuming them.

A city that develops solutions today rather than postponing problems.

A city that does not merely follow international developments,

will aim to become one of the cities that shape them.

This goal is not solely the goal of public institutions.

This goal;

of farmers,

industrialists,

tourism professionals,

academics,

young people,

entrepreneurs,

workers,

local administrators,

civil society,

and everyone living in Antalya.

Because cities can achieve great success only to the extent that they can envision shared dreams.

The manifesto we present today is a promise made to Antalya's shared future.

This promise is:

A promise to nature.

A promise to our children.

A promise to those who produce.

A promise to the Mediterranean.

A promise to Türkiye.

And a promise to the shared legacy we will leave to future generations.

We believe that:

Guided by science,

with the strength of collective wisdom,

through participatory governance,

with an awareness of environmental responsibility,

and with a strong determination to unite economic development with the principles of sustainability,

a will become one of the exemplary climate-resilient cities not only in Türkiye, but also in the Mediterranean Basin and the world.

This manifesto is not a final statement.

On the contrary, it is the first step in a long-term journey towards Antalya's shared future.

The step we take today represents our collective determination to build a safer, more prosperous and more liveable Antalya tomorrow.

We believe in Antalya's future.

We believe in collective wisdom.

We believe that sustainable development is possible.

And we believe that together, we will succeed in Antalya's journey towards 2050.

"Antalya's Future Will Be Shaped by the Power of Collective Wisdom."

Antalya Civil Platform

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