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ENHANCING ADAPTATION ACTION IN TURKEY PROJECT

TR2017 ESOP MI A3 04

LOCAL CLIMATE CHANGE ADAPTATION PLANNING GUIDELINE

SEPTEMBER 2021



REPUBLIC OF TURKEY
MINISTRY OF ENVIRONMENT
AND URBANISATION



Environment and Climate Action
Sector Operational Programme



iklime uyum





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Prepared by: Assoc. Prof. Dr. Dođan Dursun, Naz Beykan

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TABLE OF CONTENTS

INTRODUCTION	1
GENERAL FRAMEWORK FOR LOCAL ADAPTATION GUIDELINES	4
STEP 1. MEETING THE PREREQUISITES.....	5
1.1. Political commitment at the local level	5
1.2. Determining the motivation for local climate change adaptation	5
1.3. Framing the coordination structure	6
1.4. Identifying human resource and technical capacity needs	7
1.5. Identifying funding needs and sources and process budgeting	8
1.6. Ensuring stakeholder engagement and cooperation	8
1.7. Developing a communication strategy.....	11
1.8. Awareness-raising and capacity development studies	12
1.9. Associating and integrating climate change adaptation with other local government legislation and activities.....	13
Checklist.....	13
STEP 2. EVALUATION OF CLIMATE SCENARIOS AND RISKS, VULNERABILITIES AND OPPORTUNITIES	15
2.1. Reference period and present climate change analysis.....	16
2.2. Future period climate change (climate scenarios) analysis.....	17
2.3. Identifying the components and systems exposed to local climate change	18
2.4. Understanding present social, economic and environmental stresses and dependencies concerning local component and systems	18
2.5. Carrying out sensitivity analyses for cities	19
2.6. Rating present and future risks for cities	22
Checklist.....	23
STEP 3. DETERMINATION OF VISIONS AND PRINCIPLES.....	24
3.1. Determining climate change adaptation vision for cities.....	24
3.2. Determining the principles to consider when framing strategies and actions	25
3.3. Determining climate change adaptation goals.....	26
3.4. Determining climate change adaptation objectives	27
3.5. Determining monitoring and evaluation indicators for goals and objectives.....	27
Checklist.....	28
STEP 4. DETERMINATION OF ADAPTATION OPTIONS	28
4.1. Establishing adaptation options	28
4.2. Cataloguing adaptation options	28



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Checklist.....	30
STEP 5. PRIORITIZATION OF ADAPTATION OPTIONS	30
5.1. Determining a method for assessing adaptation options	30
5.2. Determining prioritization criteria for adaptation options	31
5.3. Gathering information to enable assessment of adaptation options	33
5.4. Prioritizing and selecting adaptation options.....	33
Checklist.....	34
STEP 6. FORMULATION OF ADAPTATION STRATEGY AND ACTION PLAN.....	35
6.1. Timetable / Duration	35
6.2. Establishing roles and responsibilities and collaborations.....	35
6.3. Establishing human sources	36
6.4. Identifying of financial sources.....	36
6.5. System framing for monitoring, reporting and evaluation	36
6.6. Documenting and bringing the plan into force	37
Checklist.....	38
STEP 7a. IMPLEMENTATION.....	39
Checklist.....	39
STEP 7b. MONITORING AND EVALUATION	40
Step 7b.1. Continuous monitoring	40
Step 7b.2. Regular reporting	40
Step 7b.3. Evaluation.....	40
Checklist.....	40
STEP 8. STRATEGY AND PLAN REVISION OR UPDATE.....	41
8.1. Evaluating the lessons learned	41
8.2. Returning to Step 2.....	41
Checklist.....	41



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Enhancing Adaptation Action in Turkey Project

INTRODUCTION

Climate change has increasingly devastating impacts on human life and settlements. Climate change refers to the changes in the average climatic conditions of the world due to the increasing average temperatures of the atmosphere. The current average temperature changes lead to changes in seasons and increase the frequency of occurrence or observation of extreme weather events. While natural processes are known to cause climate change, the factors leading to climate change do not arise from the nature alone. According to various reports by the Intergovernmental Panel on Climate Change (IPCC), the main cause of the ongoing warming since the Mid-20th Century is the increasing greenhouse gas concentrations resulting from the emissions from human activities. There is a consensus across the world that the use of fossil fuel which has particularly intensified after the Industrial Revolution, land use changes, destruction of natural ecosystems, and ongoing industrialization and urbanization dynamics are the main causes of climate change.

At this point, it is greatly important to mitigate the impacts of climate change; yet it does not seem possible to avoid the impacts of climate change altogether even if the mitigation measures are fully implemented. Therefore, in addition to mitigation measures, climate adaptation actions are required in order to keep climate change at lower levels and reduce the vulnerability of humankind against climate change. Adaptation refers to the arrangements in the ecological, social, or economic systems as a response to actual or anticipated climate change and its impacts. It also involves the changes to be made to mitigate potential losses and make use of the opportunities that may arise along with climate change. Therefore, the process of climate change must be slowed down through mitigation actions while measures must be taken against the unavoidable consequences of climate change by addressing pre-disaster and post-disaster vulnerabilities through adaptation actions. The further delayed the adaptation efforts in response to the speed of climate change, the more difficult and costly it will be to adapt to such impacts.

Cities have a significant role in this process in terms of formulating and implementing mitigation and adaptation actions. In the cities that have been and will be affected by significant impacts of climate change, socially, economically, culturally, politically, institutionally or otherwise marginalized groups tend to be affected more adversely by climate change compared to the other segments of society, particularly due to their limited capacity to adapt to climate change. Therefore, severe consequences are anticipated on the health and means of livelihood of certain segments of society that are referred to as vulnerable groups. The impacts of climate change bring along a broad range of problems such as increasingly frequent occurrences of extreme weather events and floods, high temperatures, and public health issues and may vary according to the typical characteristics of each city.

Although every city has a different context, the incidence frequency of climate-induced extreme weather events and therefore climate-related natural hazards such as tsunamis, hurricanes, and floods will increase. Cities provide important opportunities to develop adaptation policies/actions against climate change impacts that will have various adverse consequences for different community groups. Urban development plans can be used as a platform to develop climate change mitigation and adaptation plans. The plans to be formulated by considering the gradual or progressive changes in climate will make a significant contribution to the adaptation efforts in cities.

Cities are one of the primary sources of greenhouse gas emissions. Due to the environmental destruction, they cause during their growth and the fact that the majority of the world population lives and maintains their economic activities in urban areas, cities must formulate adaptation solutions and implement adaptation actions to respond to the impacts of the changing climate as well as preparing for its future impacts. Making urban life more sustainable and cities more resilient to climate-related



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disasters depends on understanding climate change, taking into account the fact of climate change in urban plans, and formulating plans that predict long-term climate risks. Although mitigation-oriented actions are required primarily to avoid the adverse impacts of climate change, it is also imperative that adaptation strategies are developed in response to the changing climate.

Cities, which are generally the first places to face the impacts of climate change, must initiate the process of adaptation as soon as possible. The adaptation process involves being prepared for climate change and evaluating the adverse impacts as well as potential opportunities. As dynamic systems, cities that variously face climate impacts must determine adaptation actions specific to own local conditions. Many cities are facing rapid urbanization, informal settlement expansion, poverty, inadequate infrastructure, and environmental degradation. Combined with concerns such as the need for development, such factors limit the capacity of cities to adapt to the current climate variability. Despite all such limitations, cities constitute an important part of the solution when it comes to climate change due to the scale advantages they offer. Accordingly, the impacts of the adaptation actions or solutions to be identified in cities can go beyond expectations. The adaptation actions to be determined will vary depending on the structure of urban dwellers, and commercial and industrial enterprises and organizations. In that sense, there cannot possibly be a single solution fitting every city and every settlement. Adaptation actions range from building weirs and early warning systems against floods to transitioning to drought-resistant types and building communication systems. Successful adaptation actions depend not only on governments and relevant leaders but also on efficient and sustainable engagement by national, international, and regional institutions, public and private sectors, civil society, and other relevant stakeholders. In this framework, adaptation actions must follow a gender-sensitive, participatory, and completely transparent approach by taking vulnerable groups, communities, and ecosystems into consideration. Urban climate change adaptation requires solutions based on cross-sectoral coordination and cooperation. Similarly, when considering the impacts of climate change on various sectors such as land use, sheltering, transportation, public health, water, solid waste, food security, and energy; sectoral adaptation efforts require the involvement of numerous government institutions, local communities, non-profit organizations, academic institutions, and the private sector in this process.

In addition to the engagement process, the efficient use of knowledge is a determinant in the success of an adaptation process. Adaptation actions are globally challenging for everyone at local, regional, national, and international scales and an important component of people's struggle against climate change to protect their livelihoods and the ecosystem. Thus, they must be based on science and, if applicable, traditional knowledge. Collecting information on the impacts of climate change in a city is a quite technical and resource-intensive process. The process may also introduce other requirements depending on the capacity of the cities and relevant institutions.

Urban adaptation actions must not be considered merely as mitigating climate change or adapting to its consequences; they can provide common benefits for local economic development, as well. For example, the green building implementation will provide energy efficiency and cost savings by reducing greenhouse gas emissions while providing natural cooling during warmer periods. Therefore, it must be taken into account that resilience-enhancing adaptation actions and investments for urban infrastructures and superstructures may boost urban competitiveness and attractiveness for private sector investments.

Identifying simple and low-cost adaptation actions that cities may carry out in their daily operations is extremely important, considering their resource limitations and varying priorities. Taking into account that cities have limited high-budget investment facilities for climate change adaptation, various tools must be used and implemented to determine and prioritize which recommended adaptation action or actions to follow.



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In conclusion, it must be recognized that adaptation actions are not a one-off effort but an ongoing cycle of preparation, response, and revision. The foundation for the strongest adaptation processes concerns leading, envisioning, creating options, prioritizing, framing, and assessing and evaluating efficiency and progress. Adaptation actions will help cities use their limited resources to produce maximum common benefits while avoiding unfavourable consequences. Considering climate change adaptation actions in a broader scale that involves disaster risk reduction as well as sustainable development and reduced poverty will make cities more successful. Additionally, integrating the existing planning processes and objectives with such topics will contribute to their success.



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GENERAL FRAMEWORK FOR LOCAL ADAPTATION GUIDELINES



Additional sources for local adaptation work:

- Urban Adaptation Support Tool available at the EU's climate adaptation platform, Climate-ADAPT (<https://climate-adapt.eea.europa.eu/knowledge/tools/urban-ast/step-0-0>)
- Adaptation Wizard (<https://www.ukcip.org.uk/wizard/>) tool developed by the United Kingdom under the Climate Impacts Programme (UKCIP)
- "Planning for Adaptation to Climate Change: Guidelines for Mayors", an output of the Adapting to Climate Change in Time project funded by LIFE (<https://base-adaptation.eu/planning-adaptation-climate-change-guidelines-municipalities>)
- Transition Handbook and Training Package, an output of the RAMSES project carried out in the EU (<https://ramses-cities.eu/resources/>)
- "Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments" drafted by the Climate Impacts Group and ICLEI – Local Governments for Sustainability network (<https://cig.uw.edu/publications/preparing-for-climate-change-a-guidebook-for-local-regional-and-state-governments/>)

For local governments drafting integrated mitigation and adaptation action plans:

- Climate Action Planning Framework prepared by the C40 local government network (<https://resourcecentre.c40.org/climate-action-planning-framework-home>)



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STEP 1. MEETING THE PREREQUISITES

This step aims to build the ecosystem that will be required in developing and implementing an adaptation strategy at the local level. The ecosystem consists of structures and activities such as local legislative framework, institutional capacity and resources, integrating existing strategies and activities with adaptation, stakeholder engagement, cooperation, efficient communication, awareness-raising, and capacity development. The components comprising such prerequisites are more than merely a step to overcome; they are efforts that must be maintained throughout the process, supporting all of the steps.

The 2018-2022 Strategic Plan of the Ministry of Environment and Urbanization aims to ensure that 30 metropolitan municipalities formulate a climate change action plan by 2022.

If this is not the first planning carried out by the local government, the structures and relations built in Step 1 can be arranged based on the conclusions obtained from the preparation and implementation of the previous plan.

1.1. Political commitment at the local level

As it does not align with short-term budgetary and political processes, local governments can be slow to act on climate change adaptation due to different urgencies in their busy agenda, lack of awareness of managers and personnel on the subject, or the long-term and uncertain nature of climate change. However, it is a prerequisite for chief local government executives (e.g., mayor, vice mayors, division heads) to lead the process in order for the adaptation action to succeed at the local level.

Local government leaders (e.g., mayors and division heads) can publicly communicate their political commitments on adaptation through written statements. The statement can establish the motivation to take action, which is identified in [Step 1.2](#). Furthermore, local governments can update their procedures and regulations to materialize their commitments on adaptation action.

If this is not the first planning carried out by the local government, the statement of commitment will update the action commitments in line with the vision of climate change adaptation, accentuating the successes and lessons learned in the preparation and implementation of the previous plan.

1.2. Determining the motivation for local climate change adaptation

It is important to clearly define the grounds that trigger acting on local climate change adaptation from the very beginning. These grounds will play a vital role in determining the vision for adaptation under [Step 3](#).

Local adaptation strategies can be developed and implemented for various reasons. Some of the most common motivations observed in local governments are listed below:

- Legal obligation at national level,
- Demand from local stakeholders,
- Destructive local climatic disasters,
- Increased awareness on the reputational, medical, safety and cost-related risks of the impacts (generally in the form of disasters) of climate change,
- Being responsible for the vulnerable infrastructures and services in the face of climate change,
- Willingness to increase branding, investment attraction and competitiveness,
- Meeting the membership prerequisites for international local government networks,
- Willingness to address greenhouse gas mitigation actions and adaptation in an integrated manner.



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A local government can determine the motivation(s) with which to develop an adaptation strategy by examining current experiences and the demands and responses from citizens and through consultative meetings with internal divisions. The motivation can be shared with the public and the stakeholders in the political commitment under [Step 1.1](#).

1.3. Framing the coordination structure

A team, unit, or specialist in charge of coordinating all adaptation-related steps (from [Step 1](#) to [Step 8](#)) must be identified.

The responsible team, unit, or specialist will begin with a roadmap to develop an adaptation strategy and action plan (from [Step 1](#) to [Step 6](#)). The roadmap must establish the process objectives, which stakeholders to engage, and the coordination needs with relevant local government units.

The efficiency of the process will be enhanced if the responsible team, unit, or specialist reports directly to a senior executive as high in the hierarchy as possible (if possible, the mayor) in the local government. The teams or units must consist of persons with the right skills and knowledge and can be changed or enhanced over time according to needs.

Option 1. Establishing a Team or Working Group for Adaptation in the Existing Structure

Since several services and tasks of the local government will be affected by climate change, a team or working group can be established that comprises various unit representatives. Team members must be selected from among the (non-administrative) personnel with a technical specialty in the area of study of the unit they represent.

Capacity development programmes must be developed to enhance the knowledge and skills of the team to be established from among the available personnel, according to their climate change specialties ([Step 1.8](#)).

While this option does not require additional personnel and is more suitable for small scale local governments with a limited budget, it must be taken into account that its efficiency can be limited as it may increase the workload of the existing personnel.

Option 2. Establishing a Unit for Adaptation

A unit responsible for coordinating, implementing, and monitoring the adaptation processes can be established within the local government. The unit's position in the local government's organizational chart will have direct influence on its efficiency. All service units must be informed of the tasks and responsibilities of this unit and how such tasks and responsibilities relate to their own activities.

The local government can recruit personnel to work in the intersecting areas of climate change and service. It will be beneficial to select the personnel to work in this unit from among the specialties that are related to the basic climate change impacts encountered by the local government in its jurisdiction. For example, it would be effective to appoint a tourism specialist in a tourism-intensive city or a flood management specialist in a city with frequent floods. Adaptation-related specialties can be listed as follows: climatology, land or marine biodiversity, coastal and marine ecosystems, cultural heritage, forestry, parks and recreation areas, flood management, insurance, water resources, sustainable development, urban planning, agriculture, tourism, and transportation.

This option is more suitable for (mostly large scale) local governments with greater resource access and capacity.



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Option 3. Appointing A Specialist Responsible for Adaptation

The local government can appoint a senior climate change specialist in charge of adaptation strategy development and coordination under the administrative structure (e.g., the mayor). This individual must have the technical expertise to conduct research and keep up with the developments on climate change, managerial experience to carry out an interdisciplinary adaptation process, and strong communication skills to foster stakeholder engagement.

The task effectiveness of the specialist can be enhanced if he/she is positioned above all units taking part in adaptation-related actions in the organizational chart. In order to ensure healthy coordination, a responsible person must be identified from each local government unit to carry out communications with the adaptation specialist.

This option is more suitable for small scale local governments with a limited budget.

Option 4. Establishing A Centre for Climate Change Efforts

A centre can be established in cooperation with the local government, academia, and other stakeholders to set the stage for the multi-stakeholder efforts required for climate change response. The administration board of the centre can comprise representatives from the local government and relevant stakeholders. The human resource, spatial, and equipment and resource needs of the centre can be jointly covered in kind and cash by stakeholders.

This option is suitable for both small and large scale local governments.

Advisory Boards and Cooperation

Since it would be difficult for local governments to carry all the technical specialties required for adaptation due to climate change impacts crossing over jurisdictions, sectors, and scales; local governments must consider engaging external stakeholders in their governance as more creative solutions can be developed through diverse perspectives.

The capacity deficiencies of local governments in adaptation can be eliminated through advisory boards comprised of external stakeholders, scientific advisory boards, or stakeholder cooperation referred to in [Step 1.6](#). The following qualifications can be sought in prospective advisory board members:

- Actively taking part in knowledge production or scientific research on climate change,
- Ability to guide planning processes by overseeing the uncertainties in the scientific data,
- Strong communication skills to relay scientific knowledge to different groups comprehensibly,
- Open to understanding the modus operandi of the local government.

Yet, it must be considered that there may be time and financial limitations for such specialists to make time for advisory boards. Some solutions such as allotting additional budget or making official appointments may be required to overcome such limitations.

1.4. Identifying human resource and technical capacity needs

Climate change adaptation requires interdisciplinary efforts involving multiple stakeholders.

According to the governance model established in [Step 1.3](#), human resource and technical infrastructure deficiencies in the local government must be identified in order to develop and implement the policies, plans, and actions required for adaptation. Annual budgets and business plans must be formulated to recruit the required human resources and build the necessary infrastructure.



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If the human resource requirements are to be met internally within the local government, it will be important to concentrate on awareness raising and capacity development ([Step 1.8](#)) programmes by considering the likelihood that in-house personnel may not be specialized in climate change. In the case of recruiting external human resources, capacity development programmes are also recommended for the technical improvement of the new personnel, since adaptation is an extensive subject.

Cooperation can be considered with stakeholders such as the academia and private sector to provide support regarding the human and technical resources that are not available in the local government ([Step 1.6](#)).

1.5. Identifying funding needs and sources and process budgeting

Local governments need to have the financial capacity to carry out adaptation strategy and action plan development processes and finally implement the identified adaptation actions. Restricted financial sources are one of the main barriers to adaptation planning and implementation. While local governments can often provide funding for the planning process, engagement and implementation processes may face bottlenecks in funding. Identification and in-depth framing of funding sources for implementation will be carried out in [Step 6](#).

The sources from which a local government can obtain the funding required for adaptation are listed below.

- International funds (e.g., Ufuk2020 grants)
- National public funding (e.g., grants, budget appropriation)
- Local public funding (e.g., budgeting)
- Banks and other financial institutions (e.g., loans, guarantees, or grants received directly or through commercial banks)
- Private sector funding
- Insurance and reinsurance
- Disaster/catastrophe bonds
- Public-private cooperation
- Green bonds
- Micro-finance
- Crowdfunding
- Individual/institutional donations

1.6. Ensuring stakeholder engagement and cooperation

Climate change concerns a broad group of stakeholders. Stakeholders' engagement in planning and implementation will enhance efficiency and ownership. Therefore, it is important to identify the relevant stakeholders and understand their interests concerning adaptation.

The teams, units, or personnel in the local government that are in charge of adaptation can take part in ensuring the engagement of stakeholders. Additionally, experienced facilitators must be designated to ensure the healthy progress of participatory processes, which are source and time intensive. Therefore, the required human resource ([Step 1.4](#)) and funding ([Step 1.5](#)) must be secured by taking the engagement process into account.

The first step of ensuring stakeholder engagement is mapping the stakeholders. The stakeholders to be determined are generally found in the following groups:



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- All relevant unit managers and personnel of the local government
- Local government council
- Decision-making executives of critical infrastructures
- Basic service and infrastructure establishments
- National and regional government units (e.g., provincial regional directorates)
- District municipalities for metropolitan municipalities or metropolitan municipalities for district municipalities
- Other neighbouring or relevant local governments (e.g., those sharing the same basin or on the same supply chains)
- Emergency response teams (AFAD, fire department, UMKE teams)
- Local universities, research institutions and R&D agencies
- Hospitals
- Schools
- Non-governmental organizations, chambers of profession, associations, cooperatives, etc.
- Chambers of trade and industry
- Private sector (industrialists, organized industrial zone authorities, contractors, local enterprises, etc.)
- Social entrepreneurs
- Media
- Development agencies
- Citizens' assemblies
- Transport infrastructure enterprises such as ports, airports, public transport
- Vulnerable groups of the community (e.g., the disabled, the elderly, migrants, etc.)

It must be ensured that local groups in particular are represented in stakeholder engagement. The most vulnerable groups are often overlooked in planning processes as they are generally difficult to access and have no representational powers. Climate change is known to affect such groups disproportionately and enhance their existing vulnerabilities, which is why care must be taken to engage such groups in the processes to ensure local adaptation and resilience.

Not all stakeholders must necessarily take an equal part in the processes. Stakeholders can be involved in the process using four different approaches: active engagement, dialogue, consultation, and information. The rate of involvement gradually decreases from active engagement to information.



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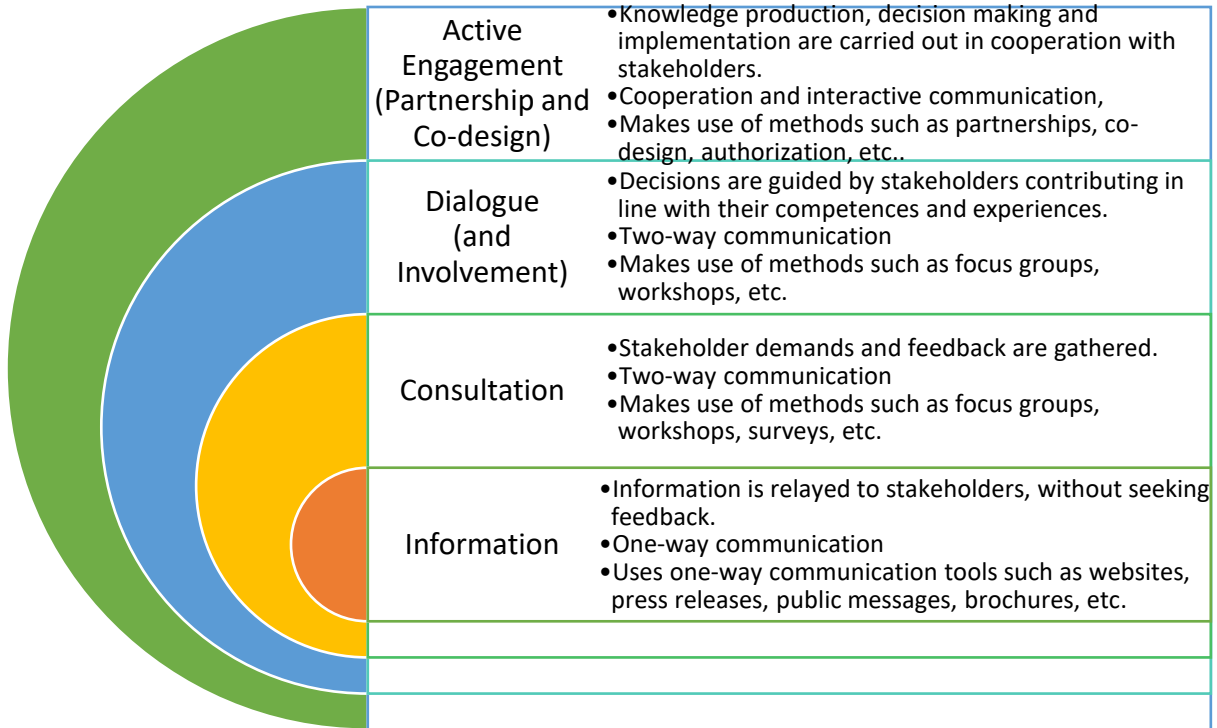


Figure 1. Engagement Processes

Engagement levels of stakeholders will be determined based on their powers, vulnerabilities against climate change, and knowledge and capacity regarding adaptation. The level of engagement can be evaluated separately for every step of the process.

In addition to engagement levels, it is recommended that the relationships and the power and impact dynamics among stakeholders are analysed.

In the process involving the planning steps ([Step 2- Step 6](#)) after stakeholders are grouped according to levels of engagement, a participation plan can be drafted that identifies the roles and responsibilities, sub-activities and schedules for each stakeholder or stakeholder group clearly. A similar participation plan for the implementation process can also be drafted during [Step 6.2](#). The plans must take into consideration that the engagement processes may involve time constraints for stakeholders or limited human resources. The local government can formulate a more focused plan by figuring out the availability of the stakeholders and shorten their periods of engagement if needed. In light of the plans, stakeholders can be requested to sign non-binding commitments concerning their engagement or asked for letters of support.

It is recommended that the plans on engagement processes are developed together with the communication plan ([Step 1.7](#)) and capacity development efforts ([Step 1.8](#)) since stakeholders need to meet at the basis of common knowledge. Every stakeholder should not be expected to have equal knowledge of climate change. Climate change and adaptation can be quite new and complex for some stakeholders, leading them to avoid becoming involved. Before starting engagement processes, awareness raising and capacity development efforts may be required for stakeholders who are not as familiar with the subject. Another reason for their avoidance can be the limited consultation experiences between local government units and stakeholders. In preparation for this, it is recommended to start adaptation efforts after the capacity development efforts are carried out on this subject.



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Certain stakeholders can be rich in knowledge and capacity. Agreements for cooperation, such as the following, can be signed with such stakeholders:

- Meeting human source requirements ([Step 1.4](#) and [Step 6.3](#)) and capacity development efforts ([Step 1.8](#)) in the development and implementation of adaptation strategy with the academia or private sector
- Development and implementation of a communication strategy with NGOs or private sector institutions that are experienced in media and communication ([Step 1.7](#))
- Climate scenario studies with universities or research institutions ([Step 2.2](#))
- Vulnerability analyses ([Step 2.5](#)) and implementation of joint adaptation options ([Step 7a](#)) together with neighbouring municipalities and the local governments in regions that are a part of supply processes

Records must be kept for the engagement processes and the stakeholder inputs and feedback collected throughout. Such records can be reported regularly as an indicator of the transparency of the process. The reports can set the stage for an exchange of information and building partnerships between stakeholders, as well as providing stakeholders with a continuous flow of information.

If this is not the first planning carried out by the local government, it can be examined whether there are any changes (e.g., additions) required in the determined stakeholder map. Engagement levels may be revised if there have been any changes to the capacity of stakeholders involved in the previous process.

Additional sources:

- “Civil Society Organization Participation in Decision Making Mechanisms: Practical Guide for Quality and Meaningful Participation in Local Governments” prepared by the Third Sector Foundation of Turkey (TUSEV) under the Monitoring Enabling Environment for Civil Society Development Project (<https://siviltoplum-kamu.org/tr/raporlar/sivil-toplum-kuruluslarinin-karar-alma-mekanizmalarina-katilimi-yerel-yonetimlerde-kaliteli-ve-anlamli-bir-katilim-icin-uygulama-rehberi/>)

1.7. Developing a communication strategy

One of the key elements to increase awareness for all stakeholders on climate change impacts and the importance of adaptation, reinforce stakeholder engagement, and support the adaptation process through [Step 1](#) to [Step 8](#) is an effective communication strategy.

An effective communication strategy is characterized by the following:

- The objectives and targets of communication have been identified (e.g., raising awareness and announcing process-related developments)
- A common language has been agreed upon.
- Communication strategy has been personalized according to stakeholders. The areas of concern for different stakeholder groups on adaptation have been identified following the stakeholder analyses carried out in Step 1.7. For instance, different messages and channels will be used for the public and the private sector. It will be important to design communication efforts to be accessible to the vulnerable groups that can be difficult to reach and disproportionately affected by climate change.



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- The “message” to be delivered and personalized messages for stakeholders have been determined.
- A timetable has been set up for communication, extending over time to ensure continuity throughout the process.
- It has been determined which communication tools and channels such as newsletters, brochures, websites, social media channels, public meetings, press conferences, etc. will be used for which stakeholders.
- Two-way communication mechanisms or communication channels have been designed through which stakeholders can give feedback and communicate their wishes, requests, and complaints.
- The required resources (human resource, financing, and infrastructure) for implementing the communication strategy have been provided.

Additionally, cooperation can be established with NGOs or private sector institutions that are experienced in media and communication from among the stakeholders determined in [Step 1.6](#). The communication strategy can be co-designed with cooperating entities.

Local government units such as “Press and Public Relations” that are already in charge of communication should be designated to develop and implement the communication strategy to ensure the continuity of communication. The unit must work closely with the team/unit/personnel in charge of adaptation.

1.8. Awareness-raising and capacity development studies

Awareness-raising and technical capacity development are required both for the adaptation studies to be carried out within the local government and the stakeholders to engage in the process. Based on the findings from the analyses in [Step 2](#), additional capacity development activities can be identified within adaptation solutions ([Step 4](#)).

Within Local Government:

Capacity development studies within local government can be organized in cooperation with units in charge of “in-service training” and the team/unit/personnel in charge of adaptation.

Some examples of capacity development studies that can be held within the local government are:

- Continuous training programmes on climate change for personnel
- Regular training on climate change adaptation in the study areas of personnel
- Training on climate change and decision-making for executive staff
- Specialized technical training for the personnel working on adaptation
- Induction training for newly recruited personnel for adaptation
- Subject-specific technical training to the personnel taking part in the implementation of specific adaptation options

External stakeholders:

The local government can hold specialized capacity development programmes for external stakeholders. Some examples are:

- Negotiating skill development training for stakeholders
- Training on raising awareness and news reporting on climate change for local press members
- Training on enhancing adaptation capacity for the private sector
- Training to institutions and units providing critical infrastructure and basic services
- Subject-specific technical training to the personnel taking part in the implementation of specific adaptation options



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1.9. Associating and integrating climate change adaptation with other local government legislation and activities

Climate change can directly or indirectly impact the existing legislation, strategy and activities or the local adaptation capacity of the local government.

The local government must consider policies, administrative processes, and services from the perspective of climate change adaptation and establish their relation to adaptation. It is recommended to make updates or adjustments that will facilitate adaptation action for or integrate an adaptation perspective into the related points. While such activities can be sustained throughout the entire adaptation guide cycle, they can also be framed as adaptation options in [Step 4](#) and applied to [Step 7a](#).

Some examples of the local policies that can be considered for integration are as follows:

Institutional Structure and Sources	<ul style="list-style-type: none">▪ Updates to regulations defining the responsibilities of environmental protection divisions, firefighting units, disaster risk and coordination units, units in charge of urban green areas, etc.
Strategic	<ul style="list-style-type: none">▪ Municipal strategic plans▪ Annual performance programmes▪ Annual budget programmes
Disaster	<ul style="list-style-type: none">▪ Disaster risk reduction plans▪ Disaster and emergency (e.g., fire) response plans
Spatial Plans	<ul style="list-style-type: none">▪ Environmental plans (for metropolitan municipalities)▪ Master plans
Sector	<ul style="list-style-type: none">▪ Waste management plans▪ Tourism master plans▪ Transportation master plans

This activity would better be carried out in consultation with all local government units. Each unit can work to explore adaptation integration opportunities in their respective areas of work. In order for this to be effective, it is recommended that the personnel is given awareness and capacity development training on climate change adaptation ([Step 1.8](#)), enhancing their capacities that can associate their areas of competence with climate change.

For local governments preparing integrated mitigation and adaptation action plans:

Local policies, strategies, and activities for mitigation can be revised in this step.

Checklist

- Establishing political will commitment at the local level concerning climate change adaptation
- Creating and determining a clear job description for a special unit for climate change adaptation
- Identifying/mobilizing human and technical resources for developing and implementing climate change adaptation policies, plans, and actions
- Determining finance mechanisms and alternative instruments for climate change adaptation
- Integrating climate change adaptation with central and local institutional and sectoral budgets
- Integrating climate change adaptation with other strategies, policies, and areas of action
- Determining the roles and responsibilities of all stakeholders including national and regional institutions, citizens' assemblies, research institutions, non-governmental organizations and private sector and ensuring engagement and cooperation in all steps
- Identifying the city's connection and assessing its collaborations with neighbouring municipalities and the regions that are a part of their supply processes
- Determining and implementing a communication strategy
- Ensuring the continuity of data and knowledge flow among stakeholders



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- Developing capacity enhancement programmes (developing continuous training programmes within the municipality and for relevant stakeholders, providing regular training, etc.)
- Evaluating and associating local government policies, administrative processes, and services from a climate change adaptation perspective



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STEP 2. EVALUATION OF CLIMATE SCENARIOS AND RISKS, VULNERABILITIES AND OPPORTUNITIES

Local impacts of climate change are observed in two forms:

- **Short-term impacts (Acute shocks):** Sudden meteorological or hydrological disasters with devastating consequences, such as flood and storm. They cause loss of life, property, and function and visible damages.
- **Long-term impacts (Chronic stresses):** These are situations such as gradually increasing temperatures and changing precipitation regimes which, unlike disasters, are not easily visible and spread over time.

It is recommended that local governments consider both types of impacts in their climate change adaptation efforts. Some examples are provided below:

	Short-term impacts Chronic stresses	Long-term impacts Acute shocks
Meteorological (short-term or small-scale weather events)	<ul style="list-style-type: none"> ▪ Changing precipitation regimes 	<ul style="list-style-type: none"> ▪ Storms ▪ Cyclones, tornadoes, and typhoons ▪ Cold waves ▪ Heatwaves ▪ Sandstorms ▪ Thunderstorms
Climatological (long-term or large-scale atmospheric processes)	<ul style="list-style-type: none"> ▪ Changing temperature normals 	<ul style="list-style-type: none"> ▪ Droughts ▪ Forest fires ▪ Land fires
Hydrological (mass movement or chemical change of aquatic bodies)	<ul style="list-style-type: none"> ▪ Changing sea levels ▪ Acidification of oceans ▪ Seawater intrusion to groundwater 	<ul style="list-style-type: none"> ▪ Floods, flash floods ▪ High tide
Geophysical (events caused by mass earth movement)		<ul style="list-style-type: none"> ▪ Mass movement ▪ Landslide ▪ Avalanche ▪ Rock fall ▪ Collapse
Biological (infections and diseases caused by a change in the growth and spread of biological creatures)		<ul style="list-style-type: none"> ▪ Epidemic (water-borne, air-borne or vector-borne) ▪ Insect infestation

Basic concepts to know when assessing risk are as follows:

- **Hazard** is a process, phenomenon or event that may lead to loss of life, injury or other health effects, property damage, social and economic disruption or environmental degradation. Climatic hazards include meteorological, climatological, hydrological, geological or biological events which may vary at the local level.
- **Exposure** is the extent to which an individual, community, entity, or system is exposed to climatic conditions or climate change.
- **Sensitivity** is the degree to which someone or something is affected positively or negatively by climate variables or climate change.
- **Adaptation capacity** is the capacity of individuals, communities, institutions, and systems to adapt to climate change (climate variability, extreme weather events and disasters), cope with the consequences of climate change, and use the opportunities that arise.
- **Vulnerability** is the conditions and characteristics that increase the sensitivity of an individual, community, entity, or system to the impacts of hazards resulting from physical, social, economic,



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or environmental factors or processes. Vulnerability is a function of sensitivity and adaptation capacity.

- **Potential impact** is all potential impacts of climate change on natural and human systems.
- **Risk** is the potential loss of life, injury, or destruction or damaging of assets that are suffered by a system, society, or community over a given period, determined as a probability function based on hazard, exposure, and vulnerability. The latest IPCC report (AR5) addresses risk as a function of hazard, exposure, and vulnerability.

Greenhouse gas emissions resulting from human activities lead to climate change and increase risks, which impact natural and socio-economic systems. Therefore, human activities and risks have a circular relationship that may multiply the risks.

[Step 2.1.](#) and [Step 2.2.](#) will help to define the hazards caused by climate change. [Step 2.3](#) will identify the local components that are exposed to climate change. [Step 2.4](#) and [Step 2.5](#) will guide to understand local vulnerabilities. [Step 2.6](#) will establish climate change risks in line with the analyses.

Additional sources for Step 2:

- “Climate Change Risk Assessment Guidance” used by the C40 local government network (<https://resourcecentre.c40.org/resources/assessing-risks-in-cities>)
- “Guidelines for Climate Impact and Vulnerability Assessments” by the German Environment Agency (<https://www.umweltbundesamt.de/en/publikationen/guidelines-for-climate-impact-vulnerability>)

For local governments preparing integrated mitigation and action plans:

A local greenhouse gas inventory study can be carried out in parallel with this step.

“*Global Protocol for Community-Scale Greenhouse Gas Emission Inventories*” (<https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities>) standard by World Resources Institute, C40 Cities Climate Leadership Group and ICLEI – Local Governments for Sustainability is recommended for use on this matter.

2.1. Reference period and present climate change analysis

It is important to identify the most frequent climate hazards and exposures that have been faced by a city as a result of climate change. This identification is one of the critical steps for determining reference values throughout the entire adaptation process. These results will be used in developing a framework for monitoring and evaluation of the reference values (in [Step 3.5](#) and [Step 6.5](#)).

The fact that the long-term impacts caused by climate change are not visible does not mean that the system is not vulnerable. In order to assess such impacts, the observations of the General Directorate of Meteorology can be used, the emerging changes at the local level can be analyzed by examining the changes in the meteorological parameters that are used.

Different seasons of the year must be taken into consideration when analysing climate variables.

It will be useful to start with the assessment of the past climate events in the past period in a region in order to understand the emerging local short-term impacts of climate change and identify frequent climatic hazards. In order to do so, the following knowledge can be inferred from experiences of local government units regarding infrastructures and services affected by disasters, and media sources by



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using the recorded data by the General Directorate of Meteorology and Disaster and Emergency Management Agency

- A list of past disasters induced by climate,
- A breakdown of the sources (labour, finance, and equipment) spent to respond to each disaster,
- Data on the social impacts (loss of life, injury, needy population, etc.) of each disaster,
- Data on the economic impacts (damage and loss costs, labour loss costs, etc.) of each disaster,
- Data on the ecological impacts (destroyed natural areas, impacts on biodiversity, etc.) of each disaster.

In light of such information, it can be easier to identify the most frequent disasters and the communities, infrastructures, assets, and services that are highly vulnerable and are frequently affected by disasters.

It is recommended to keep regular records of the events that occur during the steps of strategy development and implementation. This will facilitate data collection for this step when revising the plan.

Additional sources:

- Climate Change Projections for Turkey with New Scenarios and Climate Change Report by the General Directorate of Meteorology (<https://www.mgm.gov.tr/iklim/iklim-degisikligi.aspx?s=degisiklik>)
- Climate Change Projections for Turkey by the General Directorate of Meteorology (<https://www.mgm.gov.tr/iklim/iklim-degisikligi.aspx?s=projeksiyonlar>)
- Guidelines for data request for climate change projection by the General Directorate of Meteorology (<https://www.mgm.gov.tr/iklim/iklim-degisikligi.aspx?s=veriTalebi>)
- The project of the General Directorate of Water Management, The Impacts of Climate Change on Water Resources – Final Report, 2016 (https://projects.eionet.europa.eu/2018-eea-report-national-cciv-assessments/library/national-documents/turkey/nihai_rapor/download/en/1/Iklim_NihaiRapor.pdf)

2.2. Future period climate change (climate scenarios) analysis

It is recommended for local governments and their stakeholders to formulate adaptation actions that are preparatory for future climate change risks. This will require the analyses including (e.g., 2030), medium (e.g., 2050), and long (e.g., 2100) term future period climate scenario analyses

The global climate models and scenarios presented in the Fifth Evaluation Report (AR5) published by the Intragovernmental Panel on Climate Change in 2013 for future period climate models are considered as standard. The scenarios comprise future assumptions on factors impacting emissions, such as population growth, economic growth, technological change, energy, agricultural production, and social reactions to climate change. Four scenarios identified as Representative Concentration Pathways (RCP) in AR5 were presented:

- RCP2.6: The most optimistic scenario, projecting that greenhouse gas emissions will increase by 2025 and then decline.
- RCP4.5: The scenario projecting that greenhouse gas emission will increase by 2050 and then decline.
- RCP6.0: The scenario projecting that greenhouse gas emission will increase by 2075 and then decline.



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- RCP8.5: The most pessimistic scenario, projecting that greenhouse gas emissions will continue to increase by 2100.

There must be clear knowledge on the following to carry out a future period climate models study:

- Spatial scale of the area to be studied (different models can be used according to the scale)
- Reference period (e.g., 1971-2000, 1980-2010)
- Future period (e.g. 2030-2100)
- Representative Concentration Pathways to be used
- How future climate change will be presented (e.g., probability of occurrence or potential impacts of an event)

Such scenarios cannot predict the future exactly and climate models contain too much uncertainty. Due to such uncertainties, projections generated by climate models should be evaluated over long-term averages rather than expressing the change of a particular year. Albeit all the uncertainties, the obtained results are the guides for adaptation planning. In the cases that require further data and research, these can be evaluated as an action among adaptation options ([Step 4](#)).

It is recommended that the local government studies in Turkey must include the pessimistic RCP8.5 scenario and make projections for 2050 at the earliest.

If available, reports and studies by the General Directorate of Meteorology and Water Management and elaborated academic studies on the relevant local area can be used for the analyses. The analyses can be conducted in [Step 1.6](#), with academic research institutions or in cooperation with the private sector. Incorrect use of climate projections produced by institutions may lead to incorrect measures and inaccurate planning and may mislead decision makers. For this reason, bias correction of climate projections and evaluation with verified analyses are also very important for the preparation of correct and rational plans.

2.3. Identifying the components and systems exposed to local climate change

Before beginning to analyse what the impacts of climate change will be at the local level, the systems and components that will be exposed to climate change, some examples of which are listed below, must be identified:

- Demographic communities and groups (e.g., employers, children, the disabled, migrants)
- Natural assets and ecosystem components (e.g., forests, basins)
- Infrastructures (e.g., roads, sewer and water lines) and superstructures (e.g., buildings)
 - Critical infrastructures (e.g., power generation plants, hospitals)
- Services (e.g., healthcare, waste, environmental protection, logistics)
- Sectors or economic activities (e.g., tourism, industry, trade, energy, water resources management)

Local governments can decide which items from the list of components and systems above are more appropriate for adaptation studies in negotiation with their stakeholders.

As a result, the exposure of the components are rated.

2.4. Understanding present social, economic and environmental stresses and dependencies concerning local component and systems

In addition to climate change, there may be social, economic, and ecological stresses as well as dependencies that are outside the jurisdiction of the local government on the systems and components



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selected in [Step 2.3](#). The impact of such stresses and dependencies may indirectly increase when they are affected by climate change, which is why it is important to identify the present situation. Some examples of stresses and dependencies are as follows:

- Population growth
- Pollution
- Rapid urbanization
- Inequality
- Unemployment
- Weaknesses in institutional capacity
- Destruction of ecologic systems
- Invasive species
- Availability of resources
- Foreign dependence in supply chains
- Foreign dependence in resource supply (e.g., water and energy)
- Cross-sectoral competition for demand for water resources

2.5. Carrying out sensitivity analyses for cities

In order to analyse the vulnerability of the local systems and components identified in [Step 2.3](#), it is required to evaluate how they will be affected by climate change (sensitivity analysis) and their current adaptation capacities. The relation between sensitivity and adaptation capacity will allow for rating the vulnerability of such system or component. The analyses will be carried out in the light of present and future period climate scenarios, providing clues about future sensitivities and vulnerabilities.

Sensitivity Analysis

For the climate risks emerging at the present period and may be emerging in the future period, the sensitivity created on the local systems and components established in [Step 2.3](#) will be identified. Additionally, the stresses with which the systems and components are already faced ([Step 2.4](#)) can also be affected by climate change and increase their sensitivity. Therefore, it is important to conduct a sensitivity analysis by taking an approach that considers sequential interaction and relations.

Sensitivity analysis must be based on the time parameter. The year for which an analysis is conducted will change the outcomes, which is why it is recommended to use the time intervals for the scenarios in [Step 2.2](#).

The following questions can be asked when carrying out a sensitivity analysis for any local component or system:

- Which climate change risk(s) directly or indirectly prevent the health, function, operation, etc. of the component?
- In which ways is the component directly or indirectly affected by climate change?
- How will the component be impacted in accordance with future period climate change scenarios (the findings in [Step 2.2](#))?
- Is there a threshold, breaking point, etc. at which the component will fully lose its function?
- If any additional sources of stress have been identified for the component in [Step 2.4](#), in which ways are such stresses impacted by the current climate change? How will they be affected by the climate change scenarios that have been examined? How is this expected to affect the component?
- Is there a possibility that new stresses may arise for the component as a result of climate change? What are such stresses?



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- If the component has dependencies beyond the jurisdiction of the local government such as those identified in [Step 2.4](#), how will such dependencies be affected by the examined climate change scenarios? How is this expected to affect the component?
- In the event of failure to take any measure in line with future period climate scenarios, what will be the impacts of climate change on the health, functionality, etc. of the component?
- According to future period climate scenarios, will the needs for resources concerning the health, functionality, etc. of this climate change component change? Is a situation possible where the demand may rise above the supply for any resource?

The sensitivity of an urban component can be rated in light of these questions. For example, an assessment range of 1-5 can be used, such that (1) low sensitivity and (5) high sensitivity.

Opportunity Analysis

Not all climate change impacts are necessarily unfavourable. In some cases, sensitivity analysis can determine that climate change may produce favourable local outcomes. For example, a region becoming warmer may present an opportunity to grow different agricultural products in that region. Climate change adaptation options can include approaches that make use of or set the stage for using such new opportunities.

Adaptation Capacity Analysis

The following questions must be answered to assess the adaptation and coping capacities of each component:

- What is the local coping capacity (institutional, social, economic, etc.) level for least disruption and costs (for damages and losses) caused by present period climate change impacts?
- What is the local coping capacity level for least disruption and costs (for damages and losses) caused by climate change impacts emerging in the future period climate scenarios?
- Are there any barriers to the component's capacity to cope with climate change? (May have been identified in [Step 2.4](#)).
- Are there any stress sources among those identified in [Step 2.4](#) that limit the adaptation capacity of the component?
- Is the rate of climate change projected in the climate scenarios higher than that of the current adaptation capacity of the component?
- Are local adaptation policies available or in development?

Adaptation capacity of an urban component can also be rated. For example, an assessment range of 1-5 can be used, such that (1) is low adaptation capacity and (5) is high adaptation capacity.

Some examples of the parameters that affect local sensitivity and adaptation capacity are as follows:

	Enhances SENSITIVITY if high	Enhances ADAPTATION CAPACITY if high
Demography	Provincial Life Indexes Rate of population over 65 Rate of population between 0-4 Rate of population with disabilities Rate of population below poverty line Migrant Population Population density	Individuals with health insurance
Economy	Unemployment rate	Amount of savings deposit per household
Urban Environment	Rate of illegal buildings Rate of settlement areas with flood risk Building density Amount of built areas-coated surfaces	Urban green area rate Urban blue infrastructure (water surface ratio) Parking area per capita



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	Enhances SENSITIVITY if high	Enhances ADAPTATION CAPACITY if high
Infrastructure	Energy consumption per capita Natural gas heating requirement period Sectoral energy requirement	Number of days with good air quality Population covered by sewer services Wastewater treatment rate Population served by treatment facility Area of road per capita Number of internet and mobile phone subscribers Number of Technopolises and R&D enterprises Amount of solid waste used/recycled Population rate served by public transport
Water	Water consumption per capita Sectoral water requirement (tourism, industry, services, etc.) Potable water delivery line loss/leakage rate	Water quality Potable water amount/water potential
Ecosystems	Endangered species Forest fires	Rate of protected areas Composition and distribution of forests
Health	Prevalence of diseases caused by extreme heat Prevalence of diseases caused by vector	Number of doctors Number of beds
Agriculture	Precipitation-dependent agricultural land Chemical fertilizer use Pesticide use Irrigation water consumption	Sprinkler and drip irrigation systems Agricultural product diversity
Tourism		Bed capacity of environmentally conscious facilities
Local Institutional Capacity		Availability of Climate Change Adaptation policy Number of AFAD personnel in the province Number of disaster response assistance team personnel in the province (ministry, municipality, UMKE)

Vulnerability Analysis

Vulnerability provides clues for potential damages to be caused by climate change impacts, based on the sensitivity and adaptation capacity levels of local components or systems. It must be kept in mind that vulnerability is a dynamic phenomenon. Vulnerabilities may vary over time and new elements of vulnerability may arise depending on climate change, formation of new stress sources, or adaptation capacity changes.

As with sensitivity analysis, vulnerability analysis is also based on the time parameter. The time span (present period or the future period) for which vulnerability is assessed must be certain.





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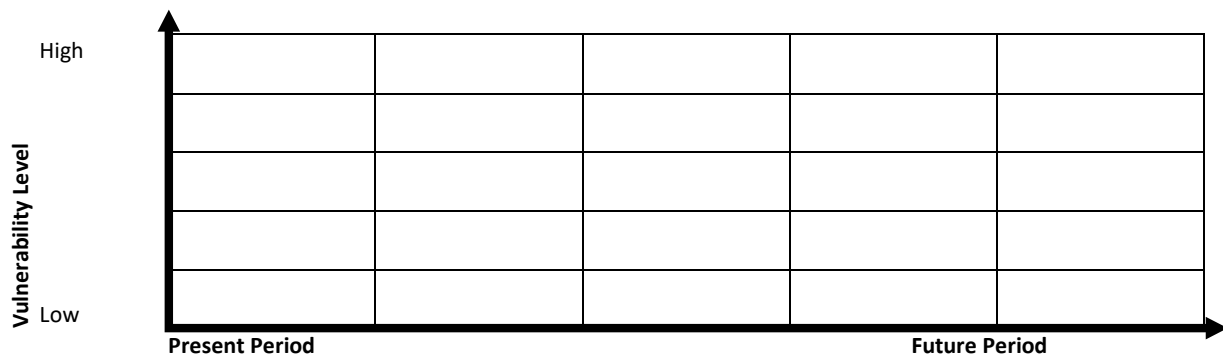
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Adaptation Capacity

The climate change impacts found by the vulnerability analysis will be gathered in four groups:

- Group 1. Impacts against which there is no present vulnerability
- Group 2. Impacts against which there is present vulnerability
- Group 3. Impacts against which there will be a vulnerability in the future
- Group 4. Impacts against which there will be no vulnerability in the future

The risk analysis in [Step 2.6](#) should focus on the vulnerabilities identified in Group 2 and Group 3. However, the situations for assessment can be narrowed according to analysis capacity and time. For example, only high-vulnerability impacts or only those with medium-high vulnerabilities can be included in risk analyses. This can be decided by the team responsible for adaptation activities within the institution, in negotiation with the stakeholders if necessary.



Additional sources:

- Scoring toolkit for Disaster Resilience Scorecard for Cities by the UN Office for Disaster Risk Reduction (<https://www.unisdr.org/campaign/resilientcities/toolkit/article/disaster-resilience-scorecard-for-cities>) (Turkish)
- Public Health Addendum for Disaster Resilience Scorecard for Cities by the UN Office for Disaster Risk Reduction (<https://www.unisdr.org/campaign/resilientcities/toolkit/article/public-health-system-resilience-scorecard>) (Turkish)

2.6. Rating present and future risks for cities

Risk analysis is conducted to compare and prioritize potential risks for vulnerable local components and systems. It can be carried out using qualitative, quantitative or mixed (quantitative and qualitative) methods. Which method to use can be decided based on the available data and the uncertainties therein. For example, quantitative approaches can be favourable in cases involving high uncertainty.

In qualitative approaches, non-action costs which are the direct and indirect costs to arise from risks can be compared to the costs of the solutions for risk mitigation. If the non-action cost is higher than solutions, then the risk will be considered high.

Scales between 1-5 are generally used to rate probability, impact intensity, and risk. Risk rating will demonstrate the point at which local governments and their stakeholders require action and the emergency of the situation.



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Probability	Almost certain	Moderate	High	Extremely high	Extremely high	Extremely high
	High	Moderate	High	High	Extremely high	Extremely high
	Probable	Low	Moderate	High	Extremely high	Extremely high
	Low	Low	Low	Moderate	High	Extremely high
	Rare	No impact / Negligible	Low	Moderate	High	High
		Negligible	Low	Moderate	High	Disaster (Catastrophic)
		Intensity				

High-risk local components and systems will be identified as a result of risk analysis. Accordingly, local governments and stakeholders can negotiate to decide which component and system risks and which risk ratings will be included in the scope of adaptation strategy.

Checklist

- Identifying the most frequent climate hazards faced by the city as a result of climate change
- Analysing local climate change trends by establishing reference values
- Analysing future period climate scenario analyses in line with global climate scenarios
- Identifying local systems and components, such as infrastructures and natural structures, that will be exposed to climate change
- Determining social, economic, and ecological stresses such as population growth and rapid urbanization, and dependencies on the selected systems and components
- Analysing the sensitivity of local systems and components against climate change
- Identifying the opportunities that may arise from climate change with regard to local systems and components
- Analysing the adaptation capacity of local systems and components against climate change
- Determining the vulnerabilities of local systems and components
- Comparing the costs of losses and damages caused by the risks, and non-action
- Identifying high-risk areas, components, and sectors through risk rating
- Determining the relevant priority risks and opportunities concerning climate change adaptation

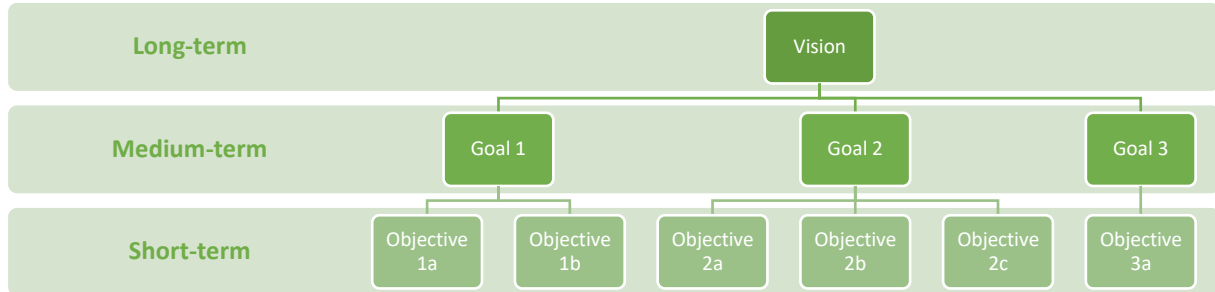


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STEP 3. DETERMINATION OF VISIONS AND PRINCIPLES

This step aims to establish the direction of the climate change adaptation strategy and the frameworks for goals and objectives based on which the actions will be established.



Implementing the strategy in cooperation will be critical for its success, as ensuring active participation by all stakeholders determined in [Step 1.6](#) in all of the activities in this step will facilitate their ownership of strategic decisions.

After determining the vision, goals, objectives, and principles, they can be shared with the public through the local government's website, newsletters, social media, etc. under the communication strategy and activities in [Step 1.7](#), thus enhancing transparency when communicating with stakeholders.

All decisions to be made in this step can be evaluated in [Step 8](#) and revised in the subsequent planning process. Since vision is established for the long term, it is not necessary to change in revisions unless the strategic orientation of the local government has changed significantly. The goals can be changed during revision according to the completion status of the objectives below; new goals and objectives can be added. However, it is prescribed to revise the objectives based on the progress made in each revision.

3.1. Determining climate change adaptation vision for cities

Local governments will have established their motivations for climate change adaptation studies in [Step 1.2](#), after which they will have an in-depth projection for present and future risks and opportunities in [Step 2](#). A long-term vision for the future can be established in light of the findings from these two steps.

It is recommended to develop a common and shared vision by engaging the key stakeholders determined in [Step 1.6](#) in the envisioning process. This will enhance the stakeholders' ownership of the planning process and implementation.

The vision can be designed to fit in the framework of an already existing vision of the local government, if available, or the current vision can be rearranged from a climate change adaptation perspective.

Climate change will have multiple impacts at the local level. It may not be realistic for adaptation strategies and actions to resolve all of the risks at once. Therefore, the priorities of the adaptation vision can target priority risks and opportunities based on the data obtained in [Step 2](#):

- Current impacts and risks
- Risk category, namely the risks with the highest probability of occurrence or intensity
- Risks affecting the most vulnerable groups
- Risks that will interrupt the operation of critical infrastructures and basic infrastructure services



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- Risks with irreversible local consequences
- New opportunities to arise

The term vision implies a request for a favourable development for the future of the city by addressing the vulnerabilities and risks associated with climate change and evaluating the opportunities.

Accordingly, the vision can focus on one or more of the following:

- Preventing risks
- Mitigating risks or vulnerabilities
- Managing unavoidable risks and their consequences (e.g., damages and costs)
- Enhancing adaptation capacity
- Evaluating new opportunities

For local governments preparing integrated mitigation and adaptation action plans:

The vision to be built will also include the city's mitigation objective. It is important to ensure that the mitigation objective is a numerical percentage with a certain deadline. The vision can focus on human activities (e.g., industry, transport, or buildings) causing high greenhouse gas emissions at the local level for mitigation, just as how it focuses on high risks or opportunities for adaptation.

3.2. Determining the principles to consider when framing strategies and actions

After establishing the vision for the climate change adaptation strategy ([Step 3.1.](#)), it is recommended to determine the principles to guide the decisions and steps for the vision.

Local governments can carry out participatory processes with stakeholders to establish approximately 5-10 principles that are the most appropriate for their cities. The goals and objectives to be clarified later on in [Step 3.3.](#) and the actions to be evaluated in [Step 5](#) will be determined in consideration of such principles.

Table 1. Examples of guiding principles for adaptation policies¹

Principle	Description
Sustainability	Formulating adaptation policies and actions in a manner that does not increase climate change risks and enhancing the resilience and adaptation capacity of the environment, community, and economy
	Formulating adaptation to complement mitigation in a manner that does not prevent meeting mitigation objectives
	Taking intergenerational equity into consideration
Cooperation	Identifying and cooperating with relevant stakeholders (e.g., citizens, institutions, NGOs, finance sector and private sector) at different levels (e.g., local, national, and international)
	Working closely with the stakeholders that create scientific research and innovation and ensuring knowledge transfer
	Encouraging the transfer of international knowledge and experience
Evidence-based decision-making	Basing decision-making processes for adaptation on current research, scientific data and implementation experiences
Integrated approach	Planning adaptation with a holistic approach that considers other risks outside of climate change, and cross-sectoral relations
Risk-based approach	Taking into consideration past, present and future risks for climate variability and extreme weather events and ensuring coordination with disaster risk management
Vulnerability-based approach	Starting adaptation planning with an awareness of present and future period vulnerabilities

¹ Adapted from "Guidelines on Developing Adaptation Strategies," "Guiding Principles for Adaptation to Climate Change in Europe"¹ and the adaptation strategies and action plans of specified countries.



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Principle	Description
Precautionary principle	Adopting a precautionary principle to ensure adaptation despite the uncertainties concerning climate scenarios and climate change impacts
Prioritization	Prioritizing adaptation policies and actions by establishing parameters (e.g., cost-benefit, urgency, and risk category)
Appropriateness for scale	Adapting adaptation solutions to the scale required by the relevant climate change impact (by taking into consideration responsibilities and finance)
	Taking into consideration the complementarity and proportionality of solutions among different governmental scales
Flexibility	Policies and actions being adaptable to change despite future climate uncertainties
Transparency	Communicating the data, policy objectives and their impacts clearly with stakeholders
Monitoring and Evaluation	Regularly evaluating the efficiency, productivity, and equity of adaptation decisions and making the necessary improvements in line with current knowledge and evidence
Ownership / Responsibility	Ownership by the senior executives of institutions working on adaptation, and provision of human sources and finance in the long term
Solution diversity	Ensuring the diversity of solutions produced for adaptation
Time scale	Taking into consideration different time scales when developing and implementing adaptation strategies and actions

3.3. Determining climate change adaptation goals

The priority risks and opportunities selected in the framework of the long-term vision ([Step 3.1](#)) and the selected approach for the vision will shape adaptation goals.

In order to ensure solid implementation of the objectives, they need to be specific, measurable, attainable (realistic) and have certain timeframes and priorities.

Goals can be categorized differently according to the frame of the analyses in [Step 2](#) or the identified risks:

- By sector (e.g., agriculture, tourism and industry),
- By risk (e.g., intense and frequent floods, heatwaves and drought),
- According to the responsibilities of local government service units (e.g., technical services, environmental protection, and transportation),
- According to the communities to which they are related (e.g., the elderly, business owners, migrants).

It is important to set a clear time objective (e.g., 5 years, 20 years, 50 years) to accomplish the goals. Some recommendations on how to determine a time period are as follows:

- It can coincide with the time intervals specified in the analyses in [Step 2](#) (e.g., 2030, 2050, and 2100).
- It can be shaped in line with the local or national planning processes with which the local government is expected to comply (e.g., strategic plans of municipalities, municipal election cycle periods).
- It can coincide with the political election cycle, which means a 5-year cycle for Turkey. It is recommended for a local government to begin [Step 1](#) following elections and complete [Step 8](#) within the 5 years by which its term of authorization ends. This way, the local government to be elected for the next term can start from [Step 1](#) by making use of previous experiences.

The span of the strategy must be clearly established. The goals can be defined as short, medium, and long-term by specifying their years of completion.



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For local governments preparing integrated mitigation and adaptation action plans:

Mitigation goals will be selected using the same principles as those for adaptation. Some goals can be framed to cover both mitigation and adaptation when there are co-benefits with adaptation.

3.4. Determining climate change adaptation objectives

The objectives constitute the milestones that must be overcome to attain the designated adaptation goals ([Step 3.3](#)). In that regard, objectives must be more specific, measurable, and attainable (realistic) than goals.

A goal can be reached by implementing multiple objectives sequentially or concurrently. On the other hand, objectives can be reached through one or more of the adaptation options to be determined in [Step 4](#).

3.5. Determining monitoring and evaluation indicators for goals and objectives

In order to ensure that adaptation options are prioritized in line with goals and objectives and a solid monitoring, reporting and evaluation in the implementation stage ([Step 7b](#)), it is recommended to lay the foundations for the monitoring and evaluation framework for goals and objectives during this stage.

First, the goal of monitoring and evaluation will be identified. The goal can be one or more of the following:

- Analysis of the progress for adaptation goals and objectives
- Measurement of the success of the adaptation strategy and plan
- Early detection and correction of the negative impacts of any strategy that is in implementation
- Follow-up on the financial, process, or technical capacity status and resource usage of implementation
- Fostering learning and knowledge exchange among local governments
- Providing stakeholders with regular and transparent feedback on the developments
- Accountability against stakeholders
- Making the outcomes visible
- Enhancing knowledge-based decision-making through outcomes from experiences
- Enhancing local sources of knowledge, experience, and data

Afterwards, indicators will be determined for evaluation. The indicators will determine whether the evaluation is qualitative, quantitative, or both. Determining goals and objectives as specifically as possible will facilitate establishing the indicators.

- **Impact indicator** establishes the cumulative impacts concerning adaptation goals and demonstrates the level of success of applications (e.g., reducing vulnerability or enhancing adaptation capacity).
- **Outcome indicator** describes a net outcome for adaptation goals.

Adaptation with the Sustainable Goal Development (<https://www.kureselamaclar.org/>) indicators can be considered when defining impact indicators for goals and outcome indicators for objectives.

The preliminary monitoring and evaluation system framing study carried out in this step will be improved in [Step 6.5](#), after having established adaptation options.



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Checklist

- Formulating a common and shared vision for climate change with the participation of key stakeholders
- Determining an adaptation vision to target priority risks and opportunities
- Determining the decisions to be made for vision and the principles to guide the steps to be taken
- Defining measurable, attainable adaptation goals with specific timeframes and priorities
- Defining measurable, attainable adaptation objectives with specific timeframes and priorities
- Defining impact indicators for goals and outcome indicators for objectives

STEP 4. DETERMINATION OF ADAPTATION OPTIONS

In this step, the aim is to catalogue all options, solutions and actions for adaptation that allow for accomplishing the vision, goals and objectives determined in [Step 3](#) by taking a participatory approach.

For local governments preparing integrated mitigation and adaptation action plans:

In this step, mitigation options for human activities causing the most greenhouse gas emissions and creating carbon sinks will be catalogued.

4.1. Establishing adaptation options

The adaptation options that will allow for attaining the determined objectives ([Step 3.4](#)) can consist of solutions that have been already tried and implemented. Studies and applications have been carried out on climate change adaptation throughout the world and in Turkey. Local governments can establish adaptation options by making use of available knowledge and experience. The methods and sources that can be used for this purpose are as follows:

- Literature and database review, and particularly reports on good examples and successful applications,
- Gathering information from scientists and technical specialists,
- Experiences of units within local governments,
- Experiences of other local governments that have developed solutions for similar problems,
- Experiences accumulated by regional, national or international local government networks,
- Experiences of stakeholders.

Taking existing policies, strategies, plans, management structures, processes, etc. and synergies into consideration will be effective in determining the adaptation options. Integration studies ([Step 1.9](#)) can be considered as an adaptation option, as well.

If this is not the first planning carried out by the local government, research will most likely only involve the adaptation options that were newly developed, produced or implemented since the preparation of the previous plan.

4.2. Cataloguing adaptation options

The adaptation options collected in [Step 4.1](#) can be categorized in several aspects. Groupings will support priority evaluation ([Step 5](#)). Multiple and different types of solutions can serve the same objective; solutions can be planned in an integrated, temporally sequential, or mutually reinforcing manner.

Category 1. Adaptation approach



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This is recommended to be analogous with the decisions aimed at vision ([Step 3.1](#)).

- Preventing risks
- Mitigating risks or vulnerabilities
- Managing unavoidable risks and their consequences (e.g., damages and costs)
- Enhancing adaptation capacity
- Evaluating new opportunities

Category 2. Types of Solution

Soft solutions include governance, support, awareness mechanisms etc. that will facilitate and enable the implementation of all types of adaptation policies, procedures, and solutions.

- Solutions aimed at knowledge production (e.g., climate scenario research and sectoral risk analyses to remedy imperfect knowledge)
- Solutions for enhancing awareness and capacity (e.g., training, awareness campaigns)
- Laws and legislation-oriented solutions (e.g., updates and changes to regulations and standards)
- Integration (e.g., integration with sectoral policies)
- Finance solutions (e.g., grant funds, incentive credits, and taxes)
- Solutions aimed at governance (e.g., governance process updates, building monitoring and evaluation systems)

Technical (grey) solutions are generally structural solutions or engineering services such as building new infrastructures or buildings that enhance resilience against extreme weather events.

- Structural and constructional solutions (e.g., construction projects)

Ecologic (green, blue, or green-blue) solutions aim to enhance ecosystem-based resilience through maintenance, restoration, and development of urban natural areas. They can be more cost-effective and viable compared to grey solutions.

- Green infrastructure solutions (e.g., green roofs)
- Blue infrastructure solutions (e.g., river ecosystem restoration)

The following information, which can also be referred to as action fiches or tags, can be compiled for all the established options:

- Name and description of the option
- The adaptation approach it aims for (Category 1)
- Climate change impacts against which it recommends adaptation
- The goal(s) and objective(s) with which it is associated
- What type of an adaptation option it is (Category 2)
- Social, economic, and environmental context
- Reference (baseline) value
- A threshold, limit value, etc. for implementing the adaptation option (e.g. if the sea level rises over a certain metric value, then building an embankment will be useless and ineffective).
- Responsible institution, unit, or stakeholder (estimated)
- Other relevant institutions, units, or stakeholders (estimated)
- Time/Duration (estimated)
- Relevant legislative framework
- Prerequisites or preconditions to implement the option



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Checklist

- Compiling the adaptation options that fit the goals determined through methods such as literature review and gathering experiences from stakeholders
- Identifying adaptation options by adaptation approach and solution type
- Gathering adaptation option information on tags/fiches

STEP 5. PRIORITIZATION OF ADAPTATION OPTIONS

This step will evaluate and prioritize the climate change adaptation options, actions and solutions determined in [Step 4](#) for urban risks and opportunities.

The process must be carried out transparently with stakeholders' participation.

For local governments preparing integrated mitigation and adaptation action plans:

Same methods can be used to prioritize mitigation options in this step. However, co-benefits of the prioritized mitigation options and adaptation must be taken into consideration and it must be ensured that the mitigation actions do not enhance vulnerabilities.

5.1. Determining a method for assessing adaptation options

There are various methods for priority assessment of climate change adaptation options. The most commonly used methods used by local governments are cost-benefit, cost-effectiveness and multi-criteria analyses. Multi-criteria analysis may include cost-benefit and cost-effectiveness analyses, that is, the second and third can constitute a criterion of multi-criteria analysis.

Which assessment method to use must be determined in cooperation with stakeholders.

Table 2. Methods for prioritizing adaptation options

	Approach	Area of Use	Strengths	Weaknesses	Coping with Uncertainty
Traditional economic decision support	Cost-benefit analysis Valuates all costs and monetary benefits of all of the options for the society and calculates their net benefits and costs.	Determining low and zero regret options for the short term.	Useful when climate risk probabilities are known and sensitivity is low and also where net market values can be used.	Valuation of non-market sectors / non-technical options. Limited uncertainty with probabilistic risks / sensitivity tests.	Does not openly deal with uncertainty, but can be used together with sensitivity testing and probability modelling.
	Cost-effectiveness analysis Lists effectiveness (monetary / non-monetary) against costs and compares them with cost curves for objectives / resources.	Same as the above, except for the markets and non-market sectors where benefits do not correspond to a monetary value	Same as the above, but for non-monetary sectors and where previously identified objectives must be attained	Not quite appropriate for cases where a single main metric is difficult to determine or for complex or cross-sectoral risks. Evaluations for uncertainty is scarce.	Does not openly deal with uncertainty, but can be used together with sensitivity testing and probability modelling.
	Multi-criteria analysis Allows for evaluating	Same as the above, but for scoping options. It may complement	If a mix of qualitative and quantitative data is available.	Based on expert judgement or stakeholders and is subjective,	Can integrate uncertainty as an assessment criteria, but is



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	Approach	Area of Use	Strengths	Weaknesses	Coping with Uncertainty
	quantitative data collectively to list alternative options.	other tools and capture qualitative aspects.		including uncertainty analysis.	generally based on subjective expert judgement or stakeholder opinion.
Uncertainty framing	Iterative risk management (adaptation-based management) Uses the iterative framework of monitoring, research, evaluation, and learning to develop future strategies.	For assessment in the medium-long term. Can be implemented as a policy-level framework, as well.	Useful when long-term and uncertain challenges exist, particularly when there are clear risk thresholds.	Challenging if there are multiple risks acting in conjunction and it is difficult to define thresholds.	Iterative analysis openly deals with uncertainty by fostering monitoring, evaluation, and learning.
Economic decision-making under uncertainty	Real option valuation Establishes an economic analysis of future option value and the economic benefit of waiting / knowledge / flexibility.	Economic analysis of medium-term large capital investment decisions. Analysis of flexibility in large projects.	Can be used for major, irreversible decisions with available information on climate risk probabilities.	Requires economic valuation, probabilities, and clear decision points.	Openly deals with uncertainty by analysing adaptation performance for different future scenarios.
	Sound decision-making Defines optimal (sound) strategies against multiple potential scenarios.	Determining a combination of strategic (independent of long term scenario) and operational (dependent on short term scenario) decisions.	When uncertainties and risks are high. Can use a mixture of qualitative and quantitative knowledge.	Requires intense numerical analyses and lots of testing.	Openly involves uncertainties and risks, and particularly systemic dependent risks, to obtain drastic solutions.
	Portfolio analysis Economic analysis of optimal options portfolio through trade-offs between return (net present value) and uncertainty (change).	Project-based analysis of future combinations. Designing portfolio mixes as part of iterative means.	Can be used when complementary adaptation actions and good knowledge is available.	Requires economic and probability data. Inter-dependence problems.	Openly deals with uncertainty by examining the complementarity of adaptation options to cope with future climates.

Source: Rouillard et al. 2016, EEA 2014

5.2. Determining prioritization criteria for adaptation options

Assessment criteria for climate change adaptation options must be established, particularly if Multi-Criteria Analysis has been selected as an assessment method in [Step 5.1](#). Such criteria may involve aspects such as viability costs and resource requirement and availability as well as sustainability and ensuring co-benefits with mitigation beyond climate change adaptation.



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It is important to select criteria that are in line with the visions and principles determined in [Step 3](#), which is why the model criteria given in the table below involve similar concepts with the principles sample ([Step 3.2](#)).

Model list of criteria for prioritizing adaptation options²

Category	Criteria	Description
Sustainability	Mitigation Co-Benefit	Avoiding options that make benefits (win-win) and mitigation difficult for mitigation strategies and actions to achieve their objectives
	Environmental Impacts	Impact on ecosystem services and biodiversity
	Equity	Number of individuals provided with social benefits (in consideration of gender, age, and income equalities)
	Implementation cost (cost-benefit)	Comparing implementation cost with non-action cost or benefits to be gained
	Operation and maintenance cost	Comparing long-term operation and maintenance cost with non-action cost and other budget outlays
	Flexibility	Being able to keep up with changes and alterable if necessary
Effectiveness	Importance/Relevance	Potential to mitigate climate change impact and enhance resilience being indispensable
	Robustness	Applicable to the uncertainty of future impacts and different future scenarios
	Reliability	Solution has been tried or proven to be effective
	Cost-effectiveness	Cost and benefit provided are inversely proportional
	Win-win	Making a positive environmental, economic or social contribution independently of adapting to climate change
	Zero regret	Low-cost and easy to implement, socio-economic benefits surpassing costs, aligned with different climate change scenarios or independent of scenarios
	Low regret	Not applicable or no longer applicable to every climate scenario, yet relevant costs are low and benefits are relatively higher
Risk and Uncertainty	Urgency	Directly related to current threats and risks
	Risk category	Current and future degrees of impact of associated risks, amenability to intervention
	Scope	Able to produce solution for more than one risk (multiple risks)
	Protectiveness	Ensuring preparation to mitigate future risks
Opportunity	Side benefits	Contributing to other environmental, economic, and social objectives, knowledge generation and capacity development
	Interaction/Reinforcement between Actions	Reinforcing effectiveness of other adaptation options
	Window of opportunity	Being in a special situation to facilitate the implementation of the option
Viability	Cultural acceptability	Appropriate for society's culture and not ill-received
	Political acceptability	Suitability with the country's political dynamics
	Sources of funds	Availability of financing sources required for implementation or accessibility to finance
	Capacity	Adequacy of technical capacity and human source required for implementation or capacity deficiencies
	Institutional competence	Being within the area of competence of the relevant institution or requirement for horizontal and vertical coordination with other institutions

² Compiled from Climate-ADAPT, UNEP 2009 and the adaptation strategies and plans of the mentioned countries.



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For local governments preparing integrated mitigation and adaptation action plans:

It is particularly recommended to choose mitigation and adaptation co-benefits as criteria in this step.

5.3. Gathering information to enable assessment of adaptation options

Information on the criteria that were selected for each identified adaptation option will be gathered and added to the action fiche/tag of the adaptation actions in the catalogue prepared in [Step 4.2](#).

5.4. Prioritizing and selecting adaptation options

In the light of the collected information, adaptation options can be assessed and categorized into three groups according to their priority:

- **Group 1:** These are the priority options according to the assessment criteria and will be prioritized in the plan to be framed in [Step 6](#) for being immediately applicable.
- **Group 2:** These are the adaptation options that, despite being a priority, cannot be applicable unless the necessary human source, finance, cooperation, etc. required for implementation is met. They can be included in the plan in [Step 6](#) if such deficiencies or requirements are met; otherwise, it will not be a problem to include them in the next planning cycle; or, meeting the requirements can be identified as an action in the current planning process. In that case, preparing fiches for these actions must not be omitted.
- **Group 3:** These are the options that are not considered priority according to the assessment or whose applicability is not low or impossible yet.

The adaptation options that have been prioritized may be associated with one another in terms of collective effect and process, particularly if they serve the same goal. For example, an option may be required to be implemented subsequently to another or there may be options that must be carried out concurrently. Some options may be aimed at the same objective but not collectively effective or productive. In that case, the prioritization can be revised. Examining the relations between options and mapping out roadmaps for implementation will also form the timetable ([Step 6.1](#)) of implementation.

Flexible and alternative routes may be required in implementation roadmaps. For adaptation options that depend on a threshold or deadline, actions will become inapplicable or ineffective in the cases when such thresholds are crossed earlier than anticipated. In that case, planning which adaptation option to commission in order to meet the objective will interrupt progress towards adaptation vision.

Obtaining approval and support from stakeholders for priority adaptation actions will ensure solid cooperation and ownership, fostering the success of the implementation.

Detailed records of the evaluation studies carried out for each adaptation option must be kept; the prioritization decision must be rationally explained and recorded. Outputs of the evaluation may shed light on whether to include the adaptation option in the next plan in the revision process which will begin with [Step 8](#).

Attention must be paid whether the benefits resulting from the implementation of the adaptation option are distributed equally. It must be ensured that the adaptation options do not have unfavourable indirect or side effects, and particularly do not feed the existing socio-economic inequalities at the local level. For this purpose, stakeholders' engagement in prioritization studies will help identify the undesirable consequences of adaptation options.



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Checklist

- Determining the method for prioritizing adaptation options in cooperation with stakeholders
- Establishing the criteria for prioritizing climate change adaptation options
- Gathering information on the selected evaluation criteria for the adaptation option
- Evaluating adaptation options in light of the gathered knowledge and prioritizing in cooperation with stakeholders



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STEP 6. FORMULATION OF ADAPTATION STRATEGY AND ACTION PLAN

In this step, the actions prioritized in [Step 5](#) will be worked into a schedule; the governance systems, human sources, financial sources, and monitoring and evaluation system required for a solid implementation will be framed. As the decisions to be made in the sub-activities of this step will affect one another, most sub-activities can be carried out concurrently. The sub-activities will support the sustainability of local climate change adaptation implementation at the local level.

The selected adaptation options can be compiled in a strategy and action plan document or fully or partially integrated into different urban or sectoral plans and documents of the local government.

If this is not the first planning carried out by the local government, the first step will be to examine the previous adaptation strategy and action plan document and decide on how it can be improved in the revision process.

6.1. Timetable / Duration

An implementation period and starting and ending dates will be established for each adaptation option that has been prioritized during the period considered for the goals. It will be useful to set the timetable of the adaptation options that are procedurally inter-dependent (e.g. consecutive or concurrent) by considering their relations. Implementation periods clarifying the adaptation options must be added to the tags/fiches.

Implementation process for all options can be demonstrated with a Gantt chart.

If this is not the first planning carried out by the local government, the revision can also indicate the uncompleted or ongoing actions from the previous plan.

6.2. Establishing roles and responsibilities and collaborations

In order for adaptation options to be implemented, it is important to clarify by whom they will be implemented. A responsible (or a leader) unit/institution as well as other stakeholders must be established for each option. Stakeholders and their responsibilities must be added to the tags/fiches for adaptation options.

It will be useful to primarily determine which actions are in and out of the responsibility of the local government and applicable through stakeholders' support.

Responsible units and their tasks will be defined for the adaptation actions falling under the area of competence of the local government. Regulations defining institutional structures and responsibilities may be updated and formalized to include the tasks for the new adaptation if required.

Stakeholders can be responsible for the implementation of the adaptation options that are outside the area of competence of the local government. The stakeholders must be identified in [Step 1.6](#) and have actively participated throughout the process. Assigning implementation responsibilities to stakeholders who have not been engaged in participatory processes must be avoided, as they will lack ownership.

The roles and responsibilities of all stakeholders who will provide leadership or support to adaptation options must be clearly defined. Relevant stakeholders can share an information letter on the subject. If possible, official approval or letter of commitment stating their acceptance of responsibility can be obtained from the stakeholder institution or a mutual agreement can be signed. Local government



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personnel or unit can be assigned for the follow-up of the adaptation options to be implemented by external stakeholders.

6.3. Establishing human sources

Human source will be required for implementing the prioritized adaptation options, following up on finance, and monitoring indicators.

The local government can consider its current capacity for the activities it will implement. If the number of personnel is lacking for the identified responsibilities, recruitment and budget planning are recommended to achieve the required human sources, as in [Step 1.4](#). If the personnel is technically inadequate, they can be provided with appropriate capacity development training in [Step 1.8](#).

Cooperation with stakeholders ([Step 1.6](#)) can be favourable in situations where the local government is inadequate in terms of human source or technical capacity.

When establishing responsibilities in [Step 6.2](#), the implementation capacities of stakeholders must be further evaluated with regard to the responsibilities with which they were assigned. Stakeholders who cannot fulfil implementation responsibilities due to lacking capacity must not be given responsibility or provided with regular capacity development in the framework of [Step 1.8](#).

6.4. Identifying of financial sources

Details of implementation costs and financing of prioritized adaptation options must be added to their tags/fiches. It is assumed that cost information will be determined in [Step 5](#) during prioritization. However, finding financial sources or developing finance mechanisms may be required for implementation in this stage.

It must be kept in mind that the finance required throughout implementation must cover monitoring and evaluation studies and such ongoing activities as governance, communication, awareness, and capacity development in [Step 1](#) as well as the implementation of adaptation options. Detailed approaches to funding sources and finance mechanisms are explained in [Step 1.5](#).

6.5. System framing for monitoring, reporting and evaluation

Establishment of monitoring and evaluation system is critical to ensure the sustainability of any implementation process and adaptation action. The goals of the monitoring and evaluation system will have been determined in [Step 3.5](#) and can be revised in this step.

The temporal frame of the monitoring and evaluation system must be parallel with the deadlines set in [Step 3.3](#) and [Step 6.1](#). For example, if the plan covers the adaptation options that will be completed in 5 years, an evaluation will be carried out in the 5th year by the end of the planning process. It is recommended that monitoring is carried out continuously and reported annually.

Indicators are the most important items of a monitoring and evaluation system. The indicators must be clear, realistic, time-bound, measurable and verifiable, acceptable by stakeholders and capacity and source requirements for measuring and monitoring must be attainable.

Impact indicators for goals and outcome indicators for objectives will have been determined in [Step 3.5](#) but may be required to change after the prioritization of adaptation options. In this step, indicators for input, process, and output will be determined for the implementation of the adaptation options prioritized in [Step 5](#).



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- **Input indicator** provides a metric for financial and human sources that have been reserved for a specific adaptation activity, programme, or response.
- **Process indicator** monitors the progress and management of sources in adaptation policy processes and actions.
- **Output indicator** identifies the direct adaptation-related outputs of an adaptation policy or action independently from its success.

Additionally, it will be proper to identify indicators for stakeholder engagement in the implementation process ([Step 7a](#)) and process indicators on the general implementation of strategy and action plans. When determining the indicators, existing indicators in the current monitoring and evaluation systems of local governments can be revised and those that are appropriate can be used for adaptation.

The following information will be established for each input, process, output, outcome, and impact indicator:

- Name of indicator
- Description of indicator
- Explanation of the importance of indicator and reason for its selection
- Unit of measurement
- Reference value
- Target value
- Threshold value (and, if necessary, description of the warning mechanism in the event of crossing the threshold)
- Anticipated change (increase or decrease) of indicator
- Indicator data source
- Data measurement or acquisition method(s)
- Institution responsible for monitoring and data collection
- Measurement/update period
- Data access cost (if any)
- Explanation of relations with other indicators
- Institution to follow up on reporting

After building the content framework of the monitoring and evaluation system, it is recommended to establish a local online platform in which all monitored data will be collected. The platform can gather knowledge and experiences concerning the adaptation options, activities, investments, scientific research, etc. to be carried out throughout [Step 7a](#).

All stakeholders that are in charge of monitoring and evaluation may be required to sign agreements in which their tasks are clearly described.

6.6. Documenting and bringing the plan into force

Adaptation strategy and action plan can be drafted as an individual document. In that case, the headings that may be included in the document are given below.

- **Acknowledgements:** Addresses all local government units, personnel and stakeholders who contributed to determining the strategy and adaptation options.
- **Preface or commitment by local government leader:** Communicates the messages in [Step 1.1](#).
- **Executive summary:** Provides a synthesis of the key messages on vision, goals and process findings.
- **Glossary:** Facilitates understanding of key concepts for readers.
- **Introduction:** Presents city's motivations for action on climate change adaptation ([Step 1.2](#)) and the framework for the document.



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- **Statement of vision:** Communicates the vision established in [Step 3.1](#).
- **Background/Context:** Introduces the city in the context of available experiences (e.g., local policies and experienced disasters) of climate change.
- **Climate change:** Presents climate change scenarios for the local level. ([Step 2](#) outputs)
- **Impacts, Vulnerabilities and Risks:** Establishes the impacts of climate change, local vulnerabilities, and the developing risks caused by climate change. ([Step 2](#) outputs)
- **Goals and objectives:** Explains the goals ([Step 3.3](#)) and objectives ([Step 3.4](#)) determined in line with the locally determined adaptation approach.
- **Priority adaptation options:** Lists and explains the priority adaptation options selected in [Step 5](#) in association with goals and objectives.
- **Implementation plan:** Establishes the required costs, financial and technical responsibilities, timetables, tools, potential barriers, etc. that are determined in [Step 6](#) in order to implement priority adaptation options.
- **References**

Additionally, the content can include information on how preparation was carried out and participatory processes.

If prepared as an individual document, the strategy and action plan will enter into force upon the approval of the municipal council.

Checklist

- Determining the implementation period, starting and ending dates for each prioritized adaptation option
- Framing procedurally inter-dependent adaptation options by considering time relations
- Determining a responsible unit as well as other supporting stakeholders for each option
- Identifying the roles and responsibilities of all stakeholders that will provide leadership or support for adaptation options clearly
- Determining the human source requirement to implement prioritized adaptation options, follow up on finance and monitoring indicators and training (if necessary) and cooperating with them
- Determining implementation costs and finance of adaptation options, finding financial sources or developing finance mechanisms for implementation
- Building the monitoring and evaluation system through clear, realistic, time-bound, measurable and verifiable indicators that are acceptable by stakeholders
- Building an online local platform in which all monitored data will be collected
- Signing agreements that clearly describe the tasks of all stakeholders with responsibility in monitoring and evaluation
- Preparing the adaptation strategy and action plan as a document that also contains information on how preparation was carried out and participatory processes
- Bringing the action plan into force upon the approval of the municipal council



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STEP 7a. IMPLEMENTATION

This step is the implementation process of the strategy and action plan that has been framed and brought into force in [Step 6](#). As a single step, it will cover a larger timeframe than the period from [Step 2](#) to [Step 6](#).

Local governments may need to run a procurement process for some applications during the implementation. It is recommended to consider the “green procurement” approach in such processes. Green procurement is the implementation of choices during the provision of required services or products by considering environmental impacts and sustainability principles.

Local governments and their stakeholders can encounter various barriers during implementation. Such barriers may have already been projected, or caused by new legislation, socio-economic or environmental development, or disaster and can significantly change the priorities and urgencies of local governments. In some cases, they can prevent the implementation of some adaptation options if such options have certain prerequisites to be fulfilled. In such cases, the concurrent monitoring and reporting in [Step 7b](#) will serve as guidance in identifying the barriers. It will be useful to assess whether an encountered barrier or situation requires an emergency change in adaptation priorities. Any changes and the solutions against barriers must be formulated in common sense with stakeholders, as with all steps.

New institutions and organizations can be established during the implementation. It is recommended that such stakeholders are included in the stakeholder network within the framework of [Step 1.6](#), without waiting for the revision process.

Checklist

- Implementing scheduled adaptation options
- Taking a “green procurement” approach in procurement processes that local governments may require during implementation
- Determining the various barriers that may be encountered by local governments and stakeholders during implementation
- Formulating the solutions against barriers in common sense with stakeholders
- Ensuring that [Step 1](#) is continued



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STEP 7b. MONITORING AND EVALUATION

This step will be carried out concurrently with [Step 7a](#) which covers the implementation of adaptation options. It will follow up on whether the implementation in [Step 7a](#) is proceeding as planned and its effectiveness within the framework of the monitoring and evaluation goals and systems that were built in [Step 6.5](#).

Step 7b.1. Continuous monitoring

The indicators determined in [Step 3.5](#) and [Step 6.5](#) will be measured or calculated and logged into the system by responsible institutions.

Step 7b.2. Regular reporting

The local government will prepare reports for its stakeholders during the reporting period (e.g., annual or biannual) established in [Step 6.5](#). Rather than being long and labour-intensive reports, they can be shared as short newsletters accentuating key developments.

Step 7b.3. Evaluation

The implementation needs to be monitored as well as having its outcomes and impacts evaluated. The progress in all indicators must be examined by the end of the implementation period of the plan (e.g., 5 years) that is established in [Step 6.5](#). The evaluation will demonstrate the success level of adaptation options as well as the extent of the progress made towards goals and objectives in the context of outcome and impact indicators. It is recommended that such findings are shared with all stakeholders and the public within the framework of the communication strategy ([Step 1.7](#)).

The following questions can be asked during the evaluation:

- To what extent are the adaptation plan goals still valid?
- Have the implemented adaptation options yielded outcomes and impacts that are consistent with the goals and objectives?
- To what extent could adaptation options be implemented?
- What were the main factors preventing implementation?
- How cost-effective were the applications?
- Were there alternative adaptation options that could be implemented more cost-effectively, efficiently, etc.?
- What were the long-term social, economic and environmental impacts of the applications?
- Did the applications have any unexpected negative impacts or supplementary benefits?
- To what extent do the benefits and effectiveness of applications maintain their sustainability?
- What were the key factors facilitating or preventing the sustainability of implementation of the adaptation options?

Checklist

- Logging indicators into the system by being measured or calculated by responsible institutions at specified intervals
- Reporting in specified periods
- Evaluating outputs, outcomes and impacts



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Enhancing Adaptation Action in Turkey Project

STEP 8. STRATEGY AND PLAN REVISION OR UPDATE

8.1. Evaluating the lessons learned

The experiences, setbacks and achievements throughout the planning and implementation processes can be compiled, using feedback from stakeholders. Surveys, workshops, and focus group meetings can be held for this purpose.

Questions that can be asked are:

- What are the successful adaptation solutions? What is their success based on?
- What are the failed adaptation solutions? Which barriers caused them to fail?
- Are there any adaptation solutions that must continue?
- What are the setbacks for the process? How can they be improved?
- Has any information on local climate change impacts, vulnerabilities, and risks been changed during implementation? (If the answer is “yes”, Step 2 will need to be further re-examined during revision).
- Was there any situation to cause priorities, vision, and principles to change? (Areas that require urgency following unforeseeable conditions at global, national, or local levels. In that case, revision in Step 3 must be inclusive of such matters).
- Was there any social, economic and environmental impact to impact reference or threshold values since the previous planning process?
- Have new finance facilities arisen since the previous planning process?

In the light of gathered information, it must be determined which applications will be different in the next planning period.

8.2. Returning to Step 2

After the initial plan process is completed and applications are evaluated, the process will return to [Step 2](#) and restart by updating climate scenarios and risks. Reference (baseline) values can be updated as a result of the progress made in the initial implementation.

Processes related to governance structure, stakeholders, awareness and capacity development in [Step 1](#) can be reviewed in the light of evaluations, as well. Otherwise, the framework in [Step 1](#) will be maintained on a continuing basis.

Checklist

- Compiling the experiences, setbacks and achievements throughout the planning and implementation processes, using feedback from stakeholders
- Determining which applications will be different in the next planning period in the light of information gathered
- Updating climate scenarios and risks by continuing Step 2



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