MONITORING AND EVALUATION SYSTEMS FOR URBAN INFRASTRUCTURE SERVICES: A COMPARISON OF THE SYSTEMS APPLIED BY TURKISH AUTHORITIES AND INTERNATIONAL FINANCING INSTITUTIONS

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ABSTRACT

MONITORING AND EVALUATION SYSTEMS FOR URBAN INFRASTRUCTURE SERVICES: A COMPARISON OF THE SYSTEMS APPLIED BY TURKISH AUTHORITIES AND INTERNATIONAL FINANCING INSTITUTIONS

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In Turkey, urban infrastructure services are responsibility of the municipalities requiring close communication with the central governmental institutions at different stages of project preparation, design, construction and operation to meet the national standards. Although, significant progress has been recorded in terms of access to services, there is still need for increasing efficiency of service provision in both technical and financial terms. In the world, monitoring and evaluation has increasingly become an important management tool to track progress of organizations, programs and projects and to facilitate decision making. International community agrees that, by closely examining performance, an organization can design programs and activities that are effective, efficient, and yield powerful results for the community. International experience shows that countries benefit from results/performance-based M&E systems in order to ensure transparency and accountability in the planning, implementation and operation processes, as well as increasing the efficiency of service provision in urban

infrastructure services. While the technical aspects of the works of the central institutions in Turkey generally conform to high standards, monitoring and evaluation arrangements suffer from inadequate understanding of the core concepts and lack of inter-agency coordination in both assessment of the performed works, leading to inefficiency and poor sustainability of investments. The need for more efficient monitoring and evaluation is underpinned also by the IFIs in their project cycles. Although, institutional and legal efforts have started to strengthen M&E of some components of the urban infrastructure systems, there is still significant need for establishment of an overall M&E system with active participation of and effective coordination between the relevant institutions. Based on the identified gaps and challenges in terms of perception of M&E concepts in Turkey, data collection and verification systems and institutional challenges, it is recommended to establish an M&E framework which clearly identifies the principles, processes, methodologies and institutional roles and responsibilities.

Keywords: monitoring and evaluation, urban infrastructure services, performance assessment, municipal environmental services

ÖZ

KENTSEL ALTYAPI HİZMETLERİ İÇİN İZLEME VE DEĞERLENDİRME SİSTEMLERİ: TÜRKİYE'DEKİ KURULUŞLAR VE ULUSLARARASI FİNANSMAN KURULUŞLARININ UYGULADIĞI SİSTEMLERİN BİR KARŞILAŞTIRMASI

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Türkiye'de kentsel altyapı hizmetleri, esas olarak belediyeler tarafından yürütülmekte ve ilgili ulusal standartların karşılanması için proje hazırlama, tasarım, inşaat ve işletme aşamalarının farklı noktalarında merkezi kamu kurumlarıyla yakın koordinasyon gerektirmektedir. Son yıllarda hizmete erişim konusunda önemli ilerlemeler sağlanmasına rağmen, hizmet kalitesinin teknik ve finansal verimliliğinin artırılmasına hala ihtiyaç duyulmaktadır. Dünyada izleme ve değerlendirme, proje, program ve kurumların ilerleyişinin takibinde ve karar mekanizmalarını kolaylaştırıcı nitelikte önemli bir araç haline gelmektedir. Uluslarası camia, performansı yakın bir şekilde inceleyerek bir kurumun daha etkili, verimli faaliyetler hayata geçirebileceği ve toplum için daha güçlü sonuçlar ortaya koyabileceği konusunda kihemfikirdir. Uluslarası deneyimler göstermektedir ki, ülkeler sonuç/performans odaklı İzleme ve değerlendirme sistemlerinden hem süreçlerin planlama, uygulama ve işletme süreçlerinde saydamlığı ve hesap

verebilirliği sağlamak hem de kentsel altyapı alanında hizmet verimliliğini artırmak amaıyla faydalanabilmektedir. Türkiye'deki merkezi kurumların çalışmaları tenik açıdan yüksek standartlarda olmakla birlikte, izleme ve değerlendirme sisteminde temel konseptlerin yeterli oranda anlaşılamaması ve kurumlar arası koordinasyonun eksikliğine bağlı olarak eksikler bulunmakta, bu da verimsiz ve sürürülebilirliği yetersiz yatırımlara sebep olmaktadır. Daha etkin bir izleme ve değerlendirme sistemine duyulan ihtiyaç uluslararası yatırım kuruluşları tarafından da belirlenmiştir. Kentsel altyapı hizmetlerinin bazı alanlarında (ör: su kayıp ve kaçaklarının izlenmesi) izleme ve değerlendirmeye yönelik kurumsal ve yasal girişimler başlamış olsa da, genel bir izleme ve değerlendirme sisteminin ilgili tüm kurumların katılımı ve kurumlar arası etkin koordinasyon ile kurulması gerekmektedir. Tez kapsamında, Türkiye'deki izleme ve değerlendirme konularının algılanışında ve veri toplama ve doğrulama sistemlerinde belirlenen eksikler ve zorluklardan yola çıkarak, genel prensipleri, süreçleri, metodolojileri ve kurumsal rol ve sorumlulukları kapsayan bir izleme ve değerlendirme sisteminin kurulması önerilmektedir.

Anahtar Kelimeler: izleme ve değerlendirme, kentsel altyapı hizmetler, hizmet verimliliği

To Gülay-Mehmet Yıldız, my mum and dad…

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TABLE OF CONTENTS

ABBREVIATIONS

DSI	State Hydraulic Works
EIB	European Investment Bank
EU	European Union
GDP	Gross Domestic Product
GDEM	General Directorate of Environmental Management
GDWM	General Directorate of Water Management
IEG	Independent Evaluation Group
ICR	Implementation Completion and Results Report
IFI	International Financing Institutions
IWA	International Water Association
IWSA	International Water Supply Association
MM	Metropolitan Municipality
MDGs	Millennium Development Goals
MoEU	Ministry of Environment and Urbanization
MoFAL	Ministry of Food, Agriculture and Livestock
MoFWA	Ministry of Forestry and Water Affairs
M&E	Monitoring and Evaluation
SDGs	Sustainable Development Goals
SUEN	Turkish Water Institute
OECD	The Organization for Economic Co-operation and Development
OECD/DAC	Development Assistance Committee of the OECD
PAD	Project Appraisal Document
PDO	Project Development Objective
PE	Population Equivalent
PPAR	Project Performance Assessments Report
TurkStat	Turkish Statistical Institute
TCA	Turkish Court of Accounts
WB	World Bank
WWTP	Wastewater Treatment Plant

CHAPTER 1

INTRODUCTION

1.1 Urban Infrastructure Services and Monitoring and Evaluation

Over the course of the last 70 years, Turkey has experienced one of the most dramatic and transformative urbanization experiences of any country in the world. While the country's total population has increased by 9.2 percent during the 2007-2014 period, the urban population[1] increased by 15.4 percent during that period. What distinguishes Turkey from many other developing countries is that it harnessed the benefits of agglomeration economies that accompanied rural-urban migration [1].

As underlined by the World Bank (WB) [2], increased urban population has resulted in sprawled cities, which exceed their service boundaries. Despite the significant increase in access to services, the challenges have remained unchanged in terms of service quality and long-term sustainability in environmental and financial terms. As cities have grown, they also responded to challenges in access to service delivery. Consequently, access to water is at 99%, access to sanitary landfills is at 60%, access to sanitation is at 91% as reported by the Turkish Statistical Institute's (TurkStat) statistic for 2014. However, quality and long-term financial and environmental sustainability of water and sanitation services remain a concern as identified in the 10th Development Plan. In the water sector, only 52% of potable water was treated in 2010, nonrevenue water is estimated at approximately 50%, and significant efficiency challenges remain in the wastewater sector as a result of operational and technological inefficiencies [2].

The total amount of public operational and capital investments was 35 billion TL between 2007 and 2013. A significant part of this amount (27.8 billion TL

(excluding 2011), corresponding to 79%) was invested in water and wastewater services, with operational and capital municipal investments representing equal shares, each being 14 billion TL. This demonstrates the high priority given to the sector, which led to the improvements presented above [3].

In the development world, monitoring and evaluation (M&E) has increasingly become an important management tool to track progress of organizations, programs and projects, and to facilitate decision making. International community agrees that, by analyzing performance precisely, an organization become capable of designing effective and efficient programs and activities which produces strong outcomes for the target group. Monitoring and evaluation are accepted as two separate but interrelated processes, which are used for the assessment of an organization's performance. At project level, monitoring is realized as a long-term systematic process that collects information regarding the project progress. Evaluation, on the other hand, is more dependent on time and it is conducted to assess to see if a project has fulfilled its objectives and delivered the expected outputs as defined in its original planning documents.

At international level, it is expected that International Financing Institutions (IFIs) comprehensively report on the impacts of their activities, especially the development impacts. The IFIs have endorsed specific systems and tools for M&E of their projects and programs to analyze their impacts and made improvements in their project cycle when it deemed necessary. Considering the IFIs' increasing share in the development environment and also in financing of urban infrastructure systems in Turkey, the M&E systems of the IFIs' are worth reviewing to see how they can be used to improve the existing M&E systems applied by Turkish institutions.

In Turkey, many institutions share the responsibilities regarding the management of urban infrastructure systems. While the technical aspects of their work generally conform to high standards, monitoring and evaluation arrangements suffer from inadequate understanding of the core concepts and lack of inter-agency coordination in both assessment of the performed works, leading to inefficiency

and poor sustainability of investments. The need for more efficient monitoring and evaluation is underpinned also by the IFIs in their project cycles. Although, institutional and legal efforts have started to strengthen M&E of some components of the urban infrastructure systems, there is still significant need for establishment of an overall M&E system with active participation of and effective coordination between the relevant institutions.

1.2 Objective and Scope of Study

The main objective of the present study is to provide an assessment of the existing M&E systems of the Turkish institutions which have a role in urban infrastructure management and to review the M&E approaches of some IFIs which take part in financing of urban infrastructure systems in Turkey. Ultimately, the study aims at defining the gaps in the Turkish system and develop some recommendations for improvement on the basis of the international standards and best practices.

In Chapter 2 of the thesis, a literature review on the basic M&E concept is presented; main definitions and main aspects of M&E are given, major elements of M&E systems are explained. Different types of monitoring and evaluation techniques and the key steps for establishing an M&E system are summarized. Finally, since the thesis focuses on urban infrastructure systems in Turkey, institutional aspects of urban infrastructure management in Turkey is briefly presented.

Chapter 3 provides a review of the M&E systems applied by the four IFIs which have a significant role in financing urban infrastructure projects in Turkey. After explaining the M&E approach and the major components, emphasis was given to the M&E in the IFI financed urban infrastructure projects.

In addition to the overview of Turkish institutions in Chapter 2, more detailed information is presented in Chapter 4 which deeply reviews the M&E systems currently implemented by these institutions. On the basis of the contents of Chapter 3 and Chapter 4, a gap analysis is conducted in Chapter 5 and recommendations for improvement of the M&E systems in urban infrastructure sector are developed in Chapter 6.

1.3 Methodology

While preparing the thesis, first, a literature review on M&E was conducted and main definitions of the basic concepts and types of M&E techniques were studied. For analyzing the currently existing M&E systems in Turkey, institutional structures and legislative structures of the relevant institutions were reviewed and the documents developed by these institutions were assessed with a special focus on M&E activities. National plans, programs, action plans, strategic plans and activity plans of the institutions were deeply analyzed. Additionally, interviews were made with the technical staff of the institutions to get more detailed information. For M&E systems of the IFIs, a similar approach was taken and a detailed review of the M&E related documents were followed by the interviews with the local staff of the IFIs.

A gap analysis was conducted by comparing the M&E systems in Turkey with the ones applied by the selected IFIs. Through the gap analysis, main issues requiring attention were identified and then recommendations for fulfilling these gaps and for development of a more effective M&E system in Turkey was developed.

CHAPTER 2

LITERATURE REVIEW

2.1 Monitoring and Evaluation

Establishment of sufficient controls over a project in order to ensure that it stays on track towards the achievement of project objectives has been defined as one of the tasks of project management. The literature states that it is achieved by internal monitoring, which is defined as systematic and continuing gathering, assessment and usage of data and information for management control purposes and decision-making. The development world acknowledges M&E as crucial in project management. It is commonly agreed that M&E prompts capacity development within countries and institutions to conduct their own assessments producing their own performance data [4].

2.1.1 Definitions of Monitoring and Evaluation

The Organization for Economic Co-operation and Development (OECD) defines M&E as a continuous process that is based on the systematic data collection on identified indicators to enable management and the major stakeholders of an ongoing development intervention with indications of the extent of progress and accomplishment of project targets and progress in fund utilization. Evaluation is the systematic and unbiased analysis of an ongoing or completed project, program, or policy, including its design, implementation, and results. Evaluation aims to determine the relevance and achievement of objectives, development efficiency, effectiveness, impact, and sustainability. An evaluation should yield credible and useful information, providing the integration of the lessons learned into the decision making process of the recipients and the donors. Towards the aim of

improving the efficacy of a project or organisation, monitoring depends on the identified targets and planned activities during the planning phases of activities. It supports keeping the work on track, and alerts the management when things are not going well. When conducted appropriately, monitoring serves as an invaluable tool for good management, and it constitutes a helpful basis for evaluation. Through monitoring, one can determine whether the available resources are sufficient and are being used properly, whether the existing capacity is sufficient and appropriate, and whether the planned activities are being realized. It aims at allowing stakeholders to make informed decisions about the effectiveness of a program and the effective utilization of available resources [5].

According to the Independent Evaluation Group (IEG) which is an independent unit of the WB for M&E of the WB projects and programs objectively, monitoring embodies the regular tracking of inputs, activities, outputs, outcomes and impacts of development activities at the project, program, sector and national levels. This can involve the monitoring of a country's progress against the millennium development goals (MDGs), or other national means of development success. The IEG defines evaluation as the process of identification of the worth or significance of a development intervention to determine the relevance of objectives, the efficacy of design and implementation, the efficiency or resource utilization, and the sustainability of results.

With evaluation processes, actual project impacts can be compared with the agreed strategies. It checks and analyses what you targeted to do, at what and how you have achieved. It can be a formative evaluation which is done during the life of an organisation or intervention with an emphasis on strategy improvement or way of functioning of the project or organisation. It can also be summative drawing lessons from a finalized project or an organisation that is not active anymore. Evaluation provides a measurement of how well the program/project activities have fulfilled the anticipated objectives and/or the extent to which changes in outcomes can be linked to the program/project. “Impact” is the change in the outcome of interest with or without the

program/project and the process for measuring the impact is usually defined as "impact evaluation" [5].

Monitoring and evaluation differ from each other basically due to their timing and focus of assessment. Monitoring is ongoing and tends to focus on what is happening. On the other hand, evaluations are conducted at particular stages in time to assess how well the project activities were realized and what difference they have made. Monitoring data is commonly used by managers for ongoing project/programme implementation, tracking outputs, budgets, compliance with procedures, etc. Evaluations may also inform implementation (e.g. a midterm evaluation), but they are less frequent and examine larger changes (outcomes) that require more methodological rigor in analysis, such as the impact and relevance of an intervention [6].

Monitoring and evaluation are two synergistic processes. Monitoring information is realized as a necessity to conduct rigorous evaluations but it does not provide sufficient input. Although monitoring information can be gathered and used for ongoing management purposes, if one relies on monitoring information on its own, it can result in distortions because it usually includes only specific dimensions of project/program activities. Furthermore, this information should be used carefully in order to avoid unintended behavioral incentives. On contrary, evaluation can enable project/program managers to interpret the performance in a more balanced manner. However, being more detailed and time-consuming, due to its greater cost, evaluation should be done more sparingly. Relying on monitoring information to identify possible issues requiring more detailed analysis via an evaluation is accepted as another approach [7].

High quality evaluation information can support clarification of the facts and trends identified by the monitoring system and therefore evaluation complements monitoring when a monitoring system indicates that the efforts are going off track. For instance, the target population might not be benefiting from the services, costs might accelerate, and there might be a strong real resistance to adopting an innovation [8].

Both monitoring and evaluation are used to measure and analyze performance, but the ways and timing they followed are different. Monitoring takes place over the course of a program or project implementation. Evaluation is conducted periodically to assess the performance of the program or project. It seeks to reasons behind the results by answering the question of "why?" [9].

Figure 1 shows the common phases and major activities in project/programme planning, monitoring, evaluation and reporting [6].

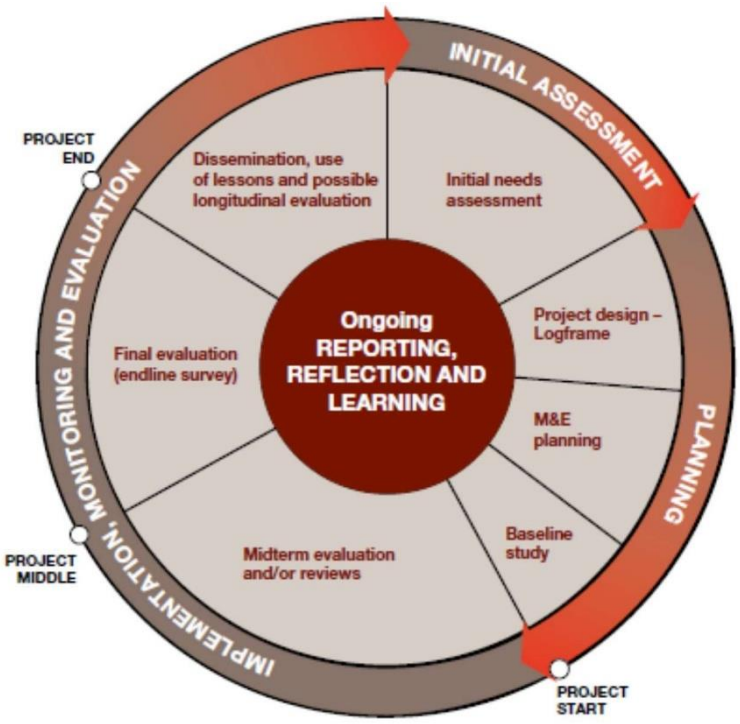

Figure 1. Common phases and major activities the project/programme cycle [6]

2.1.2 Main Aspects of M&E systems

2.1.2.1 M&E Criteria

Since 1991, the evaluation criteria defined by the Development Assistance Committee of the Economic Cooperation and Development (OECD/DAC) have formed a strong foundation for international development evaluation. These are the most prominent and widely accepted criteria used for aid evaluation by most bilateral and multilateral donor agencies, as well as international nongovernmental organizations. The criteria are based on the conception that evaluation is an assessment "to determine the relevance and fulfillment of objectives, developmental efficiency, effectiveness, impact and sustainability" of efforts supported by aid agencies. These criteria are considered as essential by the OECD/DAC members in guiding assessment of development aid [10]. The definitions of the criteria (OECD/DAC) are as follows:

Relevance: The extent to which the development aid activity fits within to the priorities and policies of the parties including the target group, recipient and donor. Verification of the following is useful while assessing the relevance of a program/project: The extent to which the targets/objectives of the program/project still relevant; Consistency between the activities and the outputs of the program/project and the overall goal and the attainment of its objectives; consistency between the activities and outputs of the program/project with the expected impacts and effects.

Effectiveness: Measurement of the extent to which an aid activity achieves its objectives. Verification of the following is useful while assessing the effectiveness of a program/project: The extent to which the objectives were achieved or possibly to be achieved, the major factors effecting the accomplishment of the objectives?

Efficiency: Measurement of the outputs in relation to the inputs. As an economic term, it is used to show that the least costly resources available are used to accomplish the expected outputs. Usually it necessitates comparison of alternative ways to reaching the same outputs, to see if the most efficient process has been

accepted. In evaluation of a program's efficiency, it is useful to consider the following subjects: Cost-efficiency of the activities; on time achievement of the objectives achieved; efficient implementation of the program or project in comparison to the alternatives.

Impact: Indication of any kind of the changes (both positive and negative) yield by a development aid (both directly or indirectly, intended or unintended). It covers the major impacts and effects of the activity on the development indicators including environmental, social, and economic and others. The analysis should deal with both intended and unintended results and must also include the positive and negative impact of external factors, such as changes in terms of trade and financial conditions. In evaluation of the impact of a program/project, it is helpful to consider the following factors: What has happened as a result of the program or project? What real difference has the activity made to the beneficiaries? How many people have been affected?

Sustainability: Sustainability is about the continuation of benefits of a project/program after withdrawal of donor financing. Projects should be sustainable both environmentally and financially. The following questions would be helpful in evaluation of the sustainability of a program/project:

- The extent to which the benefits of a program/project continue after donor funding ceased?
- What were the major factors which influenced the achievement or non-achievement of sustainability of the program or project?

2.1.2.2 Main Elements of M&E systems

Main elements of an M&E system are: frameworks and indicators. The following paragraphs present information on the definitions and different types of frameworks and indicators:

Frameworks: Frameworks are accepted as the major elements of M&E plans that detail the project components and the sequence of the project phases, which are required to reach the targeted outcomes. They improve the understanding of the program's goals and objectives, the identification of the relationships between factors critical to project implementation, and delineate the internal and external elements that might have an impact on the success of the project. Frameworks are also critical for understanding and assessing how a program is supposed to work [5].

A conceptual framework - sometimes called a "research framework" - is helpful for identification of and displaying the factors and relationships that affect the outcome of a program/intervention. Typically, diagrams illustrating causal linkages between the key components of a program and the outcomes of interest are used to show conceptual frameworks. Results frameworks, which are also called "strategic frameworks" display the direct causal relationships between the additional results of the key activities up to the overall objective and goal of the intervention. The results frameworks include an overall goal, a strategic objective and intermediate results. A strategic objective (SO) is an outcome that is the most ambitious result that can be reached and for which the organization is willing to be held responsible. An intermediate result (IR) is a distinct result or outcome which is necessary to accomplish an SO. A logic model, or "M&E framework," enables a streamlined, linear interpretation of a project's planned utilization of the available resources and its expected ends. The five essential components of logic models are: inputs, activities, outputs, outcomes and impacts [5].

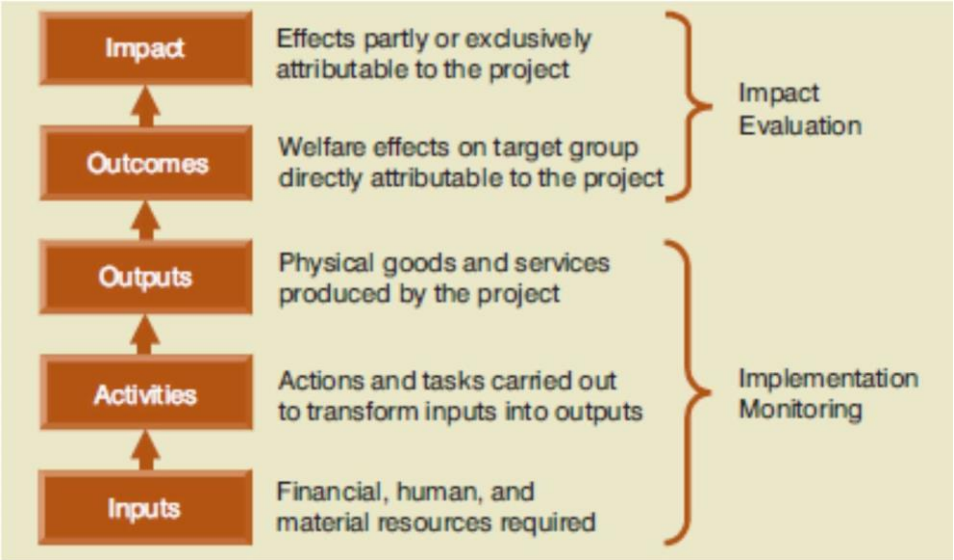

Figure 2. Project Monitoring and Evaluation Framework [11]

Indicators: Indicators, as variables, measure a specific aspect of a program/project which directly relates to the objectives of the program/project. Value of an indicator varies from the baseline figure measured at the beginning of the program to a new value at the end of a program. When the activities have made their impact felt, the indicator is measured again. Second, an indicator measures the value of the change in reasonable units in comparison to past and future units in percentage or number. Third, an indicator focuses on the program/project's single aspect like an input, an output, or an overarching objective; however, but it should be precisely defined in a way that captures this one aspect. Indicators should be SMART [5]:

S – Specific (precise and unambiguous)

M – Measurable (appropriate to the subject

A – Achievable (of a reasonable cost)

R – Relevant (serve to assess performance)

T – Trackable (easy to validate or verify)

2.1.3 Types of Monitoring

Normally, a project/programme monitors various things depending on its specific informational needs. A summary of the different types of monitoring is given in Table 1. It should be noted that the listed types of monitoring are usually used simultaneously within the scope of a thorough monitoring system [6].

Table 1. Common Types of Monitoring [6]

Type of Monitoring	Brief Description
Results monitoring	Based on tracking of effects and impacts. In this type of monitoring, the process is merged with evaluation to assess if the project/programme is on target towards the expected results and if any unintended impact (positive or negative) might arise.
Process (activity) monitoring	Provides recording the utilization of inputs and available resources, the progress of activities and the delivery of outputs. Delivery of the activities and its efficiency are examined. It is usually linked with compliance monitoring and provides input to the evaluation of impact.
Compliance monitoring	Provides compliance with donor requirements, expected results, grant and contractual obligations, local governmental legislation and standards.
Context (situation) monitoring	Records the operational setup of the project/programme, particularly since it affects identified risks and assumptions; however, also any unexpected considerations that may come up. It involves the field and the wider political, institutional, funding, and policy context that might have an impact on the project/programme.
Beneficiary monitoring	Provides tracking the beneficiary perceptions of a project/programme. It covers satisfaction of or grievance from the beneficiaries with the project/programme as well as their participation.
Financial monitoring	Clarifies costs by input and activity within predefined expenditure categories. It is commonly linked with compliance and process monitoring.
Organizational monitoring	Following up of the sustainability, institutional development and capacity development in the project/programme and with its partners. It is commonly conducted together with the monitoring processes of the larger, implementing organization.

2.1.4 Types of evaluation

For planning the evaluation in line with the most appropriate evaluation method, the difference between evaluation types should be understood. There are several evaluation designs, and the type of evaluation should properly suit the development level of the program or program activity. The level of effort and the necessary methods are determined based on the program stage and scope [6].

Evaluation can be classified in various ways. Mainly, the audience and purpose of the evaluation determines the approach and method of an evaluation. Table 2 summarizes major evaluation types depending on three general categories. It should be kept in mind that the categories and types of evaluation are not commonly exclusive and are commonly used in conjunction [6].

Table 2. Summary of Major Evaluation Types [6]

According to evaluation timing	**According to who conducts the evaluation**	**According to evaluation technicality or methodology**
Formative evaluations are used in implementation for assessment of compliance and enhancement of performance. Summative evaluations occur at the end of implementation for evaluation of impact and effectiveness. Midterm evaluations are formative in purpose and occur midway through implementation. Final evaluations are summative in purpose and are undertaken (often externally) at the completion of implementation to evaluate how well the project/programme accomplished the project/programme objectives. Ex-post evaluations are conducted a while after implementation to evaluate sustainability and long-term impact.	Internal or self-evaluations are done by the staff who is implementing a project/programme. Their cost can be lower than external evaluations and support ownership and staff capacity and ownership. However, credibility with certain stakeholders (e.g. donors) might be missing, as they are perceived as more biased or one-sided (subjective). External or independent evaluations are undertaken by evaluator(s) who are not a member of the implementing team, lending it a degree of objectivity and often technical expertise which tend to focus on accountability. Participatory evaluations are done with the beneficiaries and other stakeholders. They can be empowering, building their capacity, ownership and support. Joint evaluations are conducted in collaboration of various implementing partners. They support building consensus at different levels, credibility and joint support.	Real-time evaluations (RTEs) are conducted during the implementation of a project/programme to provide immediate feedback for modifications to enhance ongoing implementation. Emphasis is given to immediate lesson learning over impact evaluation or accountability. Meta-evaluations are used to assess the evaluation process itself. Thematic evaluations focus on one theme. This theme can be gender or environment, usually across a number of projects/ programmes or the whole organization. Cluster/sector evaluations fives emphasis a set of related activities, projects/ programmes, typically across sites and implemented by multiple organizations (e.g. National Societies, the United Nations and NGOs). Impact evaluations are typically done after completion with a focus on the effect.

Impact evaluations can follow a quantitative or qualitative approach. Use of an explicit counterfactual analysis is the basic organizing principle of quantitative impact evaluation. In other words, the welfare effect of a specific project is isolated by comparing the actual observed outcomes of project participants with counterfactual outcomes, i.e., the hypothetical outcomes that would have prevailed in the absence of the project. These hypothetical counterfactual outcomes cannot be observed since people can either be in or out of the project. As the basic objective of quantitative impact evaluation, these unobserved counterfactual outcomes are estimated. Due to this counterfactual analysis, quantitative impact evaluation provides possible clear specification of the project impact being estimated and hence considered as more authoritative and is usually referred to as rigorous impact evaluation [11].

Qualitative impact evaluation is based on understanding processes (not on a counterfactual analysis; i.e., if A is done, then likely B will occur, and then likely C will occur, etc.); observing behaviors (e.g., consumptions, visits to hospital); and condition changes (e.g., school conditions, irrigation canals). This type of evaluation usually draws inferences from studies like reviewing project implementation processes, interviewing project beneficiaries to get personal opinions, conducting focus group discussions, analyzing supportive secondary data, etc. The techniques which are used in participatory impact assessments that reflect changes using the personal knowledge of participants about the circumstances in the project area can be given as an example of the qualitative approach [11].

The two types of quantitative impact evaluations are ex post and ex ante evaluations. The intent of ex ante impact evaluations is to measure the expected impacts of future programs and policies, under the current conditions of a potentially targeted area. They may include simulations based on assumptions about how the economy works. Many times, ex ante evaluations are based on structural models of the economic environment facing potential participants. The underlying assumptions of structural models, for example, involve identifying the

main economic agents in the development of the program (individuals, communities, local or national governments), as well as the links between the agents and the different markets in determining outcomes from the program. These models predict program impacts [12].

Ex post evaluations, on the other hand, measure actual impacts accrued by the beneficiaries that are attributable to program intervention. The treatment effects model is one form of this type of evaluation. Ex post evaluations bring immediate benefits and reflect reality. However, the mechanisms underlying the program's impact on the population, which structural models aim to capture and which can be crucial for understanding program effectiveness (more specifically, in future settings) can be missed. The cost of ex post evaluations can also be much higher than ex ante evaluations due to their requirement of data on actual outcomes for participant and nonparticipant groups, as well as on other accompanying social and economic factors that may have determined the course of the intervention. The failure of the intervention, which might have been predicted through ex ante analysis another added cost in the ex post setting is [12].

2.1.5 Key Steps for Establishing an M&E System

Experts vary on the specific sequence of steps in establishment of a results-based M&E system; however, there is an overall intent on which all experts agree. WB defined the following 10 steps to build a results-based monitoring as part of an M&E framework [8]:

The first step involves conducting a readiness assessment which covers understanding the needs and characteristics of the target area or region as well as the major players like the national or local government and donors that will be responsible for implementation of the program. It is also critical to understand how the effort will respond to negative pressures and information generated from the M&E process.

As the second step, it will be useful if the evaluators agree on specific outcomes as well as key performance indicators to monitor outcomes. Third step requires the evaluators to decide on the methods for measurement of these outcomes.

The fourth step necessitates to develop the instruments for data and information collection. In assessing the impact of a program, baseline or preprogram data are helpful items. In program evaluation, either the data can be used to predict outcomes that might be a result of the program (as in ex ante evaluations) or before- and-after comparisons which are also known as reflexive comparisons can be made. Frequent discussions with staff members and targeted communities can also be held at this step.

At the fifth step, targets which can also be used to monitor results need to be established by setting periodic targets over time (at annual intervals for instance, depending on the specifications of the project). In addition to other factors that might have an impact on program implementation (e.g. political or social factors, it is important to take into account the duration of the possible effects of the program. More specifically, by monitoring these targets, the sixth step in this results-based framework is embodied and the gathering good-quality data is covered.

The seventh step is related with the timing of monitoring, recognizing that from a management perspective the timing and organization of evaluations also drive the extent to which evaluations can help guide policy. If it is found that the actual indicators diverge rapidly from the initially set goals, for instance, evaluations conducted around that time can help program managers make a quick decision on any adjustments that program implementation or other related factors might need.

At the eighth step, the means of reporting, including the audience to whom the results will be presented needs to be considered carefully. At the ninth step, the results are used to develop avenues for feedback (such as input from independent agencies, local authorities, and targeted and non-targeted communities). This feedback enables the evaluators to learn from and update program rules and procedures to enhance results, mainly outcomes.

The 10^{th} and the final step is sustaining the M&E system within the organization. In addition to other things, an effective M&E system depend on continued demand (a function of incentives to continue the program, as well as the value for credible information); transparency and accountability in evaluation procedures; effective

management of budgets; and well-defined responsibilities among program staff members.

2.1.6 M&E of Urban Infrastructure Projects

Sustainable and equitable access to safe water and adequate sanitation are widely acknowledged as important development goals. There is a wide range of mechanisms for achievement of these goals and they vary with respect to the types of services (water supply, drinking water quality, sanitation, sewerage, and hygiene); and the setting (urban, peri-urban, rural); and the typology of delivery (public or private interventions, decentralized delivery, expansion or rehabilitation). For delivery of the services, there is a wide range of possible conditions in terms of socio-cultural, economic, environmental, political and legal aspects. The impacts of water supply and sanitation (WSS) policies and programs include greater efficiency in the utilities sector, improved access to higher quality services, health enhancements, increased incomes and consumption, social and gender inclusion, and education improvements [13].

Performance assessment has been one of the hottest topics in the water industry for the past decade. The use of performance indicators and benchmarking techniques has become a common practice during this period. There are many good reasons behind this success. Water services are provided in a monopolistic environment, and in the absence of market forces it is hard to find motivation for efficiency. All the stakeholders in the business have come to realize that, by assessing the performance of the services in a systematic way, utilities are driven to continually improve their performance, with the consequential benefits for all those involved. [14].

In the early 1990s, the subject of “Performance Indicators” was selected as the theme, by the International Water Supply Association (IWSA) for one of its world congresses. The congress had to be cancelled since no abstracts were received on this subject, which apparently did not raise much interest. However, just three or four years later, the response to an inquiry sent by IWSA to about 150 senior members of water utilities from all over the world clearly showed that

“performance indicators” and “unaccounted-for water” were by far the two topics of greatest interest in the scope of the water transmission and distribution systems. In 1997, IWA established a task force on “performance indicators” which produced the IWA PI systems for water supply and wastewater services. These systems has become probably the most widely used references the sector [14].

The development for assessing performance in other urban infrastructure services has remained limited although the motivation is similar. Solid waste, for example, can be very close to water and wastewater services. Actually, the same reasons which suggest the need to assess the performance of drinking water and wastewater services also are also valid e case of urban solid waste services. However, it is clear that, regardless of the reasons, the initiatives in field of solid waste are much scarcer [14].

Cities contribute about 80% of the GDP, while being large, concentrated sources of emissions and energy consumption. They are also emerging as the most vulnerable human settlements on account of the vagaries of nature. Keeping this in mind, a significant portion of the international dialogue on sustainable development has been increasingly focused on cities. While cities have started embracing sustainability in articulating their vision and planning approaches, formidable challenges exist in translating these visions and plans into actions. As a start, cities need to first baseline themselves across sectors. These baselining efforts should also acknowledge inter-sectoral linkages in order to enable cities to plan holistically for the future. Indicators create opportunities dialogue on local conditions, offer quantification and objective identification of policy issues, monitoring and evaluation, and allow comparison of plans and programs over different time periods and/or spatially [15].

2.2 Institutional Aspects of Urban Infrastructure Management in Turkey

Urban infrastructure system of Turkey has been structured around various laws and regulations governed by a range of ministries and administrations. Part of the legislation in urban infrastructure dates back to the early years of the Republic. As a result of many amendments and additions to the current legislation in years, urban infrastructure management ceased to be simple [16].

The Turkish administrative system, including the water-related institutions, has three administrative levels: the national, the provincial and the local level (i.e. municipalities) [16]. At the national level, the Ministry of Development (MoD), the Ministry of Forestry and Water Affairs (MoFWA), the Ministry of Environment and Urbanization (MoEU), the Ministry of Food, Agriculture and Livestock (MoFAL) are all at the decision-making level. State Hydraulic Works (DSI), the General Directorate of Water Management (GDWM), the Directorate General of Environmental Management (DGEM), municipal water authorities, and other governmental organizations are at the executive level, whereas water use organizations such as irrigation unions and cooperatives are at the water user level [3].

The MoD, as one of the decision-making authorities, is responsible for preparation of 5-year development plans. The 10th Development Plan which covers the period of 2014 - 2018 was published in July 2013 [17]. The Plan aimed;

- To increase the ratio of population with access to safe drinking water to 100 %,
- To increase the ratio of population with access to sewerage system to 95 %,
- To increase the ratio of population with access to a WWTP to 80 % by the year 2018 [17].

The MoFWA is the key authority for the management of water resources with its two general directorates; DSİ and GDWM. DSİ, established in 1954, is in charge of development, planning, and management of surface and groundwater, and land

resources with 26 regional directorates in Turkey, whose boundaries correspond primarily to the river basin boundaries. DSİ's responsibilities cover the observation, field investigation, master plan, feasibility, design, construction and management plans for irrigation, hydropower, domestic water supply and flood control purposes. Whereas, GDWM, a relatively new agency, is responsible for developing policies for protecting and sustaining water resources, and coordinating and preparing river basin management plans (RBMPs) together with relevant stakeholders. The GDWM is also in charge of developing water quality standards and water quality monitoring systems for the whole country [29].

The MoEU also has responsibilities regarding water governance especially related to environmental protection and rehabilitation, assessing and monitoring environmental impacts of projects and activities, which may affect the environment. As such, it determines treatment standards for wastewater treatment plants, issues discharge permit and is in charge of monitoring performance of wastewater facilities. The MoEU is also in charge, through its EU Investments Department, of preparing and implementing the operational programme according to the legislation, EU directives and international agreements, in particular the financial agreement frameworks with the EU. As such, it sets projects' priority level [29].

The MoEU is the leading national authority for policy development in the field of waste management. The MoEU is mainly responsible for determining the policies and principles to protect environment and to prevent pollution, for developing the legislation and ensuring its implementation. The responsibilities of the MoEU in solid waste management include; preparation of legislative documents, identifying policies and strategies for waste management, conducting scientific researches, coordinating preparation of waste management plans, taking preventive actions, determining technical standards, licensing, monitoring, regulation, keeping track of given licenses, data collection, exportation of wastes, release of permits regulating hazardous waste import and transportation of these wastes over Turkey and ensuring the continuation of trainings.

Ilbank is also responsible for supplying municipal water to all municipalities by assisting in financing, developing and constructing water supply and sewerage projects. Ilbank is the development and investment Bank of Turkey. It has a major influence on municipal investments, a large share of which are in WSS, as it establishes the creditworthiness and therefore the acceptable debt level of all local governments in Turkey, provides loans (grants for small municipalities and LGs) and guarantees, channels IFI funding and carries out all aspects of related due diligence (The World Bank, 2016). Ilbank is responsible for supporting the municipalities for the solid waste projects executed by municipalities. Ilbank also supports municipalities through financing of solid waste management projects and being guarantor.

As a number of ministries and institutions are involved in aspects of the water sector management, a Water Management Coordination Board was created under the Ministry of Forestry and Water Affairs in 2012. The members of the Board are the representatives of the Ministry of Interior, the Ministry of Foreign Affairs, the Ministry of Development, the Ministry of Environment and Urbanization, the Ministry of Culture and Tourism, the Ministry of Health, the Ministry of EU, the Ministry of Science, Industry and Technology, the Ministry of Energy and Natural Resources, the Ministry of Food, Agriculture and Livestock. The activities of the Board are executed through the working groups of Water and Soil Working Group and Monitoring Working Group. The meetings which take place periodically are chaired by the Minister or the Undersecretary of the Ministry of Forestry and Water Affairs. Its primary objective is to foster cooperation and coordination among all ministries, institutions and organizations in accordance with a common strategy framework, in order to increase potable water quality and quantity and to ensure the sustainability of the water protection and usage balance.

At the user level in urban areas, within their territorial borders, metropolitan municipalities and other municipalities are responsible for ensuring the protection of water basins in harmony with sustainable development principles and providing a healthy environment for citizens in accordance with Metropolitan Municipality

Law No. 5216 and Municipality Law No. 5393, respectively. General Directorate of Water and Wastewater Administration “SKI” are established in every Metropolitan Municipality to carry out the WSS in accordance with the provisions of Law No 2560. SKIs are public entities, affiliated to the Metropolitan Municipality and have an autonomous budget. According to Law No 2560, SKIs are also responsible for ensuring protection of the water basins, even if they are located outside the boundaries of their service area and for drainage. The governance structures of SKIs include General Board, a Management Board, and Auditors.

2.3 International Financing Institutions (IFIs) in Turkey

In addition to Turkey-based financial institutions, several international developments banks like the European Union, the World Bank and the European Investment Bank also provide funding for many investment projects in Turkey.

2.3.1 The European Union (EU)

The EU has a history of supporting Turkey to align with the EU environmental, climate change energy and transport acquis. Turkey’s close cooperation with the European Economic Community (EEC) dates back to 1959. This cooperation is based on the Ankara Agreement, which is the association agreement signed on September 12, 1963. As a crucial element, "Customs Union" was established to enable Turkey to trade goods and agricultural products with EEC countries without any restrictions. The Ankara Agreement aimed to accomplish "continuous enhancement of the life conditions in Turkey and in the EEC via accelerated economic progress and the harmonious trade expansion, and to decrease the disparity between the Turkish economy and the Community".

The Instrument for Pre-accession Assistance (IPA II) is the main financial instrument for providing EU support in implementing reforms to move towards EU membership. Financial assistance under IPA II is given for the following four specific objectives: (a) support for political reforms, (b) support for economic, social

and territorial development, (c) strengthening the ability of the beneficiary country to fulfil the (future) obligations stemming from membership in the EU by supporting progressive alignment with the Union acquis, (d) strengthening regional integration and territorial cooperation. Furthermore, the IPA II Regulation requires financial assistance to focus on five policy areas: a) reforms in preparation for Union membership and related institution-and capacity-building, b) socioeconomic and regional development, c) employment, social policies, education, promotion of gender equality, and human resources development, d) agriculture and rural development, and e) regional and territorial cooperation [54].

Concerning Pre-Accession Programmes, the EU Delegation in Turkey supports Turkish institutions in charge of applying decentralized cooperation procedures and monitors the effective implementation of more than 250 projects worth a total amount of some EUR 2.0 billion [18].

2.3.2 The World Bank

The partnership between Turkey and the WB is based on the National Development Plans of Turkey. Recently, the WB prepared Systematic Country Diagnostic (SCD), which discusses the major challenges in poverty reduction and sustainable growth in Turkey. The SCD and NDP are the strong foundations for the new Country Partnership Framework (CPF), which outlines the WB's strategy for the Fiscal Year 17–21 and identifies the major cooperation fields for WB engagement in both technical and financial terms. Turkey is sixth largest borrower of the International Bank for Reconstruction and Development's (IBRD) in terms of outstanding debt. The investment portfolio and pipeline of the WB in Turkey covers providing support to the energy sector, development of financial and private sector, urban development, and health care [19].

One of the major targets of the WB's activities in Turkey in the field of urban development are to establish sustainable cities and societies by developing an inclusive, resilient, productive, and livable urbanization process according to the World Bank's goals to end extreme poverty and to promote shared prosperity.

Three core pillars of the WB's work in urban development are: (i) enhancing city finances, planning, and governance systems; (ii) strengthening different dimensions of living conditions of society including urban infrastructure services, tenure, housing, and neighborhoods; and (iii) providing support to urban transformation by improving urban and land-use planning, management, and implementation of integrated investments in infrastructure and service delivery in order to improve urban space and impact city form over the long run, through reducing sprawl and enhancing livability, resilience, and productivity. The six business lines based on three core pillars are as follows [20]:

- Cities and economic growth,
- Urban poverty and inclusion,
- Municipal infrastructure and services,
- Affordable housing and land,
- Urban management, finance, and governance,
- Cities and urban environment.

2.3.3 The European Investment Bank

As the bank of the EU, the European Investment Bank (EIB) was founded in 1958 and operates in the 27 EU Member States and more than 130 other countries. Outside the EU, the EIB supports projects for economic development in countries, which have signed association or cooperation agreements with the EU or the Member States [21].

In Turkey, currently the EIB lends are based on an EU budget guarantee and at own risk to its balance sheet, via its Pre-Accession Facility. The current budget including Turkey has a volume of EUR 8.7 billion over 2007-13. In 2009, the EIB provided EUR 2.65 billion of loans to Turkey. During the same period, around 40 percent of the loans were mainly used for the Pre-Accession Facility and the remaining part was used in accordance with the current or previous mandates [22].

There is a close cooperation between the EIB, the European Commission and the Turkish authorities in the identification of the priority investments in accordance with the national development plans as well as the priorities of the EU and the EIB. In Turkey, EIB's activity is structures upon three pillars as the lending in infrastructure (both with public institutions and municipalities); small and medium sized enterprises; and the corporate sector. Since the first EU Turkey association agreement dated 1964, the EIB has been an active partner in Turkey's economic development. Since 1964, the EIB has lent EUR 14.3 billion for the investment projects [21].

The major aspects of the EIB's investment policy in the water sector are [33]:

- River basin approach: In order to improve the relation between water resources management and service provision, the EIB prefers to closely cooperate with water resource management entities like river basin authorities.
- Sector development: The EIB seeks ways to secure appropriate financing terms for viable entities and provides support to sector consolidation, including the development of such utilities and regional service providers.
- Climate change: The area of EIB's intervention is mainly based on adaptation and mitigation of the detrimental impacts of climate change, specifically on availability and quality of water resources.
- Water efficiency: The main areas of interest are efficient allocation of water resources, pointing out scarcity issues, making sure that service providers are viable, and improving the efficiency of water services.
- Additional supply requirements: Developing new water supplies is often necessary to address imbalances between demand and supply, particularly in water-scarce regions. The EIB supports new water supply projects (e.g. water desalination plants and dams).
- Wastewater services: The EIB considers wastewater collection, treatment and disposal services as essential in terms of environmental and public

health aspects which requires important investment to fulfill the requirements of the EU and national laws and regulations.

- Research and innovation: The EIB provides support to research and technology development as well as the use of research outputs in project preparation and implementation.

CHAPTER 3

MONITORING AND EVALUATION SYSTEMS APPLIED BY INTERNATIONAL FINANCING INSTITUTIONS

M&E of the investment programs financed by IFIs has grown enormously as the public increasingly demand credible assessments of whether the funds are utilized to enhance the lives of the people who receive the services under the fund. The efforts to hold IFIs and partners accountable for the outcomes of co-operation have also increased interest in evaluation. Global efforts to enhance shared accountability have also increased the emphasis on results and created new interest in evaluation systems within partner countries. Many IFIs and partner countries are trying to establish their own evidence-based policy making and accountability systems as IFIs adapt their evaluation systems to respond to new challenges [55].

The OECD countries are increasingly facing "aid fatigue" and there are growing pressures on IFIs to display results of development activities. This is part of a much wider tendency within the OECD countries to improve their public sectors to make them more effective and performance-directed. Stakeholders want and expect the IFIs, like other domestic government agencies, to be accountable for and report on results achieved with taxpayers' money. Thus, many IFIs have been creating performance-based measurement and management systems to complement their existing M&E systems [55].

There is an increasing pressure on IFIs thoroughly report on the development impacts of their activities. Therefore, strong M&E systems are required to determine how IFIs' works contribute to development and reduction of poverty [56].

During the Second High Level Forum on Aid Effectiveness (2005) it was accepted that aid should yield better impacts. The Paris Declaration which is formulated around five central pillars (i.e. Ownership, Alignment, Harmonisation, Managing for Results and Mutual Accountability) was endorsed in order to build development efforts on first-hand experience of about the results of the aid. At the Third High Level Forum on Aid Effectiveness held in 2008, the Accra Agenda for Action (AAA) was accepted by higher number and broader diversity of stakeholders. The AAA both demonstrates commitment to the Paris Declaration and invites larger partnership among different actors taking part in development and aid [57].

The Paris Declaration (2005) which is a practical, action-oriented roadmap to improve aid activities and its development impact provides a series of particular implementation measures and creates a monitoring system for progress assessment to make sure that donors and recipients hold each other accountable for their commitments.

Designed to strengthen and deepen implementation of the Paris Declaration, the Accra Agenda for Action takes stock of progress and sets the agenda for accelerated advancement towards the Paris targets.

In this section of the thesis, the M&E systems of three IFIs will be presented: the World Bank, the European Union and the European Investment Bank.

3.1 The World Bank

3.1.1 M&E Approach of WB

The WB interprets M&E as two complementary but distinct processes. The WB teams evaluate their projects at certain points during the project cycle (often at mid-point and finalization) with respect to various key aspects which can be listed as relevance, efficiency, efficacy, impact, and performance. Evaluations made by the WB teams mostly pursue an outside viewpoint from relevant specialists.

In Investment Project Financing (IPF) in which inputs are organized to provide support to activities conforming to an exact development outcome, effectiveness of development is measured in terms of the use of limited resources, which generates the accomplishment of exact outcomes. WB practices result-based M&E, which is a management tool used in a systematic manner to record the project progress, to show the results in the field, and to evaluate if the project needs revision in a way to consider emerging conditions. This approach is different from the traditional monitoring paths, which gives emphasis on if a project is being conducted as planned. This is done by checking the achievement of agreed activities and milestones. However, the traditional approach does not enable project managers to understand the level of accomplishment [25].

The M&E system of the WB is based on results framework, which can be defined as a precise expression in the form of graphic display or matrix, or summary which articulates the different levels, of results expected from a specific intervention. It can be a project, a program, or a development strategy. Commonly, the results consist of "outcomes" or "impact", which are the longer-term objectives and the "intermediate outcomes and outputs", which anticipate and lead to the expected longer-term objectives. Even though WB has preferred to use the term "results framework" throughout the last decade, similar theoretical tools, have also been designed and used across different agencies to organize information about planned outcomes and results. Logic models, logical frameworks, theories of change, results chains, and outcome mapping are examples to these tools. Hence, the results framework covers the crucial items of the anticipated cause-effect relationships between inputs, outputs, intermediate results or outcomes, and impact [26]. The WB, similar to the other IFIs, uses indicators to track and monitor the relationship between inputs and results. In selection of indicators, the World Bank uses SMART criteria as presented in Table 3.

Table 3. Characteristics of Effective—SMART—Indicators [26]

Characteristics	Explanation
Smart	Indicators reflect simple, communicable and easily understandable knowledge.
Measurable	Changes can be demonstrated objectively. (e.g. Rate of consumers who are satisfied with the supplied drinking water.)
Achievable	Indicators and measurement units are achievable and sensitive to changes throughout the course of the project.
Relevant	Indicators follow information which is significant and expected to be used for analytical purposes and project management.
Time bound	Progress can be recorded at requested frequency for a defined time period.

3.1.1.1 Main Elements of the World Bank's M&E System

In the M&E system of WB, the results frameworks consist of three major elements:

- Project development objective (PDO) which is defined as the outcome which is expected to be achieved by a project for its main target group, given its scope, duration, and resources;
- Indicators to quantify outcomes which are related to the PDO and a list of intermediate results to record progress against accomplishing outcomes; and
- M&E arrangements which specify clear units of measurement for each indicator, baselines and targets for each indicator. The roles and responsibilities for collection, reporting, and analysis of collected data are also specified within M&E arrangements.

Information produced by M&E systems of the World Bank is normally used to report to different stakeholders including the respective government, public, other financing institutions and WB departments on project progress and performance. M&E has become a measure to expedite public awareness and to improve transparency and accountability. Data and information collection, reporting of and

benefiting from the collected information for monitoring are all under the responsibility of the borrower normally via its implementing agency. Therefore, it is important to consider the institutional capacity of the borrower while developing the M&E arrangements during preparation and to point out any issues about human resources, processes, accountabilities and responsibilities, equipment, knowledge skills, and budget which are needed to conduct a thorough M&E function. From the WB's perspective, the borrowers are usually recommended to carry out comprehensive assessment of the borrower's M&E arrangements to ensure that adequate adjustments are available to monitor and evaluate results during implementation [25].

3.1.1.2 M&E at Different Stages of World Bank Projects

One key function of the task team during project implementation is to promote the borrower's efforts to address implementation issues which might have an impact on the likelihood of achieving the project development objectives. If during project implementation the task team observes that there are issues affecting the project's performance or significant deviations from the PAD, the borrower and the WB Management should be alerted so that proactive measures can be taken. Some "risk flags" that could indicate potential or actual implementation problems include delays in procurement of agreed activities, frequent staff changes in the implementing agency, slow disbursements, and lack of compliance with covenants/safeguards [25].

Implementation Status and Results (ISR) Report is the WB's main tool for internal and external reporting on the implementation performance and prospective outcomes of investment projects. Through this tool, the project's implementation status and performance, progress toward reaching its development objective, and evolution of risks are reviewed by the task teams and the management. While the World Bank-wide minimum standard is semi-annual reporting, the frequency of updating individual ISR reports are determined on a project-specific basis [27].

Implementation Completion and Results report (ICR) is an essential part of the WB's run to raise effectiveness, over a continuous chain of self-evaluation, lessons learning and implementation, knowledge sharing, and becoming accountable for results. ICRs are prepared for both internal and external audiences. The final ICRs are shared with the public though the web site of WB unless otherwise decided in extraordinary conditions [28].

Table 4. M&E at different stages of World Bank financing [25]

Results Framework	Project Identification	Project Appraisal	Implementation Support (ISR)	Project Completion (ICR)
PDO	Identification of the PDO. A clear definition of the principal outcome is provided.	Project Appraisal Document (PAD) defines the PDO. Basic target group is also mentioned in the PAD.	The ISR report includes the progress to achieve the PDO together with a performance rating.	The ICR discusses the achievement of the project objectives on the basis of the original (or current one, if the project is restructured) results framework.
Results Indicators	Formulation of preliminary outcome level indicators. First steps for defining intermediate level results indicators and data sources are taken.	The list of indicators for measurement of all PDO aspects is provided. Indicators for each project component are defined at this stage.	The ISR report is shared with public. A project restructuring is conducted if the results framework is changed.	Contribution of the outputs (intermediate results) to the expected outcomes are articulated.
Baseline values & targets	No requirement for determining the baselines and provisional targets.	It is required that the indicators include baselines and targets. If baselines will be mentioned later, detailed plans establishment of baselines need to be prepared.	As of the first ISR, all indicators need to have baseline and target values. If not, the ISR should specify the actions which have been taken and or to be taken to collect missing data.	Assessment of data availability and quality for the baselines and targets is provided.

Table 4. M&E at different stages of World Bank financing (cont'd) [25]

Results Framework	**Project Identification**	**Project Appraisal**	**Implementation Support (ISR)**	**Project Completion (ICR)**
Institutional Arrangements	WB teams analyze the institutional capacity of the borrower for project preparation and implementation.	Institutional arrangements for data and information collection are assessed and described. Capacity of the implementing agency and the cost for the M&E process are estimated.	The ISR includes information on used data collection techniques and analysis of data against time and space. Challenges and agreed actions should be identified in the ISR.	The ICR explains how the M&E system of the country played its role to support the project. The ICR also highlights if the project provided any support to improve national M&E capacity and systems.

For each ICR prepared by the task teams, Independent Evaluation Group (IEG) of the WB undertakes a separate review in order to independently evaluate the project experience and the quality of the Bank's self-evaluation included in the ICR. While assessing the ICR's self-evaluation quality, IEG uses the following criteria: qualities of evidence and analysis; if the lessons depend on evidence and analysis; whether the ICR is results-oriented/outcome-driven; if the ICR is consistent internally and with ICR guidelines; and conciseness. Each year, IEG carries out Project Performance Assessments Reports (PPARs) for a sample of about 25 percent of completed projects. These reports include site visits and interviews of multiple project stakeholders [28].

Mid-term reviews provide task teams with enough information and a good platform to take stock of project performance and make relevant decisions regarding the future of the operation. The mid-term review is an opportunity for the borrower and the Bank to reconsider the efficacy and effectiveness of the project design and implementation approach and make adjustments as necessary. An in-depth review at a project's mid-way point of implementation normally provides the borrower and the Bank with a good opportunity to evaluate the overall performance of the project and take necessary actions about the future of the project implementation which might include a significant project restructuring depending on the findings of the mid-term review. In particular, during a mid-term review, the borrower and the Bank assess operational aspects, such as project management and implementation performance, and discuss the extent to which project objectives are being fulfilled and remain achievable within the project timeframe and/or continue to be relevant [27].

3.1.2 M&E for the World Bank financed Urban Infrastructure Projects

3.1.2.1 Core Sector Indicators

In 2013, the World Bank published a list of core indicators for 28 different sectors to assess the results obtained from the conducted activities. Table 5

presents the core sector indicators for urban infrastructure. Appendix A provides more detailed information on the World Bank's core sector indicators.

Table 5. Core Sector Indicators of the World Bank [30]

Investment Field	**Core Sector Indicator**
Water Supply	Number of people gained access to "Improved Water Sources" within the scope of the project.
	Number community water points constructed or rehabilitated within the scope of the project
	Number of new piped household water connections which are resulting from the project
	Number of piped household water connections effected by the rehabilitation works conducted within the scope of the project
	Number of water utilities which are supported by the project
	Number of other water service providers which are supported by the project
	Number of people in urban areas gained access to "Improved Sanitation" within the scope of the project
Wastewater	Number of people gained access to "improved sanitation facilities" within the scope of the project
	New household sewer connections constructed under the project (number)
	Volume/mass (tons/year) of BOD removed by the WWTP constructed/rehabilitated under the project
Solid Waste	Number of people in urban areas gained access to regular solid waste collection within the scope of the project.
	Industrial and municipal waste disposal capacity created under the project (tons)
	Industrial or municipal solid waste reduced or recycled under the project (tons/year)
	Contaminated land managed or dump sites closed under the project (ha)

3.1.2.2 Sample Projects

In this section, two WB financed projects are presented. The first project is the Municipal Services Project (MSP) which has been completed and the second one is the Sustainable Cities Project which has recently started.

The MSP was financed by the WB and provided financing for urban infrastructure services in 14 municipalities. The Implementing Agency for MSP was Ilbank and the respective WB loans were channeled to the municipalities via Ilbank between 2002 and 2016. Within the scope of MSP, in total 14 municipalities benefited from the project and 2.95 million people benefited from improved water services in urban areas; 3.5 million people benefited from industrial and municipal waste disposal capacity created; and 1.5 million people gained access to improved sanitation. The MSP supported construction of 2,450 km of water network (Antalya, Denizli, Mersin, Ilıca, Kırşehir and Elbistan); 1,150 km of sewerage network (Antalya, Denizli, Muğla, Ilıca, Mersin); 100 km of storm water network (Denizli and Ilıca); two new wastewater treatment plants (Muğla and Ödemiş), two water treatment plants (Ödemiş and Polatlı), three landfills (Bergama, Kayseri, Gelibolu) and capacity extension in Hurma WWTP (Antalya) and refurbishment of the existing Lara WWTP (Antalya) with installation of new equipment in many areas i.e. outfall pumps, surge protection, odour control for inlet facilities, new by-pass pumps, covers to secondary clarifiers, transformers, panels and SCADA for the new equipment etc. [37]

The PDO of the MSP was “to support sustainable environmental services in selected municipalities”. The M&E system was structured on this PDO and a results framework which includes the performance indicators given in Table 6

Table 6. Indicators used for M&E of MSP [37]

Sector	**Indicator**[1]
Water	- Percentage of non-revenue water over the supply area of the municipal government/municipal water company (Percentage, Custom), - New population served by expanded water supply service (Number, Custom), - Number of people gained access to "Improved Water Sources" within the scope of the project (Core).
Wastewater	- Total annual biochemical oxygen demand (BOD) load reduction from municipal wastewater in participating municipalities (Tons/year); - Percentage of population served by sewerage collection; - Percentage of municipal wastewater in participating municipality that is treated to required standards (Percentage, Custom); - Number of people in urban areas provided with access to Improved Sanitation under the project
Solid Waste	- Amount of waste safely disposed in landfills (Tons/year, Custom); - Number of people in urban areas gained access to regular solid waste collection within the scope of the
Financial	- Number of Operational Plans completed (Number, Custom) - Financial Working Ratio of municipalities/ municipal companies. (Percentage, Custom) - Number of man-days of training for Municipal PMU staff (Number, Custom) - Successful and on-time completion of annual project audits by Iller Bank (Text, Custom) - Number of man-days of training for Iller Bank PMU staff(Number, Custom)

[1] Custom indicators are not listed in the WB's List of Core Sector Indicators and developed depending on the scope and content of the respective project activities.

Throughout the course of MSP, one mid-term review and 18 ISR reports were produced. The ICR Report which was prepared for the MSP in 2017 to evaluate the results, highlighted that, it is critical to ensure development of a realistic results framework during project preparation in close collaboration with the beneficiaries of the investment. According to the ICR, the MSP project has demonstrated the issues and handicap that can arise during implementation and while attributing results when the M&E system is weak. It is also noted in the ICR that, having a good M&E framework is not sufficient enough and capacity of the implementing agency is another factor to closely monitor project progress towards meeting targets.

The PDO of the Sustainable Cities Project is to improve the planning capacity of and access to targeted municipal services in participating municipalities and utilities. According to the Project Appraisal Document, the PDO was developed in alignment with the Country Partnership Strategy (CPS) of WB Group for Turkey (2012-2016) and 10th National Development Plan (2014-18), under the pillar "Livable Spaces/Sustainable Environment". The PDO is also expected to contribute to the EU Instrument for Pre- Accession Assistance (IPA) II Multi-annual Action Program for Turkey on Environment and Climate Action. Indicators under the project is presented in Table 7.

Table 7. Indicators for Sustainable Cities Project [32]

Sector	Indicator
Water	- Number of people gained access to "Improved Water Sources" within the scope of the project (Core). - Number of water utilities which are supported by the project; - Direct project beneficiaries (Number) (Core); - Female beneficiaries (Number)
Wastewater	- Volume/mass (tons/year) of BOD removed by the WWTP constructed/rehabilitated under the project (Core); - Number of people in urban areas gained access to "Improved Sanitation" within the scope of the project (Core) - Length of sewerage pipes laid under the project (progress indicator) (kilometers)

3.2 European Investment Bank (EIB)

3.2.1 M&E Approach of the EIB

The monitoring process of the EIB starts from the signing of the loan agreement through the implementation and operation phases of the projects and ends with back payment of the loan. Requirements for M&S is based on the characteristics of each project. Particularly, the EIB's monitoring covers the servicing of the loan and the utilization of funds (whether they are used in accordance with the project objectives) in order to keep itself informed about developments on the implementing agency and its partners. It also provides the EIB with the confirmation that the project is executed physically in line with the loan agreement and the results of the investment are assessed [34].

The EIB established the Operations Evaluation Unit (EV) in 1995 to conduct ex-post evaluations. In 2009, EV started to report to the Board of Directors [39]. The EIB Group uses a set of internationally accepted criteria for evaluation of operations. These criteria depend on relevance, effectiveness, efficiency and

sustainability. In order to ensure the full review of the "three pillars of value added", the EIB Group assesses their contribution to the operations both financially and non-financially is assessed. This assessment also includes management of the project cycle and the "financial performance" of the EIB Group when relevant. The analytical criteria used atthe time of appraisal and the strategies, policies and procedures which relate to the operations are taken due account in the evaluations. After appraisal, any changes in EIB Group policies or procedures which are relevant to the findings of the evaluation are mentioned in the report and considered in the recommendations [35].

In 2012, the EIB established the Results Measurement Framework (REM) as a framework for assessment and measurement of results particularly for the operations outside the EU. As a result of its 2012 capital increase, followed by a revision of the Value-Added (VA) assessment of the EIB's operations both within the EU and Pre-Accession countries, the EIB started to implement the Three Pillar Outcomes Assessment (3PA) in 2013. EIB lending is results-driven. In recent years, in order to improve the tracking of the outputs and outcomes, the Bank has taken several steps and within this scope, revised the 3PA methodology. The latest version enables the use of indicators both at output and outcome level, together with targets and benchmarks. This makes the revisions in the methodology significant when compared to the previous versions [36].

The Results Measurement (ReM) Framework is used to improve the appraisal process and to strengthen the EIB's ability to monitor the achieved results outside the EU. This is done by recording results around the project cycle. Consequently, EIB's due diligence and monitoring process are complemented. The revised framework, which was initiated by the EIB in 2011 has replaced the Economic and Social Impact Assessment framework (ESIAF). Since the launch of the framework in 2012, more than 350 projects have gone through ReM assessment at appraisal. With some of the first projects approved under the framework now reaching

completion, monitoring and the reporting of results assessed ex post is a growing focus [37].

3.2.1.1 Main Elements of the EIB's M&E System

The focus of the framework is on the EIB contribution to national and EU policy objectives, as well as our own mandate objectives; on project quality and soundness, based on results and the ability of the project promoter or intermediary to achieve this in a given operating environment; and the contribution of the EIB – the "additionality" that goes beyond the market alternative. The aims of the ReM Framework are [37];

- to enhance the ex-ante assessment of anticipated results, and the EIB contribution to the objectives;
- to advance monitoring and evaluation (particularly ex-post) of results; and
- to strengthen the EIB's capability for reporting to both internal and external stakeholders on achievement of results.

Logical framework approach is adopted while developing the ReM conceptual framework which is presented in Figure 3. Specifically, it is designed to represent how inputs (e.g. EIB loan to a water utility), generate outputs (e.g. potable water supply), which enable outcomes (e.g. More households have access to safe water) and, over time, lead to impacts (Decreased incidence of water-borne diseases) according to the EIB's decree objectives. This logical framework approach is reflected in the ReM framework's 3 Pillar structure [37]:

Pillar 1: Assesses compatibility with EIB decree objectives and contribution of the results to EU priorities and development objectives of the country. The Pillar 1 assessment is based on two questions: Is the project consistent with EIB mandate objectives? (Pillar 1A). How well does the project contribute to EU priorities and development objectives of the country? (Pillar 1B)

Pillar 1B is based on a light logical framework, which outlines how EIB inputs generate outputs, outcomes and impacts that contribute to EU priorities and country development objectives. EU priorities are defined in various documents setting out EU development cooperation policy. Country development objectives are defined by the various national governments as national or sectoral development policies, strategies or plans.

Pillar 2: Assesses results and the ability of the promoters to achieve these based on the correctness of the operation and the operating climate. It comprises a series of objectively measurable indicators that take and environmental, social, economic and governance outcomes of the operation. Indicators in Pillar 2 are estimated ex-ante and actual results are collected during operation and implementation where relevant, for performance monitoring and reporting. For the purpose of reporting and aggregation, four categories of indicators are defined. The ReM sheets include:

- Core Standard Indicators: to be measured, when possible and relevant, for all operations (e.g. employment generated, energy efficiency, carbon footprint).
- Sector standard indicators: to be measured for all projects of a given type in a given sector (e.g. “Reduction in power outages (hrs)” for energy transmission projects).
- Other relevant standard indicators: to be measured for all projects with a given feature (eg. “Share of energy efficiency projects financed” for all credit lines aimed at improving energy efficiency).
- Custom indicators: (operation-specific) which capture expected development outcomes that are specific to an operation and cannot be captured by a standard indicator (e.g. for a transport project with a regional dimension, “Time to connect two countries/economic centres (hrs)”).

Pillar 3: Assesses the contribution or "additionality" of the EIB to the project, defined as the inputs to the project provided by EIB that are (i) required given the nature of the project and (ii) could not have been provided by a market alternative (i.e. on a purely commercial basis). Pillar 3 complements the analysis of the other two pillars, by assessing to what extent the EIB contribution is justified in a project expected to produce desirable outcomes.

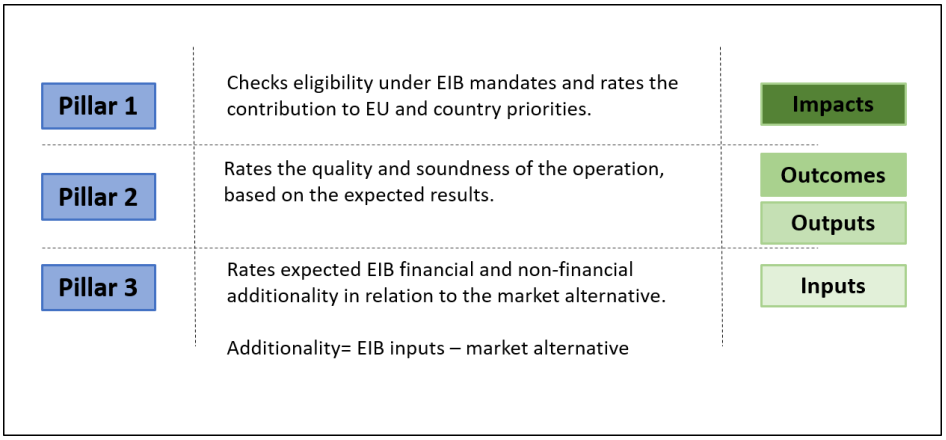

Figure 3. ReM Framework [38]

3.2.1.2 M&E at Different Stages of EIB Projects

Performance against the mandate objectives of the EIB is monitored around the project life cycle and reported mainly at two milestones. Regarding direct investments[2], the milestones are project completion and three years after the completion. For intermediated operations[3] on the other hand, the milestones are the end of the investment period for equity funds and the end of the allocation period for credit lines. The reporting for results of equity funds results are conducted at the end of the fund's life [38].

The three pillars are rated independently; no overall aggregated project rating is provided. Consistency and quality of pillar ratings is ensured by the relevant

[2] Direct operations include large infrastructure projects, framework and programme loans.

[3] Intermediate operations include financial sector operations - global loans, private equity funds, microfinance institutions, investment instruments.

services and by an inter-service committee which reviews indicators and ratings on a regular basis. The rating scale for each of the three pillars is a 4-point scale as per Evaluation Cooperation Group best practice standards.

Performance indicators are accepted crucial means for appropriate M&E in water and sanitation projects. The EIB reported that this has been neglected for the projects to a large extent making an appropriate evaluation difficult. Performance indicators for outputs, outcomes and objectives need to be developed properly at appraisal. They should be measurable and accompanied by baseline data and a defined process of data collection to ensure real assessment of project accomplishments. Although financial indicators are relatively more available, there is a lack of data on health and social aspects which are closely related with and have a significant impact on the water and wastewater sectors. [39]

3.2.2 M&E for the EIB financed Urban Infrastructure Projects

3.2.2.1 Core Indicators

Similar to WB, the EIB also uses core standard indicators separately identified at output and outcome levels as given in Table 8 and Table 9. Outputs which are immediate results of projects/programs, are defined as the products and services received by intermediary organizations or direct beneficiaries like customers and clients. Outcomes, on the other hand, are defined as more intermediate effects on intermediary organizations or on project beneficiaries and consequences of project outputs.

Table 8. Core standard output indicators of the EIB

Sector	**Indicator**
Sewerage	Capacity of sewage treatment plant constructed or rehabilitated (PE)
	Length of sewer and/or storm water pipes built or upgraded (km)
	Domestic connections to sanitation services created or rehabilitated (number)
Water collection/ treatment/supply	Reservoir or raw water storage facility capacity (constructed/rehabilitated) (m^3)
	Capacity of water treatment plant constructed or rehabilitated (m^3/d)
	Length of water lines or distribution pipes built/upgraded (km)
	Domestic connections to water supply created or rehabilitated (number)
	Length of dykes constructed or rehabilitated (km)
	Capacity of retentions or room-for-river areas constructed or rehabilitated (m^3)

Table 9. Core standard outcome indicators of the EIB

Sector	Indicator
Sewerage	Population benefitting from improved sanitation services (households)
	Additional commercial and industrial customers served (wastewater connections) (number)
	Energy consumption sewerage (kWh/m^3)
	Wastewater treated to acceptable standards (PE)
	Staffing level sewerage (nr)
Water collection/ treatment/supply	Population benefitting from safe drinking water (households)
	Additional commercial and industrial customers served (potable water) (number)
	Energy consumption water supply (kWh/m^3)
	Non-revenue water (%)
	Service level (%)
	Staffing level water supply (number)
	Population facing reduced risk of flooding (number)
	Population with reduced exposure to drought risk (number)

3.2.2.2 Sample Projects

In Mersin, which is located on the south-eastern coast of Turkey with a population of over 900,000, collected wastewater was being discharged into the Mediterranean Sea without any treatment having severe environmental impacts

and posing significant risks to public health. The rapid growth of the city increased the adverse impacts. The project named Addressing Mediterranean Pollution in Mersin was developed to ensure that the people are served with sufficient collection and treatment of wastewater in compliance with national and international environmental legislation on management of urban wastewater. The project comprised improvement of the existing collection system and construction of a new WWTP with a 1.1 million person-equivalent capacity together with a deep-sea discharge system and a proper sludge disposal unit. Due to the project, bacteriological pollution and groundwater contamination in the shore was significantly reduced, decreasing health risks for the local community. The 49 million m^3 of wastewater is treated annually representing a considerable reduction in the annual discharge of several pollutants: organic matter (9,800 tons of BOD, 1,850 tons of nitrogen, 230 tons of phosphorus) [38].

Table 10. Inputs and Results of Mersin Project [38]

EIB Contribution	EUR 60 million EIB loan; Support for project preparation and establishment of an independent unit for project management; Assistance for sharing of knowledge and experience.
Context	Discharge of raw wastewater into the Mediterranean Sea creating substantial risks to human health and tourism activities; Lack of access to long-term financing.
Outputs	WWTP, with 1,110,000 population equivalence, Deep-sea discharge system; Improvement of the existing collection system including the pumping stations; Construction of transmission lines (km)
Outcomes	Amount of annually treated wastewater increased to 49 million m^3, with potential increase to 69 million m^3; Reduction in pollutants to 9,800 tonnes BOD; 1,850 tonnes of nitrogen and 230 tonnes of phosphorus (annually).
Impacts	Risks to human health were decreased; Recreational use of the beaches and surrounding coastal waters became possible meaning potential positive impact on tourism; Quality of the aquatic environment was improved.

3.3 European Union

3.3.1 M&E System of the EU

According to the Article 4 of the Regulation No. 1303/2013[4], Commission and the member states need to guarantee the effectiveness of the European Structural Investment Funds, in particular through monitoring, reporting and evaluation. Managing for results has become a political priority for the Commission. Similar to the other IFIs, the EU recognizes M&E as two separate yet complementary areas of practice providing different inputs into the decision-making process at different points in time. Monitoring is accepted by the EU as a management tool which gives regular and systemic information on where an intervention is at any certain time or throughout any process relative to defined targets, outcomes and related indicators. Evaluation, however, questions whether the intended targets are reached also by seeking to point out any causality issues.

Since 2015, the Directorate General for International Cooperation and Development (ICD) is responsible for implementation of the Results Oriented Monitoring (ROM) system. The new ROM system includes many reforms which are a part of a comprehensive set of reforms regarding the overall project and programme management systems including monitoring, reporting and evaluation. The reforms aim at improving the accountability and management capacities of the Commission with an emphasis on results at all levels, including the corporate level as a donor, via the new EU ICD Results Framework [42]. The Better Regulation Guidelines of the Commission which was adopted in 2015, identify a list of principles to take into account when developing a monitoring system: comprehensive, proportionate, minimize overlap, timeliness, accessibility. On the

[4] Regulation (EU) No 1303/2013 of the European Parliament and of the Council of 17 December 2013 laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund and laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund.

other hand, evaluation principles inform the entire evaluation policy, starting from institutional arrangements, as well as the conduct of internal or external evaluators, contracting authorities, and line managers. The Better Regulation guidelines define five compulsory criteria for evaluation (relevance, effectiveness, efficiency, coherence and EU added value), but other criteria, namely sustainability and impact, should also be addressed in DG NEAR evaluations whenever relevant.

In March 2015, the EU presented the EU ICD Results Framework which defines the quantitative indicators used for the collection, aggregation and presentation of the following three types of results data. The EURF aims to measure and present the results accomplished against the strategic development objectives given in the 'Agenda for Change'. The following three levels forms the basis for the EURF [40]:

- Level 1 looks at overall development progress in EU partner countries, and reflects the medium- and long-term development outcomes/impact from the collective action of partner countries, donors and other development actors. Level 1 indicators set the operational context in which the results of EU external assistance should be seen.
- Level 2 focuses on development outcomes and outputs which can be related with EU- funded programmes and projects. Level 2 indicators present the aggregated results from EU-funded operations, and demonstrate how the EU contributes to development progress in partner countries.
- Level 3 looks at the organizational performance of the EC as the manager of EU aid. Indicators at this level provide data as to how Directorate General of ICD is managing its operational processes in order to contribute to achieving development results.

There are three converging sources for criteria for DG NEAR evaluations: (i) the Regulations governing external action in the framework of ENI17 and IPA II (ii) the Better Regulation Guidelines, (iii) The OECD-DAC criteria [41].

3.3.1.2 Main Elements of the M&E System of the EU

Intervention Logic: In the EU system, monitoring is directly linked to the intervention logic. Indeed, the results' statements included in the intervention logic define what is to be measured, via specific indicators, in monitoring (and evaluation) exercises. An intervention logic can be defined as the articulated result's chain clarifying the interventions' objectives and translating them into a hierarchy of effects intended to be achieved (up until the level of outputs), directly influenced (outcomes) and indirectly influenced (impacts) by a policy or action. For both outcomes and impact only contribution is to be assessed. As such, the intervention logic of a given intervention needs to be coherent to the broader strategic framework in which the intervention is framed. Indeed, the results' statements included in the intervention logic define what is to be measured, via specific indicators, during the internal and external monitoring and evaluation exercises. Even though additional indicators can be defined in these exercises, the indicators defined during planning/programming must be reported on.

Indicators: In the EU system, indicators are categorized depending on many components: level of the intervention (input, activity, output, outcome and impact or context), based on the essence of the indicator which can be macro, sector or intervention and on the dimension of concern like relevance, efficiency, effectiveness, impact, sustainability, coherence, EU added value, etc. According to the Better Regulation, indicators must be RACER: Relevant, Accepted by relevant actors, Credible for non-experts, Easy to report on and Robust, avoiding any manipulation.

3.3.1.3 M&E at Different Stages of EU Projects

Monitoring and evaluation are to be thought-through during planning/programming, when the intervention logic of a specific intervention has

to be carefully conceived. The results' statements included in the intervention logic define what is to be measured, via specific indicators, during the internal and external monitoring and evaluation exercises. Even though additional indicators can be defined in these exercises, the indicators defined during planning/programming must be reported on [41].

As part of the implementation of the commitment articulated in the Agenda for Change to strengthen the EU's capacity for monitoring and reporting results with a view to enhancing impact, accountability, transparency and visibility of EU aid and within the context of drawing more attention to results and devising means to measure these, the EU is stepping up its efforts to improve monitoring and reporting on results at all levels, i.e. at project and country level as well as at the EU's corporate level as a donor. Part of these efforts will be the introduction from 2015 of an EU ICD Results Framework.

The EU RF will be reporting on results aggregated from projects and programmes financed through the external assistance tools managed by DG International Cooperation and Development (the Development Cooperation Instrument, European Development Fund, European Instrument for Democracy and Human Rights, Instrument contributing to Stability and Peace, Instrument for Nuclear Safety Cooperation, and Instrument for Greenland and the corresponding instruments covering the programming period 2007-2013). By their very nature, corporate level results frameworks are only able to capture results that can be aggregated, thus making it difficult to produce qualitative results. The EU RF will include a set of around 30 results indicators against which the EC will report such aggregated results. For the first few years and in order to learn lessons and improve the reporting system, results measurement will take place for completed projects/programmes. In the medium term, and once new operational information management systems are established, reporting annual results from ongoing projects will be considered. Projects and programmes financed from the 2007-2013 programming period were not designed with the EU Development and

Cooperation Results Framework in mind and experience shows that results data are not always available and easy to process. Project documents and logical frameworks did not always include well-defined and measurable indicators. Reporting on results achieved, both for project specific indicators and for EU RF indicators, is therefore not necessarily an easy task and will require practice and training.

The EU expects implementing partners to establish a monitoring system used to prepare progress and completion reports using the logical framework matrix (for project modality) or the Performance Assessment Framework (for budget support modality) as a reference. Such progress and completion reports describe the level of project implementation, including results achieved, difficulties encountered and potential changes introduced. For many projects and programmes, the partner country plays a central role in the monitoring process as the main implementing partner. This is particularly the case for programmes in support of country sector policies, including sector Budget Support (BS) programmes, for which monitoring functions cover the implementation of the sector policy reforms, the achievement of related targets, the formulation and implementation of the public budget and its allocation to sectors, policy dialogue and the development of capacities. The EU will review the Results Framework throughout 2017 with the aim of reflecting the the SDGs and the new EU development priorities which was put forward in the recently approved new European Consensus on Development [40].

CHAPTER 4

M&E SYSTEMS APPLIED BY TURKISH INSTITUTIONS

4.1 Ministry of Development

4.1.1 MoD's Role in Urban Infrastructure

The Ministry of Development (MoD) was established in 2011 as a result of the restructuring of the Undersecretariat of State Planning Organization, which was founded in 1960. The MoD is responsible for preparation of plans, programs and strategies to attain sustainable development and to improve social welfare within the evolving conditions in terms of social and economic aspects. The mission of the MoD was defined as "To design the development process with participation of relevant parties and to inform the government and to guide all society groups in order to prompt the economic and social development of Turkey and to accomplish a balanced and sustainable development".

The MoD develops policies, strategies and action plans at macroeconomic, sectoral, thematic, and regional levels through various plans and programs including Development Plans, Medium-Term Programs, Annual Programs, and Investment Programs. The policies developed by the MoD also demonstrates strategic priorities of Turkey in allocation of public resources for realization of public investments. Regarding the administration of resources, the MoD coordinates with relevant ministries and public institutions which have a role in economic, social and cultural policies. In addition to the other tasks regarding coordination, the MoD is also responsible for M&E of the implementation of the developed policies, strategies, plans and programs.

Development plans are prepared under coordination of the MoD with participation of Special Expertise Committees. Through these committees, economic and social policy aspects, advices and objectives of the diverse society groups are demonstrated in the Development Plan. The 10th Development Plan which was adopted in July, 2013, covers the period of 2014 – 2018. It has been prepared with special focus on sustainable development and four development areas has been identified as (i) Qualified People, Strong Community, (ii) Innovative Production, Balanced Growth, (iii) Livable Spaces, Sustainable Environment and (iv) International Cooperation for Development. The area of "Livable Spaces, Sustainable Environment" involves policies and targets to maximize benefits from environment friendly approaches, to enhance life standards of urban and rural community sustainably, and to decrease regional disparities. The Plan includes 25 Priority Transformation Programs structured to achieve 2023 targets and the objectives of Plan in the identified reform areas.

Medium Term Programme initiates the budget process and covers the period of 2017-2019. The Programme is designed to perform the necessary breakthroughs for the growth of Turkish economy on a more competitive and stable ground and for improvement of social welfare. The Programme includes macroeconomic targets, indicators and policies in the fields of growth, public finance, balance of payments, inflation, employment. The Programme does not cover any technical indicators.

Annual Investment Programme is prepared according to the objectives of the development plan, medium-term programme and annual programme of the respective time period. Within the investment programmes, investment projects are classified as "design works", "ongoing works" and "new projects". For each project, number, name, place, characteristics, start and end dates, investment cost and expected expenditure for the plan year are shown separately.

Additionally, MoD is also responsible for coordination of preparation of National Voluntary Review Report for achievement of the Sustainable Development Goals

(SDGs) by the year 2030. Turkey has been successful in implementing almost all MDGs during the last 15 years. Comprehensive efforts to increase the level of achievement in all MDGs created an integrated development viewpoint among policy professionals. Turkey is one of the top ten performers according to the average annual rates of relative progress, especially when goals such as elimination of extreme poverty, decrease of child fatality, improvement of maternal health, improvement of environmental sustainability (in areas such as the improvement of accessibility of water and wastewater), are considered. Turkey has also indicated extensive advancement in the global partnership for improvement. As a direct result of these facts, transition to SDGs will be based on the lessons learnt in the MDG process of Turkey. As of 2017, Turkey is at the stage of preparing long term vision of the 11th Development Plan. The vision provides the development perspective of the Plan by taking into account the international and national trends in development landscape and serves as the starting point for drafting the Plan itself. Turkey aims at taking the SDGs as one of the major inputs of the vision that 11th Development Plan will be based on [53].

MoD, as the ministry responsible for the preparation of NDPs in Turkey, will follow a policy coherence approach at the center of the implementation process of SDGs. Given the coordination role of MoD and macro level place of NDPs at the top of policy- making process in Turkey, implementation of SDGs will be a responsibility shared by all stakeholders. In this respect, the integration of SDGs into all documents of relevant strategies and policies at both central and local levels will be enabled in the best possible way. Turkey's National Sustainable Development Commission (NSDC) will be strengthened and widened as a high-level technical setting, conforming to its coordinating role and the broad nature of the 2030 Agenda. The role and the structure of the Commission will be established according to the comprehensive and interconnected nature of the task lying in front of us. High level participation in the commission will be ensured for effective

policy and decision making. The Commission will act as the main responsible body for the follow-up and review in the implementation process of SDGs [53].

4.1.2 Development Objectives and Policies of Turkey for Urban Infrastructure

The 10th Development Plan assesses the current status, and sets objectives and policies under four different areas as given in the above paragraph. The status in 2013 and the targets for 2018 are given in Table 11. The objectives and policies regarding urban infrastructure are included within the scope of the sections of "Urban Infrastructure" and "Protection of Environment, Land and Water Resources Management" under the area of "Livable Places, Sustainable Environment".

Table 11. Status in 2013 and Targets for 2018 for Urban Infrastructure [17]

Indicator	**Status in 2013**	**Target for 2018**
Rate of municipal population with access to safe drinking water to total urban population (%)	99	100
Rate of municipal population with access to wastewater network to total urban population (%)	91	95
Rate of municipal population with access to WWTP to total municipal population (%)	68	80
Rate of Recycling for Package Wastes (%)	53	56
Rate of municipal population with served with a sanitary landfill (%)	65	85

4.1.2.1 Water Related Objectives and Policies

The water-related objectives and the respective policies defined in the 10th Development Plan are given in Table 12.

Table 12. The Water-related Objectives and Policies of the 10th Development Plan [17]

Water-related Objective	**Policies for the Objective**
To ensure public access to healthy and safe drinkable and usable water;	Water needs of all settlements will be fulfilled, non-revenue water will be avoided, and usage of environmental friendly and healthy materials will be promoted. In all communities, water will be supplied in accepted standards. Financial sustainability of water and wastewater investments and services will be pursued.
To preserve and improve quantity and quality of water and land resources, and to develop a management mechanism which ensures sustainable utilization of resources	In water management, lacks and unclarities in legislative structure will be eradicated; clear definitions for institutional tasks, roles and responsibilities will be provided; and institutional cooperation and coordination will be strengthened. A national system will be developed for classification of the water basins to enable protection and sustainable usage of available water resources. The quantity and quality of water resources will be estimated and monitored. An information system will be established. Protection and enhancement of water resources and prevention and control of water pollution will be provided. Sustainable usage of national water potential will be ensured. Tariff-based systems will be improved. Necessary measures for water savings, combat with drought and pollution prevention will be taken by assessing impacts of climate change and all kind of interventions in catchment areas.

4.1.2.2 Wastewater Related Objectives and Policies

The wastewater-related objectives and the respective policies defined in the 10th Development Plan are given in Table 13.

Table 13. The Wastewater-related Objectives and Policies of the 10th Development Plan [17]

Wastewater-related Objectives	**Policies for the Objective**
To ensure public access to healthy and safe drinkable and usable water.	Financial sustainability of water and wastewater investments and services will be pursued. Wastewater collection systems and WWTPs will be enhanced and operated according to the basin-specific discharge standards. Reuse of treated wastewater will be supported.
To transform local administrations to a structure that; delivers more efficient, fast and qualified service; is participatory, transparent and environment friendly; cares for the needs of the disadvantaged and is financially sustainable. The main target of local administrations is to maximize the satisfaction from public services delivered.	Legal and institutional organizations of water and sewerage authorities will be restructured in line with the expanding responsibilities of the metropolitan municipalities.

4.1.2.3 Solid Waste Related Objectives and Policies

The solid waste related objectives and the respective policies defined in the 10th Development Plan are given in Table 14.

Table 14. The Solid Waste Related Objectives and Policies of the 10th Development Plan [17]

Solid Waste Related Objectives	**Policies for the Objective**
To ensure efficient management of solid wastes by minimization of their effects of on environment and public health.	All stages of waste management (i.e. waste reduction, separation at source, collection, transfer, recycling and final disposal) will be enhanced in terms of technical and financial aspects. Higher priority will be given to awareness raising and capacity enhancement. Use of recycled materials will be supported.

4.1.2.4 Priority Transformation Programs

The 10th Development Plan includes Priority Transformation Programs designed for the following critical reform areas which are crucial for achieving 2023 targets and the objectives of the 10th Development Plan [17]:

- Improvement of Productivity in Manufacturing
- Reduction of Import Dependency
- Improvement of Domestic Savings and Waste Prevention
- Istanbul International Financial Center
- Rationalization of Public Expenditures
- Improvement of Public Revenue Quality
- Enhancement of Business and Investment Climate
- Enhancement of Labor Market Effectiveness
- Reduction in Informal Economy
- Statistical Infrastructure Development

- Commercialization in Priority Technology Fields
- Technology Development and Domestic Production Through Public Procurement
- Domestic Resource Based Energy Production
- Enhancement of Energy Efficiency
- Improvement of Efficiency Agricultural Water Use
- Structural Transformation Healthcare Related Industries
- Improvement of Health Tourism
- Transformation from Transportation to Logistics
- Development of Basic and Occupational Skills
- Attracting Qualified Human Resources
- Healthy Life and Mobility
- Conservation of Family and Dynamic Population Structure
- Enhancement of Institutional Capacity at Local Level
- Competitiveness and Social Cohesion Enhancing Urban Regeneration
- Improvement of the Infrastructure of International Cooperation for Development

The number of the Priority Transformation Programs was kept limited by the MoD to have a manageable program portfolio and measurable results. The programs were structured with both sectoral and cross-sectoral views. They aim at serving as guidelines and include targets, objectives, performance indicators as well as components. Central implementation instruments and intervention tools were designed for the programs. Additionally, the institutions in charge of execution and coordination of the components were identified.

For the Priority Transformation Program of "Improvement of Efficiency Agricultural Water Use", the following performance indicators were identified for monitoring the results of the program components which are coordinated and executed by the MoFWA:

- Irrigation efficiency,
- Irrigation ratio,
- Area irrigated by modern irrigation systems,
- Amount of groundwater used for irrigation,
- Number of farmers participated in organized trainings,
- Number of crops resistant to drought,
- Area of consolidated land,
- Budget sufficiency ratios of established organizations,
- Rate of nitrate pollution in surface water and groundwater resources.

4.1.3 Monitoring and Evaluation System Applied by the MoD

The Monitoring, Evaluation and Analysis Department under the Investment Programming, Monitoring and Evaluation General Directorate mainly undertakes the responsibility for establishing public investment policies in line with the priorities defined in the investment plan and relevant programs; conducting research and analysis on the investments; supporting the public institutions in development of new project ideas; analyzing projects and preparing, monitoring and evaluating public investment program. This Department is also in charge of development of financing models for public investments and defining monitoring and evaluation principles for public institutions [43].

4.1.3.1 M&E of Development Plans

The system for M&E of the action plans given in the priority transformation programs is determined by the High Planning Council decision dated February 16, 2015. According to this decision, M&E of the action plans will be conducted

through an online system which is used by the responsible agencies for data entry at every three months.

The responsible agencies are responsible for updating the information regarding each respective indicator. The MoD and the responsible agencies update the progress and report information on the performance indicators by using the template forms given in Table 15, Table 16 and Table 17.

Table 15: Monitoring System for the Action Plans – Template for Performance Indicators [44]

Indicator Name	**Baseline (2013)**	**2014**		**2015**		**2016**		**2017**		**2018**	
		T	**R**	**T**	**R**	**T**	**R**	**T**	**R**	**T**	**R**
1											
2											
3											
4											
…											

Additionally, the responsible institutions provide information on status of the action plans defined for each component which are under their responsibility. The template for update of action status is given in Table 16.

Table 16: Monitoring System for the Action Plans – Template for Actions [44]

Indicator Name	**Total**	**Component 1**	**Component 2**	**Component 3**
1. Number of Actions				
1.1. Number of Completed Actions				
Number of Actions completed in this period				
1.2. Number of Ongoing Actions				
Number of Actions which are Ongoing but should have been completed				
1.3. Number of Actions which have not started				
Number of Actions which have not started although starting date has passed				

Table 17: Monitoring System for the Action Plans – Template for Institution-based Actions [44]

	1. Number of Actions Plan that need to be completed by the end of the respective period	2. Number of Action Plans which are completed by the end of respective period.	3. Number of Ongoing Actions	4. Number of Action Plans which have not yet start
Institution responsible for Action				
Institution responsible for Action				
…				
Total				

4.1.3.2 M&E of the Investments in the Annual Investment Programme

The MoD has created an online monitoring system for public investments which are listed in the annual investment programmes. With this system, financial progress of investment projects is monitored on the basis of expenditure information received from respective institutions. This online system does not provide any tools for monitoring physical progress or performance of projects.

The Monitoring, Evaluation and Analysis Department of the MoD has recently started to develop a system named Public Investment Information System (KAYA). According to the information provided by the MoD, the KAYA system will not only be used for investment applications of the institutions, it will also be structured

for M&E of investment projects. The MoD aims to finalize the preparations of the monitoring module of the system by the end of 2017.

4.2 Ministry of Forestry and Water Affairs (MoFWA)

In 2011, the roles and responsibilities at ministerial-level for water and wastewater management were restructured and consequently, the MoFWA and the MoEU were established.

4.2.1 MoFWA's Role in Urban Infrastructure

The MoFWA's main mandates in relation to water are to develop policies on protection of water resources and their sustainable use and coordinate national water management. The MoFWA conducts its water-related activities mainly through two general directorates (i.e. GDWM and DSI) and one national think tank (i.e. Turkish Water Institute - SUEN)

The GDWM is in charge of delivering on these mandates, particularly:

- preparing the River Basins Management Plans;
- identifying and monitoring urban sensitive areas and nitrate sensitive areas; and
- together with related agencies and ministries, identifying targets, principles and receiving body standards for surface and groundwater protection, and monitoring of water quality or having it monitored.

The MoFWA, through its GDWM prepares River Basins Management Plans, redefines the "sensitive water bodies and the drainage areas of these water bodies as urban sensitive areas and/or nitrate sensitive areas" in a new By-Law and determines the environmental quality standards which indicate receiving body standards for protection and quality improvement of surface and groundwater protection and determines the threshold values. Additionally, the GDWM prepares

Water Quality Action Plans, River Basin Protection Action Plans and Strategy Guidelines for River Basin Protection Action Plans.

The GDWM has developed 13 Water Quality Action Plans and started implementation. The Action Plan for Burdur Lake Sub-Basin has been reviewed as an example. After providing an assessment of the current status and the existing environmental infrastructure in the area, the Plan determines the water and waste related pollution risks in the basin. Based on the analyses of the existing water quantity and quality, the Plan identifies the water quality monitoring points. On the basis of these information and assessments, the Action is structures on four goals, 12 objectives and 54 activities. The Action Plan includes a work program which shows the actions to be taken by the relevant institutions in charge of the action and the expected timeline for fulfilling the action. The Action Plan defines responsibilities of the municipalities in the area to construct or rehabilitate the wastewater treatment plants and solid waste landfills in order to protect the quality of water in the sub-basin. [45] However, the Action Plan does not present a methodology for M&E of the identified actions and fulfillment of the goals and objectives which are set in the Plan.

The GDWM has been leading the effort for the completion of River Basin Protection Action Plans, and for developing them into River Basin Management Plans by ensuring a comprehensive participation of all sectors. The River Basin Protection Action Plans for all the basins have been completed and disclosed.

DSI has a principal role in water resources planning, since it is the main agency tasked with the development of surface and groundwater resources. DSI is mandated to develop entire system of water and land resources in Turkey. It also undertakes investments in the supply of potable and industrial water and, if required, to invest in wastewater treatment plants for municipal settlements (Article 10 of the law No 1053 as revised in 2007).

SUEN is a national think tank aiming to prepare short and long-term strategies and national policies for good governance of water. Since its establishment in 2011,

SUEN cooperates with organizations active in the water sector at national and international level. SUEN conducts and supports scientific research to establish national and international policies for water management, organizes national and international events and training activities, and contributing to water- related events both at home and abroad. SUEN follows recent developments on water, carries out activities to facilitate cooperation between national and international organizations in the sector and collaborates with institutions and professionals.

4.2.2 M&E System of MoFWA

As the main authority in water resources management and as per its establishment law and regulations, the MoFWA is responsible for monitoring the quality and availability of water.

4.2.2.1 Monitoring of Water Quality

The roles and responsibilities regarding M&E of water quality has been shared between GDWM and DSI. The M&E functions of these two institutions are defined in the Regulation on Quality of Surface Waters Used or planned to be used for Water Supply (Official Gazette Number: 28338 dated June 29, 2012). The regulation states that, for the areas which are not in the borders of a metropolitan municipality surface water quality is monitored by DSI. The DSI is obliged to report monitoring results to the GDWM. The defined water quality M&E depends on analysis of the chemical parameters and calculation methodology presented in Annex-I and Annex – II of the Regulation. Treatment level required for the analyzed surface water is reported to respective municipality. The Department of Monitoring and Water Information System under the GDWM, on the other hand, is responsible for monitoring of biological parameters of surface water and groundwater resources of Turkey.

In 2015, the MoFWA initiated the Project "Assessment of Drinking Water Sources and Treatment Plants" which aims at assessing the current status of water sector in terms of legal and organizational aspects and the existing water treatment plants' performance. Under the project which will be finalized by end 2017, technical and operational data on the water resources and water treatment plants have been collected from respective municipalities, performance of all the existing water treatment plants have been evaluated, revision requirements have been identified and conceptual designs have been developed for the selected six water treatment plants. Since the project is ongoing, the results and outputs have not been shared publicly.

4.2.2.2 Monitoring of Water Losses

Due to high rates of water losses and with the aim of improvement of water supply and distribution systems, the MoFWA published Regulation on Control of Water Losses in Water Supply and Distribution Systems on May 8, 2014 (Official Gazette Number: 28994). The Regulation includes a template inventory form which are filled by the municipalities. The data collected through these forms are used to monitor water losses in water supply and distribution systems. Types of monitoring data is presented in Table 18.

Table 18. Water Loss Monitoring Data Collected from Municipalities by MoFWA [46]

Data	**Surface Water**	**Groundwater**	**Total**
Amount of water drawn from resource (m^3/year) (state name of water resource)			
Amount of treated water (m^3/year) (if there is treatment)			
Amount of water supplied to the system (m^3/year)			
Number of customers			
Amount of water consumption (m^3/year) (authorized consumption)			
Amount of water loss (m^3/year) (Amount of water supplied to the system – authorized consumption)			
Length of transmission and distribution line (pipe type and length (m))			
Is a SCADA system available?	Yes ☐		No ☐
Is there a GIS? If yes, please specify the program name.			
Is there a customer information system. If yes, please specify the program name.			
Are there any activities for water loss detection and reduction? (Active physical loss control, isolated sub-zones, pressure management, etc.) If yes, please explain.	Yes ☐		No ☐

Table 19. Water Balance Method used for Calculation of NRW [46]

<table>
<tr><td rowspan="6">System Input Volume m^3/yr (100%)</td><td rowspan="3">Authorized Consumption m^3/yr (...%)</td><td rowspan="2">Billed Authorized Consumption m^3/yr</td><td>Billed Metered Consumption (including water exported) m^3/yr</td><td rowspan="2">Revenue Water m^3/yr (...%)</td></tr>
<tr><td>Billed Unmetered Consumption</td></tr>
<tr><td rowspan="2">Unbilled Authorized Consumption m^3/yr</td><td>Unbilled Metered Consumption</td><td rowspan="5">Non-Revenue Water (NRW) m^3/yr (...%)</td></tr>
<tr><td>Unbilled Unmetered Consumption</td></tr>
<tr><td rowspan="3">Water Losses m^3/yr (...%)</td><td rowspan="2">Apparent Losses m^3/yr (...%)</td><td>Unauthorized Consumption m^3/yr (...%)</td></tr>
<tr><td>Customer Metering Inaccuracies m^3/yr</td></tr>
<tr><td>Real Losses m^3/yr (...%)</td><td>Leakage on Transmission and Distribution Mains
Leakage and Overflows at Utility's Storage Tanks m^3/yr</td></tr>
</table>

With the aim of supporting the municipalities in implementation of the Regulation, the MoFWA published Handbook on Control of Water Losses in Drinking Water Supply and Distribution Systems. The Handbook presents Infrastructure Leakage Index (ILI) as the main performance indicator. ILI is the ratio of Current Annual Volume of Physical Losses (CAPL) to Minimum Achievable Annual Physical Losses (MAAPL). The following formula is used for calculation of MAAPL [46]:

MAAPL (L/day) = (18xLm + 0,8xNc + 25xLp)xP; where,

Lm is length of main line (km); Nc is number of service connections; Lp is total length of service connections (km) and P is average pressure (m). The factors affecting leakage management are identified in the Handbook on Control of Water Losses in Drinking Water Supply and Distribution Systems as in Figure 4.

Figure 4. Factors affecting leakage management. [46]

Following the calculation of ILI, technical performance of the network is determined according to the matrix given in Table 20.

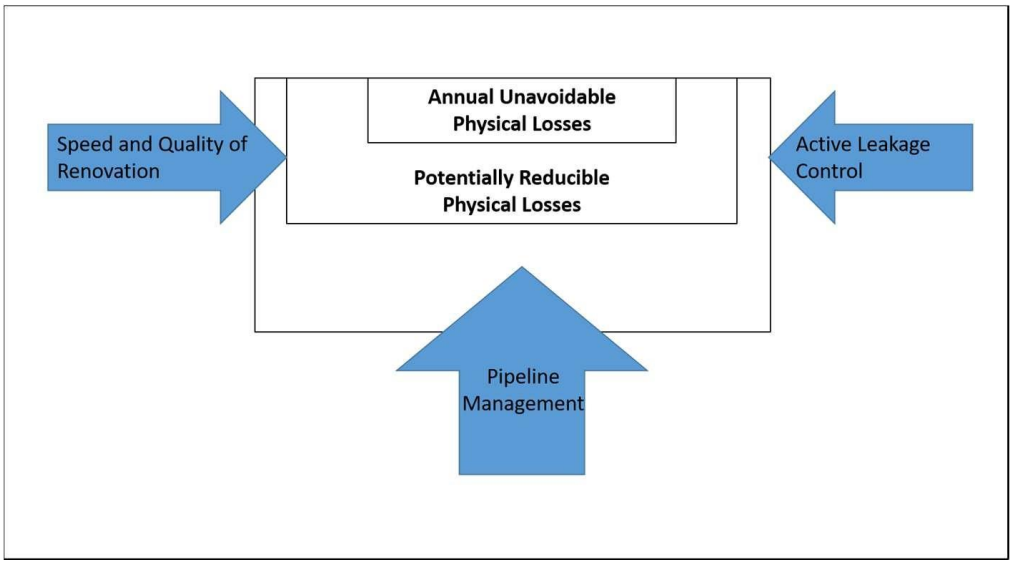

Table 20. Matrix for physical losses[5] [46]

Performance Category	ILI		Physical Losses				
			Average Pressure in the Water Network				
			10 m	20 m	30 m	40 m	50 m
Developed Countries	A	1-2		<50	<75	<100	<125
	B	2-4		50-100	75-150	100-200	125-250
	C	4-8		100-200	150-300	200-400	250-500
	D	>8		>200	>300	>400	>500
Developing Countries	A	1-4	<50	<100	<100	<200	<250
	B	4-8	50-100	100-200	150-300	200-400	250-500
	C	8-16	100-200	200-400	300-600	400-800	500-1000
	D	>16	>200	>400	>600	>800	>1000

In addition to ILI as the main indicator, the MoFWA recommends the following performance indicators and the decision tree of International Water Association (IWA) Figure 5 for selection of the appropriate performance indicator [46]:

- Daily loss volume for service connection (L/service connection/day);
- Daily loss volume for service connection at each pressure level (L/service connection/day/m pressure);
- Daily loss volume per pipe length (L/km pipe/day)

[5] Category A: Good. More decrease in water losses may not be economical.
Category B: There is potential for improvement. Pressure management, active leakage control and better network maintenance should be considered.
Category C: Poor. Can be tolerable if water resources are rich and cheap. However, water loss reduction measures should be improved.
Category D: Bad. Water Authority uses water resources inefficiently. It is compulsory to develop a water loss reduction program.

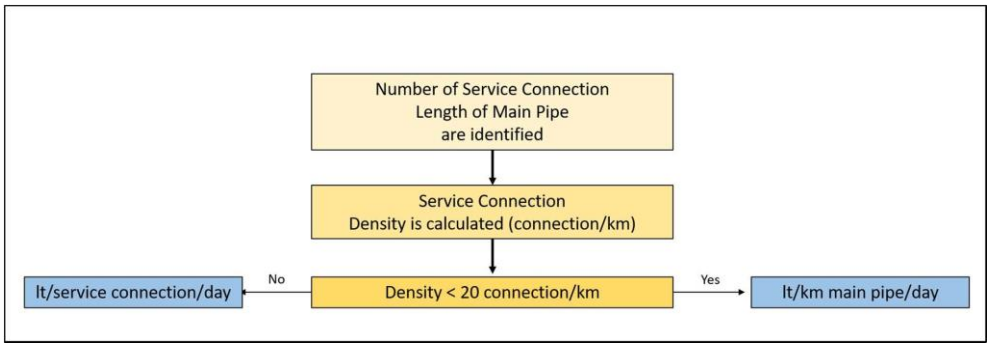

Figure 5. Decision Tree for Indicator Selection [46]

4.3 Ministry of Environment and Urbanization

Similar to the MoFWA, MoEU was established in 2011 due to the restructuring of the ministries which are responsible for water and wastewater management.

4.3.1 MoEU's Role in Urban Infrastructure

4.3.1.1 Wastewater-related Activities of MoEU

The MoEU is one of the leading authorities for water governance. Its role is related to environmental protection and rehabilitation, assessing and monitoring environmental impacts of projects and activities which may affect the environment. As such, it determines treatment standards for wastewater treatment plants, issues discharge permit and is in charge of monitoring performance of wastewater facilities. The MoEU is also in charge, through its EU Investments Department, of preparing and implementing the operational programme according to the legislation, EU directives and international agreements, in particular the financial agreement frameworks with the EU. As such, it sets projects' priority level.

In 2015, General Directorate of Environmental Management (GDEM) published the Wastewater Action Plan for the period of 2015 – 2012. The Action Plan produced a list of goals and objectives, together with the measures to reach them. Table 21 presents a list of goals, objectives and measures stated in the Action Plan.

Table 21. Goals, Objectives and Measures Identified by MoEU [47]

Goal	Objectives	Measures
To conduct sewerage and treatment services and improve the existing facilities; To develop sewerage and treatment projects in an efficient and sustainable way.	To provide sewerage services to 85% of the population in municipalities by the end of 2017; To ensure implementation of full cost recovery tariff system which includes construction, operation, maintenance, closing and monitoring of wastewater facilities. To ensure that industrial facilities discharge their wastewater to urban sewerage system after a pre-treatment system.	To identify WWTP processes and revise the existing WWTPs if necessary; To provide necessary financing for the measures; To provide incentives to implementers of full cost recovery tariff systems; To provide incentives to industrial facilities which complete their infrastructure systems.

In the 2017 Performance Program of the MoEU, it is aimed that the population served with a WWTP will be increased from 79% (2015) to 85% (2017). The indicator identified for this target is the rate of population.

4.3.1.2 Solid Waste-related Activities of MoEU

MoEU is the leading authority for the planning and development of policies for management of municipal and industrial wastes at the national level. The main task of MoEU is to identify necessary policies and principles aiming at environmental protection and waste prevention pollution reduction, preparation of relevant legislation and its implementation. Responsibilities of MoEU in the field of waste management include preparing national decrees and regulations, developing policies and strategies for waste management, organizing of national

activities on waste management, conduction research activities, coordinating preparation of waste management plans, defining technical standards, issuing and keeping records of licenses, keeping record of licenses, data collection, issuing permits regulating import and transfer of hazardous wastes over Turkey.
In the 2017 Performance Program of the MoEU, it is aimed that the population served with a waste disposal facility will be increased to 83% (2017).

4.3.2 M&E System of MoEU

Monitoring approach followed by the MoEU has been structured on the basis of two Regulations; Regulation on Water Pollution Control and Regulation on Urban Wastewater Treatment and focused on monitoring of discharge from WWTPs. According to Annex 2b of the Regulation on Urban Wastewater Treatment, water samples collected from outlets of WWTPs are analyzed periodically. Minimum number of water samples are determined according to population equivalence of WWTPs (Table 22).

Table 22. Number of water samples for different population equivalence. [48]

Population Equivalence	Minimum Number of Samples
2,000 - 9,999	12
10,000 – 49,999	12
>50,000	24

The Regulation on Urban Wastewater Treatment monitors compliance with standards by using the limit values given in Table 23 and Table 24 which presents the treatment standards for secondary and advanced treatment, respectively.

Table 23. Discharge Limits for Secondary Treatment [48]

Parameter	Concentration (mg/L)	Minimum treatment efficiency (%)
BOD	25	70-90
COD	125	75
TSS	35	90

Table 24. Discharge Limits for Advanced Treatment [48]

Parameter	Concentration (mg/L)	Minimum treatment efficiency (%)
Total Phosphorus	2 mg/L P (10,000-100,000 PE) 1 mg/L P (>100,000 PE)	80
Total Nitrogen	15 mg/L N (10,000-100,000 PE) 10 mg/L N (>100,000 PE)	70-80

The Regulation on Water Pollution Control explains the procedure for getting discharge permits depending on the sectoral classification. Through the templates provided in the Regulation, municipalities and institutions apply to the MoEU for getting discharge permit for their WWTPs. In these templates which are separately prepared for raw wastewater (without any treatment) and deep sea discharge of treated wastewater, municipalities and institutions are obliged to data and information on water utilization in their facilities and main characteristics of WWTP, discharge line and receiving water body.

Environmental impact assessments (EIA) are defined as a series of steps including screening, scoping and environmental impact statement preparation, consultation

and decision-making processes. Well defined and implemented post-decision monitoring and post-auditing stages can make an EIA system an effective tool for environmental management. During the EU Accession period, Turkey improved the EIA Regulation significantly. However, after the latest changes in the Regulation in January 2016, as a result of the interventions of the national NGOs, the Council of State adopted a motion for stay of execution for the article on monitoring. This article states that the monitoring of the EIA can be conducted by the company which prepared the EIA report. Therefore, as of November 2017, the monitoring process defined in the EIS Regulation is not applied.

4.4 Bank of Provinces – Ilbank

4.4.1 Ilbank's Role in Urban Infrastructure

IlBank is the development and investment Bank of Turkey. It has a major influence on municipal investments, a large share of which are in WSS, as it establishes the creditworthiness and therefore the acceptable debt level of all local governments in Turkey, provides loans (grants for small municipalities and LGs) and guarantees, channels IFI funding and carries out all aspects of related due diligence. [3] Currently, Ilbank is in cooperation with WB, JICA, and EIB. Additionally, Ilbank support municipalities in accessing the EU - IPA funds.

According to the Ilbank's Activity Plan 2016, Iller Bank transferred a total of TRY 6.108 million to local governments across Turkey within the scope of investment and financing program in 2016. Source expense amounting to TRY 186 million was made for source development activities of the Bank. Total source utilization is defined as TRY 6.294 million.

Ilbank's Investment Program for 2016 entered into force as TRY 20 million upon its publication in the Official Gazette dated March 31, 2016. Under the investment program published, the following amounts were utilized;

- TRY 12 Million for sewage projects,

- TRY 7.155 thousand for drinking water,
- TRY 323 thousand for zoning plan,
- TRY 619 thousand for Solid Waste related municipal service projects.

A breakdown of Ilbank's planned and realized expenditures in 2016 for water, sewerage and solid waste projects is given in Figure 6.

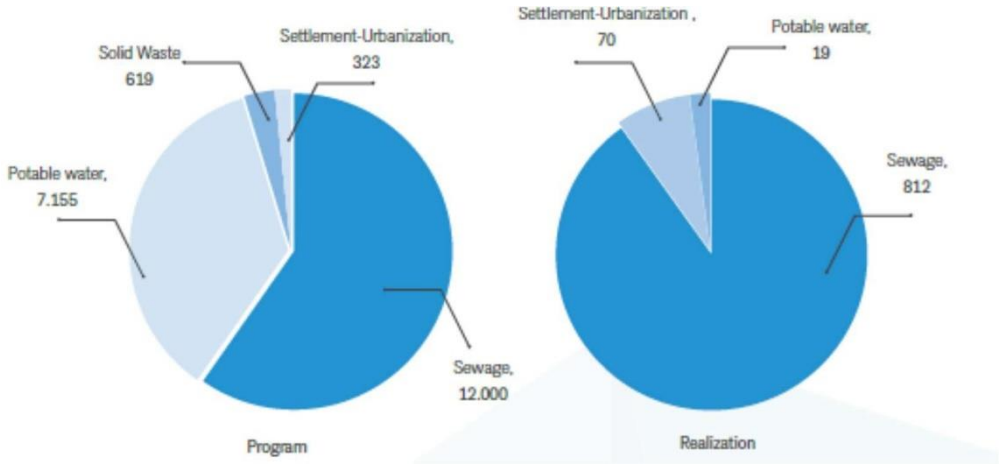

Figure 6. Breakdown of Ilbank's planned and realized expenditures for 2016. [49]

4.4.2 Urban Infrastructure Objectives of Ilbank

Ilbank's Strategic Plan for the period of 2015-2019 has been prepared in accordance with the 2023 vision of Turkey. Within the plan, the current situation of the local administrations particularly in terms financial aspects has been analyzed and goals, objectives and strategies have been identified under four strategy themes. The Strategic Plan consists of four major parts. The first part explains the process for preparation of the plan. Analysis of the current status and stakeholders together with the existing legislation are given in the second part of the plan. The view of Ilbank for the future is presented the third section. The fourth and the last section of the Plan provides information on the methodology to be used M&E of the strategic plan.

One of the four strategy themes defined in the Strategic Plan is Liveable Cities which refers to urban infrastructure system in Turkey as well as to planning and smart city concepts. Under Liveable Cities theme, Ilbank has defined three goals and 16 objectives which will be monitored by 21 performance indicators. Table 25 provides the list of goals, objectives and performance indicators under Liveable Cities theme.

Table 25. Goals, Objectives and Indicators of Ilbank's Strategy Plan [50]

Goals	Objectives	Indicators
Theme: Liveable Cities		
Development of planned cities	The spatial strategic plans at national and regional levels and landscaping plans will be developed under the framework of the protocols with the MoEU.	The Country Spatial Strategic Plan will be completed by end 2019.
		The Regional Spatial Strategic Plan will be completed by end 2019.
		Three Landscaping Plans will be completed by end 2019.
	Urban landscaping plans or land use plans for MMs and provincial municipalities will be developed.	Requests for preparation of urban landscaping plans or land use plans will be responded by end 2019.
	Main Transport Plans will be prepared for the Municipalities with population >100,000.	Requests for preparation of main transport plans will be responded by end 2019.
Development of sustainable and healthy cities	Number of infrastructure projects and construction works will be increased based on resource productivity principles and environmental protection strategies of local administrations.	Requests for preparation of infrastructure projects based on local environment strategies will be responded by end 2019.
	Municipalities will be supported to decrease water losses in accordance with the Regulation.	Joint studies will be conducted with minimum ten municipalities to reduce water losses by end 2019.

4.4.3 Monitoring and Evaluation System of Ilbank

The Strategy Plan for 2015-2019 states that "the implementation of the projects will be systematically monitored. It is aimed to gather information on the accomplishment of the objectives during the implementation phases through comparison of the results with the specified goals and objectives in line with the mission, vision and basic values given in the Plan. Additionally, consistency and compatibility of the goals and objectives will be assessed." According to the strategy plan, monitoring process will be coordinated by the Department of Planning and Coordination which is also responsible for preparation of the strategy plan. The Ilbank departments which are in charge of the identified policies will produce reports at the end of the monitoring periods and submits to the Planning and Coordination Department. The strategy plan also states that results of the monitoring process will be included in the annual progress reports which are disclosed on the web site of Ilbank.

However, when the annual report for 2016 is reviewed, it is seen that the report is based on an assessment of Ilbank's activities mainly in terms of financial progress. The report does not provide any performance assessment or monitoring of project results. The progress of the targeted activities and policies are reported by the Planning and Coordination Department directly to the higher management of Ilbank without any public disclosure process. Therefore, it can be concluded that monitoring of Ilbank's objectives is mostly based on a financial assessment and remains internal.

For the investments financed by Ilbank loans, regional directorates are responsible for supervision of construction activities. Once the construction is completed, facilities are taken over by respective municipality and Ilbank carries no responsibilities related with operation and maintenance of facilities. Both the reviewed documents and the interviews with Ilbank staff, reveals that there is no established monitoring and evaluation system for the investments financed by Ilbank.

For the IFI-financed investments, Ilbank adopts the M&E system of the respective IFI as per the signed loan agreements and applies the agreed M&E procedure. However, it stays limited to the IFI-financed project, without any implications on the institutional M&E system.

For the Municipal Services Project financed by WB, as the implementing agency, Ilbank was responsible for data collection from the municipalities for the M&E system of the project. Additionally, Ilbank prepared its own Implementation Completion and Results Report (ICR) which was incorporated into the overall ICR of the project explained in Section 3.1 of this study.

4.5 Other Institutions

In this section, two institutions and municipalities which do not have direct role in M&E processes but provide services which are indirectly related with M&E are presented.

4.5.1 Turkish Statistical Institute (TurkSTAT)

In Turkey, data collection services are mainly provided by the TurkStat. In the field of environment, particularly for municipal infrastructure services, data are collected by the Institute via questionnaires filled in by municipalities. After collecting relevant data, reports are disclosed on the official web-site of the Institute. The tables in Appendix B represent the data collected by TurkStat in the fields of water, wastewater and solid waste.

4.5.2 Turkish Court of Accounts (TCA)

The TCA conducted performance and regularity (financial and compliance) and audits. Financial audits include an assessment and a view on the accuracy of public administrative institutions' financial reports and statements. Compliance of these institutions' financial decisions and transactions with the law are reviewed within the audits. The auditees' financial management and internal control systems are also

assessed by the auditors [58].

Compliance audits include an assessment of compliance of the auditees' revenue, expenditure, assets and other accounts and transactions with the law and other regulatory documents. In performance audit, effectiveness, efficiency and economics of the utilization of public resources are assessed. Additionally, auditees' activities against the goals and indicators which have been set to ensure accountability are assessed [58].

With regard to municipal infrastructure services, the TCA carries out performance audit reports to make sure that municipalities eradicate defects in implementation, and Ministry of Interior, enhances legal policies and arrangements regarding coordination of infrastructure works [59].

4.5.3 Municipalities

Within their territorial borders, metropolitan municipalities and other municipalities are responsible for ensuring the protection of water basins in a sustainable way and providing a healthy environment for citizens in line with MM Law No. 5216 and Municipality Law No. 5393, respectively.

In Turkey, the practice of MM was started in 1984 with Istanbul, Ankara and Izmir which are the largest three cities. Following these three, the practice has been adapted to 16 cities until 2013. Since then, 14 more MMs were established in the cities where population exceeds 750,000. In total 30 MMs, around 60 million of the national population of 77,695,904 lives corresponding to 77% of the population in the metropolitan boundaries. [52]

MMs own authorities are defined in Law No. 5216 Law No. 2560 on the Establishment and Duties of the General Directorate of the Istanbul Water and Sewage Administration. Water and sewerage administrations of all MMs are responsible for taking legal, technical and administrative actions which are required for conservation of water and pollution prevention.

In the MMs holding at least 750,000 people, services like water, sewerage, waste and public transport are provided by the MM's affiliated entities of which water and sewerage administrations are regulated by law. This makes the entities public legal personality with a separate budget system. Main roles of the water and sewerage administrations can be listed as [52]:

- Supply and distribution of water (including potable, non-potable and industrial) to the city, operation of the system;
- Collection and treatment of wastewater and storm water;
- Protection of water resources against pollution.

The major responsibilities of municipalities can be summarized as; (i) to install and operate water and sewerage facilities (acc. to Municipality Law); (ii) to collect connection fees (acc. to Law on Municipal Revenues); (iii) to install and operate wastewater treatment plants and to determine and collect service fees (acc. to Environment Law).

The existing legislative structure does not bring any responsibilities for M&E of the performance of urban infrastructure services. The municipalities are responsible for providing data and information as requested

CHAPTER 5

GAP ANALYSIS

5.1 M&E Systems

Differences in Interpretation of M&E Concept: Despite the differences between the IFIs with respect to the level of details in the M&E process, it can be concluded that the international organizations have a common understanding on M&E concepts. For instance, they all follow the SMART criteria for indicator development and start designing the M&E system during the planning phase of the projects. However, the M&E approach in Turkey is significantly far from the one on which the IFIs have been following. M&E is even mostly confused with the concepts of "audit" and "construction supervision".

Performance Monitoring is Seriously Missing: Monitoring activities conducted by MoFWA on water resources and wastewater management and by MoEU on solid waste landfills are mostly a "compliance monitoring". In other words, the MoFWA and MoEU monitor whether the discharges from the WWTPs meet the legal requirements and quality of surface water and groundwater resources comply with relevant standards, or in the case of solid waste, whether leachate from landfill disturbs soil and groundwater quality. There is no defined and implemented process for M&E of the performance of the water treatment plants, WWTPs and/or landfills. (There is one ongoing project for drinking water plants' performance monitoring). The MoD on the other hand, gives emphasis to monitoring of financial progress of the projects listed in the annual investment plan.

Monitoring and Evaluation are considered as separate processes: The IFIs realizes monitoring and evaluation as two separate but interrelated processes. Whereas, the distribution of roles and responsibilities among Turkish institutions results in separate handling of monitoring and evaluation. For example, monitoring of water quality is under the responsibility of DSI; but, the monitoring data is evaluated by GDWM. TurkStat collects data in all aspects of urban infrastructure and shares it with all the relevant institutions, as well as disclosing the reports publicly.

Lack of Capacity and Experience with Evaluation: While there are some capacity and experience with monitoring in terms of collection and tracking of data, Turkish institutions' experience with evaluation processes is lacking. For instance, TurkStat conducts surveys for life satisfaction, which determine the level of people's satisfaction with the network water services they receive, and can therefore be used as a proxy. The results of the life satisfaction surveys carried out between 2004 and 2012 show that 79% of the customers expressed satisfaction with the water supply service in 2012. However, there is no institutions questioning the reasons behind the unsatisfaction of 21% of the customers which would produce helpful outputs for improvement of water supply service. Additionally, when the activity reports of the ministries are reviewed, it is seen that there is almost no human and financial resources invested in M&E activities implying that there is a lack of capacity to provide basic M&E services.

Lack of a national framework for M&E: 10th Development Plan developed by MoD sets a vision and broad goals; but, more specific outcomes and related results monitoring systems are missing. Although there are some ongoing efforts to develop a comprehensive M&E system by the MoD and more specific initiatives at sectorial level (e.g. MoFWA's ongoing project on performance assessment of the existing drinking water treatment plants), lack of a holistic framework for M&E constitutes the main gap.

5.2 Data collection, verification and evaluation

Data limitations: Collecting and organizing the data necessary to perform an in-depth analysis has proven a challenge. The thesis therefore relies on publicly available data and studies and on interviews with the representatives of the Turkish institutions and IFIs. Insufficiency of the publicly-available data on water and wastewater utilities has been faced as another challenge during this study.

Although TurkStat have been implementing a sophisticated system for collection of numerical data on all sectors, there is no centralized data collection system capturing information on continuity, reliability or quality of service provision in Turkey. The latest data available belongs to 2014. As of August 2017, there is no data for 2015 and 2016. Additionally, there is currently no benchmarking system for the provision of WSS services in Turkey. MoFWA/GDWM created one on NRW, but the guideline document needs support to get reliable and comparable data. This affects the capacity to effectively monitor utilities' performance, to make informed strategic decisions and to improve the incentive framework to encourage efficiency and financial sustainability.

It can be noted as an example that, in activity reports of some of the SKIs, non-revenue water (NRW) assessment was only given for the service area before 2014, although financial accounts cover the entire service area, as the process of compiling the technical records for the new service area is ongoing. In addition to the scarcity in reliable data, there are substantial variations in the quality of indicators and reporting systems between institutions. [3]

Lack of a Data Verification System: In Turkey, TurkStat is the main authority for data collection from the municipalities. Insufficient technical, organizational and financial capacities of the municipalities which are the basic data provider have a direct impact on data quality and reliability. Apart from the questionnaires developed and used by TurkStat, there is no subsequent process that double checks the accuracy of data and verifies the information.

5.3 Institutional challenges

Overlaps and complications in planning and monitoring responsibilities: The multiplicity of institutions with shared responsible for water and wastewater sectors, whether on resources management or water supply and sanitation, and the overlapping of numerous action plans and investment programs, complicates the M&E system in Turkey.

Apart from the complicated sharing of responsibilities, another issue can be noted that, the traditional approach for building new water or wastewater treatment plant is to use standard construction contracts and to transfer the plant, once commissioned, to the utility to operate. Besides its several shortcomings, the utility which takes over the plant may not have the capacity to operate it efficiently. It may not have included the training of its staff in the construction contract and there is no guarantee that it will be able to set aside sufficient funds to properly carry out O&M over the plant's useful life.

Lack of a separate M&E department in the institutions: Except for the MoD, none of the institutions involved in the thesis has a separate M&E unit and the existing monitoring activities are carried out by the planning departments of the institutions which contradicts with the "spirit" of M&E.

Number of plans, programs and strategies developed by the institutions: In addition to the development plans produced by MoD, relevant ministries also develops action plans and strategic plans which set targets in their fields of activity thus making the M&E of the implementation of targeted activities more complicated.

CHAPTER 6

RECOMMENDATIONS FOR IMPROVEMENT OF THE M&E SYSTEM IN TURKEY

6.1 Summary of the Previous Sections

Previous chapters analyzed the M&E systems of the IFIs and the institutional setting currently in place in Turkey for management and monitoring of urban infrastructure services. Earlier chapters underlined different interpretations of M&E concepts. Based on this analysis, gaps and challenges have been identified in Chapter 5. This section identifies some recommendations for possible improvements to increase the implementation of a proper M&E system and therefore the efficiency of the actions that the Turkish institutions undertakes to achieve sustainable development goals in urban infrastructure.

All three of the IFIs reviewed has considerable experience with performance measurement particularly at the project level. Their well-established frameworks, systems and practices have been in place for some years.

It is evident by the international experience that, Turkey would benefit from results/performance-based M&E systems to measure the achievement of the goals set in the Development Plan and the corresponding responsibilities defined for the relevant ministries and institutions. It would also contribute to ensure transparency and accountability in the planning, implementation and operation processes, as well as increasing the efficiency of service provision in urban infrastructure services.

The current situation in Turkey calls for more investment efficiency for new infrastructure and operations performance improvement for existing facilities. High NRW rates which exceeds %70 in some cities and high O&M costs of WWTPs constitute

the main obstacles in sustaining technical and financial efficiency of the facilities. International experience shows that a proper M&E system which considers the facilities in a holistic and integrated way, provides great contribution to increase service provision efficiency. Therefore, it is crucial for Turkey to establish a M&E framework which clearly identifies the principles, processes, methodologies and institutional roles and responsibilities.

6.2 Recommended Steps and Actions

- **Establishment of a clear vision and framework for M&E**

First, a high-level mutual agreement among the governmental institutions on the need for a M&E framework is required to establish an effective framework. A framework which is lack of a strong basis can result in an inefficient and unsuccessful effort. The M&E systems of the IFIs are based on a corporate understanding of M&E principles and a M&E framework which defines the basic components of the M&E system. M&E of the single projects and programs are then structured in line with this framework.

Since MoD is the main authority for preparing development programs and setting development objectives, development of a clear statement by the MoD is necessary in order to strengthen the basis for M&E. This statement then should be integrated into the development plans and the consequent documents prepared by the ministries. The M&E system should be designed to fit and complement existing political circumstances.

It is also crucial to define the relationship between the development plans and the other processes (Strategic Plans, Action Plans and Performance Programs of the ministries). Setting the M&E criteria is required to provide a structured M&E system. The following criteria which are commonly accepted and used by the IFIs is recommended: relevance, effectiveness, efficiency, impact and sustainability. Detailed explanation of the criteria is given in 2.1.3.1 of the thesis.

The project logical framework, is a well-known tool used by IFIs to conceptualize objectives and strategies of a program/project. The logframe is typically structured on a

five-level hierarchy model with assumed cause-effect relationships between them: inputs are used to undertake project activities that deliver outputs (goods/services) that yield the attainment of the project purpose that contributes to a project goal. At project level, several projects demonstrated that (e.g. Municipal Services Project financed by the World Bank), development of a realistic results framework during project preparation in close collaboration with the beneficiaries of the investment and the capacity of implementing agencies are the key factors for development and implementation of an efficient M&E system. Considering that the national institutions which execute infrastructure projects in cooperation with the IFIs, have to implement the M&E systems of the IFIs, the experience of the institutions gained through international cooperation can be used as example in establishing a national M&E Framework.

Table 29. Main Components of M&E systems and respective status in Turkey

Steps for Establishment of a National M&E System	Water	Wastewater	Solid Waste
Definition of M&E Vision and Framework	There is no vision solely defining the M&E approach of the government. First, a vision should be defined by MoD and MoFWA and a framework should be developed. The framework recommended by this study is given in Table 30.	There is no vision solely defining the M&E approach of the government. First, a vision should be defined by MoD and MoEU and a framework should be developed. The framework recommended by this study is given in Table 30.	There is no vision solely defining the M&E approach of the government. First, a vision should be defined by MoD and MoEU and a framework should be developed. The framework recommended by this study is given in Table 30.
Setting Objectives and Identifying Indicators	MoD identifies water-related objectives in the development plans. The objective recommended by this study is given in Table 30.	MoD identifies wastewater-related objectives in the development plans. The objective recommended by this study is given in Table 30.	MoD identifies solid waste-related objectives in the development plans. The objective recommended by this study is given in Table 30.
Identification of Methodology	For water sector, MoFWA identified a methodology for calculation of NRW and published Handbook on Control of Water Losses in Drinking Water Supply and Distribution Systems. Additionally, an Excel-based tool (SSDP) has been developed. This Handbook and the tool can set the basis for M&E of water losses. However, capacity of municipalities still needs to be increased for proper implementation of the methodology.	A methodology for M&E of efficiency of wastewater treatment services is missing.	A methodology for M&E of efficiency of solid waste disposal services is missing.

Table 29. Main Components of M&E systems and respective status in Turkey (cont'd)

Steps for Establishment of a National M&E System	Water	Wastewater	Solid Waste
Setting Up Data Collection System	TurkStat has a data collection system for all sectors. However, the system does not include a data verification process. For water losses, MoFWA created tables/forms for collecting data from municipalities on NRW. Capacity of municipalities which are primarily providing data still needs to be increased.	TurkStat has a data collection system for all sectors. However, the system does not include a data verification process. MoEU, on the other hand, collects information on specifications of the WWTPs. Capacity of municipalities which are primarily providing data still needs to be increased.	TurkStat has a data collection system for all sectors. However, the system does not include a data verification process. MoEU, on the other hand, collects information on the landfills. Capacity of municipalities which are primarily providing data still needs to be increased.
Setting Up Reporting System	The reporting system of TurkStat should be improved with active participation of MoFWA. Reporting system should analyze the monitoring data, identify incompliances and inefficiencies and define corrective actions to be taken.	The reporting system of TurkStat should be improved with active participation of MoEU. Reporting system should analyze the monitoring data, identify incompliances and inefficiencies and define corrective actions to be taken.	The reporting system of TurkStat should be improved with active participation of MoEU. Reporting system should analyze the monitoring data, identify incompliances and inefficiencies and define corrective actions to be taken.

- **Setting specific objectives and indicators**

Ideally, objectives of a project are need to be clarified by identifying clear statements regarding the results to be reached (outputs, purpose, and goal) and then defining the strategies or means (inputs and activities) for reaching those objectives. Development objectives of Turkey has already been defined in the 10th Development Plan which should be the basis for the M&E system. Similarly, data collection system is in place and has been implemented by TurkStat. TurkStat collects many data on urban infrastructure. However, it would be too ambitious to initiate the M&E system for all the indicators. Instead, a phased approach which includes monitoring and evaluation of priority indicators is recommended. The selection of the priority indicators should be based on the goals of the 10th Development Plan since it is the major document for investment planning. It is also recommended that the adaptation of M&E framework makes as much use of the existing systems as possible in order to minimize additional demands on the institutions concerned. The SMART criteria which is explained in 2.1.3.2 and commonly accepted by the IFIs is recommended to be followed.

- **Development of methodologies for performance measurement**

After setting the objectives and identifying the indicators, methodologies that are needed to estimate respective data should be developed. For water related objectives and indicators, as explained in Section 4.2.2, Handbook on Control of Water Losses in Drinking Water Supply and Distribution Systems published by MoFWA to guide the municipalities in calculation of water losses can be used. After all the municipalities are provided with training on the Handbook, additional capacity building activities should be developed and implemented.

- **Improvement of the existing data collection system**

Typically, different data sources and methods, frequencies of collection, and assignment of responsibility are included in monitoring performance of a project at the different levels of the logframe. Good practices show that preparation of performance monitoring plans at the project's outset that specify clearly how, when, and who will conduct data collection are needed. Selection of a data collection method and source are significant for data quality in terms of validity and reliability, but also its practicality or feasibility given cost and time limitations.

In order to ensure data reliability, the existing data collection system of TurkStat needs to be improved with a deep analysis of the applied data collection methods and tools. Additionally, since the municipalities are the primary data providers, active involvement of and capacity improvement for municipalities are crucial. For baseline data, consistency with the existing documentation and accuracy check needs to be provided. Moreover, again to increase reliability of collected data, a data verification system needs to be established.

Table 30. Recommended Results Framework for Water, Wastewater and Solid Waste Management in Turkey

Water-related Development Objective: To increase efficiency of water supply systems.					
Indicator	**Baseline**	**Target Date**	**Inputs[6]**	**Timeline for Data Collection** [7]	**Responsibility for Data Acquisition**
Percentage of NRW over the supply area of the municipalities.	Baseline data can be estimated based on the information collected from municipalities by MFWA.	Objective should be set by MoFWA and MoD.	Resources used to decrease NRW.	Annual	Coordinator: MoD Municipalities MoFWA Ilbank (to provide data on IFI-financed projects)
Wastewater-related Development Objective: To provide proper management of urban wastewater.					
Indicator	**Baseline**	**Target Date**	**Inputs**	**Timeline for Data Collection**	**Responsible Agencies**
Rate of municipal population served with a WWTP.	TUIK data	MoD Objective	Implemented WWTP projects.	Annual	Coordinator: MoD Ilbank Municipalities MoFWA MoEU
Solid Waste-related Development Objective: To provide proper management of solid waste.					
Indicator	**Baseline**	**Target Date**	**Inputs**	**Timeline for Data Collection**	**Responsible Agencies**
Rate of municipal population served with a sanitary landfill.	TUIK data	MoD Objective	Implemented WWTP projects.	Annual	Coordinator: MoD Ilbank Municipalities MoEU

[6] Inputs are defined as financial, material and human resources used in conjunction with activities to produce project outputs.

- **Establishment of a reporting system**

A standard format for reporting should be created by also taking into account the existing reporting systems applies by the institutions in order to avoid problems in adoption of the newly created reporting system.

Finally, the results are used as channels for getting feedback. This feedback can be input from independent agencies, local administrations and public. Such feedback enables the M&E teams to learn from feedbacks and update program structure and procedures to obtain improved outcomes. For sustainability purposes, an efficient M&E system should be based on continuous demand, transparency and accountability in the procedures; effective budget management; and properly defined responsibilities.

CHAPTER 7

RESULTS AND CONCLUSION

In Turkey, access to water is at 99%, access to sanitary landfills is at 60%, access to sanitation is at 91%. However, quality and long-term financial and environmental sustainability of water and sanitation services remain a concern as identified in the 10th Development Plan. In the water sector, only 52% of potable water was treated in 2010, nonrevenue water is estimated at approximately 50%, and significant efficiency challenges remain in the wastewater sector as a result of operational and technological inefficiencies.

Many institutions share the responsibilities regarding the management of urban infrastructure systems. While the technical aspects of their work generally conform to high standards, monitoring and evaluation arrangements suffer from inadequate understanding of the core concepts and lack of inter-agency coordination in both assessment of the performed works, leading to inefficiency and poor sustainability of investments. The need for more efficient monitoring and evaluation is underpinned also by the IFIs in their project cycles. Although, institutional and legal efforts have started to strengthen M&E of some components of the urban infrastructure systems, there is still significant need for establishment of an overall M&E system with active participation of and effective coordination between the relevant institutions.

In the development world, monitoring and evaluation has increasingly become an important management tool to track progress of organizations, programs and projects and to facilitate decision making. International community agrees that, by closely examining performance, an organization can design programs and activities that are effective, efficient, and yield powerful results for the community. Monitoring and evaluation are accepted as two separate but interrelated practices dedicated to the assessment of an organization's overall performance. At project

level, monitoring is defined as a systematic and long-term process that gathers information in regards to the progress made by an implemented project. Evaluation, on the other hand, is time specific and it is performed to judge whether a project has reached its goals and delivered what expected according to its original plan.

The thesis first analyzed the M&E systems of the IFIs and the institutional setting currently in place in Turkey for management and monitoring of urban infrastructure services. It is underlined that different interpretations of M&E concepts exist. The current situation in Turkey calls for more investment efficiency for new infrastructure and operations performance improvement for existing facilities. International experience shows that a proper M&E system which considers the facilities in a holistic and integrated way, provides great contribution to increase service provision efficiency. Therefore, it is crucial for Turkey to establish a M&E framework which clearly identifies the principles, processes, methodologies and institutional roles and responsibilities.

Based on the identified gaps and challenges in terms of perception of M&E concepts in Turkey, data collection and verification systems and institutional challenges, it is recommended to establish a M&E framework which clearly identifies the principles, processes, methodologies and institutional roles and responsibilities. It is evident by the international experience that, Turkey would benefit from results/performance-based M&E systems to measure the achievement of the goals set in the Development Plans and the corresponding responsibilities defined for the relevant ministries and institutions. It would also contribute to ensure transparency and accountability in the planning, implementation and operation processes, as well as increasing the efficiency of service provision in urban infrastructure services.

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APPENDIX A

WORLD BANK'S CORE INDICATORS

World Bank's Core Idıcators [30]

Core Sector Indicator	Definition of the Indicator
Number of people gained access to "Improved Water Sources" within the scope of the project.	Access to water is consistent with the definition used in the World Bank water supply sector. This indicator measures the actual cumulative number of people in urban areas who benefited from improved water supply services that have been constructed under the project. It is expected that the baseline value for this indicator will be zero. The data should be cumulative – meaning that the data in the ISR should represent the cumulative number of people in urban areas provided with access to 'Improved Water Sources' under the project.
Number community water points constructed or rehabilitated within the scope of the project	This indicator is measured as the cumulative number of improved community water points constructed or rehabilitated under the project in rural and urban areas. It is expected that the baseline value for this indicator will be zero. The data should be cumulative – meaning that the data in the ISR should represent the cumulative number of improved community water points constructed or rehabilitated under the project
Number of new piped household water connections which are resulting from the project	This indicator is measured as the cumulative number of new piped household water connections which result from the project intervention. It is expected that the baseline value for this indicator will be zero. The data should be cumulative – meaning that the data in the ISR should represent the cumulative number of new piped household water connections that results from the project intervention
Number of piped household water connections effected by the rehabilitation works conducted within the scope of the project.	This indicator is measured as the cumulative number of piped household water connections benefiting from rehabilitation works. Rehabilitation works are undertaken so that existing customers see the quantity and/or quality of their water supply services enhanced. It is expected that the baseline value for this indicator will be zero. The data should be cumulative – meaning that the data in the ISR should represent the cumulative number of piped household water connections that are benefiting from rehabilitation works undertaken by the

World Bank's Core Idıcators [30]
(cont'd)

Core Sector Indicator	Definition of the Indicator
Number of water utilities which are supported by the project.	This indicator measures the total cumulative number of utilities providing water supply with which the Bank is supporting under the project. It is expected that the baseline value for this indicator will be zero. The data should be cumulative – meaning that the data in the ISR should represent the cumulative number of water utilities that the project is supporting.
Number of other water service providers which are supported by the project.	This indicator measures the total cumulative number of other water service providers providing water supply supported under the project. It is expected that the baseline value for this indicator will be zero. The data should be cumulative – meaning that the data in the ISR should represent the cumulative number of other water service providers that the project is supporting.
Number of people in urban areas gained access to "Improved Sanitation" within the scope of the project.	Access to sanitation is consistent with the definition used in the World Bank sanitation/sewerage sector. This indicator measures the actual cumulative number of people in urban areas who benefited from improved sanitation facilities that have been constructed under the project. It is expected that the baseline value for this indicator will be zero. The data should be cumulative – meaning that the data in the ISR should represent the cumulative number of people in urban areas provided with access to 'Improved Sanitation' under the project.
New household sewer connections constructed under the project (number)	This indicator is measured as the cumulative number of new sewer connections constructed under the project. It is expected that the baseline value for this indicator will be zero.

APPENDIX B

TURKSTAT's WATER, WASTEWATER AND SOLID WASTE DATA

TurkStat's Solid Waste Data (2014) [51]

Indicator	2014 Data
Municipalities provided with solid waste	1391
People provided with solid waste services	70,843,913
Percentage of population provided with solid waste	91
Percentage of population provided with recycling	65
Percentage of population provided with recycling	61
Collected municipal solid waste (thousand tons/year)	28011
Municipal solid waste per person (kg/person-day)	1.08
Waste disposal amounts by disposal methods (thousand	
Dump site of MM	2226
Dump site of municipality	7522
Dump site of another municipality	87
Landfill	17807
Composting plant	126
Open burning	4
River and lake disposal	16
Buria	7
Other (No detail available on the web site of	114

TurkStat's Water Data (2014) [51]

Indicator	2014 Data
Number of municipalities served by water supply network	1,394
Municipal population provided with water supply network	69,871,650
Percentage of population provided with water supply network (acc. to total population)	91
Percentage of population provided with water supply network (acc. to municipal population)	97
Amount of water abstracted for municipal water supply (m^3/year) from:	
- Dam,	1,886,617
- Well,	1,423,751
- Spring,	984,869
- River,	652,370
- Lake	289,800
Amount of surface water abstracted for municipal water supply network (thousand m^3/year)	2,828,787
Amount of ground water abstracted for municipal water supply network (thousand m^3/year)	2,408,620
Water abstraction per capita in municipalities (liters/capita-day)	203
Amount of water distributed by municipal water supply network (thousand m^3/year)	3,394,545
Number of water treatment plants	69
- Physical treatment	165
- Conventional treatment	147
- Advanced treatment	
Total capacity of drinking water treatment plants (thousand	6,133,100
- Physical treatment,	148,052
- Conventional treatment,	4,955,564
- Advanced treatment	1,029,484
Amount of drinking water treated (thousand	2,995,001
- Physical treatment,	47,875
- Conventional treatment,	2,860,041
- Advanced treatment	87,085
Municipalities provided with drinking water treatment plants (number)	436
People provided with water treatment plants	41,610,124
Percentage of population provided with water treatment plants (acc. to total population)	54
Percentage of population provided with water treatment plants (acc. to municipal population)	58

TurkStat's Wastewater Data (2014) [51]

Indicator	**2014 Data**
Number of municipalities served by sewerage system	1,309
Municipal population served by sewerage system	65,071,589
Percentage of population provided with sewerage system (acc. to total population)	84
Percentage of population provided with sewerage system (acc. to municipal population)	90
Wastewater discharged from municipal sewerage to (thousand m^3/year)	4,296,851
- Sea	1,915,294
- Lake	93,595
- River	1,898,895
- Land	17,954
- Dam	120,781
- Other	250,333
Number of WWTPs	604
- Physical treatment,	49
- Biological treatment,	345
- Advanced treatment,	92
- Natural treatment,	118
Total capacity of wastewater treatment plants (thousand	5,940,579
- Physical treatment,	1,823,038
- Biological treatment,	2,074,215
- Advanced treatment,	1,984,915
- Natural treatment,	58,411
Amount of wastewater treated by wastewater treatment (thousand m3/year)	3,483,787
- Physical treatment,	869,248
- Biologial treatment,	1,155,353
- Advanced treatment,	1,450,494
- Natural treatment	8,692
Municipalities provided with WWTPs	513
Population provided with WWTPs	49,358,266
- Percentage of population provided with WWTPs (acc. to total population)	64
- Percentage of population provided with WWTPs (acc. to municipal population)	68
Wastewater discharged per person in municipalities (L/person-day)	181
Municipalities using marine discharge	36
Discharged wastewater	4,296,851
- Treated	3,483,846
- Untreated	813,005