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We care about what we measure: Assessing implementation capacities at the national level for the environmental Sustainable Development Goals

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Author's declaration

No portion of the work referred to in this dissertation has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

Furthermore, this dissertation contains no materials previously written and/or published by another person, except where appropriate acknowledgment is made in the form of bibliographical reference, etc.

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Environmental goals have become mainstream policy tools in the global quest to address environmental challenges. Despite some progress, the realization of many of these goals remains out of reach (UN Environment 2019; Jabbour et al. 2012). Since improved implementation capacities have been linked to better environmental outcomes, the thesis aimed at exploring how capacities of national governments to implement environmental goals can be assessed. As countries are gearing up for realizing environmental SDGs, addressing implementation capacity gaps could contribute to progress towards these goals. The research hypothesizes that the assessment of implementation capacities of national governments can offer insights into how these capacities can be improved through the process of policy learning. Via studying goal formulation and implementation practices related to earlier international environmental goals, the research aimed at identifying key factors of implementation capacity and attached to them, a set of implementation capacity indicators, as potential elements of a composite implementation capacity index.

The identification of implementation capacity factors started with a document review of the MDG7 implementation experience of 20 Southeast Asian and Southeast European countries. As a next step, with the use of a questionnaire to over 100 policymakers and policy practitioners in the studied regions and an indicator development exercise, these factors were then condensed into 15 implementation capacity indicator clusters as potential elements of a composite implementation capacity index. At a more theoretical level, lessons have been gathered about how qualitative aspects of implementation capacities of governments can be measured more comprehensively and how the results of these assessments may be applied. The research found that consideration should be given to striking a balance between the complexity inherent in capacity issues, the need for robustness in how they are represented in assessments and their actual applicability in practice. It was also concluded that for the sake of transparency and for ensuring stronger ownership of indices and indicator sets, indicator selection and index design should involve intended future users throughout the development processes of such tools. While the research has put forward a methodology that could enhance policy learning for improving environmental goal implementation capacities, it has also identified applicability, utility and use of capacity indicators as topics worthy of further research.

Keywords: environmental goals, environmental policy implementation, state capacities, measuring state capacities, environmental governance indicators, environmental governance assessments

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Lastly, I would like to dedicate this thesis to the memory of my grandmother, whose passing in 2012 January inspired me to apply for the Ph.D. program at CEU and follow my dreams.

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List of Abbreviations

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
BiH	Bosnia and Herzegovina
CBD	Convention on Biological Diversity
CCAP	Climate Change Action Plan
CFC-11	Trichlorofluoromethane
DPSIR	Driving force-Pressure-State-Impact-Response
EC	European Commission
EC-JRC	European Commission Joint Research Centre
EIA	Environmental Impact Assessment
EPA	Environmental Performance Assessment
EPI	Environmental Performance Index
EPR	Environmental Performance Review
EPU	Economic Planning Unit
ESG	Earth System Governance theory
EU	European Union
GEF	Global Environment Facility
GEO	Global Environment Outlook
HDI	Human Development Index
IAEG-SDG	Inter-Agency and Expert Group on SDG Indicators
IBPES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IMF	International Monetary Fund
INDC	Intended Nationally Determined Contribution
IPCC	International Panel on Climate Change
JPoI	Johannesburg Plan of Implementation
LPI	Living Planet Index
MDGs	Millennium Development Goals
MEA	Multilateral Environmental Agreements
MoE	Ministry of Environment
MoEF	Ministry of Environment and Forestry
MoEU	Ministry of Environment and Urbanisation
MOEW	Ministry of Environment and Water
MoEFW	Ministry of Environment, Forestry and Water
MoFA	Ministry of Foreign Affairs
MoFTER	Ministry of Foreign Trade and Economic Relations
MoNRE	Ministry of Natural Resources and Environment
MoP	Ministry of Planning
MoSDT	Ministry of Sustainable Development and Tourism
NCSA	National Capacity Self-Assessment
NCSD	National Council on Sustainable Development
NDC	Nationally Determined contributions

NDP	National Development Plan
NDS	National Development Strategy
NGOs	Non-governmental organizations
ODS	Ozone Depleting Substances
OECD	Organization for Economic Co-operation and Development
OWG	Open Working Group
PSR	Pressure-State-Response model
SDGs	Sustainable Development Goals
SDI	sustainable development indicators
SDS	Sustainable Development Strategy
SEA	Strategic Environmental Assessment
SEEA	System of integrated Environmental-Economic Accounting
SOER	State of the Environment Reports
SSE	State Secretariat for Environment
STMI	Sustainability Transition Management Index
UN	United Nations
UNCSD	United Nations Conference on Sustainable Development
UNCT	United Nations Country Team
UNDESA	United Nations Department of Economic and Social Affairs
UNDG	United Nations Development Group
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UN ECOSOC	United Nations Economic and Social Commission
UNFCCC	United Nations Framework Convention on Climate Change
UN GA	United Nations General Assembly
UN SD	United Nations Statistics Division
VNR	Voluntary National Reviews
WHO	World Health Organization

"Indicators arise from values (we measure what we care about), and they create values (we care about what we measure). "

Donella Meadows 1998, viii

Chapter 1 Introduction

In the era of Anthropocene, with human activities putting increasingly critical pressures on global ecosystems and the carrying capacities of our Planet (Steffen et al. 2011; Rockström et al. 2009), the need for global environmental cooperation has been increasingly recognized and the importance of forming and implementing global environmental goals have gained considerable attention (Biermann et al. 2017; Fukuda-Parr 2016; Chasek et al. 2013). Over the past few decades, governments have negotiated and adopted various environmental goals under different international regimes and agreements to tackle global environmental issues, but despite some progress, the realization of many of these goals remains out of reach (UN Environment 2019; Jabbour et al. 2012).

1.1 Problem statement

Although the understanding of governance has been transforming from a traditional top-down definition towards more inclusive approaches (see e.g. Meuleman and Niestroy 2015) the role of nation states remains crucial in promoting better environmental performances of countries (see e.g. Chasek et al. 2016; Bernstein and Cashore 2015). This research understands governance as the *"totality of interactions, in which government, other public bodies, private sector and civil society participate, aiming at solving societal problems or creating societal opportunities*" (Meuleman 2008, 11) and recognizes that a variety of actors are involved in the interactions of environmental goal implementation processes, but focuses specifically on the role and the capacities of governments (Fukuyama 2013). State capacity, the ability of nations to implement goals and policies, has been recognized as an important aspect of governance and higher-level government abilities have been linked to better policy outcomes (Wu 2018; Savoia and Sen 2015). However, while state capacities have been subject to numerous conceptualizations, categorization and measurement efforts (Wu

et al. 2018), initiatives that aim to specifically assess environmental policy and goal implementation capacities at the national level are limited both in number and scope (Almassy and Pinter 2018). In order to reduce the gap between ambitions and actual achievements in the future, it is important to better understand how improved governance capacities can make national implementation of global environmental goals work and utilize these understandings during the implementation process of the environment-focused Sustainable Development Goals (SDGs).

1.2 Research contribution

As a contribution, my thesis aims to identify key implementation capacity aspects of international environmental goal setting and implementation at the national level and translate these factors into a set of implementation capacity indicators and investigate whether and how these indicators could eventually form a Sustainability Transition Management Index (STMI). The research hypothesizes that a methodologically robust implementation capacity indicator set (and eventually an index) can support the assessment of governments' capacities to formulate, implement and monitor global environmental goals and would be able facilitate high-level analysis and comparison of countries' readiness to implement environmental SDGs.

The research is built on similar efforts to better understand how qualitative capacities related to governance can be measured in a scientifically sound and objective manner (Holt and Manning 2014; Andrews 2014; Fukuyama 2013) and takes into consideration previous works that specifically aimed at assessing environmental governance. It also responds to a recent call from the Oxford Martin Commission for Future Generations *"to develop a Long-Term Impact Index, which would rate the effectiveness of leaders of countries, companies and international organizations in addressing longer-term challenges…(and) primarily assess processes and policies"* (Oxford Martin Commission for Future Generations 2013, 62). Since many of these aspects have a more qualitative character, the research also attempts to better understand whether and how qualitative aspects related to environmental goal implementation capacities can be measured in a scientifically sound and objective manner and how their assessment could promote institutional learning.

1.3 Structure of the thesis

The thesis consists of eight chapters. Chapter 2 provides an overview of the state-of-the art knowledge concerning the formulation, the implementation and the monitoring of global environmental goals at the national levels. Chapter 3 discusses the aims of the research, presents the research questions and the conceptual framework established to address the research questions. Chapter 4 details the research methodology, which includes (1) a document review to identify implementation capacity factors of environmental goals, (2) a questionnaire to prioritize those capacity factors, which may have crucial importance to influence environmental goal implementation and lastly (3) the development and the pilot testing of a set of implementation capacity indicators, which could potentially measure countries' capacities to progress towards environmental goals. Chapter 5, 6 and 7 presents the results of the document review, the questionnaire and the indicator development and testing process. It leads through the readers of the identification of 184 potentially relevant implementation capacity factors and explains how it was condensed into 15 implementation capacity indicators, which is proposed to formulate the STMI. Chapter 8 offers a discussion on the research process, its outcomes and their relevance and applicability to inform the implementation of the implementation of the environmental SDGs. Conclusions and future research directions are summarized in Chapter 9.

Chapter 2 Literature review

This chapter aims to provide an overview of the state-of-the-art literature on global environmental goal setting and goal implementation, as a policy tool of environmental governance. It discusses (i) how environmental goal-setting processes have evolved at the international level; (ii) how environmental goals were introduced to national policies and translated to national actions and (iii) how progress towards environmental goals is measured, with a special focus on governance and capacity aspects of environmental goal implementation efforts. The above listed three aspects are discussed in three separate subchapters.

2.1 Environmental goal-setting practices at the international level: from international environmental agreements to the environmental goals of the UN SDGs

In the last century, due to the increasing number of extreme weather events, loss of biodiversity, deforestation, rapid urbanization, the appearance of megacities, the reduction in renewable freshwater resources, sea-level elevation and other environmental problems (UN Environment 2019; Jabbour, et al. 2012), it has been increasingly recognized that most of the environmental issues cannot be solved by a country or region acting individually and global cooperation to tackle these issues is necessary (World Commission on Environment and Development, 1987; UN 1992; UN GA 2000; Rockström et al. 2009) . As part of these cooperation efforts, goal-setting practices started to appear to ensure improved performance and better accountability of the involved signatory countries because well-established and clearly defined goals, quantified targets and underlying indicators have been suggested to support and accelerate progress towards sustainable development by translating complex issues into simplified and quantified objectives (Biermann et al. 2017; Fukuda-Parr 2013; Merry 2011; Roberts 2005). This section provides a historical overview of environmental goal-setting processes as an emerging policy-tool in global environmental cooperation.

2.1.1 Environmental goals in international environmental cooperation

Scholars[1] date back the history of global environmental cooperation and thus goal-setting activities related to environmental protection to the beginning of the 20th century, when the first environmental treaty, the Convention for the Protection of Birds Useful to Agriculture, was signed in 1902 (Chasek et al. 2013). Although the first environmental conventions or Multilateral Environmental Agreements (MEAs), were established at the beginning of the 20th century, they began to gain importance only around the time of the foundation of United Nations Environment Programme (UNEP), in 1972 (Jabbour, et al. 2012; Kanie et al. 2012). The number of new agreements (including modifications and amendments) showed a sharp increase from the mid-1980s, peaking in the mid-1990s and constantly decreasing ever since, while the number of signatories to major agreements has started to rise from the early 1990s and continued to rise as the number of conventions started to decrease. (UNEP 2011). Today, there are several hundreds of multilateral environmental agreements (MEAs) in existence, which address different environmental issues and became an integral foundation of global environmental cooperation and governance (Kaine 2014; Mitchell 2002-2019). Some of these MEAs have gained worldwide recognition and have been signed by most or by the majority of countries. Selected MEAs with over 100 signatories are listed in Table 1.

Table 1: Selected multilateral environmental agreements with more than 100 signatory countries, in chronological order

Name	Date of entry into force	Number of signatories
Convention on International Trade in Endangered Species of Wild Fauna and Flora	01/07/1975	181
Convention on Wetlands of International Importance, Especially as Waterfowl Habitat	21/12/1975	161
Convention on the Conservation of Migratory Species of Wild Animals	01/11/1983	119
Vienna Convention on the Protection of the Ozone Layer	22/09/1988	197

[1] Scholars' definition of an international (environmental) regime varies considerably from broader approaches where regimes are considered as principle- norm- or rule-based international relationships to stricter definitions where regimes are exclusively based on international law and represent written and binding multilateral agreements on certain issues to regulate national actions (Aust 2010; Haggard and Simmons 1987; Young 1982). This review follows the latter definition.

Montreal Protocol on Substances that Deplete the Ozone Layer	01/01/1989	197
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	1992	175
Convention on Biological Diversity (CBD)	29/12/1993	193
United Nations Framework Convention on Climate Change (UNFCCC)	21/03/1994	195
United Nations Convention to Combat Desertification	26/12/1996	198
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	24/02/2004	155
Stockholm Convention on Persistent Organic Pollutants	17/05/2004	178
Kyoto Protocol to the UNFCCC	16/02/2005	192
Paris Agreement (replacing the Kyoto Protocol)	5/10/2016	185

Source: Based on UNEP 2011; Mitchell R. B. 2002-2019

While regime theories tend to consider states as unitary actors in the international arena and examine international environmental cooperation from a top-down approach, primarily established on the principles of compliance, in recent years, various environmental governance scholars have recognized that environmental cooperation processes should be considered as more dynamic, which are influenced by various national political and interest groups (Young 2013; Kaine et al. 2012; Haas 2009). As global environmental cooperation progressively became policy arenas for various governmental and non-governmental actors, environmental goal-setting processes have emerged as a policy tool to increase national ownership, transparency of implementation and accountability of the progress made (Young 2017; Biermann et al. E 2017; Campbell et al. 2014; Fukuda-Parr 2013).

In the case of the CBD and the UNFCCC, – which were both launched for adoption by countries at the 1992 Rio Earth Summit – more articulated environmental goals have been formulating over time, with the aim of increasing national ownership of the goals, improve implementation outcomes and support better accountability (Hagerman and Pelai 2016; Campbell et al. 2014; Harrop and Pritchard 2011). The 2011-2020 Strategic Plan of the CBD launched the Aichi targets, a comprehensive set of 5 goals and 20 targets, which served as a framework for signatory countries to set national targets in their respective national strategies (UNEP 2019a). Since their adoption, the goals and the targets have been translated into National Biodiversity Strategies and Action Plans, with the aim of integrating them into national biodiversity policies (UNEP 2019b;

UNEP 2018; Campbell et al. 2014). Similarly, the 2015 Paris Agreement of the UNFCCC - which as an overall goal, set to keep global temperature rise below 2 Celsius degree by the end of the 21st century - was the result of intense negotiations among signatory countries, was formulated with taking into account the interest of various country groups as well as non-governmental actors and its implementation is to be based on nationally determined contributions (NDCs) to the overall emission reduction efforts instead legally binding requirements (UNFCCC 2019; Morseletto et al. 2017; Pauw et al. 2017).

2.1.2 Environmental goals in the global development agenda: from the Millennium Development Goals to the Sustainable Development Goals

Parallel to the evolution of environmental regimes, in the 1990s, goal-setting practices also appeared in the broader global development agenda and as a result, the first global environmental goals have also been defined (Fukuda-Parr 2016;Hulme 2010).

In order to increase the effectiveness of development aids provided by high-income economies to the least developed and low-income countries, the high-level ministerial meeting of the Organisation of Economic Co-operation and Development (OECD) issued a document in 1996, titled as "*Shaping the 21st Century: The Contribution of Development Co-operation*", and presented a list of international development goals approved by the OECD countries (DAC 1996). The international development goals were structured around the three pillars of sustainable development, including economic, social and environmental sustainability. The economic and social pillars were underlined with exact targets to be reached by 2015, from the base year of 1990. The environmental targets were not specified but included references to global environmental conventions, which had already set relevant goals.

The idea of international development goals achieved considerable outreach and revived global goal-setting intentions of the United Nations (UN), resulting in the development of the so-called Millennium Development Goals (MDGs) of the UN Millennium Declaration in 2000 (Hulme 2009; Roberts 2005). The UN Millennium Declaration, which was unanimously approved by 191 member states of the UN during the UN Millennium Summit in September 2000 in New York, aimed to provide a comprehensive solution to the problems faced by poorer countries. In order to translate

the commitments of the Millennium Declaration, in 2001, a set of Millennium Development Goals (MDGs) were developed by the UN and the OECD and launched in September 2001 as an annex to the original declaration (UN GA 2000). The MDGs comprised eight goals, supported with underlying targets and concrete indicators, to be met by 2015. The goals targeted the eradication of extreme hunger and poverty, universal primary education, gender equality and the empowerment of women, the reduction of child mortality, improvements to maternal health, a reduction in HIV/AIDS, malaria and other diseases, environmental sustainability, and the establishment of a global partnership for development (UN GA 2000). Since the main aim of the MDGs was to reduce poverty in the developing world, only one goal was dedicated to environmental sustainability, with three underlying targets and altogether nine indicators (see Table 2). At the same time, in spite of its limited content, this mechanism offered a more systematic approach towards environmental problems as – in contrast with the earlier single-environmental regimes where goal setting took place – it regarded the environment in the context of sustainable development.

Table 2: Targets and indicators for MDG 7 (Ensuring Environmental Sustainability)

MDG targets	MDG7 Indicators	Related Protocol
7.A. Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources	7.1. Land area covered by forest	*CBD*
	7.2. CO2 emissions	*Kyoto Protocol*
	7.3. Consumption of ozone-depleting substances	*Montreal Protocol*
	7.4. Fish stocks within safe biological limits	*CBD*
	7.5. Total water resources used	*n.a.*
7.B. To reduce biodiversity loss	7.6. Terrestrial and marine areas protected	*CBD*
	7.7. Species threatened with extinction	*CBD*
7.C. Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation	7.8. Population using an improved drinking water source	*n.a.*
	7.9. Proportion of population using an improved sanitation facility	*n.a.*
7.D. By 2020 achieve a significant improvement in the lives of at least 100 million slum dwellers	7.10. Proportion of urban population living in slums	*n.a.*

Source: Based on UN 2015 and UN GA 2001, p56-58

While not all MDG targets were met by 2015 (UN 2015) and the scale of progress reached on the various targets varied (Fukuda-Parr 2013; Friedman 2013), there was a

general consensus that the MDGs have been successful in drawing attention among policy- and decision-makers to crucial issues related to human development (Sachs 2015; Van Norren 2012; Hulme 2009). Acclaimed success factors included a rather high-level political commitment regarding the MDGs, the establishment of an action-oriented framework for reducing poverty, and the development of a monitoring and accountability via the conceptualization of goals by underlying quantified targets and measurable indicators. At the same time, many critics suggested that the design and content of the MDGs to be seriously flawed and incomplete due to the rather exclusive nature of the conceptualization process, the limited content, the limited considerations of the interlinkages and synergies among the defined goals and targets as well as the top-down, donor-driven implementation and monitoring activities without thorough consideration of national contexts and needs (Fehling et al. 2013; Van Norren 2012; Waage et al. 2010).

At the Rio+20 UN Conference on Sustainable Development (UNCSD) in 2012, a process was launched for developing a new set of goals – called the Sustainable Development Goals – to take the place of the MDGs after their expiration. In the outcome document of the summit, "The future we want" (UN GA 2012) 26 priority areas were identified, with a greater balance between economic, environmental and social dimensions, and the main principles for the development process were set. Member states also agreed that the SDG framework should be based on the MDGs and should be in line with the Rio Principles, Agenda 21 and the Johannesburg Plan of Implementation (JPoI), as well as other international commitments. It was also agreed that the developed goals should be aspirational, action-oriented, concise, easy to communicate, limited in number, global in nature and universally applicable, whilst reflecting national differences (UN GA 2012).

Since one of the major critiques against the MDGs was the absence of a transparent, open consultation process, steps were taken to secure greater participation of different organizations and interest groups in the formulation of the Post-2015 Development Agenda (Ivanova 2013; Bates-eamer et al. 2013). The High-Level Panel of Eminent Persons on the post-2015 Development Agenda and the UN System Task Team on the Post-2015 UN Development Agenda were both established by the UN secretary general in 2012 — first with the aim of fostering a common vision of and providing

recommendations for the development process and also to contribute with technical and analytical inputs, for example, to the establishment of a global partnership and monitoring possibilities for targets (UN 2018). To ensure the involvement of a wider range of stakeholder groups in the formulation of the development agenda, national and global consultations were also launched by the UN (UNDG 2016). Lastly, to create a member state-driven process, an Open Working Group (OWG) was mandated at the Rio+20 UNCSD to lead the consultations on SDGs (Chasek et al. 2016; UN GA 2012). The 30-member working group was established in January 2013 and held 13 thematic sessions over the course of 2013 and 2014 and submitted a proposal to the 68th session of the UN General Assembly (UN GA) in July 2015 (UN 2018).

In September 2015, 193 UN member states adopted the Post-2015 Development Agenda, including 17 Sustainable Development Goals (SDGs) with 169 targets (UN GA 2015). Building on the MDG experience, the SDGs were developed and adopted via a participatory consultation process; built on national needs and experiences; covered a wider-range of issues, from goals aiming to support human development and well-being, production and delivery of services as well as environmental sustainability and offered a more integrated and systematic approach towards sustainability challenges by considering the various interlinkages between the goals and their targets (Vandermoortele 2018; Constanza et al. 2016; Chasek et al. 2016; Nilsson et al. 2016; Le Blanc 2015).

Compared to the MDGs, environmental sustainability objectives appears more strongly: environment-focused goals include the SDG 13 (to take urgent action to combat climate change and its impacts), SDG 14 (conserve and sustainably use the oceans, seas and marine resources) and SDG 15 (to sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss). Moreover, several other goals, such as SDG 2 (Zero Hunger) SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and clean energy), SDG 11 (Sustainable Cities and Communities) and SDG 12 (Sustainable Consumption and Production) also contains environment-related targets (UN GA 2015). Table 3 offers a comparative assessment of the development approach of the MDGs and the SDGs.

Table 3: A comparative analysis of the MDGs and the SDGs

	MDGs	SDGs
Scope	Developing countries	Universally applicable
Goals	8 Goals, 18 targets	17 Goals, 169 targets
Development process	Top-down expert led	Inclusive, participatory
Integration	Limited integration, with conflicts between goals	Stronger focus on integration
Complexity	Communicable, succinct	Complex
Environment	Environment as only one goal	Environment integrated strongly across the SDGs
Suggested implementation process	Donor funded (0,7% of GNI of developed countries)	Member-state led, with the harmonization of national development objectives

Sources: Based on Vandermoortele 2018; Constanza et al. 2016; Chasek et al. 2016; Nilsson, Griggs and Visbeck 2016, Le Blanc 2015; Sachs 2015; Fehling et al. 2013; Van Norren 2012; Hulme 2009

Although the extensive coverage of development issues offers an unprecedented opportunity for addressing sustainability challenges in a comprehensive manner, scholars outlined a range of potential challenges that can hamper the progress on SDGs. These include the need for taking a systemic approach towards the implementation of the goals, addressing the interlinkages among them and ensuring policy coherence with the support of evidence-based policy-making (Nilsson et al. 2016; Constanza, et al. 2016; Le Blanc 2015); the establishment of national ownership and the building-up and strengthening of national capacities for implementation (Vandemoortele 2018; Allen et al. 2018; Elder et al. 2016), and the introduction of innovative measures and monitoring practices to assess progress towards goals and targets (Vandemoortele 2018; Reyers et al. 2017; Constanza, et al. 2016; Lu et al. 2015).

2.2 Environmental goal setting and implementation as an element of domestic public policies

As shown in chapter 2.1, environmental goal setting has become an increasingly widespread policy tool in the quest for addressing global environmental challenges. In relation to global goals and beyond, environmental goal and target-setting practices have also appeared in national policy planning (Biermann et al. 2017; Steurer and Hametner 2013; Edvardsson 2007). Although non-state actors have gained considerable influence on international environmental cooperation, nation states have remained major actors in formulating environmental policies and thus environmental goals (Chasek et al. 2016; Kanie 2012; Hulme 2009). Governments can set the direction

for negotiating global goals; contextualize, support or reject certain objectives and their underlying targets or the implementation of certain processes, organize and oversee national implementation activities (Wirth 2017; Chasek et al. 2016). This section discusses the role of nation states in global environmental goal and target-setting and provides a review of the state-of-the-art knowledge of national-level implementation experience.

2.2.1 Lessons learnt from international environmental agreements

A vast body of literature has been dedicated to researching the formation, implementation and effectiveness of MEAs (e.g. see Scott 2018; Young 2013; Underdal 2013; Mitchell 2003). Since this study primarily focuses on the national implementation of global environmental goals, this review of literature does not discuss in detail the establishment, the procedures, the dynamics or the effectiveness international environmental agreements. Instead it considers global environmental politics as an arena for countries that can influence and legitimize national policies and actions to tackle environmental problems (Tompkins and Amundsen 2008).

It has emerged from the studied literature that although environmental agreements have been successful in attracting and scaling-up global efforts for solving transnational environmental problems, implementation has often turned out to be challenging and progress remained slow (Howes et al. 2017; UNEP 2012b; UNEP 2019b). MEAs, as a set of principles, norms or rules, are developed during multiparty negotiation processes to guide/regulate national actions on environmental issues (Pisupati 2016). In theory, successful multilateral environmental agreements (MEAs) are considered to be dependent both on the overall design of the regime and the effectiveness of implementation, enforcement and monitoring mechanisms and research also suggested that effective MEAs also need to consider the connections between the environmental problems that the treaties attempt to tackle, economic and political systems as well as societal values (Young 2013; Chasek et al. 2013; Mitchell 2003).

In practice, however, even comprehensively designed MEA frameworks have often turned out the be insufficient. The Montreal Protocol that came into force in 1989 has long been considered a success, with outcomes resulting in an almost full phase-out of

ozone-depleting substances (ODSs) through the creation of an international regulatory framework and the establishment of a global partnership for implementation (UN 2015; Young 2010). Research suggested that the success of the Montreal Protocol lied in the relative simplicity of the addresses environmental problem, the strong scientific evidence; the availability of alternative technologies and the high-level involvement of scientist, governments and businesses in the process (Chasek et al. 2013; UNDG 2010). However, more recent evidence has found that starting from 2013, enforcement and monitoring activities overlooked unreported trichlorofluoromethane (CFC-11) production in China, and as a result the concertation of ODS in the air is still increasing (Rigby et al. 2019; Montzka et al. 2018). The implementation of the Kyoto Protocol of the UNFCCC that entered into force in 2005, has proven to be even a far greater challenge. In comparison to the Montreal Protocol, the Kyoto Protocol aimed to address a more complex issue, where the scientific evidence for climate change was more intensively contested, and alternatives to fossil fuels are less available and less cost-effective (IPCC 2014; Young 2010). Capacity challenges were also recognized as a major barrier to successful implementation (Mitchell 2003). According to national capacity assessments, the most frequently faced implementation challenges included incapacities to develop comprehensive legislative frameworks, the creation of a consistent institutional framework and organizational capacities, progress monitoring and stakeholder awareness-raising and education (Bellamy and Hill 2010).

Research also suggested that fragmentation of MEAs also has an unfavorable effect on the outcomes of such treaties (Bernstein and Cashore 2012; Haas 2009; Biermann et al. 2009). As most treaties were created to address specific environmental issues, international environmental agreements were designed to be operated separately by secretariats or international institutions and thus providing them with limited opportunities to address environmental issues in an integrated manner (Gomar et al. 2014; Kanie et al. 2012). To foster policy integration, proposed solutions included the mainstreaming of MEAs into regional and national policies, national-level coordination among the different MEAs and the organization of multilateral environmental agreements into thematic clusters that are administered through joint secretariats (Bizikova et al. 2016; Gomar 2016; UNEP 2011).

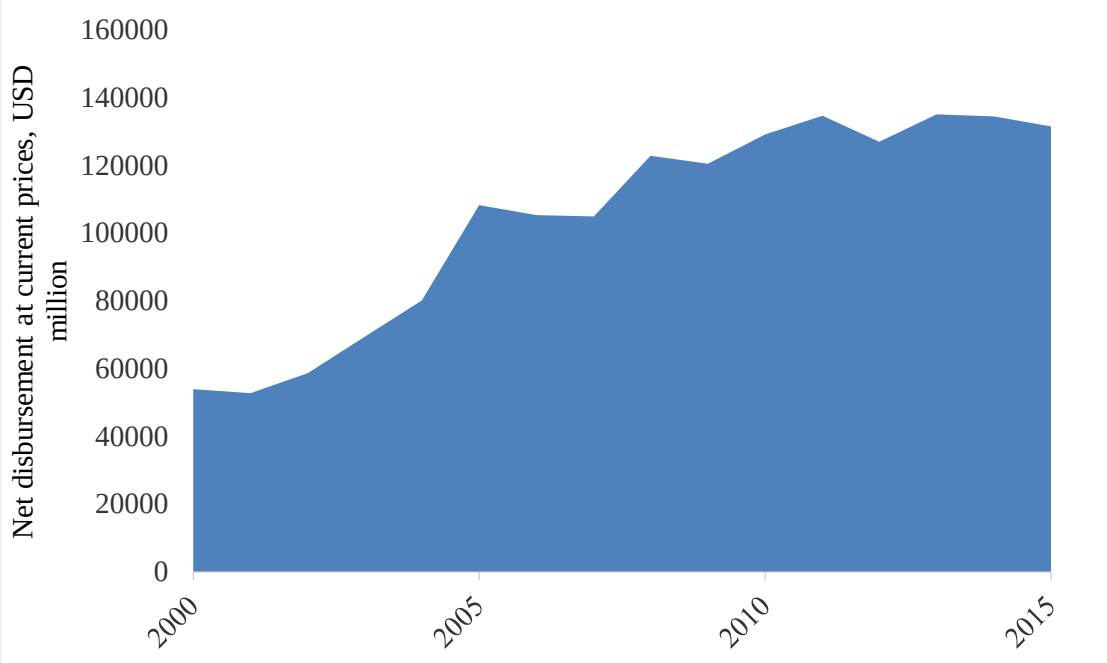
To promote better implementation outcomes, two emerging trends could be observed (1)a more systematic integration of environmental issues into the global development agenda via goals, quantifiable targets and measurable indicators (Biermann et al. 2017; Bernstein and Cashore 2015) and (2)the mainstreaming of environmental goals into national policies and the strengthening of national capacities, emphasizing ownership and transparency over compliance (Bizikova et al. 2016; Gomar 2016). Recent environmental goal-setting approaches are also designed along these ideas. The 2030 Agenda for Sustainable Development embedded the outcomes of the Paris Agreement in the SDG framework by acknowledging the UNFCCC as the primary forum responsible for climate change issues and the Paris Agreement itself relies on national commitments and actions – the so-called intended nationally determined contributions (INDC) – to implement its agreed goals (Wirth 2017; UNFCCC 2019).

Building on this last point, section 2.2.2 presents an overview on how environmental goal setting and implementation efforts evolved at the national level with the adoption of the Millennium Development Goals, particularly concerning the environmental sustainability targets under Goal 7 as well as discusses in section 2.2.3 the implementation efforts of environment-related SDGs identified to date and underlying challenges.

2.2.2 Implementation of the environmental MDG (MDG7)

After signing the Millennium Declaration in 2000 and conceptualizing the MDGs in 2001, the UN needed to ensure that the goals would not merely remain commitments but would actually be targeted and achieved (Hulme 2009).

At first, in 2002, the OECD heads of states and governments committed to increase official development assistance (ODA) to 0,7% of their Gross National Income (GNI), by signing the Monterrey Consensus (UN 2003). Although, as a result, there was a considerable increase in the provided ODA funds, most countries have not reached to provide 0,7% of their GNI by the end of the MDG implementation period (OECD 2019). See Figure 1.



Data source: OECD 2019

Figure 1: ODA flows to developing countries 2000-2014. Net disbursement at current prices, USD million.

As a major step in implementation, at the 2005 World Summit it was agreed that every country would *"adopt, by 2006, and implement comprehensive national development strategies to achieve the internationally agreed development goals and objectives, including the Millennium Development Goals"* (UN GA 2005, 4). Countries were also set to regularly collect data and report about the progress towards the set targets and indicators (UN GA 2001). The idea of integrating social and environmental issues into national development frameworks proved to be a successful means of gaining an understanding of and addressing sustainability challenges: by 2010, more than 100 countries reported the adoption of sustainable development or similar strategies (such as poverty reduction or green economy development) or the integration of the principles of sustainable development into existing development plans (UN DESA 2010; Meadowcroft 2007). At the same time, with a few exceptions, the MDGs were not typically integrated systematically in these plans.

Countries were also set to regularly collect data and report about progress towards the MDG targets and indicators (UN GA 2001). Coordinated by the UN Statistics Division (UN SD) and involving various other institutions of the UN, national government agencies and other stakeholders, an Inter-Agency and Expert Group (IAEG) was

established and assigned with the technical support to national monitoring as well as global-level data collection and progress monitoring (UN SD 2015). Available country-level data, as well as regional and global trend analyses were presented on the official UN website for MDG indicators (www.mdgs.un.org). During the course of the implementation period, most MDG countries prepared 2-3 implementation reports (UNDP 2019). Although MDG monitoring activities have contributed to the improvement of national monitoring processes in many countries, the overall reporting processes often continued to rely on extensive support from the UN country teams (UN CT). Besides national reports, regional reports were also prepared by regional UN offices. The IAEG also published annual reports on global MDG development trends after 2005 (UN 2015).

As an additional framework for international support, the UN Millennium project was launched in 2005, with the aim of developing concrete action plans for the successful implementation of the MDGs (Millennium Villages Projects 2014). In 2010, MDG Acceleration Frameworks were also launched in more than 50 MDG countries by the UN Development Programme (UNDP), in order to support the identification of implementation gaps and scale-up progress towards the targets set (UNDP 2015).

Translating the MDGs into national targets and implementation actions however raised various problems related to the conceptualization of the goals and the interpretation of the targets, policy formulation, the actual implementation of the polices as well as progress monitoring (see Seyedsayamdost 2018, Fukuda-Parr 2016; Fehling et al. 2013; UNDP 2010; Hulme 2010, Alarcon 2003). Table 4 presents the strengths and weaknesses of the MDGs and potential lessons learnt for the SDGs.

Table 4: Strengths and weaknesses of the MDG process and lessons learnt for SDGs

Policy Stages	Strengths	Weaknesses	Lessons learnt for the SDG process
Conceptual-isation	**Focus:** a set of globally important issues related to human development	**Conceptual Framework:** None **Target group**: Focus only on developing countries	To aim for an integrated sustainable development framework To target all countries

Formulation	**Signatories:** All nations	**Development process:** Donor-based, UN-led **Goals:** without proper linkages to country level targets	To aim for a member-state led, participatory development process To develop global and universally applicable goals, but also reflect national differences
Implemen-tation	**Main implementation mechanism:** National Sustainable Development Strategies or similar	**Coordination:** Lack of national ownership **Main tools:** Development aids, often based on donors' agendas	To introduce a global governance mechanism To reconceptualize national institutions and mobilize domestic funding for implementation To use development aids for the poor countries
Monitoring	**Monitoring mechanism:** Regular collection of statistical data at the national level. IAEG collecting, analyzing and reporting global data.	**Monitoring system:** Gaps in the data collection and monitoring infrastructures	To measure all three aspects of sustainability To develop indicators which are measurable in a time and cost-efficient way

Source: Based on Seyedsayamdost 2018, Fukuda-Parr 2016; Fehling et al. 2013; UNDP 2010; Hulme 2010, Alarcon 2003

Although by 2015, considerable progress has been made towards the achievement of many of the MDG targets, - including those set for the reduction of extreme poverty, undernourishment, communicable diseases, maternal and child mortality - many of others remained unachieved and none of the environmental sustainability targets were achieved in all regions of the world by 2015 (Pinter et al. 2015; UN 2015). With regard to Target 1 (or Target A and B) of MDG7, which included forest area, protected area coverage, energy use and carbon dioxide emission indicators, global trends of deforestation, biodiversity losses and rising emissions level indicate that they have not been improved sufficiently to tackle environmental degradation (Pinter et al. 2015; Shindell 2015; UN 2015). Under Target 2 (or Target C), the global target for drinking water was met before 2015, but the target for ensuring access to improved sanitation facilities had not been achieved (Satterthwaite 2015). Some progress was also achieved in Target 3 (or Target D) and the MDG target for improving the circumstances of slum dwellers was improved in many regions. Moreover, the global progress was often uneven, with some regions considerably lagging behind (UN 2015). Table 5 reflects

progress towards the achievement of MDG 7 target 2 and 3[2] and shows a mixed picture with respect to progress.

Table 5: Regional progress towards the three targets of MDG 7 under

	Northern Africa	Sub-Saharan Africa	Eastern Asia	South-Eastern Asia	Southern Asia	Western Asia	Oceania	Latin America and the	Caucasus and Central Asia
Halve proportion of population without improved drinking water									
Halve proportion of population without sanitation									
Improve the lives of slum dwellers									

Green represents targets that have been achieved by 2015.
Yellow represents those targets where insufficient progress has been achieved by the region.
Red shows where little or no progress has been achieved, or where deterioration has been observed. Grey fields indicate no available data.
Source: Based on UN 2015

Although the MDGs were successful in raising public and political attention towards global development problems and they were rather well-mainstreamed into national policy documents, implementation activities were not necessarily aligned with the political ambitions (Seyedsayamdost 2018). This was especially the case for the MDG7 targets, as the framing of environmental sustainability considerations was rather limited, not well-connected to economic and social development issues and many of the targets were not quantified or supported by indicators (Hezri 2013; Castello et al. 2009). With regard to the achievement of environmental sustainability targets, the MDG countries have also reported various difficulties, which can be grouped into four categories:

1. external factors, beyond the control of the implementing countries: such as climate change, urbanization or economic crises.
2. conceptualization problems, such as the limited array of environmental issues considered by the MDGs as well as the lack of understanding of the

[2]The original "target 2" was often referred as "target C" and the original "target 3" as "target D".

interconnectedness among various environmental problems and their linkages to social and economic issues (poverty, gender equality or health).

3. limited implementation capacities, including political commitment, institutional capacities, lack of sufficient financing and
4. challenges related to data collection and monitoring (UNEP 2013; UNDG 2010; UNDP 2010).

2.2.3 Lessons learnt for the implementation of the SDGs

The implementation process for the SDGs was planned to be built on strong national commitments, ownership and thus, nationally led implementation and monitoring activities. In order to ensure commitment and national ownership, from the beginning of the SDG development process, UN member countries were driving the process via the OWG (UN GA 2012) and the 2030 Agenda for Sustainable Development was built on the principles of universality, interconnectedness, stakeholder involvement and accountability (UN GA 2015). Moreover, to support implementation, SDG 17 meant to provide further guidance regarding the means of implementation, including financing, technology transfer, capacity-building, trade, institutional coordination, stakeholder partnerships and monitoring (UN GA 2015).

To operationalize these key principles, UN member states were foreseen to translate the SDGs into national strategies and plans; to ensure their implementation via various line ministries, at different levels of governances and with the broad engagement of business, civil society and academic stakeholders as well as to monitor and regularly report on national progress towards implementation (UNDG 2017). With regard to the planning for implementation, in their first voluntary national reviews (VNR), countries reported to have launched processes to establish an institutional framework for SDG implementation, involving various stakeholders in the process. Many countries also launched activities to assess the baseline situation regarding the targets of the SDGs and their linkages to existing national development strategies and update the relevant national policies, strategies and action plans to better reflect the nationally relevant targets (High-Level Political Forum on Sustainable Development 2016-2018; Allen et al. 2018). Furthermore, countries reported various efforts to allocate or attract financial resources for implementation and to establish a progress monitoring system towards

SDG implementation (High-Level Political Forum on Sustainable Development 2016-2018).

While some of the weaknesses of the MDGs have been addressed during the SDG development process as shown in section 2.1.2, but due to the complexity of the goals and the high number of targets and indicators, countries will need to approach implementation in an integrated manner, identify interlinkages and prioritize implementation actions that can accelerate progress in more than one areas (Allen et al 2018; Boas et al. 2016; Le Blanc 2015). Challenges of progress measurement and monitoring were also outlined, including the need for better metrics, progressive data collection approaches, capacity-building for monitoring and the effective use of collected data for progress monitoring (Pinter et al. 2017; Constanza, et al. 2016; Lu et al. 2015). In line with these findings, the VNR submissions also suggested that countries need additional efforts to improve integrated planning activities, encourage multi-partnership stakeholder engagements and enhance monitoring and policy evaluation capacities (High-Level Political Forum on Sustainable Development 2016-2018).

Among the SDGs, special attention needs to be paid to the implementation of the environmental goals. Not only because there is a major gap between the ambitions set by the SDGs and the current (negative) environmental trends (UN Environment 2019) but also because the knowledge about environmental goal and policy implementation is less well-established and mostly restricted to the assessment of individual cases as opposed to systematic reviews (Bondarouk and Mastenbroek 2018; Howes , et al. 2017; Castello et al. 2009). For example, in 2009, a systematic review (Castello et al. 2009) could only identify six scientific articles that studied the implementation of MDG7. A broader-focused, but more recent systematic literature review (Howes et al. 2017) resulted in the scoping of only 94 research articles discussing environmental policy implementation challenges, but the vast majority of these articles concerned the analysis of individual cases.

The recently published Global Environment Outlook 6 (UN Environment 2019) suggested that besides ensuring policy coherence and engaging key stakeholders in implementation, an important aspect to improve environmental outcomes is to embed

assessment and evaluation throughout the policy implementation cycles: starting from understanding the baseline situation, via cost-benefit assessments during policy design, to progress monitoring and ex-post implementation assessments of policies (ibid. 457). Other reviews, such as the first Environmental implementation review of the European Commission (EC), that assessed the implementation of various EU environmental regulations and policies (EC 2017) and a review of progress towards land-related MDG 7 targets (Pinter et al. 2015b) suggested that common implementation problems include limited institutional and policy coherence, lack of technical and financial capacities and insufficient monitoring mechanisms. Howes et al. (2017) reviewed specific case studies discussing environmental policy failures and suggested that environmental policies fail due to a *"a complex set of interrelated structural causes, implementation traps and knowledge/scoping issues"* (ibid., 5), where under "*knowledge/scoping*" (ibid., 6), the lack of monitoring was a factor mentioned by over a dozens of studies.

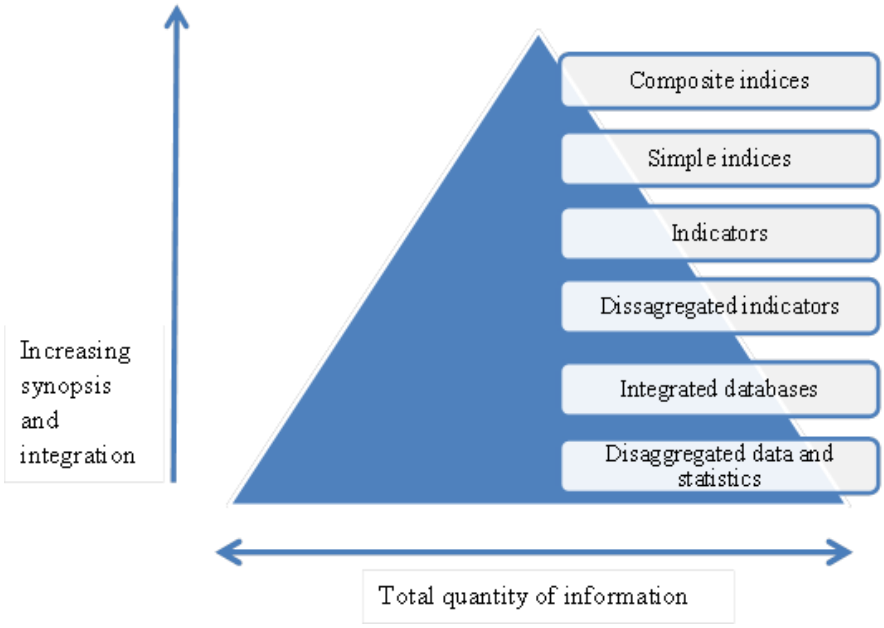
Considering the importance of monitoring to ensure progress towards environmental sustainability and the need for more systematic policy evaluations, the next section will discuss monitoring practices of environmental goals and how progress evaluation can support learning for better implementation outcomes.

2.3 Monitoring practices of environmental goals

Due to the rapid developments in information technology, the increasing availability of data, and the demand for synthesized information, attention to statistical indicators has seen marked growth over the last decades (Stiglitz, Sen and Fitoussi 2009).

Statistical indicators are defined as *"data elements that represent statistical data for a specified time, place and other characteristics"* (UN Statistical Commission and Economic Commission for Europe 2000, 30). The type of information provided by statistical indicators can vary from very general, more qualitative information to precise, quantified, time-bound data. As shown in Figure 2, the more aggregated the information, the smaller the quantity and the fewer the details. This also means that more detailed data enable the more precise assessment and monitoring of performance, but at the same time, more aggregated data can provide a more aggregated picture of a

given environmental issue in the context of sustainable development (Pinter et al. 2000).



Source: Pinter et al. 2000

Figure 2: Relationship between data, indicators and indices

Indicators can be categorized in multiple ways: based on their themes, whether they are quantitative/objective or qualitative/subjective measures or whether they focus on inputs/performances or outputs/outcomes and impacts. They can also serve various purposes by *"expanding, correcting, and integrating worldviews"* (Meadows 1998, 9). Within the context of sustainable development, the primary aim of developing and analyzing indicators is to develop and to create knowledge and to inform and support policy or decision-making processes (Merry 2011; Boulanger 2008; Hezri and Dovers 2006). Focusing on the latter, the next section provides an overview of the sustainable development indicators scene and discusses their use of indicators in environmental goal setting and implementation processes.

2.3.1 Sustainable development indicators – In the service of policymaking and implementation

Since the concept of sustainable development appeared in the early 1990s, several indicator frameworks were developed to support progress monitoring (Dizdaroglu 2017; Pinter et al. 2017; Geniaux 2009). An early framework, which was originally developed at Statistics Canada and then taken over by the OECD is the so-called

pressure-state-response (PSR) model and its later variations — the driving force-state-response (DSR) and the driving force-pressure-state-impact-response (DPSIR) model (Carr et al. 2007; OECD 1994; Smeets and Weterings 1999). Frameworks were also developed based on themes/issues; capital or well-being considerations (Pinter, Hardi and Bartelemus 2005). The capital-based approach was advanced by the World Bank to assess four basic types of resources (economic, natural, human and social capital) based on the question of whether or not a country's national wealth is sustainable (UNECE 2009; World Bank 2009b). Centering around the concept of human and ecosystem well-being and taking the capital-based approach further, the Balaton Group suggested a system-thinking approach that combines the four different types of basic capital with Herman Daly's approach to well-being, differentiating its ultimate ends and means (Meadows 1998; Daly 1973). Other notable examples of statistical frameworks relevant for sustainable development include the System of integrated Environmental-Economic Accounting (SEEA), that offers a standardized methodology for the monetization of natural and land resources (UN 2014) and the logical-based framework, which is mostly used in planning and management and assesses policy and goal implementation along an input/process-output-outcome-impact chain (Eurostat 2014b).

Building on one of the above frameworks, various sustainable development indicator (SDI) sets have been introduced at the global and also at the national- (or sub-national and city) level since the mid-1990s. Agenda 21, the outcome document of the 1992 UN Conference on Environment and Development in Rio de Janeiro requested the development of an information base on sustainable development to support decision- and policymakers and the creation of indicators for measuring progress towards sustainable development (UN 1992b). Inspired by on-going efforts,[3] the UN Commission on Sustainable Development (UNCSD), in cooperation with the UN SD, created the first set of SDIs in 1995, which was then revised in 2001 and then in 2006 after testing and applying it in numerous countries (UN DESA 2007). The final set was published in 2007, with the originally DPSR framework changed to a theme-based

[3] Such as the OECD work on environmental indicators, which had started in 1989.

framework and including 14 themes[4] and a core set of 50 indicators - based on their relevance and data availability and in line with the JPoI as well as the main MDG themes. (Dahl 2018; UN DESA 2017).

Besides and parallel with the UN's indicator development efforts, various additional sustainable development indicator sets were launched by other international organizations. Examples include the indicator set of the Statistical Agency of the European Union (EU) to monitor progress towards the sustainable development strategy of the EU (Eurostat 2011); the OECD-developed environmental (OECD 2001) and well-being indicator sets (www.oecdbetterlifeindex.org). National-level government bodies and statistical agencies also developed SDI sets for country-level use (Adella and Pallemaerts 2009; IISD 2004). Some notable national indicator initiatives include a set of Sustainable Development Indicators for Sweden (Ministry of the Environment 2001), for France (Ministry of Ecology, Energy and Sustainable Development 2010) or for Finland (Ministry of the Environment 2003); the Environment and Sustainable Development Indicators for Canada (National Round Table on the Environment and the Economy 2003); and the Gross National Happiness Index of Bhutan (Alkire 2013). Recognizing the importance of taking local circumstances into consideration, numerous regional governments and municipalities have also attempted to introduce their own sets (Cohen 2017; Dizdaroglu 2017). Additionally, in order to provide concise and easily understandable information to policy-makers and to the general public, research institutions and non-governmental organizations (NGOs) also developed their own indicator sets (EC 2019), such as the Environmental Performance Index of the University of Yale and Columbia, the Ecological Footprint of the Global Footprint Network (Wackernagel et al. 2018) or the Dashboard of Sustainability from the Consultative Group on Sustainable Development Indices (Jesinghaus 2018).

The SDI development efforts also lead to the launch of the "beyond GDP" movement, which aims to develop concise indicators or indices to measure progress beyond material well-being and economic development. With the involvement of Joseph

[4] Including poverty, governance, health, education, demographics, natural hazards, atmosphere, land, oceans, seas and coasts, freshwater, biodiversity, economic development, global economic partnership and consumption and production patterns.

Stiglitz, Jean-Paul Fitoussi and Amartya Sen, the International Commission on the Measurement of Economic Performance and Social Progress, published its influential report on the limitations of the GDP measures and assessed the potentials alternative measures to account for human well-being (Stiglitz et al. 2009). The findings of the report inspired the creation of various alternative progress measurement initiatives, such as the Better Life Index of OECD, as well as the launch of a series of global summits on progress measurement (OECD 2019).

Many of the SDI sets are presented in the form of indices (or composite indicators), which are formed by grouping indicators for the purposes of characterizing a multidimensional issue, such as sustainable development (Nardo, et al. 2008). Well-known composite indicators include:

- the **Human Development Index (HDI) of UNDP**, which was launched in 1990 to measure progress towards the ultimate ends of human well-being, such as health and education based on the theory of Amartya Sen about human capabilities (Stanton 2007). Published annually since 1990, the HDI was assessed (in 2017) for 189 countries and categorized countries into four main human development categories (UNDP 2018);
- the **Environmental Performance Index (EPI)**, which was developed by the University of Yale and Columbia in 2005 and which measures environmental health and ecosystem vitality with 25 indicators (Hsu et al. 2016). The latest 2018 edition of the index assessed and ranked 180 countries (Yale Center for Environmental Law and Policy 2018);
- the **Ecological Footprint**, which attempts to account for all human demands for natural resources by comparing the pressure of human consumption on land resources to the carrying capacity of the Earth (Wackernagel et al. 2018).
- the **Living Planet Index (LPI),** an initiative of WWF which assesses the state of the world's biodiversity based on 4005 species (WWF 2018). The Index was also adopted as one of the indicators to monitor the progress towards the implementation of the 2020 Aichi targets of the CBD (CBD 2016).

Indices or composite indicators usually attract attention when policy-makers demand simplified information about the overall state and performance of complex fields of

socio-economic development or environmental protection (Becker et al. 2017; Sebastien and Bauler 2013) but composite indicators can also facilitate the comparison of individual elements (such as countries' performances) to a certain benchmark or to each other (Pinter et al. 2000). Besides benefits, composite indicators also have various limitations. Table 6 summarizes the advantages and limitations of composite indicators, organized around two main aspects (methodology and application).

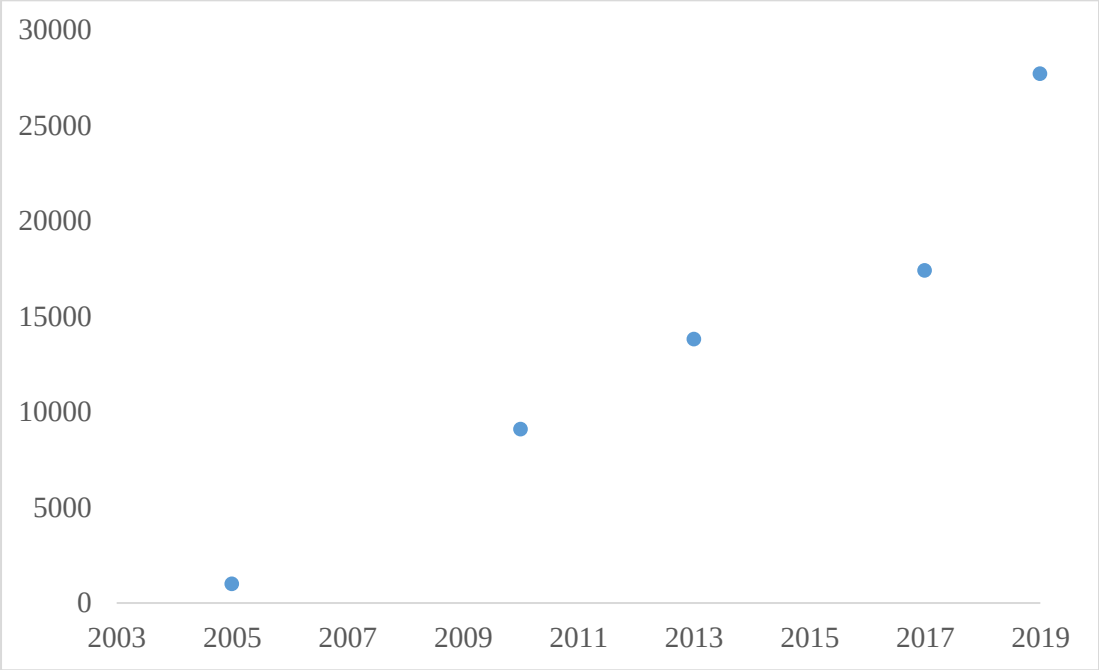
Table 6: Advantages and disadvantages of composite indicators, according to the reviewed literature

Advantages	Limitations
Methodology	
By reducing the number of visible indicators, more data can be summarized into one (or few) aggregated score(s).	Need for precise sensitivity analysis for methodological soundness. Need for sufficient transparency during the construction process (framework, indicators, weights etc.), to avoid arbitrary choices. Need for more data, which may not be readily available.
Application purposes	
Effective comparison of complex issues. Holistic evaluation of country progress on certain issues. Promotion of accountability by attracting media interest and policy makers' attention as results. Easier interpretation (compared to single indicators). Complex information for decision makers is summarized in a realistic but meaningful way. Facilitated provision of information to the public.	If composite indicators disguise the strengths and weaknesses of sub-dimensions, the holistic picture provided can be misinterpreted. If the sub-dimensions of the composite indicators are not considered, there is a risk of failure to identify specific policy solutions. The results may be oversimplified and lead to misinterpretation or misuse.

Source: Based on Greco et al. 2017; Paruolo 2013; Nardo et al. 2008; Sharpe 2004

Interest in creating and applying composite indicators to measure progress towards sustainable development in the last two decades (Greco et al. 2018). In his opening speech at the "Beyond GDP" conference in November 2007, José Manuel Barroso underlined the growing gap between available data stocks and the tools to interpret and apply them in relation to policies focusing on the sustainability of societies, economies and the planet (Beyond GDP Conference Proceedings 2007) and the ninth recommendation of the Stiglitz report also emphasized the need for the provision or development of indicators and criteria that can characterize the different dimensions of

sustainable development and enable the construction of composite indicators (Stiglitz et al. 2009). A review of existing sets carried out in 2008 has identified 178 indices (Bandura 2008) and the number of search results in Google scholar for the term "composite indicator" have been exponentially growing since 2005 (Paruolo et al. 2013): from 992 in 2005 to 9600 in 2010 and to 27700 in 2019. See Figure 3.



Data source: Paruolo et al. 2013 and Google Scholar

Figure 3: Increase in the term "composite indicators" found by Google Scholar between 2005 and 2016

The above efforts resulted in a variety of indicator sets and index initiatives, however in many cases these initiatives have remained one-off attempts and have not became part of regular monitoring activities. Various issues were also raised in connection to indicator development and use for measuring progress towards sustainable development. These includes the need for standardized sustainable development indicator sets along with the need for adjusting standard indicators to the specific local contexts; the importance of defining quantitative targets for the problems examined by the indicators; the need for participatory processes in indicator development; the rationales around (not) aggregating measures into composite indicators and the use of indicators in policy-development and assessment (Dahl 2012; Bedřich et al. 2012; Dhakal and Imura 2003; Meadows 1998). While most of the issues raised are technical

in nature and as such, are not in the main focus of this research, some consideration also concerns on how indicators have been used in environmental goal setting and implementation processes (Sebastien et al. 2014; Davis et al. 2012). Building on the latter aspects, the next section discusses how environmental goal implementation activities have been assessed and monitored so far in case of MEAs, the MDGs and most recently, the SDGs.

2.3.2 Monitoring of environmental goal implementation

In order to ensure compliance and promote policy implementation and learning, monitoring and reporting requirements have become an integral part of MEAs over the last decades. Although earlier research found that MEA monitoring activities and capacities are rather limited (Bellamy and Hill 2010; Maljean-Dubois and Richard 2004) and even questioned their direct positive influence on implementation success (Mitchell 2003), MEA arrangements have increasingly considered progress monitoring aspects, defined quantifiable targets with underlying (and measurable) indicators as well as established regular reporting requirements for signatory countries (Schoenefeld et al. 2018; Fazel et al. 2015). For example, under the Paris Agreement, the UNFCCC requires Annex 1 countries to track their GHG emissions and submit their national inventories annually and non-Annex countries are to submit biannual reports. All countries are to submit comprehensive national communications, detailing policy measures to mitigate and adapt to climate change every four years (UNFCCC 2019). Signatory countries of the CBD and the Montreal Protocol are also regularly submitting national reports: under the CBD, countries have prepared six annual communications since 1998 (CBD 2019; CBD 2005) and signatories of the Montreal Protocol are required to submit statistical data to the Ozone Secretariat about their annual production and use of ozone depleting substances since 1987 (UN 1989).

Based on the national submissions and reports to the MEA secretariats, several goal implementation assessments have been produced (Jabbour and Flachsland 2017). The most comprehensive effort is the Global Environmen Outlook (GEO), whose sixth iteration was published in 2019 (UN Environment 2019). In addition, specific environmental issues are being assessed separately by various organizations. The International Panel on Climate Change (IPCC) is tasked with carrying out regular

assessments on climatic change as well as climate mitigation and adaptation efforts (www.ipcc.ch). The global progress towards the targets of the Convention on Biological Diversity is being analyzed by the Global Biodiversity Outlooks (www.cbd.int/gbo) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). Stipulated by the 6th article of the Montreal Protocol, progress towards ozone protection objectives is also regularly reviewed by the World Meteorological Organization and/or the UNEP (World Meterological Organization 2018).

Table 7:Overview of global environmental assessments

Name of the assessment	Scope	Coordinating Organization
Global Environment Outlook (GEO)	Global environmental issues	UNEP
Assessment Report	Climate Change	IPCC
Global Biodiversity Outlooks Global Assessment Report on Biodiversity and Ecosystem Services	Biodiversity	CBD IBPES
Scientific Assessment of Ozone Depletion	Ozone protection	World Meteorological Organization and UNEP

Besides global assessments, various regional and national monitoring reports have been developed, such as the State of the Environment reports in the EU member countries (EEA 2015) and for the Association of the South-East Asian Nations (ASEAN Secretariat 2017). The OECD has been carrying out Environmental Performance Reviews in OECD member and key partner countries since 1992 (OECD 2017) and the UNECE in other pan-European and Central Asian countries since 1994 (UNECE 2019). Similar environmental performance assessments were also published by the Asian Development Bank (ADB) for the countries of the Greater Mekong region (ADB 2018). These assessments usually quantitively evaluate the status and the trends of the reviewed environmental issues and if targets exist, the progress towards these. Some of these assessments also have policy evaluation components.

Parallel to these efforts, monitoring activities to assess progress towards global sustainability goals were also launched in the 1990s. As discussed in the previous sub-chapter (2.3.1), the UN started to develop its first sustainable development indicator set after the adoption of the 1992 Rio Convention as well as several other international

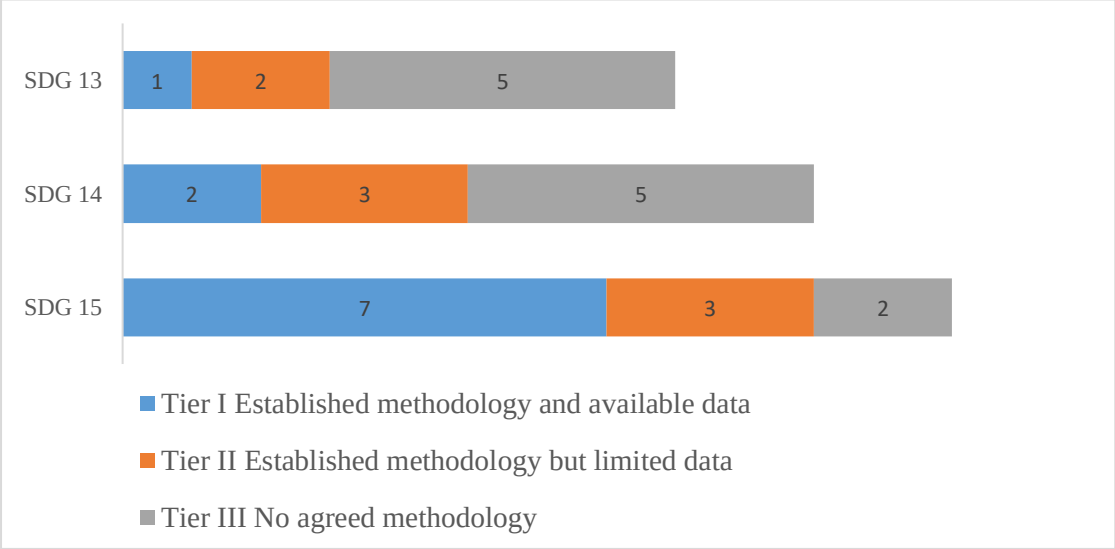
organizations, countries, regions and even NGOs launched their own sets in the 2000s. Environmental issues were considered in most of these sets, however the monitoring were in most cases aimed at measuring the status/trends of these matters and not the progress towards a specific environmental goal set and therefore had a limited capacity to influence policy (Dahl 2012). The indicators introduced under the MDG7 brought novelty in this sense as the progress (at least for some of) the indicators were measured against specific targets. Originally 8 indicators were introduced to monitor the progress toward MDG7 targets (see chapter 2.1.2) (UN GA 2001). Later, in order to better reflect biodiversity, two additional indicators were added to account for fish stocks within safe biological limits and the proportion of species threatened with extinction (UN SD 2008). As discussed in section 2.2.2, for the monitoring of the MDGs, a UN-led monitoring framework was established that required country-level data collection. As a result of global cooperation, it was suggested that MDG monitoring activities contributed significantly to improve data availability for some of the MDG7 indicators, such as the indicators measuring people's access to drinking water and sanitation facilities (UN 2015; Bartram et al. 2014). At the same time, data availability for other MDG7 indicators remained restricted throughout the 2000-2015 period, both geographically and temporally (Pinter et al. 2015). For instance, country-level data was not available for indicators on fish stocks and species threatened with extinction and only a limited set of data was available for the indicators measuring the proportion of total water resources used and the percentage of people with access to secure land tenure (UN SD 2016).

As part of the general progress reporting on MDG implementation (see section 2.2.2), the progress towards MDG7 was evaluated both globally and regionally (by the relevant UN bodies) as well as at country-level in the national implementation reports (prepared by the UN country offices and the national governments). While in many countries, these evaluations attracted considerable public attention (Suter and Fishman 2015), they had a larger emphasis on social issues and in general, less focus was given to environmental issues (partly also due to the limited number of environmental targets in the MDG set). Evaluations specifically and comprehensively focusing on the implementation of MDG7 issues also remained limited in number (Pinter et al. 2015; UNDG 2010; Castello et al. 2009).

For the monitoring of the 169 targets of the 17 SDGs, 232 individual indicators were proposed by the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDG) (UN ECOSOC 2017). However, some indicators do not have yet clearly defined measurement methodology (these are classified as "Tier III" indicators) and there are limitations of data availability for other indicators (which are classified as "Tier II" indicators) (IAEG-SDG 2019; UN ECOSOC 2017). With regard to environmental goals (SDG13-SDG15), 27 targets and 30 individual indicators were suggested by the IAEG-SDG:

- Five targets and eight indicators for SDG13;
- Ten targets and ten indicators for SDG14
- Twelve targets and twelve individual indicators for SDG 15.

At the same time sufficient data for progress monitoring is only available for ten of these indicators, an additional eight indicators have limited or no data and for twelve indicators no methodology have been developed so far. The figure below summarizes the number of targets and indicators for the environmental SDGs as well as the status of the indicators as of 2019.

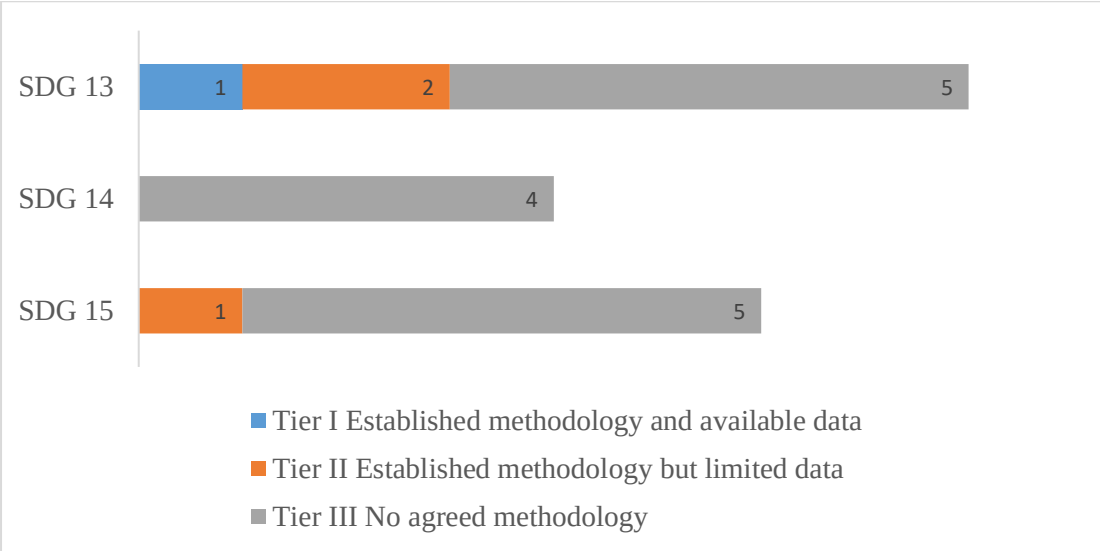


Data source: UN ECOSOC 2017; IAEG-SDG 2019

Figure 4: Overview of monitoring information for SDG13-SDG15

The MDG monitoring framework had various weaknesses and to address these, different suggestions have emerged for the development of the SDG monitoring framework (Georgeson et al. 2018; Jaboc 2017; MacFeely and Barnat 2017; Hak et al. 2016; Fukuda-Parr et al. 2014). In relation to the subject of this research, studies noted

that the monitoring of country performances happened in an overly simplistic manner without defining interim targets or taking into consideration local baselines and circumstances. Specifically, the MDG monitoring framework was established in a way that disregarded initial country baselines and the rate of progress towards the targets set (Suter and Fishman 2015; Fukuda-Parr and Greenstein 2010). The SDG monitoring framework was designed in a way to be carried out primarily by national statistical capacities and also allows more space for monitor national performance according to the national realities (UN ECOSOC 2017) but, similarly to the MDG monitoring framework, it offers no clear recognition that statistical reporting does not necessarily mean assessment, which would require deeper analysis by the statistical agencies. Lastly, while the MDG monitoring framework did not include indicators to measure governance/implementation-related indicators, the SDGs introduced some input/process indicators, which approach goal-achievement from an implementation capacity point of view (e.g. assessing the existence of strategies or implementation plans related to a certain goal, the available funding or educational and research activities). However, these indicators often fall within the Tier II or Tier III category, with no/limited available data or no established measurement methodology respectively. The figure below provides an overview of the number of environmental indicators within SDG13-15 that concerns implementation capacities, as well as shows their availability as of 2019.



Data source: IAEG-SDG 2019; UN ECOSOC 2017;

Figure 5: Overview of monitoring information for the capacity indicators under SDG13-SDG15

As presented above, although various input/ process indicators have been proposed for SDG targets concerning the natural environment, most are not yet measurable or measured. Taking further this last point, the next section offers an overview of approaches related to measuring environmental goal implementation capacities.

2.3.3 Measuring environmental goal implementation capacities of countries

Efforts that aim at measuring environmental goal implementation capacities are usually part of various governance measurement initiatives. Governance is a contested and constantly evolving term and its definition can vary from top-down approaches, which primarily focuses on the role of governments to implement policies to broader, networked governance concepts, which concentrates on interactions among different actors (Hulme et al. 2015; Meuleman and Niestroy 2015, Fukuyama 2013; Kaufmann et al. 1999).

Governance may encompass various aspects including more complex principle-based aspects as well as operational management-type functions. Francis Fukuyama, who defined governance as a *"government's ability to make and enforce rules, and to deliver service"* (Fukuyama 2013, 3), suggested that governance measurement efforts can consider the procedural, capacity, output and bureaucratic autonomy aspects of governance. The Earth System Governance (ESG) theory, which takes an integrated approach towards existing governance systems of the public, private and non-profit sphere, distinguishes five distinctive aspects of governance for sustainable development: the "five A" concept includes institutional architecture, stakeholder involvement, adaptive policy-making, accountability and equality (Biermann et al. 2010). A recently developed initiative of the EC identified five dimensions of environmental governance to assess environmental policy implementation in the EU countries, including transparency, participation, the rule of law, accountability and implementation effectiveness (Nesbit et al. 2018). Two SDGs (SDG 16 and SDG17) are also dedicated to the improvement of various sustainability governance aspects, including the rule of law, accountability as well as financial and monitoring capacities (UN GA 2015).

Using various terminologies – such as institutional establishment and capacity, policy/regulatory effectiveness, enforcement capacity – state capacities are part of almost all governance conceptualization efforts. Overall, state capacity can be defined as a government's ability to implement policies (Savoia and Sen 2015; Rogers and Weller 2014; Besley and Persson 2009). Concerning the aspects, which may constitute this capacity, there are various categorizations. Savoia and Sen (2015) distinguished administrative, legal, infrastructural, fiscal and military capacity of states. For a global assessment of country-level capacities to implement selected MEAs, the UNDP defined five dimensions, including capacities to engage stakeholders, to generate knowledge; to develop policies and legislation and to implement and monitor the implementation of these (Bellamy and Hill 2010).

To measure governance, or more specifically, capacities of governments to implement policies (some of which may also be tied to goals and targets), various initiatives were introduced – usually focusing at the national-level and concerning general governance issues. Notable examples of measures include:

- the **World Governance Indicators** is developed and calculated under the egis of the World Bank since 2000 and measures six aspects of governance including voice and accountability, political stability, the rule of law and control of corruption and two aspects concerning state capacities: government effectiveness, regulatory quality (Kaufmann et al. 2014);
- the Governance Index of the **Bertelsmann Transformation Index**, which – encompassing both input/process and output/outcome indicators – assesses and ranks the democratic transformation abilities of 128 developing countries every three years since 2003. (Bertelsmann Stiftung 2019);
- the **Ibrahim Index of African Governance** (IIAG), which focuses on 54 African countries and measures their governance capacities in the areas of safety and the rule of law, participation, sustainable economic development and human development (Dias 2018).

The potentials and limitations of measuring governance qualities, capacities and outcomes have attracted considerable research interest over the last two decades. Main points of discussion include whether (1) to measure the quality of governance processes

and the capacities of governments to deliver services (and with this, to focus on goal implementation capacities) or assess the outputs and the results of governance efforts (Andrews 2014; Holt and Manning 2014; Fukuyama 2013); and (2) to what extent the different measurement methods used to develop governance metrics could be considered valid and credible and useful for policy-making and evaluation (Kayser 2018; Bersch and Botero 2014; Sebastien and Bauler 2013).

With regard to the targeted evaluation of environmental governance and, more specifically, environmental goal implementation capacities, in a recent review (Almassy and Pinter 2018), we identified 22 relevant indices or composite indicator sets. Notable examples of indicator sets or indices that exclusively or partially assess environmental goal implementation capacities, include:

- the **City Biodiversity Index**, which was developed by the National Parks Board of Singapore to measure conservation efforts in/of cities to protect urban nature and includes ten implementation capacity indicators among its 23, such as the presence of a local biodiversity strategy or action plan; the number of government bodies included in the coordination of biodiversity matters; the inclusion of nature protection issues in the school curriculum or the number of stakeholder involvement initiatives (Chan et al. 2014).
- the **Climate Change Performance Index** that measures the climate protection efforts of 58 (later 56) countries annually since 2006 (Germanwatch 2019). Of its 14 indicators, two measures (with a 10-10% weight each) the quality of the national and the international climate policies of the studied countries (Burck et al. 2018).
- the **Environmental Democracy Index** that assesses access to environmental information, participation in decision-making and environmental justice in 70 countries globally, was launched in 2014 and it includes 75 indicators on participation, transparency and justice (Worker and De Silva 2015).
- the **Resource Governance Index** that measures the natural resource management capacities of 58 natural resource-rich countries with 61 indicators assessing value realization, revenue management and enabling environment (Natural Resource Governance Institute 2017).

According to our review of environmental governance indices (Almassy and Pinter 2018), the initiatives covered a variety of environmental issues (including overall environmental sustainability, water resources, climate change and energy, natural resources) and primarily evaluated country performances, comparing them against each other. The majority of relevant initiatives were developed by international or NGOs and most of them were introduced after 2010. The review also found that many of the composite indicators studied were only calculated once and regular assessments remained limited. Fourteen of the studied sets included both input/process and output/outcome/impact indicators and eight exclusively evaluated environmental governance aspects. Frequently introduced indicator themes concerning environmental governance included policy processes, institutional capacities, financing measures, accountability and stakeholder participation. See Table 8.

Table 8: Indicator themes of selected environmental governance indices

Name of the index	Indicator themes
Africa Capacity Indicators on Natural Resource Management	Policy Environment (9 indicators) Processes for Implementation (32 indicators) Development results for Natural Resource Management (19 indicators) Capacity Development Outcome (9 indicators)
Asia Water Governance Index	Legal (6 indicators) Policy (8 indicators) Administration (6 indicators)
Climate Laws, Institutions and Measures Index	International cooperation (2 indicators) Domestic climate framework (3 indicators) Significant sectoral fiscal or regulatory measures or targets (6 indicators) Additional cross-sectoral fiscal or regulatory measures (1 indicator)
Environmental Democracy Index	Transparency (21 indicators) Participation (15 indicators) Justice (39 indicators)
Environmental Policy Stringency Index	Market-Based (10 indicators) Non-market policies (5 indicators)
Forest, Land and REDD+ Governance Index	Law and Policy Framework (24 indicators) Governance Capacity (27 indicators) Civil Society Capacity (18 indicators) Indigenous People/Community/Women (12 indicators) Business Capacity (11 indicators) Performance (25 indicators)
Resource Governance Index	Institutional and Legal Setting (10 indicators) Reporting Practices (20 indicators) Safeguards and Quality Controls (15 indicators) Enabling Environment (5 indicators)

Sustainable Water Governance Index	Access (3 indicators) Planning (3 indicators) Participation (1 indicator)

Source: Almassy and Pinter 2018

As opposed to general governance assessment initiatives, the arena of specific environmental governance and implementation capacity indicators is relatively newer, less populated and thus less researched overall (Niemann et al. 2017; Surminski and Williamson 2012). Based on Gisselquist (2014) and Nardo et al. (2008), our review of environmental goal implementation capacity indices (Almassy and Pinter 2018) identified various approaches to establish a theoretical framework for indicator development, to select appropriate and measurable indicators and to ensure the robustness of the selected indicators, e.g. by weighting methodologies. However, various methodological challenges emerged during the development processes. Some initiatives failed to define a solid conceptual framework, which could sufficiently support indicator choices. Others had limitations in developing measurable and reliable indicators or applying statistical methods during the construction of the indices to ensure that the indicators are aggregated in a scientifically-sound manner.

Besides methodological challenges, the application of these indicators has also remained at the experimental stage. While environmental governance indicators or indices were proposed to support various policy objectives, such as policy development (African Capacity Building Foundation 2013); cross-country comparison of environmental policy implementation (Natural Resource Governance Institute 2017; Steves and Teytelboym 2013) or policy learning (Araral and Yu 2010), our in-depth review of eight relevant indices found that only one composite indicator/index was calculated more than once and have become relatively well-known (Almassy and Pinter 2018). However, the limited application was less likely due entirely to methodological issues of the constructed indices, but it also indicated a lack of understanding between the developers and the targeted users of the indices, that eventually resulted in instruments with a limited level of usability (Sebastien and Bauler 2012; Rosenstrom 2009).

2.4 Summary of the findings of the literature review

This literature review first provided an overview of existing global approaches to environmental goal setting as part of MEAs and global goal setting efforts (chapter 2.1).

Concerning the implementation of environmental goals (chapter 2.2), the review summarized relevant scientific knowledge concerning MEAs, the environmental sustainability targets of the MDGs as well as set forward lessons learnt for the implementation of the environmental goals of the SDGs. Lastly, chapter 2.3 provided an overview of sustainable development indicators in the context of environmental policymaking, monitoring activities of the MDG7 targets and the environmental goals of the SDGs as well as discussed, the state-of-the-art knowledge of assessing environmental goal implementation capacities of countries.

In relation to the purposes of this research, identified gaps in scientific approaches have emerged from the literature review concerning three areas:

1. There have been limited research efforts to o assess environmental goal implementation efforts of countries systematically. Analysis of environmental goal/policy implementation efforts mainly remained at the case study level (limited both in thematic and geographical scope).
2. While research recognized that improved state capacities could result in better implementation outcomes, there has been limited research on systematically mapping necessary state capacities that would be required to improve implementation aspects of environmental goals.
3. As a result, a comprehensive set of indicators, which could assess the capacities of countries to implement environmental goals, is missing.

Based on the identified gaps in scientific approaches, the next chapter defines the goals of this research by establishing a set of research questions and a conceptual framework that would support answering these research questions. In order to address the identified research gaps, the thesis aims at systematically assessing country approaches to the implementation of environmental goals (chapter 5), by identifying a set of implementation capacity factors which could promote better implementation outcomes for environmental goals (chapter 6) and offer a set of implementation capacity indicators, which can assess the capacities of countries in this regard (chapter 7) and can potentially be translated into an implementation capacity index (chapter 8).

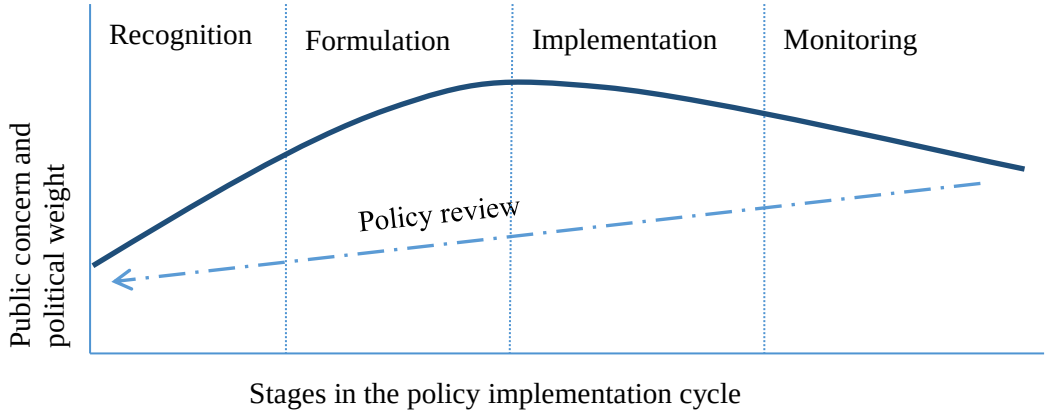
Chapter 3 Research aims

This section restates in a focused way the research problem, presents the research questions that this dissertation aims to address and introduces the conceptual framework, which is suggested to address the research questions.

3.1 Contextualization of the research

As Achim Steiner, a former executive director of the UNEP stated in 2012: *"Over 500 international environmental agreements have been concluded since 1972, the year of the Stockholm Conference and the establishment of the UNEP… Yet despite the impressive number of legal texts and many good intentions, real progress in solving the environmental challenges themselves has been much less comprehensive*." (UNEP 2012a, ii).

From a policy-implementation viewpoint, the statement summarizes the essence of the problem with the operationalization of sustainable development. The policy-implementation theory (DeLeon, 1999; Brewer 1974) applies a system-oriented approach to policies and suggests that problem formulation, policy development, implementation, progress monitoring and policy review should form an interconnected, continuous cycle. In the case of sustainability and environmental policies, the conceptualization and establishment phases are frequently in the focus of political and public attention. However, the implementation, monitoring and policy review phases are apparently often not followed by persistent interest on the part of both political and public actors. See Figure 6.



Source: Adapted from Pinter et al. 2000

Figure 6. Stages of the policy-implementation cycle in light of public concern and political weight

To a certain extent, this "broken" policy cycle can explain the differences between the efforts put into negotiating environment-related international agreements – completed with goals and targets in some cases – and their achievements over the last decades, because inadequate and insufficient implementation efforts will contribute to an implementation gap – a gap between expected outcomes as indicated by goal-specific targets and what is actually achieved (Koop et al. 2017). This also resonates with one of the recommendations of the recently published GEO-6, which suggest studying policy processes on a "*systematic level by following the policy decisions throughout the policy cycle, from design to post-evaluation"* (UN Environment 2019, 457).

As discussed in chapter 2 (see chapter 2.1), previous research has found that progress is often the greatest for environmental issues where well-defined and quantifiable targets have been set, and where realistic implementation plans, and actions have been created for achieving them (Jabbour et al. 2012). In this regard, the SDGs can offer a new opportunity for countries to translate the sustainability concept into more integrated, inclusive, action- and results-oriented policies (see chapter 2.1.3) and this process should draw on the lessons from the successes and challenges related to the execution of environmental regimes and goals outside and within the framework of the MDGs. However, although there have been significant research efforts to study the design of international environmental regimes (see chapter 2.2.1), studies about country-level implementation experiences of environmental goals, up to and including the meeting or not meeting previously agreed targets, is rather scarce (see chapter 2.2.2

and 2.3.2). Similarly, while state capacity has been identified as an important contributing factor to successful policy outcomes and it has been subject to numerous conceptualization, categorization and measurement efforts (Wu et al. 2018), initiatives that aim to define and assess environmental policy and goal implementation capacities are limited both in number and scope (see chapter 2.3.3).

Considering the above, this research is focused on investigating the formulation, implementation and monitoring of global environmental goals at the national level, assuming that there is a scope for significant improvement based on the experience of often inadequate performance over the last decades. Through the study of goal implementation practices related to earlier agreed international environmental goals, the research aims to explore possibilities for identifying a set of implementation capacity indicators (and eventually a composite implementation capacity index), which could be used to analyze how the implementation of the environmental SDGs can better tackle the challenges they address. The purpose of the research is therefore, two-fold. At the practical level, I intend to collect potential lessons learnt about the implementation of international environmental goals, more precisely, the environmental targets of the MDGs, that could help better understand and assess the implementation capacity requirements of the environment-focused SDGs. At the theoretical level, I aim to contribute to the on-going efforts for measuring qualitative aspects of governance capacities in a more comprehensive and scientifically sound manner.

3.2 Research questions

This research hypothesizes that state capacity has significant importance in promoting better environmental outcomes and a robust implementation capacity indicator set (and its composite), which has undergone a methodologically sound and precise development process, could support the assessment of governments' capacities to implement environmental goals. Thus, it can offer insights on how implementation capacity of countries can be improved for better environmental outcomes.

Based on the above, the research aims at addressing the following main question and four related sub-questions:

How can lessons learnt about state capacities to conceptualize, implement and monitor international environmental goals support the national implementation of the environment-related Sustainable Development Goals?

1. How were the existing international environmental goals and targets relevant for environmental SDGs formulated at the national level and how was their implementation framework designed?
2. What are the critical implementation capacities relevant to the achievement of environmental goals at the national level?
3. How can key environmental goal implementation capacities be translated into a set of indicators and used in assessments?
4. What insights can the development of implementation capacity indicators offer for the eventual construction of an environmental SDG implementation capacity index?

3.3 Conceptual framework

To examine the above established hypothesis and answer the underlying research questions, policy-implementation theory is applied to analyze selected key environmental goal setting and implementation processes within the MDG framework, as the closest proxy to the environmental SDGs. To date, the MDG framework is the only applied and evaluated governance framework for sustainable development, since the SDG process is still in an early phase of implementation, with limited available knowledge on implementation opportunities and challenges.

The policy implementation theory takes a systems-oriented approach towards policies and suggests that problem formulation, policy development, implementation, progress monitoring and policy review should form an interconnected, continuous cycle (Brewer 1974; Laswell 1971). Although it has been criticized as a "stage-heuristic" theory because it takes an over-simplified approach to real-life policy processes (Hill and Hupe 2009; Sabatier 2007), it does offer a systemic approach towards policies and creates strong links between policy formulation, implementation and review and therefore, it has remained an enduring concept for public policy studies (Howlett 2018; deLeon, 1999). There are various categorizations of the policy stages, but for the purposes of this research, the five distinctive elements of goal implementation cycles are distinguished based on the works of Howlett et al. (2009), deLeon (1999) and Hogwood

and Gunn (1984). As presented in Figure 7, the stages include goal setting, policy formulation, implementation, monitoring and review.

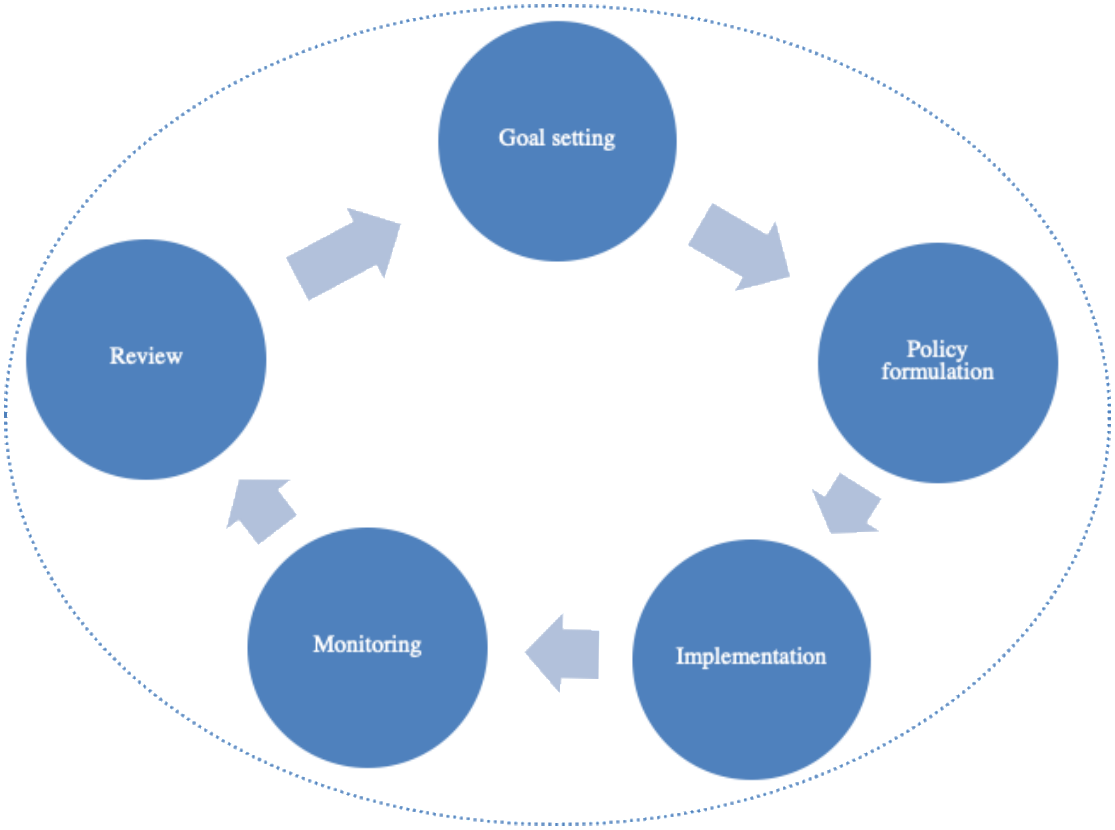


Figure 7: Environmental goal implementation stages identified for the research

As discussed in chapter 2.3.3, state capacity has been recognized as an important contributing factor to improve implementation outcomes throughout the policy cycle (Wu et al. 2018). For the purposes of this research, state capacity is defined as a government's ability to implement policies and underlying goals and targets. Although there have been some attempts to categorize state capacities (e.g. Savoia and Sen 2015; Bellamy and Hill 2010), this research introduces a categorization that follows the policy implementation cycle and links the different implementation capacities to the above-defined distinctive stages of the policy cycle.

Taking the above into consideration, the policy-implementation theory, completed with the concept of state capacity, is proposed as the basis of a conceptual framework to study country-level management of international environmental goals.

Within the context of global environmental goal-setting efforts, the dissertation first examines national policy development, implementation and monitoring activities of environmental goal implementation processes. The findings of this analysis are presented in chapter 5, with the aim to answer the first research question of this dissertation.

Drawing on the observed features of these processes , a set of implementation capacity factors is identified and validated. Using the identified factors, a set of implementation capacity indicators is suggested for the eventual construction of the Sustainability Transition Management Index (STMI), with the aim to measure the capacities of states to support the implementation of environmental goals. The set of indicators (and eventually the index) are suggested to be developed in order to operationalize the policy implementation theory for environmental goals. Although environmental trends often change slowly and positive or negative outcomes and impacts of policies can only be seen over a long time, governments usually plan for the shorter-term of their election period and thus, are likely to prioritize socio-economic matters over environmental concerns. Assessing the extent to which countries have the capacity at present to improve their environmental performance on the longer-term can offer insights into the extent to which countries will be able to achieve environment-related goals and targets and identify opportunities to improve implementation processes, which on the longer-term can contribute to better environmental outcomes. In order to create an instrument that could measure environmental goal implementation capacities on a regular basis; enhance policy learning via a quantifiable feedback mechanism about state capacities for implementing environmental goals and support capacity-building for addressing greater environmental challenges in the future, the indicator development process will attempt to address potential gap between assessment needs and efforts and place more emphasis on involving stakeholders more intensively in the indicator and index development processes.

The indicator identification and development process are further explained in section 4.5 and 4.6 of the methodology chapter. The outcomes of the indicator development process are presented in chapter 6 and chapter 7, with the aim to answer the second and the third research questions of this dissertation. Lastly, with the aim to address the fourth research question, the research discusses the potentials of developing and using

an implementation capacity index to support policy learning and to improve environmental goal implementation in chapter 8.

A schematic figure of the conceptual framework is presented in Figure 8 and the detailed research methodology is discussed in chapter 4.

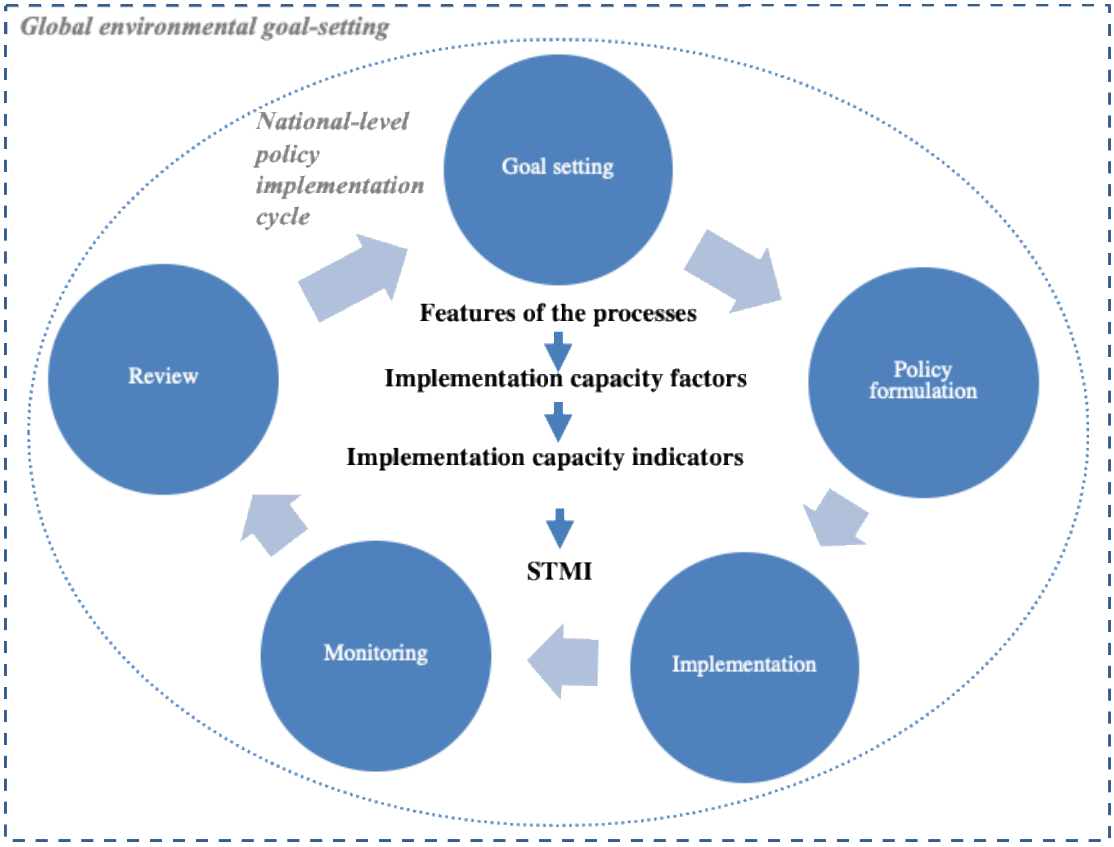


Figure 8: The conceptual framework of the research

Chapter 4 Research methodology

To answer the main question and sub-questions of the research, a three-stage research methodology was developed, which included (1) a document review for the identification of country-level implementation capacity factors of environmental goals; (2) a questionnaire to select priority implementation capacity factors and (3) the formulation of a set of implementation capacity indicators, which can potentially form a Sustainability Transition Management Index (STMI). This section provides an overview of the three research stages.

In order to ground the research in policy practice and support future applicability, I chose to study the implementation experience with the MDG 7 targets in 20 countries of the Southeast European and the Asian region. The justification for the issue focus is presented in chapter 4.1 and the country selection is discussed in chapter 4.2. The three stages of the research methodology are set forward in chapter 4.3 -4.6.

4.1 Issue focus: MDG7

Since governments may have approached various environmental issues differently (Social Learning Group 2001), the research focused on international environmental goals satisfying two conditions:

- they exist within the set of the MDG7 targets (which were defined either through an MEA or through the MDG process), as the closest proxy to the environmental SDGs and to date, the only applied and evaluated governance framework for sustainable development;
- where progress at the country-level was measurable (measurement methodologies for the indicators were set and data was collected regularly).

The MDG7 targets, aiming to ensure environmental sustainability, included ten indicators overall. See Table 2 in chapter 2.1.2. After taking into consideration the second selection criterion (measurability of progress and data availability), only six of the MDG7 issues have been included in this research. Two issues concerning fish stocks (7.4) and species threatened with extinction (7.7) were excluded due to the lack of adequate monitoring and measurement methodologies for national-level assessment.

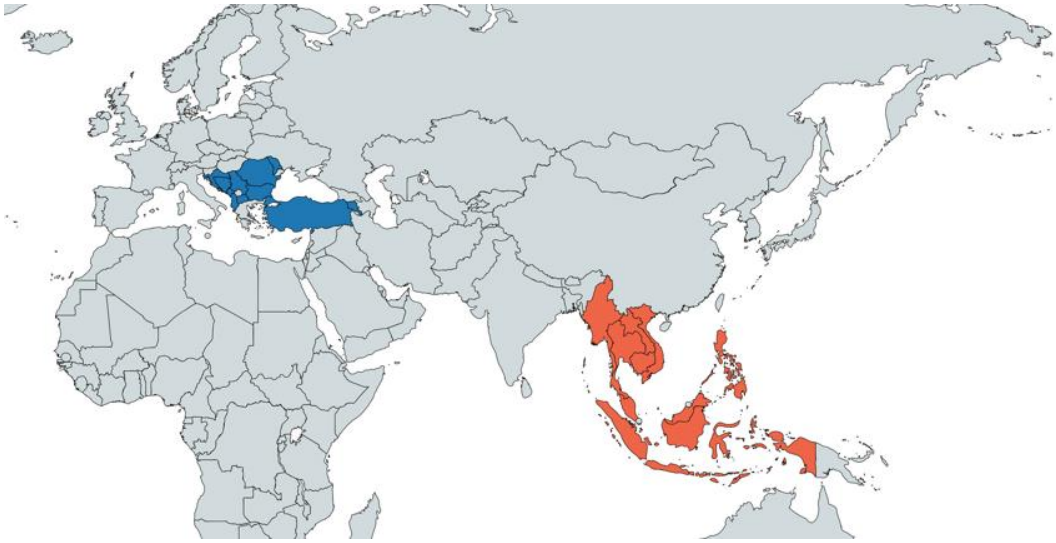
An additional two issues, freshwater resources (7.5) and urban population living in slums (7.10), were also excluded due to the limited availability of data. See Annex 1. As a result, the following issues (and linked MEAs, if applicable) were included in the research:

- forest management and land use;
- mitigation of GHG emissions (UNFCCC and Kyoto Protocol);
- phase-out of ODS (Vienna Convention and Montreal);
- protection of terrestrial and marine areas (and Nagoya Protocol); and
- improved access to drinking water and sanitation.

4.2 Geographical focus: Southeast Europe and Southeast Asia

Beyond covering different substantive issues, the intention was to include a variety of countries in the review in order to ensure the robustness of the results under a wider range of socio-political and geographic conditions. For the selection of the countries, purposeful sampling was chosen (Taylor-Powell 1998) to include high and low-performers on the studied environment issues, represent various income-levels, population sizes as well as bring regional diversity.

Instead of global sampling, a group of countries from Southeast Asia and Southeast Europe was included, where I had previous research or work experience and thus, already had a basic knowledge of the country contexts. It was also expected that I would have easier access to relevant documents and questionnaire respondents. To ensure a substantial sample-size, in total 20 countries were considered from the two regions; eleven countries from Southeast Europe (Albania, Armenia, Bosnia and Herzegovina, Bulgaria, Croatia, North Macedonia, Moldova, Montenegro, Romania, Serbia and Turkey) and nine countries from Southeast Asia (Cambodia, Indonesia, Lao PDR Malaysia, Myanmar, the Philippines, Thailand, Timor-Leste and Vietnam). See Figure 9.



Source: Generated at www.mapchart.net

Figure 9: Map of studied countries in Asia and Europe

These countries also represented different income-levels and population sizes as well as demonstrated high or low performances across the selected MDG 7 issues (see detailed analysis in Annex 1). In addition, the selected countries were also expected to bring additional added value to the analysis. First, most are emerging developing economies, which over the years have seen considerable economic growth and thus, in many cases, face considerable environmental degradation. Secondly, as their economy grows, they become less reliant on donor assistance over the years and thus domestic capacities became more definitive for implementing environmental goals. Thirdly, countries from both regions have joined or formed regional co-operation processes, the EU accession/partnership agreements and the ASEAN, which, although to a varying extent, served as an additional driving force or at least a motivating factor in improving their environmental performance. This latter also inspired countries to carry out assessments reviewing national environmental performances, therefore, a good coverage of data and documents with relevant experience was expected.

4.3 Research stages

The research was carried out between 2014 January and 2018 December and consisted of three main stages. At **Stage 1**, an extensive document review was conducted to understand the conceptualization and implementation process of global environmental goals at the national level and to identify implementation capacity factors throughout

the goal implementation cycle. Based on the outcomes, in **Stage 2,** a questionnaire was designed to identify implementation capacity factors with priority importance for national-level implementation that could provide the basis for the formulation of a set of implementation capacity indicators. In **Stage 3**, a set of implementation capacity indicators were designed, which could support the assessment of countries' preparedness to implement environmental goals and to help identify their strengths and weaknesses that can support or hamper the implementation process. The hypothetical relevance of the indicators was tested with empirical data collected for Turkey and their applicability for the eventual development of the STMI was discussed.

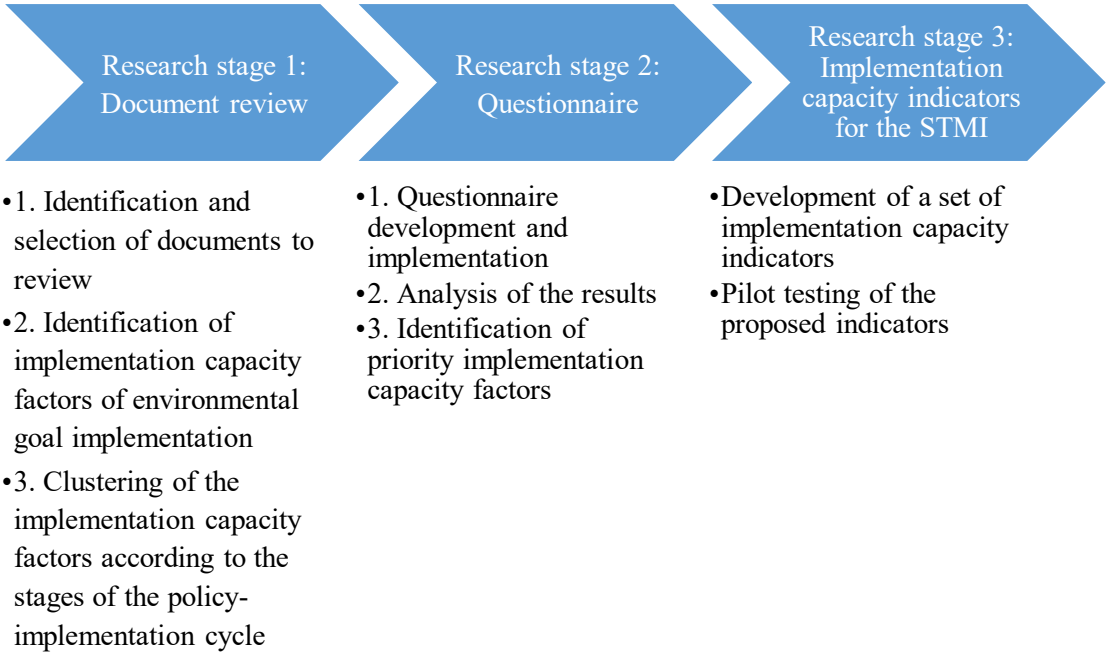


Figure 10: Main stages of the research

The following sections presents the three main stages of the research.

4.4 Research stage 1: Document review to identify implementation capacity factors of environmental goal implementation processes

In the first stage of the research, secondary information (Steward and Kamins 1993) was collected about national-level implementation processes of the selected international environmental goals in the selected countries. Systematic document review was chosen as a methodology for this exercise, as a time and cost-effective

methodology to gather and synthesize evidence of successful policymaking and implementation elements in a certain topic (Wesley 2014; Pullin et al. 2009).

Based on methodological recommendations (Adams et al. 2017; Wesley 2014; Bilotta et al. 2014) and the study of the methods of similar research processes (Plummer et al. 2013; Taylor et al. 2013; Hepworth et al. 2011; Lucas et al. 2010), the following document review protocol was established:

1. Identification and selection of documents to review.
2. Identification of the features of national environmental goal implementation processes, including their success factors and challenges
3. Translating and clustering the identified implementation features into implementation capacity factors following the stages of the policy-implementation cycle (as described in chapter 3.3).

4.4.1 Identification and selection of documents to review

In order to investigate relevant national-level policy implementation practices tied specifically to the selected MDG7 issues, the relevant scientific and grey literature were studied. Documents were sought to be published after 2000 as the MDGs were introduced in that year and articles, and reports published after June 2015 were not considered as the document review was concluded by that date. The protocol to identify and select documents and articles for the review is detailed below.

In order to identify publications from the **scholarly literature**, the following search criteria were applied:

- English-language, peer-reviewed articles available through the EBSCO website before June 2015.
- Included one or more of the following search terms:
    - Millennium Development Goal or MDG 7; CBD or Convention on Biological Diversity; Montreal Protocol; UNFCCC or Kyoto Protocol; international environmental agreements; environmental policy implementation; environmental goals; environmental governance;
    - AND reference to one or several of the studied countries.

- The abstracts confirmed that the articles concerned the implementation of the selected MDG7 targets or related international environmental agreements/goals.

As for **grey literature**, the following search criteria were applied:

- Government documents and technical reports of international organizations, which concerned (partially or exclusively) the implementation of the studied environmental goals, including:
    - MDG progress reports (submitted usually after 2004/2005)
    - National submission related to the UNFCCC/Kyoto Protocol, Vienna Convention/Montreal Protocol and the CBD
    - Most recent National Development Strategies/Plans (NDS/NDPs) and/or Sustainable Development Strategies (SDS)
    - State of the Environment Reports (SOER)
    - Environmental Performance Reviews (EPR) or Assessments (EPA)
    - National Capacity Self-Assessments (NCSA) for the Global Environment Facility (GEF)
    - National submissions to the Rio+20 UNCSD
    - Latest UNDP Assessments of Development Results
    - Latest EU progress report about accession (for the Southeast European accession countries)
- Documents written in English-language and published before June 2015.

Although it was possible to identify a relatively large number of relevant documents, very few peer-reviewed articles could be identified, that would provide a comprehensive summary of the MDG7 implementation experience and/or relevant environmental conventions and goals. Instead, most peer-reviewed articles were only partially relevant to the topic of this research and usually focused on a single environmental issue, one or a few types of implementation issues and/or a relatively small geographical area within the studied country. Although the identified policy documents/technical reports offered a more comprehensive overview of environmental goal implementation processes, due to the lack of peer review processes over the content of these reports, they had to be studied with a certain level of caution. In order to limit the uncertainty of the retrieved information, only documents with higher credibility (Adams et al. 2017) were considered and which were ideally reviewed by an

external organization, including books, government reports and documents, international organization or think thank reports.

In total, ca. 300 policy documents and ca. 200 peer-reviewed articles were included in the document review. See Table 9 for a detailed overview of the number of the reviewed documents and Annex 2 for the full lists of the studied policy documents and peer-reviewed articles.

Table 9: Overview of the reviewed documents

	Europe	**Asia**	**Total**
Number of policy documents	174	129	*303*
Number of scientific articles	105	98	*203*
Total	*279*	*227*	***506***

4.4.2 Identification of implementation capacity factors for environmental goal implementation

First, the selected documents were scanned to get a general understanding of their structure, content and approach to the implementation processes of the international environmental goals in question. Afterward, in order to identify implementation capacity factors, relevant sections of the documents were reviewed in detail, and all applicable information was extracted concerning specific country approaches as well as explicitly identified success factors and challenges of the implementation processes of the selected international environmental goals at the national level.

The identified implementation capacity factors were inserted into an analytical sheet in Excel, which was organized around the four distinct stages of a goal implementation cycle. The initial analytical sheet (presented in Annex 3a) was pre-set with some national factors, which were previously identified by various literature sources (based on the literature reviews presented in chapter 2.2.2 and chapter 2.3.3). During the course of the document review, this preliminary list of implementation capacity factors was extended with additional factors, emerging from the studied documents. To ensure robustness of the findings, the additional factors included in the list were those that were mentioned across at least three different countries and in three different types of country assessment reports (Wesley 2014). As a result of this exercise, ca. 200 (184)

specific implementation capacity factors were identified and grouped into 45 major themes. See Annex 3b for the final list.

4.4.3 Clustering of the findings according to the stages of the policy-cycle

As a next step, in order to better organize the identified implementation capacity factors, they were clustered. The clustering followed the distinctive stages of the policy-implementation cycle (policy formulation, implementation, monitoring and review) and aimed at grouping similar or overlapping implementation capacity factors.

The created clusters and their content were consulted with experts from the two regions and revised and finetuned as a result of the feedback provided. The clustering process also required the country documents to be revisited in order to double-check whether certain elements appear across different countries and different types of policy documents and whether the previously extracted elements belong to the clusters or not. For this task, I used a Delphi-based computer-program, which extracted relevant texts from all studied documents, containing specific search words. Consequently, the originally identified 184 implementation capacity factors were clustered into 58 implementation capacity factors and grouped into 11 implementation themes along the four stages of the policy cycle. The relevance and the comprehensiveness of the created eleven implementation themes and underlying capacity factors were validated by a questionnaire targeting researchers and policy practitioners in the studied countries (see chapter 7.1).

Chapter 5 provides an overview of the 11 implementation themes, and chapter 6 offers a detailed review of the 58 implementation capacity factors. Annex 4 presents an overview of the identified implementation capacity factors and supporting country examples, derived from national assessment documents. As it is presented in Annex 4, for most factors, country examples show more than one example from different source documents. However, the assessment sheet does not necessarily contain all relevant examples from the studied country documents. In case of sufficient evidence or when the same information occurred across various documents, information was only presented from one or maximum of two documents.

4.5 Research stage 2: Questionnaire for the validation of the identified implementation capacity factors and selection of priority implementation capacity factors

As presented in chapter 5 and 6, a variety of implementation capacity factors have emerged from the document review, which were considered crucial for the successful implementation of global environmental goals in the studied Southeast European and Southeast Asian countries. To validate the findings of the document review and to identify those priority implementation capacity factors that should be considered for the development of the implementation capacity indicators, a questionnaire was used. The questionnaire was designed, implemented and analyzed between 2015 July and May 2016, and the results were validated between December 2016 and March 2017.

4.5.1 Questionnaire development and collection of answers

The questionnaire had a two-fold aim: to validate the findings of the document review and to inform the selection (and potentially the weighting) of the implementation capacity indicators.

The questionnaire development process was discussed with experts both from Europe and Asia as well as with the Competence Centre of Composite Indices and Scoreboards at the EC Joint Research Centre (EC-JRC). The final design was created with user-friendliness and time-consciousness in mind since the questionnaire was distributed to experts to ensure its representativeness (with the number of responses above 100). See Annex 5.

The questionnaire consisted of multiple-choice questions and a comment section:

- Question 1-7 aimed at investigating the profile of the respondents' profile.
- Question 8-19 targeted the selection of the most important implementation capacity factors from the pre-defined eleven implementation themes. In order to investigate what factors the experts in the two regions consider as a priority for successful implementation of environmental goals, respondents were requested to choose up to three factors under each implementation theme that were identified during the document review.

- Question 20 and 21 intended to collect opinions on the relevance and the relative importance of the implementation themes and to collect any feedback concerning the implementation factors (e.g. that have not been pre-selected for the questionnaire or should have been placed under another theme).

The questionnaire was implemented between November 2015 and March 2016. The geographic focus included those 20 emerging economies of Asia and Europe, which were also included in the document review. The main target groups were experts from government, civil society, international development and research organizations, who have been involved or are familiar with the implementation of the studied international environmental goals. Respondents were identified via purposeful sampling by using personal contacts, conference participant lists and internet search. By the end of the collection period, 335 experts were contacted: 190 in 11 countries of Southeast Europe (an average 17,27 per country) and 172 in 9 countries of Southeast Asia (an average of 19,11 contacts per country). As a result, 117 completed questionnaires have been received, covering all studied countries. The average number of responses was 5,85 per country, ranging from a minimum of 4 to a maximum of 9 country responses. The average response rate was slightly higher from the European region (6,18) and lower from the Asian region (5,44). Table 10 shows an overview of the number of respondents by country and by region.

Table 10: Number of submissions from the studied countries

Europe	**Number of submitted questionnaires**	**Asia**	**Number of submitted questionnaires**
Albania	5	Cambodia	5
Armenia	6	Indonesia	6
Bosnia and Herzegovina	6	Lao PDR	5
Bulgaria	5	Malaysia	4
Croatia	4	Myanmar	4
Macedonia	7	Thailand	6
Moldova	7	The Philippines	9
Montenegro	7	Timor-Leste	4
Romania	4	Vietnam	6
Serbia	9		
Turkey	8		
Total	***68***	***Total***	***49***

4.5.2 Analysis of the questionnaire results and identification of priority implementation capacity factors of environmental goal implementation

To confirm the competency of the respondents and ensure that the results are reliable and comparable, the profile of the respondents of the questionnaire was analyzed in detail first. The results of this analysis, including the characterization of their level of experience, their familiarity with the MDG process and MEAs and their institutional background, are presented in Annex 6a.

Concerning the prioritization of the implementation capacity factors, questions 8-19 were summarized by counting the number of respondents that selected an implementation capacity factor as their first, second or third priority under each of the questions. Afterward, in order to identify a list of priority implementation capacity factors across the respondents from the two regions, the implementation capacity factors selected by more than 2/3 of all respondents were listed. As a result of the analysis of the questionnaires, 17 priority implementation capacity factors were identified, as listed in chapter 6.12 and in Annex 6b. In order to analyze the results further and identify possible outliers, the outcomes of the results were also assessed separately for the two regions, according to the institutional background of the respondents, as well as their level of experience. Lastly, the responses provided for questions 20 and 21 were summarized in order to identify those implementation themes, to which respondents assign an overall higher or lower importance. The results of the analysis are presented in chapter 7.

In order to validate the outcomes of the questionnaires, individual expert consultations were organized between December 2016 and March 2017 as a follow-up activity to the analysis of the questionnaires. Country-level results were summarized and sent to all respondents, who provided their email address. Respondents were requested to provide feedback and comment on the results. As a result, personal communications were established with over a dozen respondents. With some of the respondents, phone discussions were carried out, while other respondents provided feedback via emails. The questions during the discussion were unstructured and notes were made of any relevant comments and suggestions. The outcomes of these discussions were

anonymized and used to finetune the indicator selection and reflect on the possible applicability of the implementation capacity indicators (see chapter 7.1).

4.6 Research stage 3: Identification and pilot testing of implementation capacity indicators for the STMI

Based on the outcomes of Stage 1 and Stage 2 of the research, the third step focused on developing a set of implementation capacity indicators, which can be used to measure the capacities of countries to implement environmental goals and also provide the basis for the eventual creation of an implementation capacity index.

4.6.1 Review of relevant scientific literature and index development guidelines

First, in order to ensure that appropriate indicators are selected, relevant scientific literature and index development guidelines were consulted (Greco et al. 2018; Gisselquist 2014; Paruolo et al. 2013; Nardo et al. 2008; Böhringer and Jochem 2006). Considering the main theoretical and methodological problems inherent in the development of indices, the OECD – EC-JRC Handbook on Composite Indicators (Nardo et al. 2008) suggests a ten-step development process, which encompasses the establishment of a theoretical framework as the basis for the selection and aggregation of the indicators; the selection process of the indicators and various statistical steps, including sensitivity analysis, to assess uncertainties around input choices and multivariate analysis to test the overall structure of the indices. The importance of these considerations was also supported by other guidelines and literature reviewed, thus also followed by this research.

Moreover, in order to gain a better understanding of practical issues and problems related to the construction of environmental governance indices, similar sets were identified and studied. The outcomes of this study were presented in a book chapter (Almassy and Pinter 2018), as summarized in chapter 2.3.3 and reflected in chapter 7.4. Figure 11, presents the proposed methodological steps for index construction which encompasses the establishment of a theoretical framework as basis for the selection and combination of the indicators; the selection of the indicators, various methodological steps to ensure the relevance and credibility of the composed index, the comparison of its results to other similar indices and the visualization of the results.

Theoretical framework as basis for the selection and combination of the indicators.

Indicator selection - Based on analytical soundness, measurability, country coverage, relevance and relationship to each other.

Statistical assessments to ensure methodological robustness:

- Imputation of missing data
- Multivariate analysis to investigate the overall structure of the indicators
- Normalisation to render the indicators comparable
- Weighting and aggregation according to the underlying theoretical framework and data properties
- Robustness and sensitivity of the composite indicators to identify possible sources of uncertainty
- Dissagregation of the index to test transparency of underlying indicators or values
- Correlation of the composite indicator with other published indicators

Visualisation of the composite index in a clear and simple way

Source: Based on Nardo et al. 2008

Figure 11: Suggested construction process for composite indicators

4.6.2 Development of a set of implementation capacity indicators

The reviewed literature outlined the importance of establishing a solid theoretical framework as a basis for the selection of indicators. Therefore, the conceptual framework, established in chapter 3 and used to identify capacity factors for environmental goal implementation, were taken forward during the indicator development process. Some of the respondents of the questionnaires were consulted about the prioritized implementation capacity factors, and the applicability of the policy-implementation cycle approach for assessing environmental goal implementation capacities was also discussed with them. See the outcomes of these personal consultations in chapter 7.1 and in chapter 8.

As a next step, based on the identified implementation capacity factors in Stage 2, a set of indicators were defined, and a measurement methodology was proposed for these indicators. Grouped under six implementation themes, in total, 15 implementation capacity indicator clusters were suggested. After the establishment of this first potential set of indicators, their applicability, relevance and measurability were tested for goal

implementation activities related to climate change mitigation policies in Turkey. The assessment of the indicators for the pilot testing was carried out via the review of secondary data and consultation with country experts. The outcomes of the pilot-testing were used to refine the original questions where clarification was needed as well as to gather feedback on the relevance applicability and measurability of the proposed indicators. The suggested indicators are presented in chapter 7.2 and the outcomes of the pilot testing are presented in chapter 7.3.

As the last step, the necessary methodological steps for the eventual creation of the STMI were set forward. Due to resource limitations, it was not possible to collect sufficient data for the methodological testing of the index as the suggested statistical assessments require a dataset concerning a minimum of 20 countries (Saisana pers. comm 2016). Therefore, only the proposed steps, emerging from the review of composite indicator guidelines and the study of similar environment governance indices were described in chapter 7.4.

4.7 Chapter summary: Overview of the research outcomes

The research recognizes that coherent terminologies and their consistent and conceptually clear use is an important foundation for the development of a comprehensive assessment framework (Kumazawa et al. 2009; Janssen et al. 2009). In order to ensure this, a metalanguage was adopted and systematically followed throughout the process and used in this thesis. The elements of this metalanguage are grounded in policy-implementation theory and concern the main terminologies in this research, as follows:

- **Implementation capacity themes:** major themes of environmental goal implementation capacity, following the policy implementation cycle and emerging from the document review. The themes are presented in chapter 5.
- **Implementation capacity factors:** Elements *within* implementation capacity themes, emerging from the document review. The factors are presented in chapter 6.
- **Implementation capacity indicator components:** major themes of implementation capacity indicators, as presented in chapter 7.1.

- **Implementation capacity indicator clusters:** Building blocks of implementation capacity indicator components, as summarized in Table 38.
- **Implementation capacity indicators:** Measurable elements of the implementation capacity indicator clusters, presented in chapter 7.2.

As a result of the document review, the questionnaire implementation and the indicator development exercise, the originally identified ca. 200 implementation capacity factors, which were clustered into 58 factors and grouped under 11 environmental goal implementation themes, were condensed into 6 implementation capacity indicator components and 15 implementation capacity indicator clusters, which could potentially form the STMI. On a more theoretical level, throughout the entirety of the research process, valuable lessons have been gathered about how qualitative aspects of governance capacities can be measured in a more comprehensive and scientifically sound manner and how the results of these assessments can be applied. An overview of the research process with focus on the outcomes of the research is presented in Figure 12.

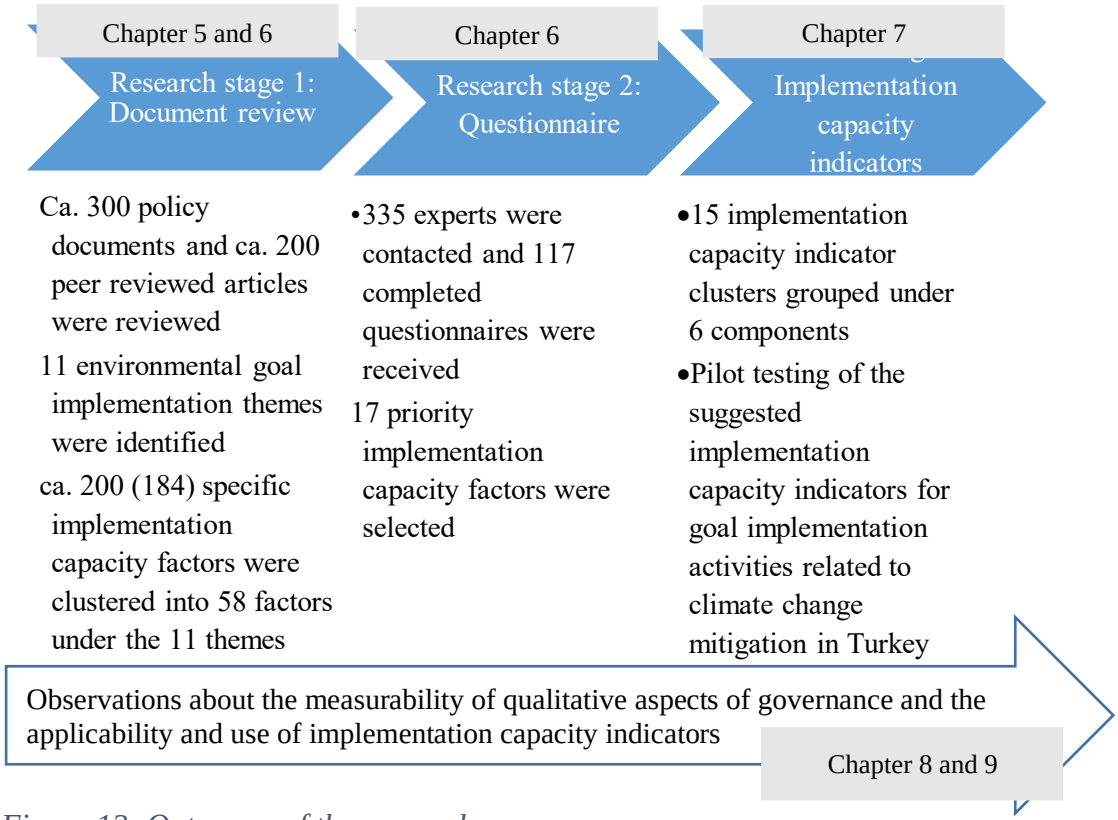


Figure 12: Outcomes of the research process

The research questions set forward in chapter 3.2, are discussed in the subsequent chapters of the dissertation:

- Research question 1, concerning how the key existing international environmental goals and targets relevant for environmental SDGs were formulated at the national level and how their implementation framework was designed is covered in chapter 5.
- Research question 2 about the key implementation capacities to achieve environmental goals at the national level is discussed in chapter 6.
- Research question 3 about how key implementation capacity aspects can be translated into a set of implementation capacity indicators and be used to construct an index to assess governments' capacities for implementing global environmental goals is covered in chapter 7.
- Research question 4, which seeks answers for how an implementation capacity index can be developed to inform the implementation of the environment-related SDGs and Post-2015 Development Agenda, is presented in chapter 8.

Chapter 5: Country experience in formulation, implementation and monitoring of global environmental goals – via the experience of Southeast Asian and European countries

This chapter presents the identified features of national policy development, implementation and monitoring activities for environmental goal implementation, within the context of global environmental goal-setting efforts. In order to identify these implementation features the chapter was based on an extensive document review covering the implementation of selected MDG 7 targets and related international environmental agreements in 20 countries in emerging Asia and Europe. In total, ca. 300 policy documents and ca. 200 peer reviewed articles were included in the document review. The methodology of the document review is described in chapter 4.4.

As shown in Annex 1, progress towards the MDG7 targets showed a mixed picture in the studied countries. Since the aim of the document review was to find response patterns to environmental goal implementation that can help identifying implementation capacity factors for the development of a set of implementation capacity indicators, the chapter did not aim to carry out an assessment of the effectiveness of the responses but solely to identify general trends of implementation. Accordingly, this chapter attempts to provide a comprehensive overview of the national approaches to environmental goal implementation without a judgement on how successful the measures were actually. It will provide an overview of:

- how global environmental goals were translated into national level policies (chapter 5.1);
- how the studied countries attempted to implement (chapter 5.2), monitor and review (chapter 5.3 and 5.4) the set goals;
- a list of the implementation capacity themes that emerged from the identified approaches.

Besides the in-text country-specific examples, the data that further supports the findings discussed in chapters 5.1-5.4, with additional country-level examples, is included in Annex 4.

5.1 Environmental goal setting in the studied countries

In order to translate global environmental goals into national goals, the review highlighted the importance of developing a relevant and comprehensive policy/strategic framework and establishing an institutional set-up for implementation. This section presents the national approaches to these two implementation themes.

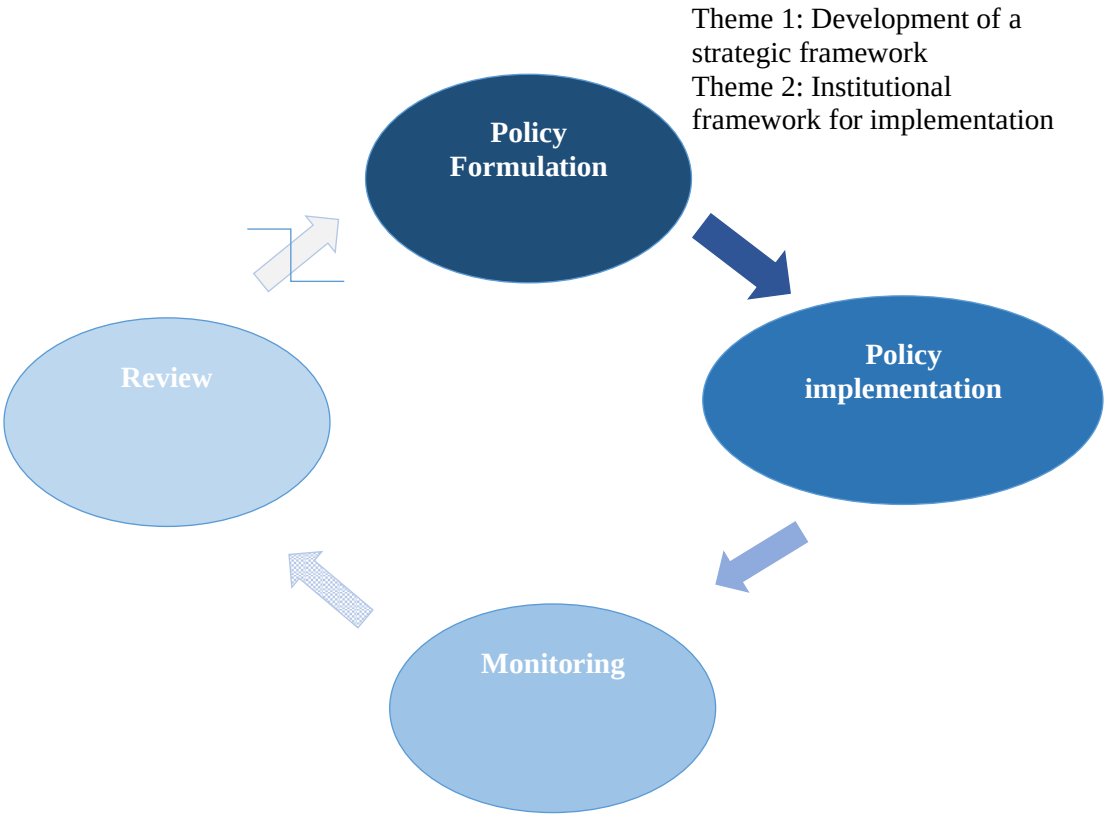


Figure 13: Identified implementation themes of environmental goal implementation processes in the policy cycle

5.1.1 Theme 1: Development of a national strategic framework

In most of the countries studied, the introduction of global environmental sustainability objectives into national policy contexts began with the ratification of various MEAs. In 2000, with the adoption of the MDGs, some of the MEAs (e.g. the UNFCCC, the CBD and the Montreal Protocol) became part of the first set of global environmental sustainability targets (MDG7). Some countries had already ratified these Conventions before the adoption of the MDGs, while others adopted them after 2000.

Several countries outlined that the adoption of such environmental goals acted as a "compass" helping to define future sustainability directions and to formulate and extend national environmental policies. For example, Armenia noted that *its environmental policy has been shaped mainly according to requirements of the international conventions and MEAs* (Armenia, Government and UN CT in Armenia 2010, 67). At the same time, others e.g. Albania (UNECE 2012a) and the Lao PDR (Lao PDR, MoNRE 2012) suggested that the adoption of new global environmental goals were not always carefully considered, had sometimes been overambitious, and that their overall success had been hampered by insufficient capacity for implementation. For instance, the 2012 Environmental Performance Report (EPR) report of Albania noted the "*tendency to concentrate efforts on adopting new MEAs while implementation is still falling behind"* (UNECE 2012a, 63).

Synergies between the adoption of global goals and efforts at regional integration were also highlighted. In fact, many of the European countries noted that EU accession efforts were one of the major driving forces behind international environmental goal implementation efforts. Bulgaria in its 2008 MDG progress report mentioned that "*environmental sustainability is one of the MDGs where the impact of Bulgaria's accession to the EU was felt most strongly"* (Bulgaria, UNDP 2008, 62). In Serbia the EU integration process *"had a decisive influence on determining the priorities of international cooperation of RS in the environmental field"* (Todic and Dusko 2014, 176). In the Asian countries, the ASEAN also influenced national environmental goal setting (Cambodia, MoE 2014; the Philippines, DNER 2014; Malaysia, MoNRE 2009).

In order to integrate global environmental goals into the national strategic framework and to provide a basis for their implementation, many countries started to align environmental priorities with socio-economic objectives and/or include at least some of the environmental goals in national development strategies and plans. During the course of the studied period, environmental priorities gradually appeared in such documents, starting with forestry and water management, and expanding to objectives such as climate change or biodiversity protection. In more recent development plans, sustainability has been often highlighted as a ruling principle for development. In the 10th Malaysia Plan for the 2011-2015 period the government stated that it aims to *"protecting the environmental quality of life, caring for the planet, while harnessing*

economic value from the process" (Malaysia, EPU 2010, 297) . Moreover, many countries included the right to a healthy environment in their national constitutions and a few countries also included references to citizens' obligation to protect the environment. Montenegro declared itself as an "Ecological Country" in its constitution (Ministry of Tourism and Environmental Protection 2007). In Cambodia, where the degradation of land areas and deforestation puts a major pressure on the livelihood of the rural population, the constitution obliges the government to rationally use natural resources and ensure environmental protection (Cambodia, MoE and UNEP 2008).

To support the implementation of environmental sustainability goals, either linked to international commitments or driven by domestic needs and objectives, countries have developed and adopted a variety of policy documents including legislations, integrated or issue-focused environmental strategies, policies, and various planning documents:

- **Environmental strategies and policies:** To set a comprehensive vision for environmental sustainability, the countries developed sustainable development strategies and/or cross-cutting environmental strategies or policies. Countries also introduced sectoral strategies or policies focusing on various issues such as water, climate change or forestry. Although many countries lacked sector-specific strategies at the beginning of the 2000s, they usually developed necessary strategies over the course of the study period. In some cases, relevant Conventions provided basis for developing sectoral strategies i.e. for biodiversity protection or climate change.
- **Environmental plans:** Planning documents detailing specific actions for the implementation of the relevant environmental goals were also considered as essential. These ranged from general environmental action plans, issue-based plans, programs, management plans and MEA implementation plans. Moreover, spatial plans, local environmental plans, Local Agenda 21s and urban plans for solving specific environmental issues at the subnational level were also put forward.
- **Environmental legislation:** To promote and enforce implementation, countries ratified MEAs; introduced environmental principles into the national legislative framework; and created specific environmental laws. Some kind of law on environmental protection had already been introduced in many countries before the studied period in the 1980s and 1990s, but more specific and detailed environmental

legislation - signaling a more comprehensive legal framework - often appeared only after 2000.

5.1.2 Theme 2: Establishment of an institutional framework for implementation

Another important step in the national contextualization of global environmental goals was the creation, adjustment or strengthening of an institutional set-up taking the lead in the formulation and the implementation of national environmental policy documents. In most studied cases, policy development and implementation processes have been led by the ministries responsible for environmental protection (sometimes jointly with the ministry for agricultural production) and supported by environmental agencies as well as other sectoral ministries and subnational, local bodies. In many instances, the ministries responsible for environmental protection were already in place before the adoption of global environmental sustainability goals started, but the global and the regional initiatives had the effect of strengthening these institutional mechanisms. For example, Malaysia established a Department for Environment already in 1974 (Malaysia, EPU 2005) and by 2011 it had *"ministerial councils on green technology, forestry and biodiversity, two (or more) dedicated ministries on environment and natural resources, numerous cabinet processes, cross-agency task forces… and a de facto environmental policy unit in central planning agency"* (Hezri 2011, 65-66).

With the ratification of the various Conventions, countries also created dedicated lead units or focal points for various global environmental goals within the ministries, such as Ozone Protection or Climate Change offices. Implementation and enforcement responsibilities were often designated to general or issue-focused environmental agencies and/or shared between different sectoral ministries and bodies. E.g. in Cambodia, *"climate change focal points have been appointed in each ministry to develop strategies, plans and projects"* (Am 2013, 8). Moreover, decentralization processes have also accelerated during the studied period as governance parties gradually started to devolve natural resource management to sub-national (regional and local) level bodies.

As a result of the integration of environmental considerations into the work of sectoral authorities and decentralization, the synchronization of policy development and

implementation required the establishment of various coordination processes and mechanism. Coordination was considered necessary both vertically (between different levels of government) and horizontally (between different governance bodies) as well as with various stakeholders. (Vietnam, MoNRE and UNEP 2008, 42; Croatia, MoE 2014; 2014b).

For the coordination of policy development and implementation among government bodies as well as among other stakeholders and academia, countries designed various frameworks and platforms. Romania established an Inter-ministerial Committee to oversee and co-ordinate environmental policy development (UNECE 2012b). The Philippines, focusing solely on climate change, created an Inter-Agency Committee on Climate Change in 2009 to co-ordinate climate change policy-development and implementation efforts between various government agencies (the Philippines, Government 2014b). For stakeholder involvement, more formalized platforms were the National Councils for Sustainable Development (NCSD), created to provide a permanent platform for consulting businesses, NGOs or local communities concerned with implementation of plans and programs. In order to ensure that environmental considerations are integrated into decision-making processes and environmental goal implementing organizations have sufficient and easy access to necessary environmental information, ad-hoc and formalized cooperations between universities or research institutions and environmental goal implementing organizations was also promoted.

5.2 Environmental goal implementation in the studied countries

Moving through the policy-implementation cycle, countries attempted to put in place different types of enablers and measures for implementation. According to the country assessments, such enablers included adequate institutional capacities, securing sufficient financing from national and international sources, while implementation measures concerned the enforcement of legislation; awareness-raising and stakeholder engagement and supporting research activities.

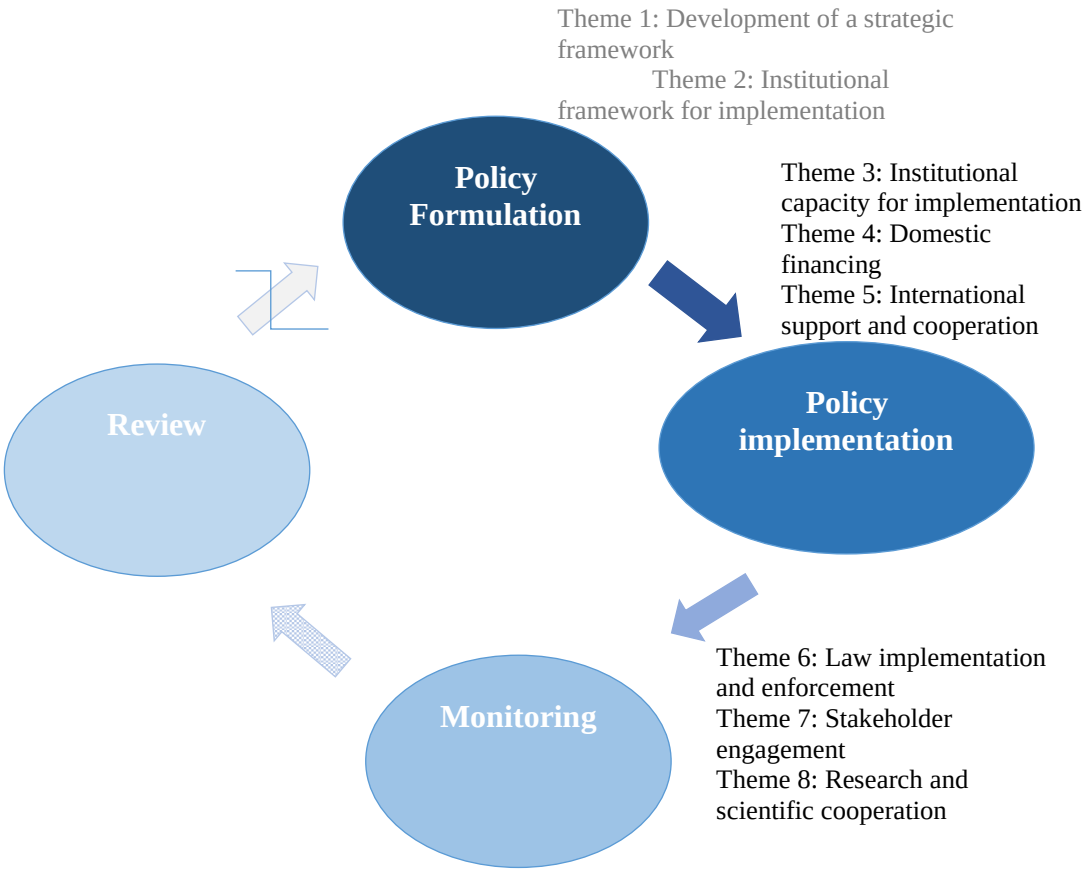


Figure 14: Identified implementation themes of environmental goal implementation processes in the policy cycle

5.2.1 Theme 3: Institutional capacity for implementation

Once the institutional framework was established for environmental goal implementation, countries needed to ensure the continuous and efficient functioning of these institutions. For this, a variety of institutional capacity elements were considered necessary.

During the studied period, the countries worked towards establishing the needed capacity of the institutional framework created for the implementation of environmental goals. According to country these capacities included human, technical and financial resources of the implementing institutions, both at the national, regional and local level. The 2013 MDG report of Montenegro summarized these requirements as follows: *capacity building and ensuring adequate support (political, financial and human resources) for the achievement of MDG 7 target values is the key recommendation for the future.* (Montenegro, MoSDT 2013, 38).

Such institutional or administrative capacities were required and utilized for implementing environmental strategies and plans; enforcing relevant legislations; providing technical (such as research or monitoring) expertise to implementation or enforcement; providing education or awareness-raising to stakeholders; participating in international co-operation activities or to carry out day-to-day environmental management tasks to manage protected areas or monitor water resources. Some countries also found it important to ensure capacity (both at the national and the local level) to design legislation, strategies, but others outlined the need to focus capacities on actual implementation instead of the development of additional strategies and legislations. For example, the NCSA of Thailand found that *"the inadequate capacity for effective law enforcement to be more important than the possible development of new legislation tailored to the convention's implementation"* (Thailand, ONEP 2009, 46) *and* Macedonia noted that "*the already limited financial and human resources are mainly devoted to making rather than implementing policy"* (UNECE 2011b, xxv).

In general, most countries noted that the overall institutional capacities necessary to fulfill international environmental obligations and to achieve underlying goals remained low (see chapter 6.3), even though some progress has been made over the course of the studied period to address such constraints. The 2011 MDG report of Myanmar suggested that the *"national response to obligations under the UNFCCC…remain limited because of a lack of relevant human and institutional capacities"* (Myanmar, UN CT 2011, 33).

5.2.2 Theme 4: Domestic financing of environmental goal implementation

Securing sufficient financing for the implementation of environmental goals was perceived as a crucial if not central element of success. While financing is also discussed in other themes (e.g. to improve institutional capacity or to carry out research and monitoring), this section reviews capacity elements directly related to financing of environmental goals, instead of support functions.

Primarily, environmental financing was required for the development and maintenance of various forms of environmental infrastructure. Related to the MDG7 objectives, such

investments included infrastructure for forest fire control, water supply and wastewater facilities, energy efficiency investments, development of nature protection networks, and investments to tackle industrial damages or in some cases, war damages. Financing was also required to carry out targeted programs in order to protect terrestrial bio-diversities, marine or coastal areas as well as to restore or improve the quality of various natural resources (i.e. forests or fauna).

To secure sufficient domestic financing, countries highlighted that the implementation of the environmental goals should be linked to government (investment) programming and that budgets should be allocated for implementation both at the national and local levels. In response to increasing financing needs, many countries created integrated or issue-based environmental funds. Others attempted to mainstream environmental objectives into various state funds. To raise additional financing, countries introduced the "polluter pays" and "user pays" principles into environmental legislation and in line with the principles, launched various environmental taxes and put charges on the use of natural resources. Besides taxes and charges, countries also introduced financial mechanisms with the intention of incentivizing environmentally friendly behavior from businesses and citizens, and to mobilize private resources for environmental objectives. These incentives included subsidies, loans and other co-financing mechanism for environmental investments or for environmentally friendly technologies; in-kind contributions to households or communities; output-based funding (e.g. payments for ecosystem services); and emissions trading mechanisms.

At the same time, some assessment documents recognized that increased financing itself is not sufficient to solve environmental problems and funding should be managed in a sensible way to achieve the highest benefits. The 2008 EPA of Thailand suggested that *"funding alone is rarely a full answer to complex environmental problems…*and*…making a case for greater government expenditure...requires a comparison of that expenditure with its expected benefits* (Thailand, MoNRE and UNEP 2008, 62).

5.2.3 Theme 5: International support and co-operation for implementation

As noted above, several countries considered international support indispensable to the implementation of international environmental goals, in line with the principle of common, but differentiated responsibilities.

Most countries emphasized that environmental goal implementation activities are (highly) dependent on sustained international support. In its submission to the Rio+20 conference, the Government of Moldova noted that implementation of those 19 MEAs to which the country is a member "*was possible due to the external assistance*" (Moldova, WG Rio+20 2012, 17). In its Second National Communication to the UNFCCC, Malaysia noted difficulties *"to progress to a low carbon economy without technological and financial assistance*" (Malaysia, Ministry of Natural Resources and Environment 2011, 89). Taking a step further, the NCSA report of Thailand labelled the assistance from foreign donors as *"the actual driver for progress made towards the implementation of the CBD and UNFCCC"* (Thailand ONEP 2009, 80).

The assessment documents differentiated between financial and technical support from the donor communities. Received in the form of grants and concessional loans, international financial support for environmental goal implementation included ODA from OECD-DAC members and other financial support from non-OECD donor countries; funding provided by international organizations, businesses and NGOs, as well as EU accession funds for countries in Southeast Europe. Funds were primarily used for infrastructure development and capacity-building and less frequently for research or monitoring. Besides financial support, countries also relied on technical assistance from donor countries in order to support environmental goal implementation. Technical assistance included: international support for strategy development and planning activities; capacity-building for implementation and monitoring activities; public awareness-raising activities; technology transfers; establishment of monitoring stations or laboratories to contribute to data collection, assessment and reporting. In addition to financial or technical support from developed economies, countries also noted the importance of international cooperation, collaboration or exchange of experiences with other countries (see further details in chapter 6.5).

5.2.4 Theme 6: Law implementation and enforcement

The countries attributed a major importance to the implementation and the enforcement of environmental laws and regulations.

As discussed in section 5.2.2, governments adopted various policy documents and legislations to support environmental goal implementation. In order to ensure that these were implemented in practice, the studied countries introduced various measures. Example of measures included the designation and management of protected areas; large-scale reforestation or rehabilitation programs; the development of forest fires prevention systems; the introduction of water management and energy efficiency measures; and the construction of renewable energy plants or water infrastructure. However, policy and law implementation often remained insufficient. The 2014 EPR of Croatia found that the cross-sectoral integration of environmental considerations has remained *"largely conceptual"* (UNECE 2014a, 19) and the 2008 EPA of Thailand noted deficiencies in "*translating some of the announced policy principles into practice* (Thailand, MoNRE and UNEP 2008, 67).

To improve the environmental performance of industries and businesses and to regulate their use of natural resources, the countries introduced environmental permitting, e.g. for water use, forest harvesting, GHG emissions permitting or Integrated Polluting Permitting Systems. Obligatory Environmental Impact Assessments (EIA) of major investments and projects became part of licensing procedures in many countries. To make permitting and licensing more transparent, they introduced various improvements to institutional arrangements and capacities as well as to technical processes (see chapter 6.6).

In order to ensure and monitor compliance with government regulations, reduce illegal logging, hunting or fishing, uncontrolled interventions to the water supply system and tackle corruption related to environmental management and natural resources, the countries attempted to strengthen their enforcement framework. They aimed at establishing registers to track activities with environmental impacts; carrying out environmental (regular) inspections, imposing sanctions and fines; identifying worst offenders. Related to enforcement, most countries also tried to improve the capacities

of the judicial system by ensuring the access of citizens to justice on environmental matters; training of judges about environmental issues; securing the necessary technical experts during court procedures and improving the coordination with police forces. For example, Malaysia established Environmental Courts (Malaysia, MoNRE 2014); and Indonesia launched a task force to improve coordination between various enforcement bodies (AECEN 2008). In connection with the management of natural resources, the assessed countries also attempted to settle land ownership rights and improve land management principles during the studied period.

5.2.5 Theme 7: Stakeholder engagement

The achievement of environmental goals also rests on the engagement and involvement of stakeholders. In country assessment documents, the main stakeholders mentioned were individual citizens and communities, NGOs and other civil society organizations, and businesses. While many countries engaged stakeholders (at least to a certain extent) during the consultation processes of strategic documents and during operative decision-making processes (i.e. during EIA consultations), they also considered it crucial to involve stakeholders in the actual implementation. Although in general a variety of actions were undertaken to target the involvement of different stakeholder groups, the outcomes and impact of these activities seems to have been less studied.

Countries used various means to increase stakeholder involvement, including communication campaigns, information sessions, media articles, and environmental awareness days. Most awareness-raising activities targeted the general public and some focused on specified groups (such as journalists or small business owners). Topics covered water resource management, climate change and natural resource use, compliance with environmental legislation, and financing mechanisms. The importance of local-level community awareness-raising was also outlined by many countries.

A more systematic way of stakeholder engagement was via the inclusion of environmental education in school curricula, or through the organization of training for targeted groups (such as NGOs, journalists, industries, project beneficiaries). As for educational activities, many countries have joined the UN Education for Sustainable Development Initiative and subsequently attempted to introduce sustainability elements

at various levels of the education system. Some countries have achieved considerable progress and fully integrated these elements into the curricula, whilst in others sustainability education activities remained heavily donor funded and more ad-hoc in nature. Adult or life-long education was carried out usually in the form of training or capacity-building programs. These usually targeted specific groups to ensure better compliance with legislation (e.g. ODS phasing-out) and to promote more advanced technologies or sustainability practices. Complementary to training, countries also developed manuals, technical notes or codes of good practices to promote and transfer new techniques and technologies to the public and businesses.

Several countries emphasized the crucial role of civil society in implementation of environmental goals. In most countries, NGOs were encouraged to participate in awareness-raising activities, to provide training to other stakeholders, and to implement projects to improve environmental conditions. They often formed cooperations with businesses, academia or government bodies.

Besides compliance with relevant environmental legislation, many countries emphasized the importance of engaging businesses in environmental activities and to integrate environmental considerations in their operations. Some countries reported progress in adoption of environmental management, audit and reporting schemes, such as the ISO, the EMAS or the Global Reporting Initiative (GRI). To avoid over-exploitation of resources, countries also tried to involve businesses in environmental accounting initiatives and signed voluntary agreements with them to creative incentives for sustainable resource management practices. Certification programs (for forestry or fisheries) or labelling also seemed to be a particular area of interest. Many countries also attempted to embed environmental considerations into privatization processes as well. At the same time, the involvement of businesses into environmental goal implementation remained challenging. In Serbia, research noted "*a lack of motivation of the economic sector to take active voluntary participation in environmental protection"* (Nadic 2012, 332) and related to forest management, Cambodia suggested that *"companies' activities are not compliant with sustainable development "* (Cambodia, MoP 2013, 35).

5.2.6 Theme 8: Research and scientific co-operation

The third area of implementation that countries considered as crucially important was scientific research. Research was considered essential for supporting the development of a realistic and appropriate strategic framework; for supplementing operative decision-making processes with relevant information; to develop innovative sustainability solutions and technologies; and to provide a basic foundation for monitoring and review activities.

In order to carry out environmental research, the countries aimed at establishing the necessary research infrastructure, which included institutional, technological, and human capacities. To increase capacities, countries restructured or reorganized existing research institutions to carry out more targeted environmental research activities. Research infrastructure appeared to increase with the introduction of environmental education at universities, which required the engagement of researchers in relevant scientific activities.

Countries also found it important to identify research priorities for environmental goal implementation and for this to carry out long-term research programs. Research programs were suggested to be especially vital in the area of climate and biodiversity protection as well as for the development of new and more cost-efficient technologies for water and energy-related infrastructure development. Another specific area of research was to identify, gather and transfer relevant knowledge for safeguarding indigenous, traditional practices.

The need for cooperation in carrying out research activities, was mentioned both at the national and the international level. To improve cooperation at the national-level, countries attempted to created research networks and platforms, web-based databases, or other mechanisms to facilitate information exchange. Cooperation with businesses was often discussed as well, especially for the facilitation of technology transfers. In terms of international co-operation, the research programs of the EU facilitated the move towards intensified collaboration and supported research activities in many countries. Similar initial co-operation efforts were also observed in the Southeast Asian region, e.g. within the framework of the ASEAN.

5.3 Monitoring of environmental goal implementation in the studied countries

In connection to monitoring of progress towards the set environmental goals, two major themes emerged from the studied literature. First, countries aimed at establishing a monitoring framework with sufficient resources available to carry out regular monitoring activities. Second, data collection processes were determined in order to ensure that the collected data is good-quality, timely and available for further analysis.

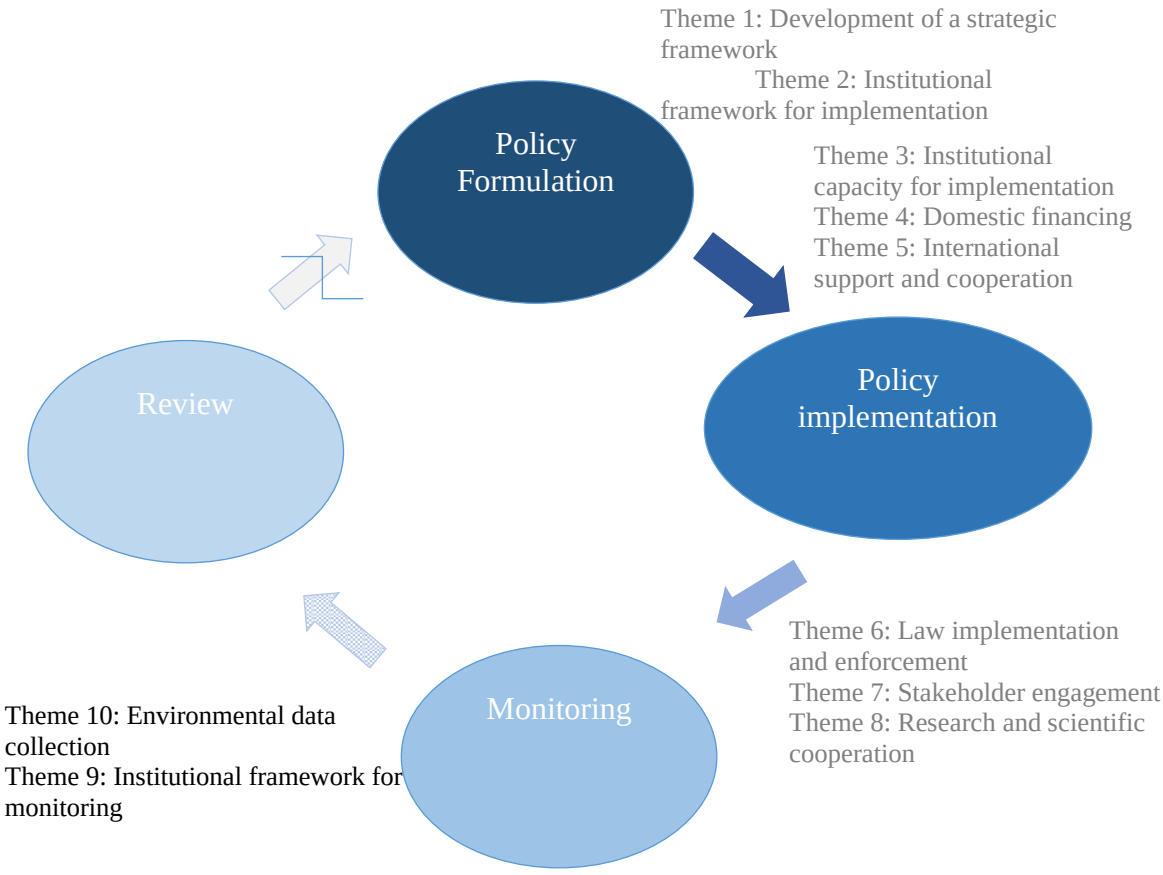


Figure 15: Identified implementation themes of environmental goal implementation processes in the policy cycle

5.3.1: Theme 9: Institutional framework for monitoring

The first task in monitoring of environmental goal implementation was to initiate or identify a national network of institutions, assign clear data collection responsibilities and allocate necessary resources to the relevant institutions involved in the monitoring process.

Most countries designated responsible ministries or agencies to conduct the collection of environment-related data and statistics from subordinate bodies and stakeholders, such as NGOs, research institutions and self-monitoring institutions. As in most countries a variety of public and stakeholder institutions are involved in monitoring, inter-institutional mechanisms were found important in order to co-ordinate information exchange and co-operation between them. Usually, such coordination was one of the responsibilities of the main responsible authority (or authorities) designated to collect environmental data and statistics. The importance of ensuring sufficient human capacities, financial resources and adequate technical capacities were frequently noted in order to fulfill monitoring responsibilities. In connection to this, countries noted that the monitoring of international environmental goals, such as the MDG7 targets or various environmental Conventions, boosted national environmental monitoring capacities and these processes were also helpful in establishing the capacities of national statistical institutions, developing common data standards, collecting baseline data for future and improving the quality of monitoring processes.

Countries have also joined global and regional monitoring initiatives. In Southeast Europe, accession countries were requested to join the European Union monitoring initiatives, such as European Environmental Agency (EEA) and the European Environment Information and Observation Network (EIONET). Southeast Asian countries had less intense collaboration but found regional monitoring cooperations important to ensure better data for the monitoring of trans-boundary water or biodiversity resources.

5.3.2: Theme 10: Environmental data collection processes

To effectively monitor progress towards environmental goals, countries have introduced monitoring plans and programs of various environmental issues. These plans included the selection of indicators for status and progress measurement, the establishment of underlying quality standards and the development of mechanisms for measuring the indicators. For example, Croatia introduced a national list of biodiversity indicators (Croatia, Ministry of Foreign Affairs 2010); Macedonia and Montenegro both adopted a set of national environmental indicators and developed monitoring plans

to support their assessment (UNECE 2011b; Macedonia, Ministry of Finance 2009; UNECE 2015a).

To ensure good quality and comparable data sets (over time and cross-country), standardized and harmonized monitoring methodologies, including data collection, sampling techniques and quality controls procedures were considered necessary by the studied country documents. In the case of environmental goals under MEAs, monitoring methodologies had to be in compliance with international guidelines but, at the same time, tailored according to national circumstances. In general, this motivated countries to improve monitoring techniques. Southeast European countries also strived to be compliant with EU monitoring methodologies and the countries of Southeast Asia also aimed to harmonize their data with neighboring countries or with other ASEAN members.

Country assessment found integrated environmental or issue-based databases and spatial information systems as important tools to systematize data collection, to avoid gaps or overlaps in collected data, to ensure processing and assessment, and to ensure an adequate flow of data. Such platforms were also seen as important in order to co-ordinate information exchange and cooperation between various public monitoring bodies; to gather and harmonize data collected by various stakeholders; and to support decision-makers with easily accessible and processed data for strategy development and for monitoring of implementation. EU members and accession countries in Southeast Europe that joined the Eurostat and the EEA SOER processes were also required by the law to develop such systems, although the systems were often not functional (BiH, MoFTER 2012; UNECE 2014a). In Southeast Asia, integrated data platform process development efforts were more limited and started even later, although early attempts at creating issue-specific databases were identified (Indonesia, Ministry of Environment 2010; the Philippines, Government 2014b).

Even if a more or less solid institutional framework was in place, countries have reported various challenges related to the data collection process itself. Countries linked weak data to the lack of designated authorities to collect the data, insufficient financing, a lack of technical-human capacities, and outdated and inadequate methodologies. For instance, the 2012 EPR report of Albania stated that *"environmental monitoring*

activities have not demonstrated great improvement in recent years in spite of a number of dedicated assistance projects, supply of modern equipment and specialized capacity-building for national experts" (UNECE 2012a, xxiv). This suggests systematic problems in the data collection processes, which were the results of a mix of weaknesses in the monitoring system and have been aggravated by the lack of political and public interest in environmental statistics as well as contextual challenges.

5.4 Review of environmental goal implementation

Country documents also outlined the importance of evaluating progress towards environmental goals and inform policy and decision-makers and other stakeholders about the implementation outcomes. Furthermore, reporting aimed to support policy revisions in the interest of improving policies and adapting them to the changing global and national contexts.

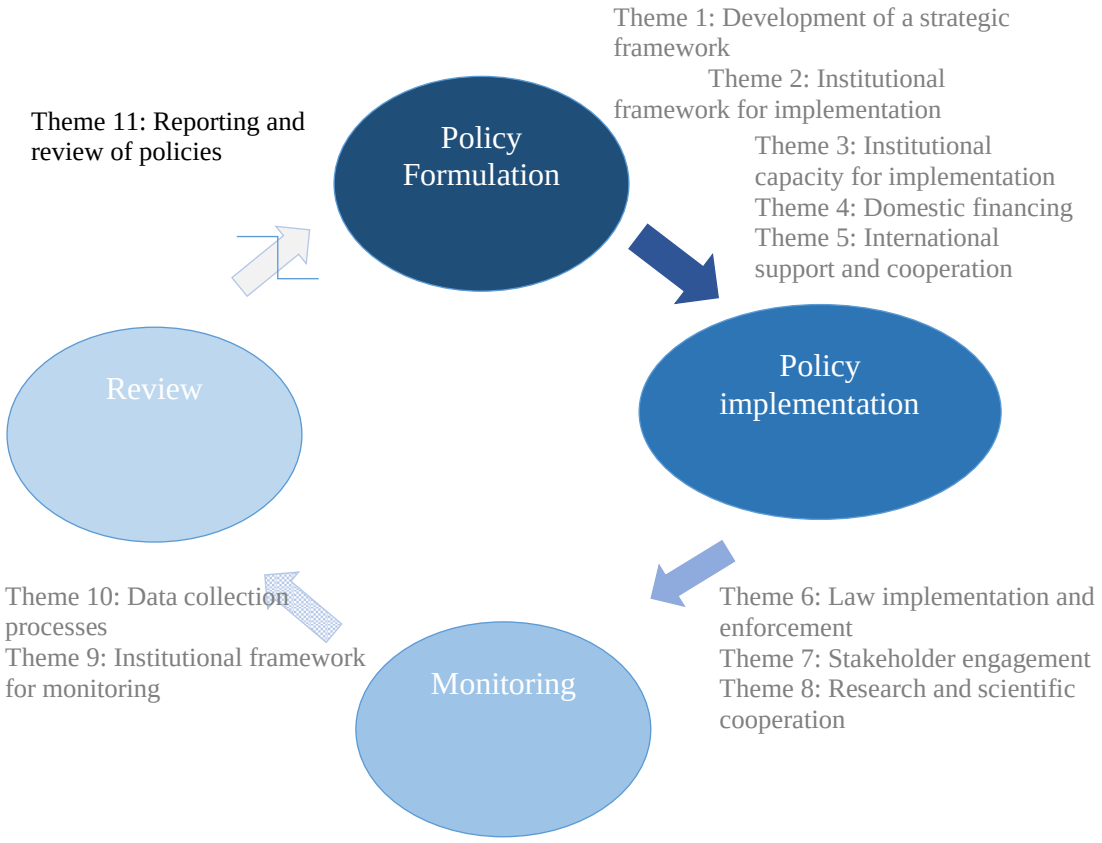


Figure 16: Identified implementation themes of environmental goal implementation processes in the policy cycle

5.4.1: Theme 11: Reporting and review

Reporting activities were introduced in the countries with various objectives. One of the major objectives was to fulfill international reporting requirements related to MEAs, MDG implementation and other international processes, e.g. EU accession in the Southeast European region. These attempts were either driven by donor requirements and the need to remain eligible for international funding, or by the country's willingness to be adequately represented at international fora and fulfill international commitments. As a result, even in those countries where national environmental reports were rarely prepared, international reporting obligations were more or less fulfilled. Another aim of the reporting process was to inform, decision-makers and the public about the status of the environment and documenting progress with implementation of environmental policies. The third, but less frequently mentioned, aim of environmental reporting was to establish systematic policy review processes in order to track implementation of various environmental policies, including general environmental strategies, Conventions and sectoral or local environmental plans.

It was found important to apply international guidelines during the content development, ensure regular reporting activities with clear linkages to policy revision processes and to make the reports available and accessible for the public. As for report preparation and policy review mechanisms, the CBD reporting can be considered as a good example: signatory countries have not only been required to submit regular national communications as per the requirements of the Convention, but also to prepare and review national strategies for the implementation of the Convention.

Measures to guarantee smooth public access to the result of reports included the establishment of a designated unit or department within the responsible ministry to coordinate information management; regular website updates; preparation of publications and organization of seminars or conferences.

Despite the above trends, there seemed to be limited examples for evidence-based policy revisions. In most countries, environmental strategy documents did not require implementation assessments (Thailand ONEP 2009; Timor-Leste, Ministry of Economy and Development 2012; Armenia, Ministry of Nature Protection 2004) at all

whilst, in other cases, implementation reports were not prepared in spite of the legal requirements (UNECE 2015b; Turkey, MoEF 2011). At the same time, some good practice examples were also identified: for example, the Montenegrin Government have adopted five reports on the implementation of its NSDS by 2014 (UNECE 2014) and in 2012, the government of Romania compiled monthly implementation reports about the implementation progress with its NSDS (UNECE 2012b). External processes also seemed to boost other policy revision processes: Bosnia used its State of the Environment Report (SoER) to the European Environmental Agency as a basis to update and revise environmental policies and Bulgaria reviewed its Clean Air municipal programs after a legal investigation was launched by the European Community.

Improving government accountability was also emphasized. Proposed methods included regular parliamentary sessions on the progress towards environmental goals and adoption of sustainability/environmental reports by the parliament (UNECE 2015a; Thailand, MoNRE and UNEP 2008); establishment of a multi-stakeholder accountability committee (Romania, MoE 2008; Cambodia, MoE 2007) and the creation of a transparency portal (Timor-Leste, Ministry of Economy and Development 2012).

5.5. Findings of the review of country experiences with environmental goal implementation

As stated in the introduction, this chapter aimed to identify response patterns and provide a comprehensive overview of the national approaches to environmental goal implementation without an actual judgement on how successful the measures were actually. The main conclusion of this chapter is that countries tended to focus more on the environmental policy development processes and less on addressing actual challenges during the implementation of environmental objectives and on monitoring implementation efforts. This often resulted in broken policy cycle mechanisms where policy-oriented monitoring was lacking, and the review and update of existing strategies was not based on actual monitoring of implementation efforts.

The reviewed documents suggested that global environmental goal-setting activities had a positive impact on accelerating national environmental goal setting and supporting policy formulation processes in many of the countries. Various environmental strategies and plans were developed, and underlying legislations were adopted. In order to implement these policies and legislations, countries made efforts to establish the necessary institutional framework and to secure institutional capacities and financing sources. However, the documents recognized various flaws, gaps and weaknesses in these processes, which were suggested to hamper actual implementation efforts. Major, frequently quoted challenges included; inadequately developed and incoherent strategies and legislative documents, institutional fragmentation and the lack of horizontal and vertical coordination, overlapping and conflicting implementation responsibilities, lack of political will to support implementation, unsatisfactory human and technical capacities and insufficient financing resources.

As a result, the reviewed documents often implied that countries faced major difficulties in implementing environmental strategies and enforcing legislation, engaging citizens, businesses and other stakeholders in implementation activities and building further environmental knowledge via research activities. Given the difficulties during the implementation processes, the studied countries seem to have even more limited capacities to monitor policy implementation, to review or update policies and thus, to systematically address weaknesses in institutional and financial capacities or solve other implementation challenges. If countries identified and introduced solutions to address the recognized implementation challenges, these were often suggested to happen without systematic considerations and realistic feasibility assessments and, therefore, resulted in limited improvements.

As presented in this chapter, the review of the national approaches to environmental goal implementation in the studied countries identified eleven major implementation themes. See Table 11.

Table 11: Identified implementation themes of environmental goal implementation

Stages of the policy cycle	Implementation Themes
Policy Formulation	1. Development of a strategic framework
	2. Institutional framework for implementation
Policy implementation	3. Institutional capacity for implementation
	4. Domestic financing
	5. International support and coordination
	6. Law implementation and enforcement
	7. Stakeholder engagement
	8. Research and scientific co-operation
Monitoring	9. Institutional framework for monitoring
	10. Environmental data collection processes
Review	11. Reporting and review

Within these major implementation themes, specific features of these processes were also identified during the document review. Ca. 200 implementation capacity factors emerged from the initial document review (see Annex 3b), which were then clustered into 58 factors. Grouped under the eleven implementation themes, these implementation capacity factors are presented in chapter 6 in detail.

Chapter 6 Priority national capacity factors for environmental goal implementation

Drawing on the observed features of environmental goal implementation processes, in this chapter, a set of implementation capacity factors are presented and validated for the purposes of developing a set of implementation capacity indicators for the STMI.

As presented in chapter 5, the findings of the document review concerning the national approaches to environmental goal implementation were clustered into 58 implementation capacity factors grouped under eleven themes. See Table 11. These factors were then validated via a questionnaire, targeting government officials, researchers, and civil society representatives. Respondents of the questionnaire were requested to prioritize those implementation capacity factors, which they consider crucial for environmental goal implementation. As a result, a subset of 17 priority implementation capacity factors were identified. The methodology of the document review and the questionnaire collection were presented in chapter 4.4 and 4.5.

This chapter is structured according to the eleven implementation themes presented in chapter 5. Under each theme, first the identified implementation capacity factors are discussed – five or six for each of the themes. Then the questionnaire results are presented concerning the prioritization of the implementation capacity factors of a given implementation theme. Lastly, in chapter 6.12, based on the results of the questionnaires, the 17 implementation capacity factors prioritized by the majority of the questionnaire respondents are presented.

6.1 Theme 1: Development of a strategic framework

In relation to the development of a strategic framework, assessment reports have documented a variety of challenges and success factors (implementation capacity factors) that potentially influence implementation outcomes. The overview of the identified implementation capacity factors is presented in the table below, followed by a short overview of the factors and the results of the questionnaire responses concerning this theme.

Table 12: Challenges and success factors (implementation capacity factors) concerning Theme 1: Development of a strategic framework

Implementation Theme	Implementation Capacity Factors	Justification
1. Development of a strategic framework	1. Policy documents are based on research and feasibility studies	To support the development of policy documents with data, feasibility studies and ex-ante assessments
	2. Policy documents are consulted with stakeholders	To integrate stakeholder perspectives into policy documents and secure their ownership over the developed documents
	3. Policy documents are coherent and harmonized	To address gaps, overlaps, and inconsistencies in the strategic framework (with a formal mechanism)
	4. Policy documents use integrated approaches	To mainstream sustainability aspects into relevant strategies and sectoral plans and to ensure integrated environmental planning
	5. Policy documents set concrete, quantified and time-bound targets	To increase policy efficiency by specifying and quantifying implementation objectives
	6. Policy documents reflect/ are translated to regional/local circumstances	To include local perspectives in national strategies and policies and to develop plans addressing local problems

Theme 1, Implementation Capacity Factor 1: Policy documents are based on research and feasibility studies. Country assessment noted the need for in-depth research and analysis of environmental strategies and policy documents to ensure adequate implementation. Inadequately developed or too ambitious strategies were often due to the lack of physical assessments (Indonesia, MoE 2009; Macedonia; Ministry of Finance 2009; Yenigun 2009); the lack of baseline environmental statistics (UNECE 2007a; Lao PDR and the UN 2008; Lestrelin 2010; Miyazawa 2013); and the lack of scientific evidence to support sustainability solutions (Käkönen et al. 2014; Cambodia, MoE and UNEP 2008; Vietnam, MoP 2010). Besides, strategic environmental assessment (SEA) of policy documents and regulatory impact assessments of legislative documents were also considered necessary. However, capacities to implement these assessments in practice were often lacking (UNECE 2012a; Victor and Agamuthu 2014; Çörtoglu 2013). With regard to feasibility assessments, financial analysis seemed especially missing (Montenegro, MoSDT 2012; Milutinovic 2010).

Theme 1, Implementation Capacity Factor 2: Policy documents are consulted with stakeholders. Stakeholder consultation throughout the strategy development process was found to be crucial to develop understandings about diverse implementation perspectives and secure national ownership of the final documents. Many countries carried out national consultations for strategy development via workshops, roundtable meetings, questionnaires and surveys (Bulgaria, MoEW 2013; Montenegro, MoSDT 2013; Indonesia, Ministry of Forest and Environment 2014). Besides ad-hoc consultation processes, some countries also established National Sustainable Development Councils to enhance wider stakeholder participation in the longer-term. These Councils have usually involved representatives of national and local governments, academia, business and the NGO sector and later were also involved in operative decision-making processes (see Theme 2, chapter 6.2). However, in spite of positive intentions, some strategy documents were carried out without wider consultations and the end-product was at times only reflected the views of more powerful stakeholder groups (Macedonia, MoE 2005; Simpson 2015; Indonesia, BAPPENAS 2012).

Theme 1, Implementation Capacity Factor 3: Policy documents are coherent and harmonized. Countries found it essential to ensure coherence between elements of the environmental policy framework and harmonize them with other national strategic documents, such as sectoral policies and plans. In many cases, they also highlighted that harmonization processes with international policies had a positive impact on implementation outcomes. The EU especially influenced Southeast European accession countries to prepare and harmonize their laws in accordance with the relevant EU directives. On the other hand, fragmentations, inconsistencies, overlaps and gaps in the strategic framework were repetitively mentioned in various assessment documents and found to hamper implementation and monitoring (Cambodia, Government 2014; Murdiyarso 2004; Marks 2011; Uddin et al. 2009). For instance, in 2007 in Serbia, "*monitoring of nature protection was regulated by more than 130 different laws and by-laws"* (UNECE 2007b, 34). To address these challenges, some countries introduced mechanisms to systematically co-ordinate policy formulation activities or processes to revise existing policies and make them more consistent (Quitzow et al. 2013; Coskun and Gencay 2011).

Theme 1, Implementation Capacity Factor 4: Policy documents use integrated approaches towards socio-economic and environmental problems. Mainstreaming environmental sustainability objectives into national development strategies (often labeled as green economy or green growth policies) have increasingly appeared throughout the country documents during the studied period (Malaysia, EPU 2010, Thailand, MoNRE 2010; UNECE 2015b). However, this approach, in many cases, remained at the conceptual level, and cross-sectoral integration of environmental goals remained limited (Montenegro, UNDP 2004; MoSDT 2013; Moldova, Rio+20 2012). To support environmental planning, countries progressively introduced integrated management approaches to water resources, forest areas and coastal zones. While most EU accession countries have implemented such management frameworks to comply with the EU accession requirements, Southeast Asian countries had more sporadic experiences (Indonesia, BAPPENAS 2010; the Philippines, NEDA 2011).

Theme 1, Implementation Capacity Factor 5: Policy documents set concrete, quantified, and time-bound targets. In many countries, the MDG7 targets and/or the underlying MEAs represented the first concretized (quantified and time-bound) environmental sustainability targets (i.e. concerning water and, in some cases, deforestation and nature protection). Besides, the ratification of international agreements seemed to be a major driving force in many countries for target setting (UNECE 2012a). A few countries also adopted voluntary targets (Indonesia, BAPPENAS 2010). However, the target-setting process was not successful across the board: many of the policy documents did not contain targets, sectoral targets were difficult to harmonize, and targets were often not legally binding (EC 2014); Romania, MoE 2014; Bulgaria, UNDP 2008). The lack of targets was also recognized as a reason for decreased policy efficiency. For example, in Armenia, it was noted that the lack of afforestation targets resulted in "*random forest sector development programs*" (Armenia, Ministry of Nature Protection 2010, 96).

Theme 1, Implementation Capacity Factor 6: Policy documents reflect local circumstances and are translated to regional/local policies. Many countries mentioned that local governments were consulted during the adoption of national environmental policies, and the results of these consultations were later also translated into local plans. Governments also increasingly recognized the need for

decentralization and some countries also started to require or motivate local governments (at least larger ones) to develop their own local environmental action plans or programs, and to integrate these with their respective spatial plans (Armenia, NCSD 2012; Government and UN CT 2010; the Philippines, NEDA 2014). The relevant country-level policies and programs often provided the basis for these plans, but the approach was not fully top-down (Montenegro, MoSDT 2012). At the same time, subnational entities were not always consulted about environmental policies and laws or they did not update their local plans in the absence of updated national strategies (UNECE 2014a; Moldova, MoE 2013; Lao PDR, STEA and UNEP 2012).

6.1.1 Summary of questionnaire results concerning theme 1, Development of a strategic framework

In the questionnaire (see chapter 4.5), respondents were asked to evaluate the importance of the above implementation capacity factors, concerning the development of a strategic framework for environmental goal implementation.

According to over 60% of the responses, priority success factors for this theme included the existence of consultation processes with relevant stakeholders about the formulated documents (65%) and the use of integrated approaches in these documents (64%). Some considerable regional differences between European and Asian respondents in the selection of factors can also be observed. Over 50% of the European respondents prioritized the introduction of quantified and time-bound targets and the use of research and feasibility studies (versus 23% and 45% of the Asian respondents). At the same time, 71,5% of the Asian respondents were more likely to select stakeholder involvement in policy development (versus 60% of the European respondents). More than 50% of the Asian respondents suggested that successful policy documents should be tailored to regional/local circumstances (e.g. with local environmental plans). This latter potentially and partially can be explained with the larger territorial area size of the studied countries from Asia – which may require a more emphasized need for tailed regional or local solutions. See Table 13.

Table 13: Selection of priority implementation capacity factors for the theme based on all responses and based on regional choices

Theme 1: Development of a strategic framework	Total choices	Europe	Asia
Total number of respondents	***117***	***68***	***49***
Factor 1. Strategies/Policies/Plans are based on research and feasibility studies	49,57%	52,94%	44,90%
Factor 2. Strategies/Policies/Plans are consulted with stakeholders	64,96%	60,29%	71,43%
Factor 3. Strategies/Policies/Plans are harmonized and coherent	32,48%	27,94%	38,78%
Factor 4. Strategies/Policies/Plans use integrated approaches towards socio-economic and environmental problems	64,10%	63,24%	65,31%
Factor 5. Strategies/Policies/Plans set concrete; quantified and time-bound targets	41,88%	55,88%	22,45%
Factor 6. Strategies/Policies/Plans are tailored to regional/local circumstances	42,74%	33,82%	55,10%

Minor institutional differences were also observed in the selections. The majority of the respondents from international organizations and research institutions prioritized Factor 2, stakeholder involvement (81% and 69% respectively), and Factor 4, the use of integrated approaches (73% and 81% respectively) higher. Respondents from government institutions and civil society organizations also highly prioritized Factor 1, concerning the use of research and feasibility studies for the development of policy documents. See Annex 6c.

6.2 Theme 2: Institutional framework for implementation

Country assessment documents outlined a variety of necessary implementation capacity factors to bring about a functioning institutional framework that can ensure the implementation of environmental sustainability objectives and underlying strategic documents. See an overview of the identified factors in Table 14, followed by a justification and the results of the questionnaire responses concerning this theme.

Table 14: Implementation capacity factors concerning Theme 2: institutional framework for environmental goal implementation

Implementation Theme	Implementation capacity factors	Justification
Theme 2: Institutional framework for implementation	1. Designation of lead national implementation institution(s)	To oversee the implementation of environmental policies and MEAs and to manage the use of natural resources
	2. Clear allocation of implementation responsibilities	To clearly understand and to address gaps or overlaps of exact implementation responsibilities
	3. Interinstitutional coordination mechanisms	To co-ordinate environmental goal implementation organizations among various sectors and at different government levels
	4. Support to operative decision-making with relevant scientific research results	To provide policymakers with necessary and adequate scientific information
	5. Involvement of stakeholder groups in environmental decision-making	To support the participation of stakeholders in decision-making and policy implementation

Theme 2, Implementation Capacity Factor 1: Designation of lead national implementation institution(s). Between 2000 and 2015, most studied countries established, restructured and considerably strengthened the lead institutions dedicated to environmental goal implementation (usually Ministry of Environment and National Environment Agency). For example, to reduce policy and institutional fragmentation, in 2004, the government of Malaysia integrated various environmental responsibilities under the newly created Ministry of Natural Resources and Environment (MoNRE) (Hezri and Mahadi 2015). However, even towards the end of the studied period, not all countries had lead institutions in place (BiH, MoFTER; 2012; Lao PDR 2012; Buzogany 2015) and institutions overseeing the implementation of specific environmental goals were also missing (Turkey, SPO 2010; the Philippines, NEDA 2014a, Bulgaria, MOEW 2014). When established, the lack of empowerment of the designated institutions caused further implementation challenges. In many instances, focal points, directly responsible for the implementation of selected environmental goals, did not have considerable power to influence or co-ordinate implementation (Lao PDR, MoNRE 2013; Marks 2011).

Theme 2, Implementation Capacity Factor 2: Clear allocation of implementation responsibilities. Many of the studied countries stressed the importance of integrating environmental issues into the work of different sectoral organizations beyond the traditional environmental sphere – especially in connection to climate change and green economy initiatives. For this purpose, countries frequently established environmental units in line ministries and increased responsibilities of regional or local organizations. However, country documents often outlined the lack of understanding of exact implementation responsibilities and emphasized the need for more precise mapping and allocation of these (Serbia, Ministry of Agriculture and Environmental Protection 2014; Myanmar, UN CT 2011). The unclear assignment of implementation responsibilities often resulted in implementing institutions facing power-sharing problems between different ministries and national and local governments (Moldova, Government 2013, 9; the Philippines, NEDA 2011 20) and gaps or overlaps in implementation responsibilities (UNECE 2014a, 8; UNECE 2007b, Yenigun 2009, 63). In order to address these challenges, countries repeatedly reallocated competences between ministries and other government bodies; however, this process often resulted in further confusion (Raitzer et al. 2015; UNECE 2015b, 29; UNECE 2012a).

Theme 2, Implementation Capacity Factor 3: Inter-institutional coordination mechanisms. Studied countries highlighted the importance of facilitating horizontal and vertical coordination of environmental goal implementation organizations of various sectors and different government levels (Marks 2011, Timor-Leste, SSECTOPD 2007; Armenia, Ministry of Nature Protection 2014). However, the introduced processes and mechanisms were often created on an ad-hoc basis; were not followed-up with regular activities or ceased to function after some time (UNECE 2014b; 2012a, AECEN 2008). The ineffective coordination platforms caused problems during policy development and planning, resulting in inconsistent policy documents, and lengthy and complex decision-making procedures (Lao PDR, STEA and UNEP 2012; Vietnam, MoNRE 2014). At the operational level, research also identified limited coordination among management bodies with overlapping responsibilities (Çörtoglu 2013; Khalid et al. 2013). To improve coordination, assessment documents outlined the need for ensuring necessary financial resources (Cambodia, MoE and UNEP 2008) and improving their communication and transparency (UNECE 2012a, 3).

Theme 2, Implementation Capacity Factor 4: Coordination with research institutions to support decision-making with relevant scientific research results. In the studied countries, institutionalized coordination between research and governmental institutions was launched in various forms during the studied period: Albania formed a core team of national expert for climate change issues (MoEFWA 2009); Turkey established the "Turkish Research Area" to enhance cooperation between researchers and stakeholders (MoEU 2013). The Ministry of Agriculture in Indonesia created a climate change research consortium (MoE 2010). The Philippines directly supported local governments with providing relevant scientific data to plan for climate change adaptation (NEDA 2011) and established a Biodiversity Clearing-House Mechanism where all biodiversity-related agreements, research results, and reports are regularly updated and published (DENR 2014). At the same time, countries often note that necessary scientific information was not always at hand for the relevant government bodies due to the lack of available or adequate information (Thailand, MoNRE and UNEP 2008; Montenegro, MoSDT 2014, 8*)* or the lack of data management processes between research institutions and policymakers (UNECE 2015b).

Theme 2, Implementation Capacity Factor 5: Involvement of stakeholder groups in environmental decision-making. The studied countries also highlighted the need for institutionalized involvement of various stakeholder groups, e.g. via National Councils for Sustainable Developments throughout the operative decision-making processes. For example, in Montenegro, such platform was established in 2002 to support the development of various policy documents and oversee the implementation of the NSDS and although restructured twice during the studied period, it was still operational in 2015 (UNECE 2015a). However, these platforms were not always efficient and long-lasting, due to lack of funding (BiH, MoFTER 2011) or political conflicts (UNECE 2014b). Although countries seemed to have made considerable progress in stakeholder involvement during the studied period, the need for more extensive and profound engagement was also repeatedly highlighted, even in the most recent assessment documents (Moldova, Government of the Republic 2013; EC 2014; Simpson 2015). Countries also noted the need for stakeholder involvement in sectoral procedures with considerable environmental impact (e.g. during industrial or investment permitting procedures or for natural resource extraction and management

activities). However, as a result of insufficient legislation of concrete procedural approaches, this was often lagging (UNECE 2011b: Unalan 2009). Additionally, the real added value of such stakeholder consultations was also questioned sometimes. For instance, research outlined that in Indonesia, businesses have a more substantial influence on decisions compared to NGOs or workers (Croissant et al. 2013).

6.2.1 Summary of questionnaire results concerning theme 2: Institutional framework for implementation

From the five implementation capacity factors, which emerged from the document review for an effectively functioning institutional framework, over 75% of the respondents prioritized two issues: Factor 2 (allocation of implementation responsibilities) and Factor 5 (stakeholder involvement of decision-making). 57% of the respondents also underlined the importance of Factor 4, to support decision-making with relevant scientific research results. Over 50% of the Asian respondents also prioritized the establishment of Factor 1 (designating national implementation institution) but only 34% of their European counterparts.

Table 15 : Selection of priority implementation capacity factors based on all responses and based on regional choices.

Theme 2: Institutional framework for implementation	Total choices	Europe	Asia
Total number of respondents	***117***	***68***	***49***
1. Designated national implementation institution(s)	41,88%	33,82%	53,06%
2. Clear allocation of implementation responsibilities	78,63%	83,82%	71,43%
3. Inter-institutional coordination mechanisms	39,32%	38,24%	40,82%
4. Coordination with research institutions to support decision-making with relevant scientific research results	57,26%	58,82%	55,10%
5. Involvement of stakeholder groups in environmental decision-making	75,21%	76,47%	73,47%

Regarding institutional differences in the selection, the analysis also found relatively minor differences. Fewer respondents from international organizations selected Factor 1 (designated national institutions) and Factor 4 (collaboration with research institutions) and they were more likely to prioritize Factor 2 (clear allocation of implementation responsibilities) and Factor 3 (high level inter-institutional coordination mechanism) instead. Representatives from NGOs less often selected Factor 2 and Factor 3 but more often favored Factor 4 and Factor 5. Interestingly,

respondents from research institutions, universities and think-tanks choose Factor 4, which concerns coordination with research institutions below the average of the total choices. See Annex 6c.

6.3 Theme 3: Institutional capacity for implementation

Identified implementation capacity factors in terms of institutional capacity elements included political commitment, sufficient human, technical and financing capacities and the empowerment of local governments. See Table 16 and the subsequent justification.

Table 16: Implementation capacity factors concerning Theme 3: institutional capacity for environmental goal implementation

Implementation Theme	Implementation capacity factors	Justification
Theme 3. Institutional capacity for implementation	1. Political support/commitment to implementation	To ensure that environmental objectives are sufficiently taken into consideration in decision-making processes
	2. Qualified human capacities	To secure a sufficient number of staff at implementing organizations and provide systematic capacity-building
	3. Technical preparedness of institutions	Establishment of technical standards, access to the best available technologies, and mechanisms to select and upgrade technologies.
	4. Stable economic situation of implementing organizations	To secure adequate human resources and technical capacities for implementation objectives
	5. Empowerment of local governments	To engage local communities in environmental management issues

Theme 3, Implementation Capacity Factor 1: Political commitment to implementation. At the policy formulation stage, many governments affirmed and reaffirmed their commitment to environmental sustainability. However, political support often remained at the level of verbal pledges and lacked sufficient subsequent actions. (BiH, Ministry of Finance and Treasury and the UN CT 2013; Montenegro, MoSDT 2013). One general concern was that environmental objectives were often disregarded to safeguard economic interests and countries often failed to reconcile environmental and economic (growth)-related objectives. (Quitzow et al. 2013; Simpson 2015). For example, in 2012, Turkey introduced exceptions to the national

EIA procedures (which were earlier harmonized with relevant EU legislation) in the interests of allowing the construction of large infrastructure projects, with considerable environmental impacts (EC 2014). Some country assessments also noted that politicians were simply not aware or sufficiently knowledgeable about environmental issues, thus tended to disregard them. (the Philippines, Government, UNDP and GEF 2005; Nadic 2012). Therefore their training was considered necessary (Serbia, MoE 2010). Political support to implementation was also of concern at the subnational levels (UNECE 2014b; 2011b).

Theme 3, Implementation Capacity Factor 2: Sufficient and adequately qualified human capacities. The lack of sufficient and trained human resource capacity was one of the most quoted problems in the country assessment documents. For a start, many countries lacked sufficient numbers of staff in various institutions. To address this challenge, the studied countries continuously increased the number of staff at the Ministry of Environment and at other implementing agencies over the studied period. However, even if the assigned number of staff was increased over time, the increase was not usually quoted to be in line with the intensification of tasks (AECEN 2008; UNECE 2014b). For instance, in Romania, the progress reports to the CBD repeatedly noted between 2005 and 2014 the insufficient number of staff, as a major problem related to the management of protected areas (Romania, MoE 2014; MoE 2009; MoEW 2005). Furthermore, the preparedness and qualification of the human capacity represented a major challenge – particularly because capacity-building needed to be continuous, systematic and backed with sufficient financing. Towards the end of the studied period, several studied countries noted that although the available capacity has significantly increased, deficiencies still persist in terms of qualification (Bulgaria, MOEW 2014; (the Philippines, NEDA 2014). Besides national authority staff, countries also found capacity-building necessary at different levels of governance and in sectors with linkages to environmental sustainability objectives. Other challenges included access to adequately educated and trained staff (Lao PDR 2012; Thailand, MoNRE and UNEP 2008); motivating staff and reducing fluctuation rates (Cambodia, MoP 2013; UNECE 2014b).

Theme 3, Implementation Capacity Factor 3: Technical preparedness of implementation institutions. Technical capacities mentioned in connection with

environmental goal implementation included the establishment of technical norms and standards, awareness about and access to the best available technologies and mechanisms to select and upgrade technologies. Studied countries however, often noted the lack or the insufficiency of technical capacities at environmental goal implementation organizations (UNECE 2012a; BiH, Ministry of Finance and Treasury and the UN CT 2013; Cambodia, MoP 2013; Vietnam, MoNRE 2010). A few countries also noted the absence of institutional memory (i.e. records or information systems) that would have supported the continuity in implementation activities (Moldova, Government 2013; AECEN 2008; Murdiyarso 2004). In many cases, weaknesses in technical capacities were linked both to financial constraints and to knowledge problems (to identify and access to best available technologies). Related to the latter, some countries outlined the importance of communication and information exchange, e.g. via the establishment of clearing house mechanisms or technical committees (Myanmar, MoEF 2012; Malaysia, EPU 2011; Romania, MoE 2009).

Theme 3, Implementation Capacity Factor 4: Stable economic situation of environmental goal implementing organizations. Countries considered sufficient financing for environmental bodies necessary to ensure adequate human resources and technical capacities for implementation and often linked unsatisfactory capacities to the lack of financial resources available for implementing organizations (Myanmar, ADB 2013; Bulgaria, MOEW 2014; Turkey, MoEF 2011). Designated implementation agencies often operated with an insufficient earmarked budget or had to entirely rely on their own revenues. In Montenegro, national park management bodies were primarily financed from their own (insufficient) revenues (UNECE 2015a) Focal points for MEA implementation also repeatedly noted financial difficulties and limited financing sources and related to this, weak capacities to participate in budgetary planning as an important factor undermining successful implementation (Thailand ONEP 2009; Armenia, Ministry of Nature Protection 2004). In addition, after 2008, some countries mentioned that the financial crisis has seriously impacted the budgeting of implementation organizations, as environment was one of the fields where resources were immediately reduced or withdrawn. (Cambodia, MoP 2010; Romania, MoE 2014).

Theme 3, Implementation Capacity Factor 5: Empowerment of local governments to implement environmental goals. Countries considered decentralization processes and the engagement of local communities important for environmental management issues (Cambodia, MoP 2010). In case of Timor-Leste, Miyazawa (2013) highlighted that the "tara bandu" a traditional community-based management approach effectively protected natural resources, while official capacities were insufficient (Timor-Leste, SSECTOPD 2007). Besides supporting community participation in forest, pasture or fisheries management, many governments transferred the management of water and energy supply companies to local authorities. However, these processes required the allocation of sufficient financial resources as well as technical and management capacities at subnational levels, which often remained limited (UNECE 2012b; 2011b; Lao PDR, STEA and UNEP 2012; Marks 2011). Besides capacity issues, some countries, e.g. Serbia (UNECE 2007b; Milutinovic 2010), Indonesia (AECEN 2008; Marquardt 2014) or Vietnam (AECEN 2005) reported that the performance of local governments were also constrained by overlapping responsibilities, limited coordination with national bodies and the lack of stakeholder involvement processes. To overcome these challenges, the national governments' role in empowering local authorities was considered crucial. Suggested supporting mechanisms included improved regulatory frameworks, training programs, and additional funds from national and sometimes international sources.

6.3.1 Summary of questionnaire results concerning theme 3: Institutional capacity for implementation

Among institutional capacities for environmental goal implementation, one factor was emerging as highly important: 78,5% of the respondents selected political commitment to implementation (Factor 1). 65% of the respondents also prioritized financing capacity of implementing institutions (Factor 4). Concerning regional differences, European respondents selected in higher percentage qualified human capacity (68% versus 45%) and Asian respondents were more likely to choose technical preparedness of institutions as a priority implementation factor (43% versus 26,5%). Similarly, to the strategy formulation theme, where a higher percentage of Asian respondents highlighted the need for local/regional tailoring of policies, also more respondents prioritized the empowerment of local governments (67% versus 56% of European respondents). See Table 17.

Table 17: Selection of priority implementation capacity factors for the theme based on all responses and based on regional choices.

Theme 3. Institutional capacities for implementation	Total choices	Europe	Asia
Total number of respondents	***117***	***68***	***49***
1. Political commitment to implementation	78,63%	80,88%	75,51%
2. Qualified human capacities	58,12%	67,65%	44,90%
3. Technical preparedness of implementing institutions	33,33%	26,47%	42,86%
4. Stable economic situation of implementing organizations	64,10%	61,76%	67,35%
5. Empowerment of local governments to implement environmental goals	60,68%	55,88%	67,35%

Institutional differences were sizeable only in a few cases. Representatives of research institutions considered Factor 1 (political commitment) less important (56% versus the total average of 78,5%) but, along with civil society organizations, were more likely to prioritize Factor 5 (empowerment of local governments) (75% versus 61%). See Annex 6c.

6.4 Theme 4: Domestic financing for implementation

The studied documents drew attention to a variety of implementation capacity factors pertaining to the need for sustained financing sources, including a stable macro-economic environment; sufficient earmarked financing for environmental issues, adequate taxes and financial incentives and sustainably operating environmental utilities.

Table 18: Implementation capacity factors concerning Theme 3: institutional capacity for environmental goal implementation

Implementation Theme	Implementation capacity factors	Justification
Theme 4: Domestic financing	1. Stable macroeconomic environment/ adequate economic development	To balance economic development and the sustainable use of natural resources and to ensure stable economic conditions
	2. Earmarked budget is allocated to environmental goals	To ensure that the government provides sufficient funding for environmental goal implementation. (linked to budget line)
	3. Use of environmental taxes and charges	To put a price on the use of natural resources or on pollution and to secure additional financing for environmental protection objectives
	4. Use of financial incentives to mobilize private resources	To motivate environmentally conscious behavior and to promote the adoption of sustainability practices
	5. Adequate economic operation of environmental utility companies	To ensure that utility companies operate sustainably and maintain environmental infrastructures

Theme 4, Implementation Capacity Factor 1: Stable macroeconomic environment and adequate economic development. Although in national development plans countries often outlined the need for sustainable socio-economic development, in reality, economic objectives were often prioritized over environmental considerations (Vietnam, MoP 2013; Cambodia, MoE 2014; Yenigun 2009; Turkey, MoEF 2009; Macedonia, MoE 2005). The negative impacts of economic development on the exploitation of natural resources were also recognized. According to an assessment carried out for Serbia, *"environmental degradation causes annual costs for the Serbian economy between 4.4% GDP* (Milutinovic 2010, 581). At the same time, poverty was also found to undermine sustainable development, with poor people heavily relying on national resources (Lao PDR, Government 2012; Leebouapao 2014; the Philippines, NEDA 2007) After the 2008/2009 financial crisis, several countries in the Southeast European region reallocated budget items earmarked for environmental protection or terminated specialized environmental funds (UNECE 2015b; Bulgaria, MOEW 2009).

Theme 4, Implementation Capacity Factor 2: Earmarked budget is allocated to environmental goals. Although all studied countries earmarked sources to

environmental investments and programs, budget allocations were not always covering all environmental objectives and financing sources often remained insufficient (UNECE 2014a, Montenegro, MoSDT 2015; Cambodia, MoE 2012). To fill financing gaps, country reports repeatedly signaled the need for international financing (see section 6.5). Meanwhile, in some cases, it was also noted that budgeting for environmental protection from national sources was simply *"not very high on the agenda of the Government" (*UNECE 2011a, 63*)* and was, therefore "*regarded as a lower priority among budgetary expenditure priorities*"(Armenia, NCSD 2012, 38). To raise additional revenues for general or issue-specific environmental objectives (e.g. energy efficiency or forest management), many of the studied countries established Environment Funds during the examined period and in order to ensure their long-term sustainability, the revenues of such funds were often obtained from collected environmental charges and fees (Lao PDR, Government and UN 2013; Moldova, WG Rio+20 2012; Uddin et al. 2006). However, such funds were not always successful: Macedonia terminated its Environmental Fund in 2005, considering it non-transparent and inefficient (UNECE 2011b).

Theme 4, Implementation Capacity Factor 3: Use of environmental taxes and charges. Countries considered the introduction of taxes and fees as a useful tool to motivate environmentally conscious behavior and to secure financing for environmental protection objectives (Malaysia, EPU 2011; Vietnam, MoNRE and UNEP 2008). However, if introduced, such taxes and charges were, in many cases, poorly designed – often being set too low, lacking consistent application or not being collected effectively (Matesic et al. 2014, 352; Simachaya 2009; UNECE 2015a). In order to improve the efficiency of environmental taxes, a number of measures were suggested: direct taxes imposed on polluting sources; mechanisms that regularly accounts for and reviews environmental charges and taxes; and independent bodies that coordinate and monitor the setting of environmental taxes (Lao PDR, Government and UN CT; BiH, MoFTER 2012; UNECE 2014a). Some countries suggested that as part of a successful environmental taxation scheme, adequate subsidies on the use of natural resources for the poor should be also provided (Cambodia, MoP 2010; Moldova, Government 2013; Indonesia, BAPPENAS 2012).

Theme 4, Implementation Capacity Factor 4: Use of financial incentives to mobilize private resources. To mobilize private resources for green technologies (i.e. energy efficiency investments, renewable energy deployment or water infrastructure development), countries sought to provide subsidies, loans, tax allowances or tax exemptions as well as launched green investment schemes and established public-private partnerships. At the same, time concrete implementation experience was rather scarce, and most of such initiatives were launched and operationalized during the second half of the studied period (Vietnam, MoNRE and UNEP 2008; Malaysia, EPU 2011; Macedonia, Ministry of Finance 2009). Most of the introduced initiatives remained in experimental/piloting stages with limited national capacities available to monitor the outcomes and the impact of such programs (Pham et al. 2015; McElwee et al. 2014; Suhardiman et al. 2013). Countries also joined international financing schemes, such as the Carbon Development Mechanisms of the UNFCCC or the emissions trading scheme of the EU, but some noted legal and institutional barriers or difficulties in utilizing them (EC 2014; UNECE 2012a; Indonesia, BAPPENAS 2007). Moreover, countries have not fully phased-out harmful subsidies until the end of the studied period (UNECE 2014a, Merrill and Chung 2015).

Theme 4, Implementation Capacity Factor 5: Adequate operation of environmental utility companies. A recurring theme from country reports was the importance of the adequate management of environmental infrastructure companies. Inefficient management of environmental utilities seemed to especially hamper the implementation of water-related MDGs (Indonesia, BAPPENAS 2005; 2007; 2012; Malaysia, EPU 2015; Montenegro, MoSDT 2013). One of the reasons behind the problems was the low level of tariffs, which resulted in utility companies operating below the cost-recovery level (UNECE 2015b, Armenia, Government and UN CT 2010). Other management challenges occurred due to insufficient and inadequate infrastructure, illegal activities, and low collection rates (UNECE 2012a; Teo 2014; Timor-Leste, Government and UN CT 2004). To address these issues, countries started to promote decentralization with the aim that community ownership can contribute to better financial operations of utilities (Buzogany 2015). However, in some countries (e.g. Moldova or Romania), it was suggested that municipalities were unwilling to set energy or water tariffs sufficiently high and insufficient municipal budgets were to be

completed with national funds to ensure smooth operation of water utilities (UNECE 2014b; 2012b).

6.4.1 Summary of questionnaire results concerning theme 4: Domestic financing

From the above implementation capacity factors, two were selected by around 80% of the respondents, indicating the need for both public and private financing for successful implementation. These factors were the allocation of earmarked public budget to environmental goals (Factor 2) and the use of financial incentives to mobilize private resources (Factor 4). Almost 60% of the respondents also outlined the importance of adequate economic development (Factor 1) as well as the use of environmental taxes and charges (Factor 3). Although the need for improving the adequate management of environmental utilities (Factor 5) was frequently mentioned in various environmental performance reviews and other country assessment documents, only a few respondents choose this factor (16%). No significant regional differences could be observed. Somewhat fewer European respondents selected public budget allocation (Factor 2), and the opposite was observed for the use of financial incentives (Factor 4). More European respondents favored the use of environmental taxes and charges (Factor 5), and more Asian respondents highlighted the need for more efficiently operating utilities (Factor 3).

Table 19: Selection of priority implementation capacity factors for the theme based on all responses and based on regional choices.

Theme 4. Domestic financing	Total choices	Europe	Asia
Total number of respondents	***117***	***68***	***49***
1. Stable macroeconomic environment/Adequate economic development	57,26%	57,35%	57,14%
2. Allocation of earmarked public budget to environmental goals	81,20%	76,47%	87,76%
3. Use of environmental taxes and charges	58,97%	64,71%	51,02%
4. Use of financial incentives to mobilize private resources	78,63%	80,88%	75,51%
5. Adequate economic operation of environmental utility companies	16,24%	10,29%	24,49%

The selection according to the type of institution of the respondents tended to vary more. Respondents from NGOs choose less frequently Factor 4 (the use of financial incentives) with 65% compared to the total average of 78,5%. Respondents from

international organizations and research organizations found Factor 1 (macroeconomic conditions) less important with 42% and 38% compared to the total average 59%. As for the use of environmental taxes and charges, respondents from international organizations and NGOs prioritized this factor more often than respondents from ministries and research institutions (73% and 70% versus 51% and 56%). See Annex 6c.

6.5 Theme 5: International support and cooperation

Identified implementation capacity factors in connection with international support and cooperation encompassed the need for harmonizing donor and recipient objectives, accessing to sustained financial and technical support, improving national capacities to use international resources and participating in regional cooperation activities.

Table 20: Implementation capacity factors concerning Theme 5: International support and cooperation

Implementation Theme	Implementation capacity factors	Justification
Theme 5. International support and cooperation	1. Donor and recipient objectives are synchronized	To follow commonly set investment priorities and address the most pressing environmental challenges
	2. International financial support	To allocate donor funds for environmental goal implementation from international sources
	3. International technical assistance	To support legislation drafting and planning as well as monitoring and reporting activities with technical support
	4. Sufficient national capacity for efficient utilization of international support	To follow the use of international funds and to improve the sustainability of implemented projects
	5. Transboundary/Regional cooperation	To address environmental problems that go beyond national problems, to draft common legislation, implement large-scale projects and regional monitoring initiatives.

Theme 5, Implementation Capacity Factor 1: Synchronized donor and recipient objectives. Country assessment documents outlined that successful international cooperation was not restricted to support from donor countries and also required a more

proactive approach from the recipients. Thus, they emphasized the importance of determining common interests in international cooperation activities and actively coordinating with international and foreign donors. In several instances, however, synchronization and coordination were hampered either from the donor or from the recipient side. From the recipient side, challenges included the setting of clear environmental and investment priorities for international support and establishing national capacities to represent the country's interest at negotiations of international environmental agreements or towards donor countries (UNECE 2007b; Moldova, MoE 2013; Sivhuoch and Sreang 2015; Cambodia, MoE 2012). To address these challenges, countries tried to articulate more clearly their national priorities (Indonesia, MoE 2010; UNECE 2012a). On the other hand, some countries also noted that donors tended to operate independently without coordination with government agencies, and thus did not necessarily support their most pressing environmental objectives in a synchronized manner (Cambodia, MoE and UNEP 2008; Ware 2011).

Theme 5, Implementation Capacity Factor 2: Sustained international financial support. Many of the studied countries expressed heavy reliance on international funds to achieve international environmental goals (Croatia, Ministry of Foreign Affairs and European Integration 2010; UNECE 2015b; Timor-Leste, Ministry of Economy and Development 2012). For example, it was suggested that the development of water infrastructure in the Lao PDR has *been principally the good performance of the donors rather than the Government"* (Lao PDR, STEA and UNEP 2012, 19). In fact, the (perceived) reliance in some cases was so significant that countries cited insufficient international financing as one of the principal reason for failing to work towards environmental goals (Malaysia, MoNRE 2014; Romania, MoE 2014; Myanmar, Ministry of Forest and UNEP 2011; Armenia, Government and UN 2010; Metaj 2009). Despite the emphasized need for international financing, countries tended to allocate only a smaller percentage of funds from international sources towards these objectives. For example, in the financial year 2009-2010, Bosnia only earmarked only 0.6% of Official Development Assistance for environmental protection (BiH, MoFTER 2012). At the same time, countries with increasing income levels also recognized that available international sources might decrease in the future, and they will eventually have to seek more funds from national sources (Vietnam, MoP 2013).

Theme 5, Implementation Capacity Factor 3: Sustained international technical assistance. Technical support was provided by donors usually in the form of specified projects targeting a specific implementation objective of MEAs or the MDG7 targets (Thailand, ONEP 2009; Lao PDR MoNRE-IUCN 2015; Armenia, UNDP 2014).The need for technical assistance was often mentioned in connection with legislation drafting and planning activities as well as monitoring and reporting (Myanmar, ADB 2013; Albania 2012b). National reports to various conventions and the UN were also often developed by or with support from international organizations or donor countries. Although this latter showed a decreasing tendency over the studied period as countries' reporting capacities has increased. In the Southeast European region, many of the technical support projects were received from the EU in order to support the harmonization of national legislations and to build national capacities for the implementation of these updated legislations (Sotirov et al. 2015; UNECE 2011b).

Theme 5, Implementation Capacity Factor 4: Sufficient national capacity for efficient utilization of international support. Country assessment documents also noted the lack of sufficient national capacity to adequately administer and keep track of international funds, to develop and implement large-scale projects, and to communicate results and follow-up with donors (Romania, MoFA 2010; Myanmar, MoEF 2012, Lao PDR, MoNRE 2013. To building-up national capacities, countries recognized the need to improve the planning procedures, the internal management and the monitoring of the implemented projects (Bulgaria, MoEW 2014; Indonesia, MoE 2010). Adequate monitoring of international funds and financed projects – e.g. with the establishment of a database or an online platform – was also believed to improve implementation and coordination with donors (UNECE 2012a; Cambodia, EU Delegation 2012). Regarding the sustainability of these projects**,** some countries also noted that internationally funded projects were often discontinued once project funding ended and as a result, in Serbia, for example, "*donors remain quite reserved regarding further assistance and support"* (UNECE 2007b, 3).

Theme 5, Implementation Capacity Factor 5. Trans-boundary/Regional cooperation: The studied countries appeared to take a more proactive role in regional cooperation than in cooperation with donors, principally focusing on activities to protect trans-boundary water and forest resources or improve air quality. Opportunities

for such cooperation included policy development, coordinating implementation, or enhancing monitoring performances (Cambodia, MoE 2014; Macedonia, MoE 2008 Lao PDR, STEA and UNEP 2012). For instance, the Philippines established in 2006 the ASEAN Center for Biodiversity with the aim *"to formulate and coordinate biodiversity-related policy, strategy and action… and to promote and advance common positions"* (NEDA 2007, 56). In Serbia, the implementation of regional infrastructure development strategies provided a framework for greater trans-boundary coordination on environmental issues (Todic and Dusko 2014). At the same time, limited cooperation with neighboring countries was also noted in some cases (EC 2014; Vietnam, MoP 2010).

6.5.1 Summary of questionnaire results concerning theme 5: international cooperation

From the above five issues, 74% of the respondents choose Factor 4 (national capacity for efficient utilization of international support) and 68% Factor 3 (international technical assistance). 61,5% of the respondents also selected Factor 2 (International financial support) with a higher selection rate (71%) from Asian respondents and a lower (54%) from Europeans. Some further regional differences could be observed in the selection. In general, Asian respondents were more likely to choose factors that concern international support (Factors 2-4), while more European respondents favored capacity aspects related to international cooperation (Factor 1 and 5).

Table 21: Selection of priority implementation capacity factors for the theme based on all responses and based on regional choices.

Theme 5. International cooperation and support	Total choices	Europe	Asia
Total number of respondents	***117***	***68***	***49***
1. Synchronized donor and recipient objectives	45,30%	52,94%	34,69%
2. International financial support	61,54%	54,41%	71,43%
3.International technical assistance	68,38%	64,71%	73,47%
4. Sufficient national capacity for efficient utilization of international support	74,36%	70,59%	79,59%
5. Transboundary/Regional cooperation	43,59%	48,53%	36,73%

More significant differences could be observed in the selection of factors according to the institutional backgrounds of the respondents. Representatives of international organizations favored Factor 1 (65%) but were less likely to select financial and

technical support. It is to be noted however, that most respondents of international organizations were from European countries, where the above factors were also preferred in a higher percentage. Respondents from government organizations highlighted the importance of international financial and technical support (73% each). Respondents from NGOs favored financial support (70%), while representatives of research organizations were more likely to choose technical support (81%). See Annex 6c.

6.6 Theme 6: Law implementation and enforcement

Implementation capacity factors, which could be directly linked to this theme, included the introduction of government measures to support environmental goals, environmental permitting practices, the establishment of effective enforcement and juridical systems and the improvement of land ownership rights.

Table 22: Implementation capacity factors concerning Theme 6: Law implementation and enforcement

Implementation Theme	Implementation capacity factors	Justification
Theme 6: Law implementation and enforcement	1. Targeted government measures for implementation of laws and strategies	To ensure that laws and strategies are translated into adequate implementation actions (e.g. government programs)
	2. Environmental permitting/licensing	To carry out adequate environmental impact assessments procedures and provide environmental permits and licenses accordingly.
	3. Transparent and efficient system for enforcement	To introduce efficient compliance and enforcement mechanisms (including inspections, collection of sanctions and fines)
	4. Adequate operations of court services in environmental matters	To ensure sufficient access to justice in handling environmental matters
	5. Improved land ownership and management	To reduce conflicts over land ownership and to improve the sustainability of its use

Theme 6, Implementation Capacity Factor 1: Targeted government measures to implement laws and strategies. Many countries noted that there is much progress needed to fully implement environmental laws and underlying strategic documents

(UNECE 2014b; Thailand, MoNRE and UNEP 2008). For example, in 2008, Bulgaria announced the approval of almost 350 protection area for wild birds or wild flora and fauna (Bulgaria, UNDP 2008). However, six years later the 5th CBD report of country listed various problems with the designation of the sites, preparation of management plans and the development of investments (Bulgaria, MOEW 2014). Cited reasons for insufficient implementation of government measures included the lack of political will, e.g. in Macedonia and Turkey (Baumgartner and Stojanovska 2014; Yenigun 2009) inadequately developed laws, e.g. in Serbia, Indonesia, Thailand and Armenia (Milutinovic 2010; Indonesia, MoEF 2014; Thailand, MoNRE and UNEP 2008; Armenia, Government and UN CT 2010), insufficient human and technical capacities and financing sources, e.g. in the Philippines (NEDA 2014a) and in Serbia (Milutinovic 2010). In addition, the overall effectiveness of implementation measures was also scrutinized sometimes. For instance, reforestation programs resulted in a high percentage of low-quality forest (Vietnam, MoP 2010; Moldova, Government 2013) or designated protected areas failing to cover biodiversity hotspots (Thailand, MoNRE and UNEP 2008; Melovski et al. 2012).

Theme 6, Implementation Capacity Factor 2: Environmental permitting/licensing. In EU accession countries in Southeast Europe, EIA and permitting procedures were promoted and required by the EU, and therefore these countries made targeted efforts to improve permitting procedures, especially in the second half of the studied period. Compared to their European counterparts, the systematic application of such activities in Southeast Asia somewhat seemed to be lagging, but many of the studied countries in the region also noted that environmental impact assessments were carried out for large projects, and permits were also introduced in certain cases e.g. for forest or wildlife-trading activities. However, in impact assessments and permitting procedures have always not become fully operational until the end of the studied period. Although EIA was required for all projects with major environmental impacts, assessments were sometimes incomplete, did not fully comply with permitting procedures, and have not ensured appropriate public participation (UNECE 2015a; 2012a; 2011a; Thailand, MoNRE and UNEP 2008; Ke and Gao 2013). The use of single environmental media-based approaches and thereof the lack of their integration was mentioned as a deficiency in Moldova and Turkey (UNECE 2014b and OECD 2008). Research concerning the countries in the

Mekong region suggested that although EIA requirements have been formulated, provisions ensuring public participation and information sharing remained limited in some of the countries (Ke and Gao 2013). Another cause for concern was coordination among involved bodies and the provision of sufficient capacities for these bodies (UNECE 2015a; AECEN 2008; Vietnam, MoNRE and UNEP 2008). Separating EIA implementation and monitoring responsibilities among national bodies was also proven to be challenging (UNECE 2015b; 2014b, AECEN 2008).

Theme 6, Implementation Capacity Factor 3. Transparent and efficient system for enforcement: Although some progress in monitoring the use of natural resources and in enforcing relevant legislation can be observed throughout the studied period, most of the studied countries reported weaknesses in this regard. One consistent sign of the insufficiency of the enforcement system was the persistent reoccurrence of illegal or uncontrolled activities, such as logging, hunting, and fishing, as well as illegal trade of ODS substances or of threatened species. For example, assessment reports of Macedonia continually noted non-compliance with legislation and illegal use of natural resources (Macedonia, MoE 2014; 2005; Ministry of Finance 2009; UNECE 2011b;) and the CBD reports of the Philippines between 2002 and 2015 repeatedly highlighted illegal fishing, hunting and logging as one of the major reasons for the depletion of natural resources (DENR 2006; 2009; 2014). In some cases, non-compliance with environmental agreements or other international standards were also recognized. For example, the EU launched a non-compliance procedure against Bulgaria for not meeting the PM10 air pollution standards of the EU (Bulgaria, MOEW and ExEA 2010). Identified weakness of the enforcement systems included the lack of sufficient technologies, human or financial capacities for inspections, e.g. in Bosnia-Herzegovina (UNECE 2011a), in Turkey (MoEF 2011) in Cambodia (Cambodia, MoE and UNEP 2008) and in the Lao PDR (STEA and UNEP 2012); selective enforcement of relevant environmental legislation (Nadic 2012; Marks 2011); lack or low level of fines and sanctions (Moldova, Government 2005; Timor-Leste, Ministry of Economy 2012; AECEN 2008; UNECE 2012a); the lack of coordination and information exchange between enforcement bodies (UNECE 2012a; 2012b) and Romania (UNECE 2012b); the lack of political will to ensure enforcement (Indonesia, MoE 2005) and problems related to corruption and bribery among law enforcers (Bulgaria, UNDP 2008) as well

as among military and local government officials (Poffenberger 2009; Collins et al. 2011).

Theme 6, Implementation Capacity Factor 4: Adequate operations of court services in environmental matters. Some countries viewed the insufficient provision of justice on environmental matters as one of the reasons for weak enforcement of legislation (the Philippines, DENR 2009; AECEN 2008; UNECE 2002). For example, the 2005 EPR report of Moldova mentioned that "*the Constitution gives every citizen the right to take actions to the courts, but there are no examples of people who have exercised this legal right yet"* (UNECE 2005, 27). Reasons for the inadequate operations of court services in handling environmental matters were the lack of coordination and communication between enforcement bodies, such as inspectors, polices and judges (AECEN 2008; Albania, MoEFW 2006); the insufficient capacity of courts (UNECE 2015b; BiH, MoE 2010) as well as the inadequate environmental knowledge of courts personnel (Turkey, MoEF 2011; UNECE 2015a). To tackle these problems, jointly organized training and capacity-building for these bodies seemed of crucial importance (UNECE 2011b; 2014a). Going beyond capacity factors, political instability sometimes also affected the functioning of the courts (Timor-Leste, SSE 2014).

Theme 6, Implementation Capacity Factor 5: Improved land ownership and management. Unclear and unregistered property rights often resulted in conflicts over management of lands and thus increased pressure on agricultural lands, forests or protected areas and rendered their sustainable management more difficult (Collins et al. 2011; Romania, MoEW 2005; Vietnam, MoNRE and UNEP 2008*).* The resolution of these problems was also not smooth: the introduction of land registering procedures was often long and complicated (Cambodia, MoP 2013; Turkey, MoEF 2011). Consultation processes to settle conflicts, e.g. around the establishment of protected areas (Montenegro, MoSDT 2012; Porej and Matic 2009) or management of forest areas were also difficult (Riggs et al. 2016). Moreover, many countries privatized land during or recently before the studied period. Some reports suggested that private ownership of lands could improve environmental conditions (Lao PDR, STEA and UNEP 2012; UNECE 2014b), but many noted that it had increased pressure on natural resources – especially when smaller scale ownership was created (Montenegro,

Ministry of Tourism and Environmental Protection 2007; Bulgaria, UNDP 2008; Armenia, Ministry of Nature Protection 2004).

6.6.1 Summary of questionnaire results concerning theme 6: Law implementation and enforcement

From the above five implementation capacity factors, 83% of the respondents highlighted the importance of transparent and efficient systems for enforcement (Factor 3); 77% chose Factor 1 (targeted government measures to implement laws and strategies) and 67% Factor 2 (environmental permitting/licensing). The regional differences for these three factors were relatively minor. For the two remaining factors, there were bigger regional differences: almost 50% of European respondents highlighted the need for adequate court operations; and the need for clear land ownership rights emerged in Asia with 35% compared to the total 23% and the 15% of European responses. See Table 23.

Table 23: Selection of priority implementation capacity factors for the theme based on all responses and based on regional choices.

Theme 6. Law implementation and enforcement	Total choices	Europe	Asia
Total number of respondents	***117***	***68***	***49***
1. Targeted government measures to implement laws	76,92%	73,53%	81,63%
2. Environmental impact assessment and permitting/licensing	66,67%	63,24%	71,43%
3. Transparent and efficient system for enforcement	82,91%	85,29%	79,59%
4. Adequate operations of courts in environmental matters	38,46%	48,53%	24,49%
5. Improved land ownership and management	23,08%	14,71%	34,69%

Major institutional differences could not be observed: respondents from ministries highlighted more frequently the need for environmental licensing and permitting (78%), while NGOs more often prioritized land ownership rights (40%). Research institutions were more likely to select factors related to enforcements; 88% chose Factor 3 and 50% Factor 4. See Annex 6c.

6.7 Theme 7: Stakeholder engagement

Identified implementation capacity factors related to stakeholder engagement included the need for public awareness-raising and educational activities, the involvement of NGOs and business in the implementation activities as well as the integration of environmental considerations into privatization processes.

Table 24: Implementation capacity factors concerning Theme 7 Stakeholder engagement

Implementation Theme	Implementation capacity factors	Justification
Theme 7. Stakeholder engagement	1. Public awareness-raising about environmental issues	To inform the general population about environmental problems and motivate them for environmental-conscious actions
	2. Environmental education in schools and via training programs	To provide adequate education and training about environmental problems at all education levels
	3. Civil society involvement in environmental activities	To enable adequate participation of civil society in environmental planning, decision-making and implementation activities.
	4. Engagement of businesses in voluntary environmental activities	To involve private companies in environmental activities, e.g. via certification programs or environmental management schemes.
	5. Integration of environmental considerations into privatization processes	To ensure that privatization agreements have environmental clauses and land use agreements undergo environmental assessments.

Theme 7, Implementation Capacity Factor 1: Public awareness-raising about environmental issues. Despite a proliferation of such activities undertaken during the studied period, country documents found generally low levels of awareness about different environmental topics (Pojani et al. 2013, 699; EC 2014; Lao PDR Government and UN 2013). With regard to biodiversity protection, several countries highlighted low awareness and the lack of or inadequacy of awareness-raising programs among the general population as one of the perceived implementation barriers (Armenia, Ministry of Nature Protection 2014; BiH, MoFTER 2011; Indonesia, MoEF 2014; Vietnam, MoNRE). Awareness-raising programs were also found to be necessary for improved drinking water or sanitation usage (Cambodia, MoE and UNEP 2008; Malaysia, EPU 2015; Albania, UNDP and the UN CT in Albania 2004) as well as for the promotion of

environmental laws and policies to support enforcement (Indonesia, MoEF 2014; Myanmar, ADB 2013). The efficiency of awareness-raising programs was also a concern, as higher awareness-levels did not necessarily result in a higher willingness for environmental-conscious actions among the population. (Montenegro, MoSDT 2013, Hezri 2011; Rahman 2011). Lastly, the role of media in promoting environmental awareness and the need for increased capacity of journalists in addressing relevant issues were also mentioned in a few country documents (Armenia, Government and UN CT 2010; the Philippines, DENR 2009; Thailand, MoNRE and UNEP 2008). Although the contribution of media was perceived generally positive (Montenegro, MoSDT 2013; Cambodia, MoE and UNEP 2008), an overall low-level media coverage of different environmental issues was often suggested (Nadic 2012; Mol 2009; BiH, MoFTER 2012).

Theme 7, Implementation Capacity Factor 2: Environmental education in schools and via training programs. Although many of the countries reported activities to strengthen environmental education, the progress was often limited in introducing education activities; (Macedonia, MoE 2014; 2005; UNECE 2011b; the Philippines, DENR 2014); to develop education materials (Vietnam, MoNRE 2010; 2008) and to provide training activities to professionals (Malaysia, EPU 2011; UNECE 2012a). Quoted barriers to ensure adequate environmental education included the lack of or limited curricula (Montenegro, MoSDT 2015; Vietnam, MoNRE 2010; Armenia, Ministry of Nature Protection 2010; Rao et al. 2014); systemic problems with integrating education material into the existing curricula (Myanmar, MoP 2005; Indonesia, MoE 2005; UNECE 2012a) or insufficient institutional coordination (Montenegro, Government and UN 2010; UNECE 2011a) and the lack of earmarked financing, e.g. in Moldova and Romania (UNECE 2014b; UNECE 2012b).

Theme 7, Implementation Capacity Factor 3: Civil society involvement in environmental activities. Country assessments repeatedly highlighted the critical role of NGOs in environmental awareness-raising campaigns and education activities (Armenia, Government and UN CT 2010; Croatia, MoE 2014; Indonesia, MoE 2005). However, these organizations were not always involved as equal partners in policy planning or environmental decision-making (O'Brien 2015; Sotirov et al. 2015, Sivhuoch and Sreang 2015). Mechanisms for the involvement of civil society

organizations in policy implementation also remained weak (Çörtoglu 2013; Serbia, MoE 2010). Limitations in cooperation and involvement were sometimes the result of historical predispositions – e.g. in case of Myanmar (Raitzer et al. 2015), the Lao PDR (Lao PDR, STEA and UNEP 2012) and in Vietnam (Quitzow et al. 2013). For example, in Vietnam, that environmental NGOs functioned as technical advisors (Quitzow et al. 2013, 13*)* and the government tightly controlled these organizations (Mol 2009). The issue of independent operation has also been mentioned as a potential barrier to implementation. For instance, the SDS of Romania noted that civil society organizations still encounter "*instances of patronage in their relations with the authorities and political actors"* (Romania, MoE and UNDP 2008, 39). Observations also added that NGOs sometimes do not have their own strategic goals and have limited access to funding, thus their activities become donor-driven (UNECE 2012a; Romania, MoE 2014 and UNECE 2002). Some of the studied countries also noted that environmental NGOs also have difficulties in establishing a functioning organization, writing, or implementing projects, fund-raising or cooperating with other organizations (BiH, MoFTER 2012; OECD 2008).

Theme 7, Implementation Capacity Factor 4: Engagement of businesses in voluntary environmental activities. Despite different initiatives introduced and promoted, many countries noted challenges in involving private companies and businesses in environmental activities. (Nadic 2012; Lao PDR, Government 2013; 2010; Vietnam, MoP 2010). In the Southeast European region, companies seemed to be more active in introducing environmental management and reporting standards, especially towards the end of the studied period. Nevertheless, the progress still seemed limited (e.g. UNECE 2012b; 2015b; Andrejevic and Vucenov 2011). The 2002 EPR of Albania identified interest in introducing environmental management systems, but ten years later, the 2nd EPR still noted the lack of widespread uptake of these (UNECE 2012a). Quoted actions to involve private entities more efficiently included better institutional coordination (UNECE 2014a; Malaysia, MoNRE 2011); introduction of financial incentives (Cambodia, MoE 2012; UNECE 2011b; the Philippines, NEDA 2007), the use of regulatory tools (Cambodia, MoE 2012; Indonesia, BAPPENAS 2005) and awareness-raising activities (Myanmar, ADB 2013; Malaysia, MoNRE 2008; Bulgaria, MoEW, GEF and UNDP 2004). The importance of focusing on small

and medium scale enterprises and business owners were also outlined in some of the countries (UNECE 2011b; the Philippines NEDA 2007; OECD 2008).

Theme 7, Implementation Capacity Factor 5: Integration of environmental considerations into privatization processes. Many country assessment documents suggested that natural resource extraction agreements and the privatization of land areas, environmental utilities, power plants, or industrial facilities are a necessity for economic development and for improving the sustainability of operation (also in terms of environmental performances) (Croatia, MoE 2014b; 2001; Turkey, MoEF 2009). Simultaneously, however, documents also noted that privatizations and land concessions often risked the state of the environment, given that private operators may take sustainability objectives less into consideration (Bulgaria, MoEW, GEF and UNDP 2004; Moldova, MoNRE 2005) and land concessions or resource extraction agreements often result in adverse environmental impacts (Baird 2014; Poffenberger 2009; Collins et al. 2011). To some extent, governments could influence the operations of privatized units by introducing environmental considerations into the privatization processes. For example, in Montenegro, all privatization agreements had environmental clauses (UNECE 2015a) and the Philippines was set to review and monitor the regulatory compliance of mining concession (NEDA 2011). However, in many of the studied countries, environmental assessments and audits have not become regular parts of privatization processes (UNECE 2012a; UNECE 2011b) and land use agreements had not been consulted with the affected population (Cambodia, MoP 2013).

6.7.1 Summary of questionnaire results concerning theme 7: Stakeholder Engagement

Under this theme, environmental education (Factor 2) was chosen by 76% and NGO involvement in environmental activities (Factor 3) by 65% of the respondents. Both awareness raising programs (Factor 1) and engagement of major companies (Factor 4) received around 60% of the votes. Regional differences were negligible for the first most preferred priority factors (Factor 2 and 3), and between +/- 10% in case of the remaining three factors. See Table 25.

Table 25: Selection of priority implementation capacity factors for the theme based on all responses and based on regional choices.

Theme 7. Stakeholder involvement	Total choices	Europe	Asia
Total number of respondents	***117***	***68***	***49***
1. Public awareness-raising about environmental issues	59,83%	52,94%	69,39%
2. Environmental education in schools and via training	76,07%	76,47%	73,47%
3. Civil society involvement in environmental activities	64,96%	64,71%	63,27%
4. Engagement of businesses in voluntary environmental activities	58,97%	66,18%	46,94%
5. Integration of environmental considerations into privatization processes	34,19%	26,47%	44,90%

Institutional differences in the selections were also below 10% in most cases. Respondents from research institutions prioritized environmental education less frequently and the engagement of companies more likely. See Annex 6c.

6.8 Theme 8: Research and scientific cooperation

Identified implementation capacity factors for improved research and scientific cooperation in environmental goal implementation encompassed the establishment of research infrastructure, regular research programs, and cooperation between national research bodies, with businesses and international counterparts.

Table 26: Implementation capacity factors concerning Theme 8: Research and scientific cooperation

Implementation Theme	Implementation capacity factors	Justification
Theme 8. Research and scientific cooperation	Sufficient research infrastructure	To ensure adequate and sufficient human and technical capacities for research, backed by the necessary financing resources
	Regular and systematic research programs	To ensure that research on environmental issues are guided by a long-term, systematic research agenda
	Cooperation between research organizations and businesses	To encourage businesses to carry out R&D activities and to transfer new technologies
	Collaboration between national research institutions	To promote information exchange between research institutions and interdisciplinary research
	Collaboration with international research institutions	To build capacities, attract additional financing for research and carry out joint research projects

Theme 8, Implementation Capacity Factor 1: Sufficient research infrastructure. Research infrastructure at the national level was considered essential to carry out environmental activities. Although countries had universities and designated institutions and to carry out research about various environmental topics, assessments often noted limited human research capacities and the need for mechanisms to support researchers in developing knowledge about modern technologies or to motivate them to research environmental issues. This was both the case in the Southeast Asian region (Myanmar, MoEF 2012; Lao PDR, Government and UN 2013; Malaysia, MoNRE 2009; Timor-Leste, SSECTOPD 2007) and especially in the first half of the studied period, in the Southeast European region (Turkey, MoEF 2011; Croatia, Environment Agency 2005; Macedonia, MoE 2005; Albania, MoEFW 2006). Limitations in technical capacities were also noted in some cases (Turkey, MoEF 2011; Albania, MoEFW 2006; Romania, UNDP and GEF 2005; Indonesia, MoE 2010). One of the main reasons for limited research infrastructures was insufficient national financing (Bulgaria, MOEW 2014; Macedonia, MoE 2005; Romania, UNDP and GEF 2005; Cambodia, MoE 2010; Indonesia, MoE 2010) and donor funding for research was considered to be crucial in many (especially lower-income) countries *(*Cambodia, MoE and UNEP 200*8;* Vietnam, MoNRE and UNEP 2008).

Theme 8, Implementation Capacity Factor 2: Regular and systematic research programs. Although the need for establishing environmental research programs have been emphasized, countries often seemed to lack overarching, long-term research agendas even towards the end of the studied period (Montenegro, MoSDT 2014; UNECE 2015a; Romania; MoE 2013; Malaysia, MoNRE 2009; Uddin et al. 2009). Due to the lack of systematic research frameworks, country assessments often reported that research programs were ad-hoc, uncoordinated or not fully in line with policy needs (Romania, MoE and UNDP 2008; Lao PDR, MoNRE-IUCN 2015; Thailand, ONEP 2009). Suggesting that existing research programs did not necessarily address policy needs in Moldova, country reports repeatedly noted the need for research on various aspects of climate change (Moldova, MoE 2013; 2005 as well as biodiversity protection (Moldova, MoE 2009; MoNRE 2006). Related to Malaysia, it was suggested that research funds often prioritized ad-hoc environmental issues over the most urgent ones (Hezri 2011), and this resulted in gaps and overlaps in environmental research (Malaysia, MoNRE 2008; 2009). Lastly, although its importance was acknowledged,

efforts to safeguard and apply traditional practices were reported to be limited (Myanmar, UN CT 2011; Armenia, Ministry of Nature Protection 2004). For example, Indonesia reported the use of local knowledge in conservation projects (Indonesia, MoEF 2014), but this was limited in scope as in its second CBD report in 2002 it was already suggested that in many areas *"traditional knowledge of local communities have gone forever"* (Indonesia, MoE 2002, 32).

Theme 8, Implementation Capacity Factor 3: Cooperation between research organizations and businesses. Countries in the Southeast European region found a generally low-level of private sector participation in research activities (EC 2011; Moldova, MoE 2006). The lack of privately-owned and run environmental research centers or laboratories was also a concern in some countries (UNECE 2011a; Bulgaria, MoEW 2013; Moldova, MoE 2013). Information about the studied countries in the Southeast Asian region was more limited, but some pointed out cooperation needs between research institutions and private sector organizations (Cambodia, MoE 2007; Indonesia, MoE 2005). For example, Indonesia (MoE 2005) created an online information system for encouraging businesses to establish research cooperation. The support of innovation activities and the transfer of the best available technologies were also seen necessary. In some cases, countries assigned a dedicated national institution for coordination activities (Thailand ONEP 2009); tried to provide public funding (Armenia, Ministry of Nature Protection 2010) or pool private resources (Bulgaria, MOEW 2014, 106).

Theme 8, Implementation Capacity Factor 4: Collaboration between national research institutions. Many countries noted a generally low-level of exchange and coordination among national research institutions and academia both in the Southeast European region (Albania, MoEFW 2006; Croatia, Environment Agency 2005; Macedonia, MoE 2005; Montenegro, MoSDT 2015) and in Southeast Asia (Lao PDR MoNRE-IUCN 2015; Thailand, ONEP 2009). The interdisciplinary nature of environmental research activities was often recognized, but synergies were not necessarily utilized. (Armenia, Ministry of Nature Protection; Bulgaria, MOEW 2013). Solutions for strengthening relationship among various research organizations were also suggested by introducing coordination mechanisms in the field of climate change and biodiversity research (Turkey, MoEF 2011; 2007); by signing a memorandum of

understanding for cooperation (Moldova, MoE 2013) or by introducing a technical platform to address weaknesses in research collaboration (Lao PDR, MoNRE 2013; Vietnam, MONRE 2006).

Theme 8, Implementation Capacity Factor 5: Collaboration with international research institutions. International cooperation in scientific activities were considered as a means to increase national research capacities (UNECE 2014a; Macedonia, MoE 2008; Malaysia, MoNRE 2009; to secure additional financing for research (BiH, MoE 2010; Vietnam, MoNRE 2006), or to carry out research jointly and to exchange research results (Armenia, NCSD 2012; Myanmar, MoEF 2012; Vietnam, MONRE 2006; Timor-Leste, SSECTOPD 2007). Although country reports mentioned various cooperation activities, many countries noted inadequate or insufficient scientific relationship with other countries, especially in the first half of the studied period (Albania, UNDP and UN CT 2004; Croatia, Environment Agency 2005; the Philippines, Government 2014b; Indonesia, MoE 2005). A low level of international cooperation was suggested to be the result of limited capacities of research institutions to develop research projects and co-finance them (Indonesia, MoE 2005).

6.8.1 Summary of questionnaire results concerning theme 8: Research and scientific cooperation

Selections from respondents were somewhat evenly distributed. Coordination with business and institutional research organizations both received around 67% of the votes, while 62% of the respondents outlined the need for regular and systematic research programs. Regional differences were also not considerable and remained around +/- 5%. Respondents from Europe tended to prioritize coordination capacities between research and business organizations more frequently, while respondents from Asia were more likely to select coordination among national research organizations.

Table 27: Selection of priority implementation capacity factors for the theme based on all responses and based on regional choices.

Theme 8. Research and scientific cooperation	Total choices	Europe	Asia
Total number of respondents	***117***	***68***	***49***
1.Sufficient and adequate research infrastructure	55,56%	57,35%	53,06%
2. Regular and systematic research programs	61,54%	60,29%	63,27%
3.Cooperation between research organizations and businesses	66,67%	70,59%	61,22%
4. Collaboration between national research institutions	41,03%	36,76%	46,94%
5. Collaboration with international research institutions	67,52%	67,65%	67,35%

Institutional differences were more prominent. Notably respondents from international organizations had a different selection pattern: they prioritized Factor 1, ` (research infrastructure) and Factor 4 (national research coordination) less; while Factor 3 and 5, business and international coordination were well above the total selection averages. Respondents from NGOs and research organizations evaluated the importance of research infrastructure higher. In addition, respondents from NGOs found business-research coordination somewhat less, and national and international research collaboration somewhat more important. Research organizations deemed the importance of national collaboration higher and international collaboration lower than respondents from other institutional types. See Annex 6c.

6.9 Theme 9: Institutional framework for monitoring

Five implementation capacity factors were emerging from the document review and were selected for the questionnaire. These included the allocation of institutional responsibilities for monitoring, mechanisms to coordinate monitoring activities, sufficient human, technical and financial capacities and the participation in regional and global monitoring initiatives.

Table 28: Implementation capacity factors concerning Theme 9: Institutional framework for monitoring

Implementation Theme	Implementation capacity factors	Justification
Theme 9. Institutional framework for monitoring	1. Clear institutional responsibility for data collection	To define data collection responsibilities for monitoring organizations
	2. Mechanism to coordinate monitoring capacities	To harmonize data collection and analysis activities and to improve information exchange between data collection institutions
	3. Sufficient and adequate human capacity for monitoring	To ensure a sufficient number of qualified staff at responsible institutions
	4. Sufficient and adequate technical capacity for monitoring	To ensure necessary technical equipment and infrastructure for data collection at responsible institutions
	5. Sufficient financial resources for monitoring	To secure sufficient financing for data collection and analysis
	6. Involvement in regional/global monitoring initiatives	To harmonize and share environmental data with other countries and to improve national monitoring capacities via international collaboration

Theme 9, Implementation Capacity Factor 1: Clear institutional responsibility for data collection. While progress was achieved in developing monitoring mechanisms for environmental goals, the establishment of a comprehensive institutional framework for monitoring seemed to be a slow process. In many countries, monitoring responsibilities were still not entirely designated in the mid-2000s, and remained overall weak during the studied period (Serbia, MoE 2012; the Philippines, DENR 2009). To allocate monitoring responsibilities, the lack of a clear legislative background for monitoring i.e., to regulate data provision from subordinate bodies and stakeholders, stood out as one of the potential barriers (Myanmar, Ministry of Forest and UNEP 2011; Albania, UNDP and the UN CT 2004; Montenegro, Ministry of Tourism and Environment 2007). Other challenges included the temporary involvement of institutions carrying out monitoring on an ad-hoc basis (Armenia, Ministry of Nature Protection 2014; UNECE 2014b) and fragmented or duplicated monitoring activities (UNECE 2012a; Myanmar, Ministry of Forest and UNEP 2011; BiH, MoFTER 2012). In some cases, especially for biodiversity monitoring, designated institutions to collect, analyze or update data on specific environmental issues were completely missing (BiH, MoFTER 2012; UNECE 2014b; Indonesia, MoEF 2014; Vietnam, MoNRE 2014).

Theme 9, Implementation Capacity Factor 2: Mechanism to coordinate monitoring capacities. Coordination of monitoring activities remained weak in many countries during the studied period and thus slowed down the establishment of an effective monitoring framework. While in many countries, a large number of institutions were responsible for data collection and monitoring responsibilities were spread among various institutions, the coordination of these activities and the communication between responsible agencies was often insufficient and inadequate (UNECE 2012a; 2011a; Malaysia, MoNRE 201l; Lao PDR, MoNRE 2011). For example, in Vietnam at one point during the studied period *"nine agencies had jurisdiction over water quality monitoring in Hanoi* (Vietnam MoNRE and UNEP 2008, 43) and in BiH, more than 60 institutions were responsible for environmental data collection with limited coordination among these bodies (UNECE 2011a, 42). To improve coordination, the need for harmonizing data collection activities (Turkey, Ministry of Forestry And Water Affairs 2014) and centralizing inventory preparations at one institution (Turkey, MoEF 2011) were both outlined. Assessment reports also noted the importance of formal avenues for data sharing, such as information databases/platforms, clearing house mechanisms, improved standardization and inventory methods (UNECE 2014a; Romania, UNDP and GEF 2005; Cambodia, MoE 2007; Malaysia, MoNRE 2011; Myanmar, MoEF 2012; Vietnam, MoNRE 2014).

Theme 9, Implementation Capacity Factor 3-4: Sufficient and adequate human and technical capacity for monitoring. In most studied countries, human and technical capacities to fulfill monitoring requirements of environmental goals seemed to be insufficient. In terms of human capacities, besides the scarce number of staff (Armenia, Ministry of Nature Protection 2010; Montenegro, MoSDT 2013; Sivhuoch and Sreang 2015), the lack of sufficient technical expertise was also a recurring problem (Zdraveva et al. 2014; Malaysia, MoNRE 2011; Njegovan 2004). Capacity building needs for monitoring activities were outlined both in terms of number and expertise (Lao PDR MoNRE-IUCN 2015; Indonesia, MoE 2009; the Philippines, DENR 2014; Turkey, MoEF 2011). For example, Vietnam reported "*an inadequate pool of greenhouse gas inventory technical experts in the ministries and agencies"* and stressed the need for capacity building at *"GHG inventory-related ministries, agencies and provinces"* (Vietnam, MoNRE 2010, 126 and 128). Concerning technical capacities,

physical infrastructure for data collection, including collection and control points, monitoring equipment and laboratories were considered as a prerequisite. Most countries reported progress in the establishment and the modernizations of technical infrastructures during the studied period. However, progress was not always sufficient, especially in Southeast Asia. Some countries reported insufficient physical infrastructure for monitoring (Myanmar, Ministry of Forest and UNEP 2011; the Philippines, Government 2014b; Timor-Leste, SSE 2014; Vietnam, MoNRE 2010), while others noted equipment modernization needs (Croatia, MoE 2014; Moldova, MoNRE 2005; UNECE 2007a; Myanmar, ADB 2013; Baltacı et al. 2008).

Theme 9, Implementation Capacity Factor 5: Sufficient financial resources for monitoring. Insufficient financing for monitoring objectives was often cited as the underlying reason for the lack of human and technical capacities and for limited data collection activities (e.g. the Philippines, DENR 2009, Cambodia, MoE 2010; Malaysia, MoNre 2011; Montenegro, MoSDT 2015; Serbia, MoE 2010). Countries often reported that the agencies responsible for data collection has a limited budget, and stakeholders involved in monitoring actives, such as civil societies or research institutions relied on insufficient public support (UNECE 2007b; 2011a; 2014b; Macedonia, MoE 2005). In some cases, public financing for monitoring objectives was not available at all (UNECE 2007a). Similarly to research activities, the importance of international support to fulfill monitoring requirements was also highlighted (Croatia, Ministry of Environmental and Nature Protection 2014b; Armenia, Government and UN CT in Armenia 2010; UNECE 2012b).

Theme 9, Implementation Capacity Factor 6: Involvement in regional/global monitoring initiatives. Participation in global and regional networks was considered beneficial from various aspects. It enabled countries to develop, collect and report standardized and comparable data as well as to build capacity and fulfill reporting obligations imposed by environmental conventions (UNECE 2012a; Bulgaria, MOEW and ExEA 2010; Macedonia, MoE 2008; Moldova, MoE 2013). Likewise, in the Southeast Asian region, countries underlined the importance of both global and regional cooperation to improve environmental monitoring capacities (Myanmar, MoEF 2012; the Philippines, Government 2014b; Timor-Leste, SSE 2014). At the same time, insufficient level of cooperation was also noted i.e., to harmonize environmental data

with other countries *(*Cambodia, MoE and UNEP 2008; Macedonia, MoE 2005) or to participate in data-sharing platforms of environmental agreements (Plengsaeng et al. 2014 Romania, UNDP and GEF 2005).

6.9.1 Summary of questionnaire results concerning theme 9: Monitoring framework

78% of the respondents highlighted the importance of clear allocation of monitoring responsibilities and 63% the need for sufficient financial resources for monitoring activities. Other factors received less than 50% of selections – with the lowest number of votes for international and regional monitoring coordination. Regional selection patterns were not considerably different. European respondents were slightly more likely to prioritize the need for human capacities and financial resources (Factor 3 and 5), while Asian respondents highlighted the need for coordination mechanisms well above the total average (Factor 2).

Table 29: Selection of priority implementation capacity factors for the theme based on all responses and based on regional choices.

Theme 9. Institutional framework for monitoring	**Total choices**	**Europe**	**Asia**
Total number of respondents	***117***	***68***	***49***
1. Clear institutional responsibility for data collection	77,78%	76,47%	79,59%
2. Mechanism to coordinate monitoring capacities	43,59%	35,29%	55,10%
3. Sufficient and adequate human capacity for monitoring	48,72%	51,47%	44,90%
4. Sufficient technical capacity for monitoring	37,61%	35,29%	40,82%
5. Sufficient financial resources for monitoring	63,25%	70,59%	53,06%
6. Involvement in regional/global monitoring initiatives	23,93%	23,53%	24,49%

Significant institutional differences in selections were only observed in a few instances. Respondents from government institutions considered institutional aspects (Factor 1 and 2) less important, while capacity and resource factors (3-5) more important than the total averages. NGOs and research institutions were less likely to prioritize technical capacities and financial resources for monitoring (Factor 4 and 5), while evaluated higher the importance of regional/global monitoring initiatives (Factor 6). See Annex 6c.

6.10 Theme 10: Environmental data collection processes

Concerning the technical aspects of monitoring, the following five implementation capacity factors were included in the questionnaire: the introduction of monitoring plans, the creation of baseline data sets, standardized monitoring methodologies and data collection processes, and integrated environmental information systems.

Table 30: Implementation capacity factors concerning Theme 10: Environmental data collection processes

Implementation Theme	Implementation capacity factors	Justification
Theme 10. Environmental data	1. Monitoring plans are introduced	To establish a comprehensive system of indicators or quality standards for monitoring progress towards environmental goals
	2. Monitoring methodologies are harmonized	To develop monitoring methodologies for environmental data, which are followed by all national actors and comply with relevant international requirements
	3. Baseline data is available	To ensure that physical assessments or inventories are available as a basis for data collection efforts
	4. Data collection processes are adequate	To ensure that data collection processes provide sufficient, functional and regular statistics and supported with quality monitoring
	5. Integrated databases for environmental information systems are introduced	To introduce and maintain data platforms collecting environmental information for planning and decision-making

Theme 10, Implementation Capacity Factor 1: Monitoring plans are introduced. Comprehensive monitoring plans, including established environmental indicators, underlying quality standards and guidelines to collect related data were often reported to be missing, even towards the end of the studied period. For instance, in Armenia, and in Romania, a comprehensive biodiversity monitoring program was reported to be still missing in 2012 (Armenia, NCSD 2012; UNECE 2012b). Myanmar has still lacked emissions and biodiversity monitoring plans in 2011 and 2009 respectively (Myanmar, Ministry of Forest and UNEP 2011; Ministry of Forestry 2009) and Malaysia only launched a comprehensive GHG monitoring program in 2013 (Malaysia, EPU 2015).

Even if monitoring programs were in place, the indicators selected for monitoring were often not complete or entirely relevant (the Philippines, NEDA 2014a; Vietnam, MoNRE 2014; BiH, MoFTER 2012) and they were not fully integrated with national monitoring systems. (Thailand, Economic and Social Development Board 2010; UNECE 2012a). To address these inconsistencies and gaps in the monitoring plans, countries recognized the need to amend or extended the structure or the list of environmental indicators in use (UNECE 2014b; Bulgarian, UNDP 2008), as well as adjust quality standards to international norms or improve data collection approaches (Indonesia, MoE 2010; Vietnam MoNRE and UNEP 2008).

Theme 10, Implementation Capacity Factor 2: Monitoring methodologies are harmonized at the national level and reflect international methodologies. Country assessments repeatedly stressed the importance of internationally harmonized and nationally agreed measurement methodologies but they often concluded that the applied methodologies were underdeveloped, not agreed and followed by all national actors and failed to comply with relevant international requirements (the Philippines, DENR 2009; UNECE 2012a, Njegovan 2004). In the Southeast Asian region, several country assessments stressed the importance of the development of national emission factors to improve GHG inventories (Timor-Leste, SSE 2014; Myanmar, MoEF 2012; Malaysia, MoNRE 2011; Lao PDR, MoNRE 2013). BiH lagged behind in revising protected area categorization according to international standards (BiH, MoFTER 2012) and the 2008 EPR of Thailand underlined the importance of verifying forest cover calculations methods against international and regional approaches (Thailand, MoNRE and UNEP 2008). In connection to water issues, Turkey reported both in its 2005 and 2010 MDG reports that relevant definitions and methodologies are not harmonized (Turkey, SPO 2005; 2010).

Theme 10, Implementation Capacity Factor 3: Baseline data is available. Data collection processes were often impeded by the lack of physical maps, resource inventories or baseline registries. Missing data on historical emissions hampered the establishment of baseline emissions data in many of the studied countries (e.g. Romania, UNDP and GEF 2005; Cambodia, EU Delegation 2012; Malaysia, MoNRE 2011; Myanmar, Ministry of Forest and UNEP 2011). The first biodiversity inventories had not or only been partially completed by the end of the studied period (Armenia,

Ministry of Nature Protection 2014; Macedonia, MoE 2014; UNECE 2015a; Timor-Leste, SSECTOPD 2007; Vietnam, MoNRE 2014). In 2005, Turkey noted missing forest inventories (Turkey, SPO 2005), and in 2011, the Philippines have still not had a comprehensive inventory for water resources (NEDA 2011). In some cases, primary socio-economic data such as a population census, were also outdated e.g. in Bosnia-Herzegovina (BiH, MoFTER 2012) or in Myanmar (Ware 2011). However, reasons for missing baseline data did not entirely originate from weaknesses in the monitoring systems. In some instances, historical data was not collected in the past or existing institutional memory has been lost e.g. due to the Balkan war in the former countries of Yugoslavia or the Indonesian occupation in Timor-Leste (Moldova, Government 2013; University of Goteborg 2008).

Theme 10, Implementation Capacity Factor 4: Data collection processes are adequate to provide sufficient, functional and regular statistics. Despite efforts to designate institutional frameworks to monitoring, to build capacities and to introduce monitoring plans, data collection processes often remained inadequate. Country assessments often registered missing or irregular data sets (Montenegro, MoSDT 2014; 2013; (Zdraveva et al. 2014; Serbia, MoE 2012; Cambodia, MoE 2012; Indonesia, BAPPENAS 2010) and problems with the accuracy, the reliability or the timeliness of the collected data (UNECE 2014a; Armenia, Government and UN CT 2010; Moldova, Government 2013; the Philippines, NEDA 2014a). Quality problems resulted from slow data collection processes and limited efforts to validate or verify the collected data (Vietnam, MoNRE 2010; Cambodia, MoE 2012). The importance of regular updates to existing datasets was also underlined as data collection activities had sometimes remained one-off efforts (the Philippines, NEDA 2014a; Timor-Leste, SSECTOPD 2007; Lao PDR, Government and UN 2013; 2008).

Theme 10, Implementation Capacity Factor 5: Integrated databases for environmental information system are introduced: Almost all studied countries noted the need to introduce to integrated technical platforms collecting environmental data: in order to support planning and decision-making (BiH, MoFTER 2012; Indonesia, MoE 2010; Njegovan 2004; Romania, Government and UN 2003), to provide information to various stakeholders for research and technology development (Myanmar, Ministry of Forest and UNEP 2011; Myanmar, UN CT 2011); to enable

exchange among them (Turkey, SPO 2007; UNECE 2011b); to enable the implementation of policies (Bulgaria, MoEW 2009; UNECE 2012a) and to monitor policy implementation (Malaysia, MoNRE 2008). In spite of efforts to create such systems, integrated environmental databases seemed not be fully functioning in many countries even around the end of the studied period (UNECE 2015a; 2012a; Macedonia, MoE 2014. For instance, Vietnam reported the lack of centralized biodiversity information system, both in the 2006 NCSA and a decade later in its 5th CBD report (Vietnam, MONRE 2006; 2014). The Philippines also emphasized the need for an improved environmental information sharing system in several country reports and strategies. (DENR 2014; NEDA 2014a; 2011; Government, UNDP and GEF 2005). In Montenegro, environmental information system *"has been developed partially, and for the parts available no automatic information flows have been ensured"* (UNECE 2015a, xxii). Recognizing the scale of the task, some countries established or appointed dedicated offices responsible for the development and the maintenance of such databases (UNECE 2014a; Serbia, Ministry of Agriculture and Environmental Protection 2014; Myanmar, Ministry of Forest and UNEP 2011).

6.10.1 Summary of questionnaire results concerning theme 10: Environmental data collection processes

The importance of the above five issues was weighted rather equally by the respondents of the questionnaire: all issues have been selected by 52-66% of them. The highest priority (66%) was assigned to data collection processes that can ensure timely, regular, sufficient and functional statistics. Over 60% of the respondents also considered the establishment of integrated databases for environmental information systems as a priority success factor and 57% highlighted the need for baseline data collection. Regional priorities were somewhat more pronounced for two issues: 69% of the Asia respondents prioritized the necessity to establish baseline data (Factor 3), while 73,5% of their European counterparts highlighted the need for establishment of integrated environmental information systems (Factor 5). This indicated that monitoring processes were somewhat more advanced in the latter region and Southeast European countries were more likely to have scattered environmental database that needed systematization, while Southeast Asian countries only started to establish their data sets for environmental monitoring.

Table 31: Selection of priority implementation capacity factors for the theme based on all responses and based on regional choices.

Theme 10. Environmental data collection processes	Total choices	Europe	Asia
Total number of respondents	**117**	**68**	**49**
1. Monitoring plans are introduced	52,99%	51,47%	55,10%
2.Monitoring methodologies are harmonized	53,85%	52,94%	55,10%
3. Baseline data is available	57,26%	48,53%	69,39%
4. Data collection processes are adequate	65,81%	64,71%	67,35%
5. Integrated databases for environmental information system are introduced	62,39%	73,53%	46,94%

Institutional differences in the prioritization of related capacity factors were observed in some cases. Factor 1 was assessed higher by NGO representatives and researchers and lower by respondents from international organizations. NGO representatives and researchers were less likely to highlight the importance of baseline data (Factor 3), but researchers considered adequate data collection processes more important (Factor 4). See Annex 6c.

6.11 Theme 11: Reporting and review of policies

Emerging from the document review, five main implementation capacity factors could be identified from the studied country assessment documents under this theme, including the need for an adequate reporting process, for fulfilling international reporting obligations, the provision of environmental information to the public, regular review of implementation progress and the accountability of governments.

Table 32: Implementation capacity factors concerning Theme 11: Reporting and review of policies.

Implementation Theme	Implementation capacity factors	Justification
Theme 11. Reporting and review	1. Adequate environmental reporting processes	To establish a comprehensive institutional framework and mechanism to prepare environmental reports
	2. International reporting obligations are followed	To fulfill reporting obligations for international environmental goals by adhering to relevant guidelines and reporting processes
	3. Environmental goal implementation is regularly assessed by the government	To create systematic review mechanisms for environmental policies, which can support their update and review
	4. Public access to environmental information is secured	To share environmental data on publicly accessible platforms and provide environmental information to research and review purposes
	5. Governments are held accountable for environmental goal implementation	To ensure transparency of environmental goal implementation processes

Theme 11, Implementation Capacity Factor 1: Adequate environmental reporting processes. To establish adequate reporting processes, the studied country assessments found it important to assign a designated coordinating institution, to involve public bodies and research institutions in the process on a regular basis, and to build sufficient national capacity for developing reports. However, such processes were not fully launched or maintained in many of the studied countries. For example, the need for institutionalized reporting systems and sustainable capacities for preparing reports to environmental agreements were often outlined (Turkey, MoEF 2011; Montenegro, MoSDT 2015; Zdraveva et al. 2014). In the Southeast Asian region, the need for regular reporting mechanisms and system was also outlined to develop general state of the environment reports (Cambodia, MoE and UNEP 2008; Myanmar, Ministry of Forest and UNEP 2011; Vietnam MoNRE and UNEP 2008); to follow climate change policy implementation (Lao PDR, MoNRE 2013; Malaysia, MoNRE 2011; Timor-Leste, SSE 2014) as well to report about biodiversity protection (the Philippines, DENR 2014). In addition, countries have faced many challenges during the report preparation processes, including inadequate data and information systems that failed to properly support report preparations (UNECE 2014b; Albania, UNDP and UN CT 2004; the Philippines, DENR 2009; Lao PDR, STEA and UNEP 2012), as well as limitations of institutional

capacities (Montenegro, MoSDT 2015; the Philippines, Government, UNDP and GEF 2005). To tackle these challenges, countries often received some international financial and technical support during the report development processes.

Theme 11, Implementation Capacity Factor 2: International reporting obligations are followed. The studied countries emphasized the importance and attempted to fulfill reporting obligations to various environmental conventions, such as the CBD and the UNFCCC, as well as regularly prepared MDG implementation reports. However, in some cases, non-compliances were noted: i.e., delays in the preparation of the UNFCCC reports in Myanmar (Myanmar, Ministry of Forest and UNEP 2011) or missing GHG emissions data in a UNFCCC submission of Turkey (EC 2014). In 2009, Serbia was yet to prepare its initial UNFCCC communication (Serbia, Government 2009) and it was noted that Albania did not submit a report to the UNCSD for a decade or prepared a position paper for the Rio+20 Summit (UNECE 2012a). For the preparation of these reports, international guidelines and reporting formats were taken into consideration and used (the Philippines, Government 2014b; Croatia, MoE 2014. While the relevance of these guidelines to national planning and reporting processes were recognized (Moldova, MoNRE 2005; Lao PDR, MoNRE 2013), in some cases their applicability was questioned. For instance, in Croatia, the link of the country's MDG reports to its NSDS was found debatable, due to *"a lack of coherent indicators to track progress"* (UNECE 2014a, xxiv).

Theme 11, Implementation Capacity Factor 3: Environmental goal implementation is regularly assessed by the government. While various environmental reports have been produced in the studied countries during the reviewed period, in many cases the reporting processes remained ad-hoc, donor-driven activities without clear linkages to policy-development and revision processes (UNECE 2014b). Moreover, even when prepared regularly, the quality and the content of the reports raised concerns. For example, the annual SOER reporting processes were found to be too "*lengthy and complicated*" (UNECE 2014a, 61) thus, *has limited relevance and input to the policymaking process"* (UNECE 2012a, xxiv). Policy update and revision processes were further hindered by the lack of established review mechanisms and by insufficient institutional capacities (Serbia, MoE 2012; Cambodia, MoE and UNEP 2008; UNECE 2011b; Petak 2006). In Malaysia, the nonexistence of systematic policy

analysis was noted and as a result, policy developers had limited knowledge about the outcomes of past environmental policies and had to *"rely on anecdotal evidence or speculation on success and failure"* (Hezri 2011, 67). A large number of involved institutions in the implementation of biodiversity protection activities could also complicate the reporting as well as the policy review processes (Montenegro, MoSDT 2014).

Theme 11, Implementation Capacity Factor 4: Provision of environmental information to the public is secured: The provision of environmental information seemed to improve in many countries during the studied period, especially with the rapid development of internet technology (BiH, MoFTER 2012; UNECE 2014b). For example, the 2004 NCSA of Armenia reported the *"absence of willingness to provide information to the public and clearly defined relevant procedures"* (Armenia, Ministry of Nature Protection 2004, 103), but in 2010, the country reported the creation of public environmental information centers as a direct result of the accession to the Aarhus Convention (Armenia, Ministry of Nature Protection 2010; Government and UN CT 2010). The importance of access to information was especially emphasized in those EU accession countries which signed the Aarhus Convention. However, some countries, especially in Southeast Asia, noted difficulties in ensuring public access to environmental information. These included limited and restricted access to information (AECEN 2005; Myanmar, Ministry of Forest and UNEP 2011; UNECE 2011b; slow and complicated data request procedures (AECEN 2008; Cambodia, MoE and UNEP 2008; Albania, Government and UN 2007) and the lack of publicly available data-platforms (Timor-Leste, SSECTOPD 2007; the Philippines, Government 2014b; Turkey, MoEF 2011; UNECE 2014a).

Theme 11, Implementation Capacity Factor 5: Governments are held accountable for environmental goal implementation. The studied country documents often indicated the need for improvements in the accountability and transparency of environmental protection issues (UNECE 2014a; 2011a; UN CT Myanmar 2011b; Bass et al. 2010). Even with the necessary reporting and accountability mechanisms in place, implementation remained insufficient (UNECE 2012a; Indonesia, MoE 2005). In some cases, accountability problems were noticed in connection with specific areas of implementation, including cooperation with NGOs in Montenegro (UNECE 2007a);

water resource management practices in the Lao PDR (Lao PDR, STEA and UNEP 2012) and environmental taxation at the sub-national level in Indonesia (White 2007). Country documents also noted various issues, which hampered the accountability. These included the lack of legislative backing for monitoring progress towards environmental targets or lengthy decision-making and policy adoption processes (OECD 2008; UNECE 2014a); limited institutional coordination (UNECE 2011b; Myanmar, UN CT 2011; Philippines, NEDA 2011) and lack of official and accessible monitoring information (Moldova, MoE 2009).

6.11.1 Summary of questionnaire results concerning theme 11: Reporting and review of policies

Under this theme, 73,5% and 72,5% of the respondents selected two priority issues: the need for institutionalized *environmental reporting processes* (Factor 1) and the necessity of *government accountability* procedures (Factor 5). 61% also selected *public access to environmental information* (Factor 4*)* as an important implementation factor. Some regional differences could be observed in preferences: while respondents from both regions highlighted the importance of government accountability procedures, Asian respondents were more likely to outline the need for established environmental reporting procedures, while European respondents prioritized public access to environmental information higher.

Table 33: Selection of priority implementation capacity factors for the theme based on all responses and based on regional choices.

Theme 11: Reporting and review of policies	Total choices	Europe	Asia
Total number of respondents	***117***	***68***	***49***
1. Adequate environmental reporting process is established	72,65%	64,71%	83,67%
2. International reporting obligations are followed	35,04%	41,18%	26,53%
3. Environmental goal implementation is regularly assessed by the government	52,14%	45,59%	61,22%
4. Public access to environmental information is secured	60,68%	69,12%	48,98%
5. Governments are held accountable for environmental goal implementation	73,50%	75,00%	71,43%

Institutional differences in the selection of factors were the following: researchers considered international reporting obligations (Factor 2) less important than respondents from other institutional groups. Representatives of international

organizations and NGOs found the regular assessment of goal implementation efforts less important (Factor 3), while a higher percentage of respondents from government and research institutions considered it important. Public access to information (Factor 4) was highly prioritized by respondents from international organizations and well below average by respondents from ministries. The lowest percentage of votes for government accountability (65%) came from representatives of government institutions. See Annex 6c.

6.12 Selected priority implementation capacity factors for environmental goals

In total, 17 priority implementation factors were identified by more than 2/3 of the 117 respondents from the studied countries. Capacity aspects related to law implementation and enforcement; sufficient public financing and the provision of financial incentives to mobilize private resources, the clear allocation of institutional responsibilities for implementation and monitoring activities were selected by the highest number of respondents. Political commitment was also selected by the large majority of the respondents and environmental education and stakeholder involvement in environmental decision-making processes also emerged as high priority implementation capacity areas. An overview of the results of the selections is presented in Annex 6b and the 17 priority implementation capacity factors are listed in Table 34.

Table 34: Prioritized implementation capacity factors by the majority of the questionnaire respondents

	Selections (1st, 2nd and 3rd priority choices)	Total choices	Europe	Asia
1.	Theme 6. Factor 3. Transparent and efficient system for enforcement	83%	85%	80%
2.	Theme 4. Factor 2. Allocation of earmarked budget to environmental goals	81%	76%	88%
3.	Theme 2. Factor 2. Clear allocation of implementation responsibilities	79%	84%	71%
4.	Theme 3. Factor 1. Political commitment to implementation	79%	81%	76%
5.	Theme 4. Factor 4. Use of financial incentives to mobilize private resources	79%	81%	76%
6.	Theme 9. Factor 1. Clear institutional responsibility for monitoring	78%	76%	80%
7.	Theme 6. Factor 1. Targeted government measures to implement laws and strategies	77%	74%	82%
8.	Theme 7. Factor 2. Environmental education in schools and via training programs	76%	76%	73%

9.	Theme 2. Factor 5. Involvement of stakeholder groups in environmental decision-making	75%	76%	73%
10.	Theme 5. Factor 4. National capacity for efficient utilization of international support	74%	71%	80%
11.	Theme 11. Factor 5. Governments are held accountable for environmental goal implementation	74%	75%	71%
12.	Theme 11. Factor 1. Adequate environmental reporting processes	73%	65%	84%
13.	Theme 5. Factor 3. International technical assistance	68%	65%	73%
14.	Theme 8. Factor 5. Collaboration with international research institutions	68%	68%	67%
15.	Theme 6. Factor 2. Environmental permitting/licensing	67%	63%	71%
16.	Theme 8. Factor 4. Cooperation between research organizations and businesses	67%	71%	61%
17.	Theme 10. Factor 4. Data collection processes are adequate to provide sufficient; functional and regular statistics	66%	65%	67%

In general, a strong convergence can be observed in the selected 17 priority factors between the Asian and the European respondents. In terms of regional differences among the selected factors, the Southeast Asian respondents prioritized sustained international financial support more and technical support somewhat more than their European counterparts. Environmental impact assessment/permitting was also selected by a slightly bigger percentage of Asian respondents than Europeans. Meanwhile, Southeast European respondents prioritized cooperation between businesses and research higher than respondents from Asia.

Moreover, if the results are normalized to account for the differences in the number of submitted responses from European and Asian countries, sixteen of the above listed capacity factors would remain on the list and only the issue of sustained financial support would have received less than 2/3 of the votes.

In addition, there were a few implementation capacity factors, which were prioritized high by the majority of the respondents in one of the regions but have not received the overall priority of the votes. Concerning institutional capacities (theme 3), the majority of European respondents prioritized the need for qualified human resources as an important implementation factor, while Asian respondents selected more frequently the empowerment of local authorities and sufficient financing for environmental goal

implementing organizations as priority implementation issues. For theme 5, access to international financial support also emerged as a higher priority among the Asian respondents (with 71% selection rate). Regarding stakeholder involvement (theme 7), awareness-raising activities were prioritized higher by the Southeast Asian respondents and business involvement by the European respondents. With regards to the institutional framework for monitoring (theme 9), the need for sufficient financial resources was prioritized only by the European respondents. In terms of data collection processes (theme 10), the majority of Asian respondents highlighted the importance of baseline data collection, while European respondents were more likely to emphasize the need for integrated environmental systems here. Under theme 11, reporting and review of policies, the provision of public access to environmental information was considered a priority issue by more than 2/3 of the European respondents, but only by less than 50% of the Asian respondents. These issues can be considered for testing during a sensitivity analysis of the testing of the STMI, at the same time, the regional responses should be treated with some level of caution in terms of representativeness as they do not reach the level of a large sample size (n=100).

Table 35: Prioritized implementation capacity factors by the majority of the respondents from one of the regions

	Total	Europe	Asia
Theme 3. Factor 2. Sufficient and adequately qualified human capacities	58%	68%	45%
Theme 3. Factor 4. Stable economic situation of environmental goal implementing organizations	64%	62%	67%
Theme 3. Factor 5. Empowerment of local governments to implement environmental goals	61%	56%	67%
Theme 5. Factor 2. International financial support	62%	54%	71%
Theme 7. Factor 1. Public awareness-raising about environmental issues	60%	53%	69%
Theme 7. Factor 4. Engagement of businesses in voluntary environmental activities	59%	66%	47%
Theme 9. Factor 5. Sufficient financial resources for monitoring	63%	71%	53%
Theme 10. Factor 3. Baseline data is available	57%	49%	69%
Theme 10. Factor 5. Integrated databases for environmental information system are introduced	62%	74%	47%
Theme 11. Factor 4. Public access to environmental information is secured	61%	69%	49%

Moreover, there were four implementation capacity factors which were selected by 60-65% - both by the total respondents and also at the regional level. Two of these

concerned the development of a strategic framework, including the capacity needs to develop policy documents with the involvement of stakeholders and by using integrated approaches towards socio-economic and environmental challenges. Under the theme of stakeholder involvement (Theme 7), civil society involvement in environmental activities was prioritized by over 65% of the respondents. For theme 8, research and scientific cooperation, the factor concerning the development of regular and systematic research programs were selected by 62% of all respondents. Thus, these factors can additionally also be considered during the development of the implementation capacity indicators and the eventual construction of the index.

Table 36: Implementation capacity factors selected by more than 60% of the respondents

	Total	Europe	Asia
Theme 1. Factor 2. Strategies/Policies/Plans are consulted with stakeholders	65%	60%	71%
Theme 1. Factor 4. Strategies/Policies/Plans use integrated approaches towards socio-economic and environmental problems	64%	63%	65%
Theme 7. Factor 3. Civil society involvement in environmental activities	65%	64,7%	63,3%
Theme 8. Factor 2. Regular and systematic research programs	62%	60%	63%

Based on the list of priority implementation capacity factors, in the next chapter a proposal is set forward for a set of indicators, which can support the assessment of country capacities to implement the environmental components of the SDGs. Chapter 7 elaborates on possibilities to translate the selected capacity factors into indicators, tests the applicability of these and provide suggestions for measuring and aggregating them into an implementation capacity index.

Chapter 7 Towards the development of the Sustainability Transition Management Index

As presented in chapter 6, 17 implementation capacity factors emerged from the document review and the questionnaire implementation, which can be considered of priority importance for successful environmental goal implementation. See Table 34 for an overview and Annex 6b for the full list of assessed implementation capacity factors. This chapter discusses how these factors could be translated into measurable indicators, presents the results of a pilot testing exercise of the developed indicators and discusses how the indicators could be used to develop an implementation capacity index (the STMI).

Considering the main theoretical and methodological problems inherent in the development of composite indicators, the OECD – EC-JRC Handbook on Composite Indicators (Nardo et al. 2008) suggests a ten-step development process, encompassing the establishment of a theoretical framework as basis for the selection and combination of the indicators; the selection of the indicators, various methodological steps to ensure the relevance and credibility of the composed index, the comparison of its results to other similar indices and the visualization of the results. As presented in chapter 4.6, the importance of these considerations was also supported by other guidelines and literature reviewed, thus also followed by this research.

7.1 Conceptual framework to develop a set of implementation capacity indicators for the STMI

As a first step in the construction process of composite indicators, the development of a theoretical framework is suggested, in order to provide a clear and detailed understanding of the nature and structure of the measured phenomena (Gisselquist 2014; Nardo et al. 2008). Such a theoretical framework is also crucial as a basis for establishing the selection criteria for the elements of the composite indicators (Nardo et al. 2008).

For the development purposes of the STMI, the selection of the implementation themes and the identified implementation capacity factors for the questionnaire have been

derived from the conceptual framework of the research, which was established in 3.3. Based on the policy implementation theory, this conceptual framework established the linkages between the themes, thus helped to define the necessary capacity factors which were to be confirmed and/or modified via the answers to the questionnaire and the following personal consultations. Based on the questionnaire responses (to question number 20-21) as well as personal consultations organized after the collection and analysis of the questionnaire results, a summary of feedback concerning the overall concept of the STMI and applicability of the implementation capacity indicators were gathered and is presented below.

Besides identifying priority implementation capacity factors, two questions (number 20 and 21) in the questionnaire aimed to query and validate the overall importance of the eleven different implementation themes emerging from the document review (see methodology section 4.5). As shown in Figure 17, almost all respondents confirmed the importance of the identified eleven themes. Two themes, institutional capacity for implementation and law implementation and enforcement, were suggested as very important for the implementation of environmental goals by the two-third majority of the respondents. An additional six themes were selected as "very important" by more than half of the respondents. Three themes, international cooperation, research and monitoring frameworks were prioritized somewhat lower by the majority respondents.

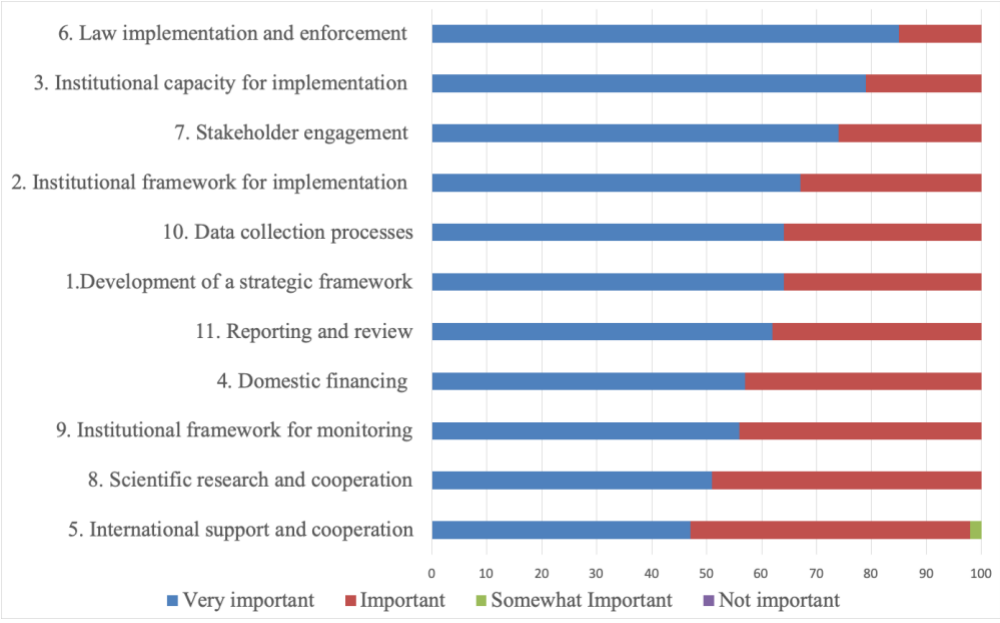


Figure 17: Overall importance of the identified environmental goal implementation themes, according to the respondents of the questionnaire (showing the number of respondents)

Some regional differences could also be observed concerning the prioritization of the implementation themes. Asian respondents considered the development of policy framework more important than European respondents (71% versus 46%), but financing scored somewhat lower compared to the European respondents (35% versus 61%). Progress monitoring and policy review themes were, in general rated as of higher importance by European respondents.

Table 37: Percentage of respondents, marking a theme as "very important"

Implementation themes	Total	Europe	Asia
Theme 6. Law implementation and enforcement	73%	79%	65%
Theme 3. Institutional capacity for implementation	68%	72%	65%
Theme 7. Stakeholder engagement	64%	61%	71%
Theme 2.Institutional framework for implementation	58%	57%	58%
Theme 1.Development of a strategic framework	56%	46%	71%
Theme 10. Data collection processes	56%	64%	45%
Theme 11. Reporting and review	53%	60%	46%
Theme 4. Domestic financing for implementation	50%	61%	35%
Theme 9. Institutional framework for monitoring	49%	56%	39%
Theme 8. Scientific research and cooperation	44%	50%	36%
Theme 5. International support and cooperation	41%	47%	32%

The questionnaire results, concerning the selection of the specific priority implementation factors (as presented in chapter 6.12), were also discussed with experts in the field of indicator development as well as with some of the respondents of the questionnaires (see chapter 4.5.2. and 4.6.). In general, the interviewed experts and stakeholders confirmed that the 17 selected capacity factors (see Table 34 and Annex 6b) represent challenges that countries have to address in order to promote better environmental goal implementation outcomes. It was also suggested that if countries improve their performance on these factors, it is likely that better results can be achieved with the implementation of environmental goals.

It was also suggested that the number of responses is large enough to be used as a basis for the overall selection of indicators (Saisana, pers. comm 2016). 65% can be considered as a good threshold value for the selection, but in order to protect the selection and to ensure that there are no important issues lost, a sensitivity analysis

could be carried out during the eventual construction of the index for those issues, which were selected by 50%, 55%, 60% of the respondents.

During the interviews, stakeholder involvement emerged as particularly important and was also rated a high priority theme by the majority of the questionnaire respondents, especially among Asian respondents. One respondent also suggested that "stakeholder involvement" should be given much more prominence and should be placed at the heart of the evaluation. At the same time, under this theme, only education received more than two/third of the votes, while awareness-raising programs to the general public, civil society and business involvement in implementation were all received above 50% of the priority votes.

There were some issues, which were selected by the majority, but did not reach the 65% threshold. For example, civil society involvement, qualified human capacities or the use of research for policy-development, were highlighted as important issues in certain country contexts. Other issues, which were not priority for the majority of the respondents, were still pointed out as significant in some countries. For example:

- In Romania, securing land ownership rights were identified as important to ensure better nature protection and forest management.
- In Myanmar, the creation of a statistical system was suggested to be a cornerstone of more successful environmental goal implementation. While an environmental monitoring framework had already been established in other countries, the relevant supporting law to establish a monitoring framework was only approved recently, and baseline data collection is in its initial phase in Myanmar.

With regard to pilot testing of the indicators, most of the interviewees agreed that the evaluation of the selected implementation capacity factors could be helpful in better understanding the level of preparedness of countries for implementing environment-related SDGs. Some respondents suggested that the results could be especially useful for experts at lower/ technical governance levels – at the same time, also highlighted that policy practitioners would likely not have sufficient time and capacity to carry out the evaluation themselves.

Other respondents suggested that results would need to be considered with caution. For example, while it is likely possible to establish a general list of indicators for the identified issues, some of the indicators may need to be modified depending on the country-context, which would, in turn, limit country comparability. It was also highlighted that the same implementation capacity factors might be at a different level of progress for different issues (i.e., the data collection is adequate for one environmental goal but not for another) or, in some cases, the same capacity factors should be assessed with somewhat different measures. These comments also pointed to the direction that environmental goal implementation capacities may be better evaluated according to environmental issues (or goals) and could be further tailored to country contexts.

7.2 Developing a set of implementation capacity indicators for the STMI

The second step in the process of constructing composite indicators is the selection of indicators (Nardo et al. 2008). In a report to the Balaton Group, (Meadows 1998) identified 15 important characteristics of ideal indicators. According to this list, good indicators are clear in value and content, relevant to policies, and based on existing data or indicators, but at the same time, they provide a sufficient level of supplementary information to stakeholders, leading them to act in a timely manner. They are also measurable (affordable, timely and quantifiable), hierarchical, and aggregated at an appropriate level of scale. Lastly, good indicators are democratically selected and open to discussion and change.

To establish a set of indicators based on the prioritized implementation capacity factors, the research took into consideration capacity and process indicators identified during the course of the document review as well as the relevant indicators, emerging from a review of environmental governance indicators (Almassy and Pinter 2018). As presented in chapter 4.4, the main purpose of the document review was to identify implementation capacity factors, but relevant process and capacity indicators were also noted down. Such indicators could primarily be identified in the National Capacity Self-Assessments (NCSA) concerning the national implementation of the three Rio Conventions, in a few National Biodiversity Strategies and Action Plans submitted to

the CBD and in some scientific articles. Our review studying environmental governance indices (Almassy and Pinter 2018) also identified various indicators concerning environmental policy and regulatory frameworks; the institutional capacities available for goal implementation, the availability and the management of financial resources and the level of stakeholder involvement. A list of sample indicators, organized by the eleven implementation themes (as defined in chapter 5), is presented in Annex 7.

To increase consistency and reduce potential overlaps among indicators, the 17 implementation capacity factors selected by the respondents are proposed to be grouped further into six components, consisting of 15 indicators cluster and 81 underlying indicators. The organization and the content of the components also take into consideration the ranking of the 11 priority themes and places more emphasis on those aspects which were ranked higher.

The six implementation capacity components are established as follows:

1. Institutional framework and capacity
2. Law/Policy implementation capacity
3. Financing capacity
4. Knowledge creation capacity
5. Monitoring capacity
6. Policy review capacity

It emerged from the reviewed literature and discussions with the respondents of the questionnaires that countries' implementation capacities may vary among different issues and the assessment of goal implementation capacities should take such differences into consideration. Therefore, the established implementation capacity indicators are proposed to measure implementation capacities of different environmental goals separately, such as climate change mitigation and adaptation under SDG 13, biodiversity protection (SDG 15). The proposed structure of the components and the implementation capacity indicator clusters for the assessment of environmental SDGs are presented in the table below.

Table 38: Proposed implementation capacity components and indicator clusters

	SDG 13	SDG14	SDG 15
Component 1: Institutional framework and capacity			
1.1: Allocation of implementation responsibilities			
1.2: Political commitment to implementation			
1.3: Involvement of stakeholder groups (e.g. businesses; civil society) in environmental decision-making			
Component 2: Law implementation capacity			
2.1. Targeted government policy measures to implement laws			
2.2: Transparent and efficient system for enforcement			
2.3: Environmental impact assessment and permitting/licensing			
Component 3: Financing capacity			
3.1. Allocation of earmarked public budget to environmental goals			
3.2. Use of financial incentives to mobilize private resources			
3.3. National capacity for efficient utilization of international support			
Component 4: Knowledge creation capacity			
4.1. Environmental education and training			
4.2. Research and scientific cooperation			
Component 5: Monitoring capacity			
5.1. Delineation of institutional mandates for monitoring			
5.2. Adequacy of data collection processes to provide sufficient, functional and regular statistics			
Component 6: Policy review and update capacity			
6.1 Environmental reporting systems			
6.2 Government accountability mechanisms			

An important methodological decision in the development process concerns the scoring methodology of the implementation capacity indicators of the STMI. The reviewed environmental capacity or governance indicators are usually based on expert judgement, assessed by the developers of the indices or by independent evaluators (Almassy and Pinter 2018). Some indices relied more on subjective expert assessments (like the Resource Governance Index or the Asia Water Governance Index), while others, such as the NCSA indicators, the Environmental Democracy Index or the Climate Laws, Institutions and Measures Index (CLIMI) proposed indicators with three or four variables and provided a precise definition for scoring them (Worker and De Silva 2015; Steves and Teytelboym 2013). These more strictly defined scoring methodologies aimed to address the limitations of more subjective assessments.

Following this latter approach, each of the indicator clusters in this research is proposed to be constructed of 3-4 indicator, which are formulated as yes/somewhat/no questions, using a "traffic light" type (green/yellow/red) scoring mechanism. Accordingly, the indicators were designed to assess the existence/the partial or the non-existence of certain implementation capacities. This approach was also suggested to limit the level of subjectivity of the questions and the resource needs of the data collection.

In the following section, the components, the proposed 15 indicator clusters and the underlying 81 indicators of the STMI are presented. The discussion is completed with a proposed scoring methodology for each indicator. Issues that can hinder the measurement of the indicators are also highlighted. An overview table of all components, indicators clusters, indicators and scoring methodologies is included in Annex 8.

7.2.1 Component 1: Institutional framework and capacity

It emerged from the document review that institutional arrangements and capacities are key to promote the implementation of environmental goals. For the STMI, this component is defined as the ability of a government to create a comprehensive and sufficient institutional framework for the implementation of the environmental SDGs.

The respondents of the questionnaire ranked institutional capacity as the second, and institutional coordination as the fourth most important themes of environmental goal implementation processes (presented in chapter 6.2. and chapter 6.3). In terms of institutional arrangements and capacities, three implementation capacity factors have been selected by 75-80% of the questionnaire respondents and these three capacity factors will form the three indicator clusters of this component:

- clear allocation of implementation responsibilities (e.g. among ministries; between national and local level;
- political commitment to implementation and;
- the involvement of stakeholder groups (e.g. businesses; civil society) in environmental decision-making.

During the literature review and the document review, various indicators of institutional arrangements and capacities were identified (see Annex 7). While some of them, especially those measuring institutional capacities, were quantifiable, such as the percentage of environmentally educated staff, number of staff hired for the implementation of certain environmental goals, number of units established for environmental goal implementation at the sub-national level; percentage of SEA/EIAs that involved NGOs etc.; many of them were qualitative– requiring expert assessments or ratings, such as the degree of integration of convention objectives into work programs, level of political prioritization of environmental issues. Concerning institutional arrangements, the assessment of clear allocation responsibilities remains challenging.

The "ideal" indicator for evaluating **how clearly implementation responsibilities are allocated** could be a percentage measure that shows how many of the identified environmental goal implementation measures are assigned to a primary organization that bears the responsibility for overall implementation and coordination among involved actors and have a target set in terms of progress with implementation. Of course, this would require that the government prepares an implementation plan to progress towards environmental goal(s) and institutional responsibilities in it. While this seems challenging, the 2016 NSDS of Montenegro (MoSDT 2016), that aligned national development priorities with the SDGs, contains such an action plan, thus would provide the opportunity for such an assessment.

To evaluate the **level of political commitment**, some initiatives, such as the NCSA indicators or the Africa Capacity Indicators (African Capacity Building Foundation 2013) proposed to assess the extent to which environmental issues mainstreamed into government plans and programs. The Forest, Land and REDD+ Governance Index also included an indicator that accounts for the number of legislators who advocate for community forest management issues (UNDP Indonesia 2012).

Relevant indicators assessing the **level of stakeholder involvement** in relevant decision-making processes were also identified. These aimed at evaluating whether stakeholders are engaged formally and if yes, to what extent. Indicators were also identified that look at the quality of these processes and their results (Koop et al. 2017;

Araral and Yu 2010). One of the components of the Environmental Democracy Index focuses on participation and assesses the extent and quality of stakeholder engagement activities starting from policy formulation, via environmental decision making to the review processes (Worker and De Silva 2015).

Taking into consideration the results of the reviews, the table below presents a set of three indicator clusters and underlying indicators proposed for this component.

Table 39: Proposed environmental goal implementation capacity indicators – Component 1: Institutional framework and capacity

Indicator clusters and Indicators	Suggested scoring
1.1. Allocation of implementation responsibilities	
1.1.1. Is there an implementation plan for the environmental issue(s) in question, which defines the main responsible government body for each implementation measure?	*1 – Yes* *0,5 – To some extent* *0 – No*
1.1.2 Are there dedicated units in relevant ministries to support the implementation of the environmental SDG in question?	*1 – Yes in all* *0,5 – Yes, in some* *0 – No*
1.1.3. Are the responsibilities of the local governments clearly defined regarding the implementation of the studied environmental SDG?	*1 – Yes, defined by law* *0,5 – To some extent* *0 – No*
1.1.4 Is there an established institutional mechanism for the coordination of implementation activities among multiple actors?	*1 – Yes* *0,5 – Yes but with limited functioning* *0 – No*
1.2. Political commitment to implementation	
1.2.1. Are all relevant international environmental agreements signed and ratified?	*1 – Yes* *0,5 – Partially* *0 – No*
1.2.2. Is the environmental SDG in question included as a priority in the current national development strategy of the country?	*1 – Yes* *0,5 – Discussed but not as a stand-alone priority* *0 – No*
1.2.3. What is level of the main responsible body or unit, which is the primary responsible for the coordination and the implementation of the environmental goal in question?	*1 – Dedicated Ministry* *0,66 – Department* *0,33 – Dedicated Unit* *0 – None of the above*
1.2.4. Are environmental considerations supported and prioritized in budget planning/investment decision?	*1 – Yes* *0,5 – To some extent* *0 – No*
1.3. Involvement of stakeholder groups (e.g. businesses; civil society) in environmental decision-making	
1.3.1. Is there a formal mechanism (e.g. a National Council for Climate Change) to involve various stakeholders during the planning of policies and implementation activities of the environmental SDG in question?	*1 – Yes* *0,5 – Restricted to some stakeholders or ad-hoc* *0 – No*

1.3.2. Are results of stakeholder consultations taken into consideration before finalizing policies and plans concerning the environmental SDG in question?	*1 – Yes* *0,5 – To some extent* *0 – No*
1.3.3. Are stakeholders involved in operative-level environmental decision-making relevant to the environmental SDG e.g. industrial or investment permitting procedures or in negotiating natural resource extraction and management activities)?	*1 – Yes, defined by law* *0,5 – To some extent* *0 – No*

7.2.2 Component 2: Law implementation capacity

The capacity of countries to implement and enforce laws and regulations was ranked by the questionnaire respondents as the most important priority theme of implementation. For the purposes of the STMI, "environmental law implementation capacity" is defined as countries' ability to translate relevant environmental legislations into concrete policy measures and implement and enforce them.

In connection to the law implementation and enforcement theme in the questionnaire (chapter 6.6), three factors received over 2/3 of the respondents' votes:

- targeted government policy measures to implement laws
- transparent and efficient system for enforcement and
- environmental impact assessment and permitting/licensing.

In order to assess **the extent to which laws are translated into policy measures,** there were relatively few measures available in the literature. The proposed indicators included the number of laws and policies introduce in practice (NCSA indicators), in case of nature protection, the existence of management plans for biodiversity protection areas (Porej and Matic 2009). The document review in this regard also highlighted that the actual success with law implementation mainly depends on other capacity factors, i.e., whether they were based on research-evidence and thus are realistic/feasible to implement and whether there is sufficient human capacity to implement them. Since these two factors were prioritized by questionnaire respondents under other implementation themes and also highlighted as important considerations during the interviews, it is proposed to include these as indicators of the law implementation theme.

The issue selected with the highest percentage of votes – above 80% - concerned the capacity to create a **functioning enforcement system** for environment-related

legislations. Examples of relevant indicators include the existence, the timeliness, the fairness of procedures for the implementation/enforcement of environmental laws (Environmental Democracy Index); existence of legislation that require the government to set penalties for non-compliance activities (Resource Governance Index 2017) and sufficiency of the number of inspections, of fines and sanctions and capacity-building activities for staff who are enforcing the legislation. In connection to this issue the document reviews mostly highlighted the existence and the quality of inspections and activities to curb illegal activities.

Related to indicators assessing **permitting, licensing and environmental impact assessments activities**, there was a general convergence in the measures identified in the studied environmental governance indicators and via document reviews. These included the existence of requirements to prepare EIAs before development project and to publicly disclose the results (Resource Governance Index 2017), the number of development projects that were approved without an EIA (Environmental Democracy Index), the number of permits issued, the number of organizations that requires environmental permits (NCSA indicators), the existence and the comprehensiveness of mechanisms that grants resource management permits and licenses (Forest, Land and REDD+ Governance Index). The level of stakeholder involvement in these processes was also a commonly noted measure.

The suggested indicator clusters and indicators for this component are presented in the below Table.

Table 40: Proposed environmental goal implementation capacity indicators – Law and policy implementation capacity

Indicator clusters and Indicators	Suggested scoring
2.1. Targeted government measures to implement laws	
2.1.1. Are relevant environmental policies and laws translated into concrete (quantified and time-bound) implementation measures?	*1 – Yes* *0,5 – To some extent* *0 – No*
2.1.2 Are measures defined by environmental policies and laws are based on research and feasibility studies and thus realistic to implement?	*1 – Yes in all* *0,5 – To some extent* *0 – No*
2.1.3. Do the institutions primarily responsible for the implementation of the relevant environmental SDGs hold sufficient human capacity to translate environmental policies and laws into specific measures and support their implementation?	*1 – Yes/Mostly* *0,5 – To some extent* *0 – No*

2.2. Transparent and efficient system for enforcement	
2.2.1. Are there established target values for improvements the environmental SDG in question?	*1 – Yes* *0,5 – For some targets* *0 – No*
2.2.2. Is there regulation in place to monitor and enforce compliance with relevant environmental policies and laws?	*1 – Yes* *0,5 – To some extent* *0 – No*
2.2.3. Are inspections processes planned according to international practices and follow a standardized approach concerning reporting and evaluation?	*1 – Yes* *0,5 – To some extent* *0 – No*
2.2.4. Is there regulation in place that stipulates fines and sanctions concerning the environmental SDG in question and defines a method of their collection and use?	*1 – Yes* *0,5 – To some extent* *0 – No*
2.3. Environmental impact assessment and permitting/licensing	
2.3.1. Are there requirements to prepare EIAs before large development projects?	*1 – Yes* *0,5 – Yes, but with limited scope* *0 – No*
2.3.2. Is there a comprehensive, integrated environmental permitting and licensing system (e.g. IPPC)?	*1 – Yes* *0,5 – Not fully developed* *0 – No*
2.3.3. Does the environmental permitting/licensing system function efficiently?	*1 – Yes* *0,5 – To some extent* *0 – No*

7.2.3 Component 3: Financing capacity

For the purposes of the STMI, "financing capacity" is understood as governments' ability to secure sufficient financing for the implementation activities of environmental SDGs.

In connection to this theme (chapter 6.4), three factors were prioritized by the questionnaire respondents:

- the sufficient allocation of earmarked public budget to environmental goals;
- the use of financial incentives to mobilize private resources and
- the national capacity to utilize international support.

The difficulty of measuring **the allocation of earmarking government budget** for the implementation of environmental goals is mainly due to the subjectivity of defining what is "sufficient" as an implementation budget. For information and sometimes comparison purposes, environmental spending as percentage of the GDP has been introduced and calculated in the studied countries. At the same time, even if

implementation budgets increased, almost all studied countries noted that budgets are insufficient. For the measurement of this indicator it is suggested that from a capacity point of view, it is more important to understand whether the government has a clear understanding of the amount of resources needed for the implementation of set environmental objectives and has clear intentions and takes concrete steps to ensure the allocation of resources. For instance, the NCSA of Croatia proposed to measure the number of local governments that have mainstreamed and budgeted for biodiversity objectives (Croatia, Environment Agency 2005).

Mobilizing private capital was found crucial, however concrete implementation experience was scarce. Indicators, relevant to this issue, were also scarce and were limited mainly to the UNDP NCSA indicators. Examples of measures included the number of green certificates or tax exemptions to promote technology transfer. Measures concerning the mobilization of private capital for environmental goal implementation could also target to assess the existence of subsidy schemes, tax allowances/exemptions or grants and loans for promoting the implementation of a certain environmental goal in the private sector, green investment schemes and initiatives for public-private partnerships as well as participation in international financing schemes.

In connection to financing capacity, the importance of **international support** was also highlighted. Among them, countries with lower incomes more frequently emphasized the importance of external financial support while middle income countries tended to emphasize technical assistance. However, as a cross-country priority implementation factor, the need for countries to **utilize such international support efficiently** was identified. While only few relevant indicators were found in some NCSAs (including the number of staff participating at negotiations of international conventions and the existence of an analysis of national responsibilities in international collaboration), the document review pointed to the need for analyzing the institutional and human capacity aspects of the management and monitoring the use of international support and project implemented with the use of international funds.

The proposed indicator clusters and indicators for assessing financial capacities for environmental goal implementation are presented in the below table.

Table 41: Proposed environmental goal implementation capacity indicators – Financing capacity

Indicator clusters and Indicators	Suggested scoring
3.1. Allocation of earmarked public budget to environmental goals	
3.1.1. Are the exact financial requirements of programmed environmental actions and plans (set e.g. in action plans) known?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.1.2. Is there a mechanism to ensure that resources are earmarked in annual government budget to implement all relevant environmental investments and programs?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.1.3. Are there revenue collection activities for the implementation of the environmental goal in question (e.g. via the collection of environmental charges and taxes or the establishment of environmental funds)?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.2. Use of financial incentives to mobilize private resources	
3.2.1. Are subsidy schemes, tax allowances/exemptions available for private sector actors that can motivate the implementation of relevant environmental SDGs.	*1 – Yes* *0,5 – To some extent* *0 – No*
3.2.2. Are there (green) investment schemes that can provide loans and grants to private sector actors to motivate the implementation of the relevant environmental SDGs?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.2.3. Is the country a member of relevant international financing schemes?	*1 – Yes* *0,5 – To some* *0 – No*
3.2.4. Has the country phased-out of environmentally harmful subsidies (e.g. for fuels and pesticides)	*1 – Yes* *0,5 – To some extent* *0 – No*
3.3. National capacity for efficient utilization of international support	
3.3.1. Does the country have a plan with concrete measures for attracting and coordinating international financial and technical support for the implementation of the environmental SDG in question?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.3.2. Is there a government body that coordinates international funds and support for the environmental SDG in question?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.3.3. Is there sufficient capacity at the national level to attend negotiations of the relevant environmental conventions?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.3.4. Is there sufficient capacity at the national level to manage, monitor and report the implementation of projects financed and supported from international funds?	*1 – Yes* *0,5 – To some extent* *0 – No*

It is to be noted, that the last indicator will not be relevant for those high-level income countries that provide development financing.

7.2.4 Component 4: Knowledge creation capacity

For the STMI, the "knowledge creation" capacity is understood as a government's ability to raise awareness and educate public about environmental problems in order to

engage them in implementation environmental SDGs and support the implementation of the goals with state-of the art scientific knowledge and best available environmental technologies.

In connection to knowledge development, three implementation capacity factors were prioritized by the questionnaire respondents from the stakeholder engagement and research and scientific cooperation themes:

- Environmental education and training to target groups
- Collaboration with international research institutions
- Cooperation between research organizations and businesses

Given the overlaps in the focus of these implementation capacity factors, they are suggested to be merged into two indicators:

- Environmental education and training
- Research cooperation

Over 75% of all respondents prioritized **environmental education** targeting both formal education and capacity-building of professionals. Compared to other themes, environmental education assessment is quite well covered in the literature. The Education for Sustainable Development program of UNECE also developed various indicators to assess policy and institutional frameworks that can support the introduction of education for sustainable development policy; the level of coherence with general education policies and the level of its integration into general education policies. Indicators assessing capacities to provide education and especially adult training on environmental issues also appeared in some of the environmental governance indices (Africa Capacity Indicators; Forest, Land and REDD+ Governance Index).

Concerning the '**research and scientific cooperation'** theme, two factors were prioritized by more than two/third of the respondents, international research collaborations and research cooperation with businesses. In the literature, various research capacity indicators were suggested by the NCSAs, including measures to assess the sufficiency of research capacities at the individual level; the identification of

priorities for research, the funds per capita or the percentage financing of all research projects for basic and applied research in the field of environment, number of all research projects in the field of environment and average value; private spending for research and subsidies for research and the development. At the same time, the implementation factors that were prioritized the most by the questionnaire respondents, were not covered well. Country experiences emerging from the document review highlighted that in terms of international research collaborations countries need to have plans that harmonize and promote such activities at the national level and have sufficient human and financial capacities to carry out such activities. In terms of cooperation with business, the importance of privately led research centers and technology transfer mechanisms were highlighted.

Table 42: Proposed environmental goal implementation capacity indicators – Capacity to create knowledge

Indicator clusters and Indicators	Suggested scoring
4.1. Environmental education	
4.1.1. Is there a government decision (decree) or strategy/action plan to introduce education concerning the environmental SDG in question?	1 – Yes *0,5* – To some extent 0 – No
4.1.2. Is there a responsible body to coordinate environmental education activities in the country?	1 – Yes *0,5* – To some extent 0 – No
4.1.3. Are there environmental education curricula developed at the national level?	1 – Yes *0,5* – *To some extent* 0 – No
4.1.4. Are environmental considerations/modules integrated into higher-education curricula and vocational training?	1 – Yes *0,5* – To some extent 0 – No
4.2. Research and scientific cooperation	
4.2.1. Is there a strategy or plan that establishes research priorities, cooperation areas and technology transfer mechanisms concerning the environmental SDG in question?	1 – Yes *0,5* – To some extent 0 – No
4.2.2. Are national researchers supported to participate in relevant international research activities and collaborations?	1 – Yes *0,5* – *To some extent* 0 – No
4.2.3. Are there privately-owned and run environmental research centers or laboratories in the country (concerning the environmental SDG in question)?	1 – Yes *0,5* – To some extent 0 – No
4.2.4. Is/Are there national scheme(s) and/or bodies to support the transfer of environmentally friendly technologies to businesses by awareness-raising, consultancy and financing activities?	1 – Yes *0,5* – *To some extent* 0 – No

7.2.5 Component 5: Monitoring capacity

For the STMI, the component concerning 'Monitoring capacity' is defined as a government's ability to establish a comprehensive and functioning monitoring system and ensure adequate data collection to monitoring the implementation of the environmental SDGs.

Two indicators were prioritized by over 2/3 of all respondents under the themes monitoring framework and data collection, including:

- the institutional framework for environmental monitoring and
- the adequacy of data collection processes.

The theme 'institutional framework for monitoring' was not prioritized among the most important implementation themes by the respondents, but almost 80% indicated that the clear delineation of monitoring responsibilities is a crucial consideration. The issue of 'environmental data collection processes' was prioritized higher among the implementation themes and implementation capacity factor concerning the adequacy of the overall processes, which can provide sufficient; functional and regular statistics was also selected by the majority of the respondents as a high priority. At the same time, all other possible indicators under this theme received a relatively high number of votes (above 50%). Thus, it is suggested that the evaluation questions composing of the indicator will also reflect the remaining indicators to some extent instead of focusing on strictly on actual data collection processes. Accordingly, the two indicators of this cluster are the following:

- Delineation of institutional mandates for monitoring
- Adequacy of data collection processes to provide sufficient, functional and regular statistics

Regarding the **delineation of institutional mandates for environmental monitoring**, some possible measurements were identified among UNDP NCSA indicators such as the existence of permanent institutions responsible for monitoring and the availability of sufficient data measurement and collection points (e.g. for air quality measurement). Quantitative measures were also found for this category, including the number of institutions participating in monitoring or the percentage of communities adopting

sustainable development monitoring systems. Some of the studied environmental governance indices also included similar indicators. The Environmental Democracy Index includes indicators on the existence of laws to mandate public authorities to collect data on environmental pressures, on operators of activities with impact on the environment and the Africa Capacity Indicator assessed the existence of a monitoring plan, programs to strengthen monitoring capacities as well as countries involvement in regional statistical initiatives. (African Capacity Building Foundation 2013).

As for ensuring the **adequacy of data collection processes**, once again the UNDP NCSA indicators offered some measurement options, including indicators to assess the timeliness and the quality of the data collection processes as well as the number of institutions included in data quality control. A Statistical Capacity Indicator was also created, as an initiative of the World Bank to measure the country's overall capacity to collect statistical data by assessing the overall quality of the data collected. The Statistical Capacity Indicator is a composite index of 25 different indicators, assessing the number of indicators covered by statistics as well as the source and the regularity of the data collected (World Bank 2019b).

Based on the existing indicators in the literature as well as the review of country documents, the following indicators could be considered.

Table 43: Proposed environmental goal implementation capacity indicators – Monitoring capacity

Indicator clusters and Indicators	Suggested scoring
5.1. Delineation of institutional mandates for monitoring	
5.1.1. Is there a main body responsible for the coordination of monitoring activities?	*1 – Yes* *0,5 – Partially* *0 – No*
5.1.2. Are data collection responsibilities clearly defined?	*1 – Yes* *0,5 – To some extent* *0 – No*
5.1.3. Is there data provision requirements for external actors (e.g. for companies) concerning the environmental SDG in question?	*1 – Yes* *0,5 – To some extent* *0 – No*
5.1.4. Do institutions have sufficient capacity to regularly collect, process and store relevant data?	*1 – Yes* *0,5 – To some extent* *0 – No*
5.2. Adequacy of data collection processes to provide sufficient, functional and regular statistics	
5.2.1. Is data collected for all relevant environmental indicators?	*1 – Yes*

	0,5 – For some *0 – No*
5.2.2. Have clear data collection guidelines been developed?	*1 – Yes* *0,5 – To some extent* *0 – No*
5.2.3. Are data collection activities carried out regularly so that the available data is up to date?	*1 – Yes* *0,5 – To some extent* *0 – No*
5.2.4. Is the quality of the collected data validated and the data is processed for further analysis?	*1 – Yes* *0,5 – To some extent* *0 – No*

7.2.6 Component 6: Capacity to review policy implementation

Compared to monitoring, more measures were identified in the literature for assessing governance capacities enabling the follow-up implementation activities. Under this theme, two capacity indicators were prioritized by over 75% of the respondents:

- the establishment environmental reporting processes that informs policy and decision-makers; and
- accountability procedures for environmental goal implementation activities of governments.

With regards to **environmental reporting processes**, the Environmental Democracy Index tracks the existence of laws stipulating state of the environmental reporting procedures and assesses the quality of such laws (e.g. timeliness and comprehensiveness). The Water Governance Indicator Framework (OECD 2018) suggests indicators to assess the existence of reporting mechanisms for organizations operating in the water sector. Some of the UNDP NCSA processes developed indicators to assess the number of annual implementation reports (related to different environmental issues), as well as to rate the effectiveness and timeliness of evaluations.

Regarding **government accountability mechanisms**, only a few examples of indicators could be identified. The Resource Governance Index included measures to evaluate senior officials' public disclosure requirements, state-owned enterprises external audit obligations (Natural Resource Governance Institute 2017). The UN Habitat Water and Sanitation Governance Index aimed at calculating the percentage of councils that provide external audit of for relevant departments (OECD Water Governance Initiative 2015).

Based on the reviewed indicators and country experiences, the following measures could be applied:

Table 44: Proposed environmental goal implementation capacity indicators – Policy review capacity

Indicator clusters and Indicators	Suggested scoring
6.1 Environmental reporting systems	
6.1.1 Is there a law that requires the preparation of general state of the environment reports concerning the environmental SDG in question?	*1 – Yes* *0 – No*
6.1.2. Is there a responsible body appointed to coordinate the preparation of state of the environmental reports?	*1 – Yes* *0 – No*
6.1.3. Is the necessary data available for the preparation of reports?	*1 – Yes* *0,5 – To some extent* *0 – No*
6.1.4. Are stakeholders (including research institutions, NGOs) involved in the preparation of environmental reports?	*1 – Yes* *0,5 – To some extent* *0 – No*
6.2 Government accountability mechanisms	
6.2.1. Do relevant environmental strategies require the preparation of regular progress review of their implementation?	*1 – Yes* *0,5 – To some extent* *0 – No*
6.2.2. Are relevant data and information or (if available) implementation reports of environmental SDGs made publicly available on a timely basis?	*1 – Yes* *0,5 – To some extent* *0 – No*
6.2.3. Is the government required to report (e.g. to the parliament) on progress with the implementation of environmental strategies?	*1 – Yes* *0,5 – To some extent* *0 – No*
6.2.4. Is there a general auditor body to review progress with the implementation of the environmental SDG in question?	*1 – Yes* *0,5 – To some extent* *0 – No*

7.3 Pilot testing of the proposed indicators

As discussed in the introduction of chapter 7.2, the implementation capacity indicators of the STMI are proposed to be evaluated separately for the different environmental SDGs (see Table 38). In order to assess the applicability of the proposed indicators, Turkey was selected as a test case and its implementation capacities were evaluated concerning climate change mitigation goals. [5]

[5] Turkey emerged as an evident choice for pilot testing since I lived in Turkey during the course of the research work, I am familiar with both the national language and the country context and I could also access to relevant country experts.

First, answers to all indicators were researched in scientific articles, policy and assessment documents, news and websites. Second, the information was validated by and completed with information from country experts and the applicability of the index was discussed with them, considering both the relevance of the measures and the results. In the following sections, the results are presented and discussed by indicator themes. An overview of the analysis is also included in Annex 9.

7.3.1 Component 1: Institutional framework and capacity

Concerning institutional framework and capacity, three indicator clusters were set forward (as described in section 7.2.1):

- 1.1. Allocation of implementation responsibilities
- 1.2. Political commitment to implementation
- 1.3. Involvement of stakeholder groups in environmental decision-making

The results for this component, concerning climate change goal implementation capacities of Turkey are presented in the following section.

Table 45: Indicator cluster 1.1.: Allocation of implementation responsibilities

Indicators	Score
1.1.1.Is there an implementation plan for the environmental issue(s) in question, which defines the main responsible government body for each implementation measure?	0,5 – Yes, in some
1.1.2.Are there dedicated units in relevant ministries to support the implementation of the environmental SDG in question?	0,5 – Yes, in some
1.1.3.Are the responsibilities of the local governments clearly defined regarding the implementation of the studied environmental SDG?	0,5 – To some extent
1.1.4.Is there an established institutional mechanism for the coordination of implementation activities among multiple actors?	0,5 – Yes, but with limited functioning
Sub-total	***2//4***

Concerning the institutional framework for climate change, in Turkey, the main responsible body for climate change management is the Ministry of Environment and Urbanization (MoEU). Beyond the MoEU, the Climate Change Action Plan (CCAP) developed for the 2011-2023 period assigned implementation tasks to various other ministries such as the Ministry of Energy and Natural Resources, the Ministry of Agriculture, the Ministry of Transport or the Ministry of Forestry and Waterworks

(Kocabas 2013; Turkey, Ministry of Environment and Urbanization 2011). At the same time, implementation responsibilities for some activities have not been updated since 2015 (OECD 2019).

There are two departments in the MoEU dedicated to climate change mitigation and adaptation (Turkey, MoEU 2019). The Ministry of Energy and Natural Resources also has a Deputy Directorate for Renewable Energy and a Department focusing on Energy Efficiency and Environment (Turkey, Ministry of Energy and Natural Resources 2019). At the same time, other responsible ministries (such as the Ministry of Agriculture or Transport) have not established such units. Concerning municipalities (1.1.3), the action plan also assigns their specific implementation responsibilities (Turkey, MoEU 2011). It is also not fully addressed how the various responsibilities of municipal governments (such as waste management, public transport, building sector) are connected to their climate change mitigation and adaptation tasks because the municipalities are not yet obliged to developed climate change action plans. However, the MoEU is now drafting a bylaw, which will require municipalities to develop such a plan.

Regarding the last indicator (1.1.4), which assesses the institutional coordination for improved implementation, Turkey established a Climate Change and Air Management Coordination Board. For this Committee, the MoEU acts as the Secretariat, involving various ministries as well as business associations (Turkey, MoEU 2019a). At the same time, the 2018 report of the EC suggests that other national strategies have not been aligned with the national climate change strategy and the integration of climate change considerations into the work of the different ministries remains weak (EC 2018), indicating limitations of the coordination committee.

Indicator 1.1.1 and 1.1.2 were found to be self-explanatory measures and thus their assessment was straightforward. Although in case of Indicator 2, it would be possible to distinguish whether climate change units were introduced in the majority or only in the minority of the responsible institutions and introduce a numerical threshold for more precise calculation. In case of Indicator 1.1.4, it was noted that the existence of a coordination body does not necessarily characterize whether the body is functioning effectively.

Table 46: Indicator cluster 1.2: Political commitment to implementation

Indicators	Score
1.2.1. Are all relevant international environmental agreements signed and ratified?	0,5 – Partially
1.2.2. Is climate change included as a priority in the current national development strategy of the country?	0,5 – Discussed but not as a stand-alone priority
1.2.3. What is level of the main government body or unit, which is the primary responsible for the coordination and the implementation of the environmental goal in question?	0,66 – Department
1.2.4. Are climate considerations supported and prioritized in budget planning/investment decision?	0 – No
Sub-total	***1,66/4***

Turkey is a party to the UNFCCC and the Vienna Convention for the Protection of the Ozone Layer. It also ratified the Kyoto Protocol in 2004 as an Annex-1 country but with no specific emission reduction target, due to its special status as an OECD member country but developing economy with low responsibility for historical emissions (Erdogdu 2010). Although Turkey has signed the Paris Agreement, it has not ratified it yet because its special status, which had originally been recognized by the UNFCCC, but has not been reflected in the Agreement (Turkey, MoEU 2018).

In the Tenth National Development Plan for 2014-2018 (Turkey, Ministry of Development 2014), climate change is mentioned as a global trend that can have an influence on the development of Turkey. While it is not considered as a separate priority, relevant issues are discussed under the development priorities concerning energy and environmental sustainability. A priority investment program, set forward in the latest NDP, also focused on energy efficiency improvements.

Regarding the institutional prioritization of climate change management (1.2.3), as mentioned in the previous section, two climate change departments were established in the MoEU as well as there is a Deputy Directorate for Renewable Energy and a Department focusing on Energy Efficiency and Environment (Turkey, MoEU 2019; Ministry of Energy and Natural Resources 2019). Commitment to tackle climate change has also been expressed by various other government bodies and authorities, including the (now former) Deputy Prime Minister, Mehmet Şimşek (TÜSİAD 2018).

Under the presidents' office, the Presidency for Strategy (former Ministry of Development/State Planning Office) approves the investment budgets. This office also has a unit on environment and sustainable development (Strateji ve Bütçe Başkanlığı 2019). However, the overall government spending on environmental protection is less than 0,05% and climate change expenditures are not included separately in the annual budget (Turkey, Ministry of Treasury and Finance 2019).

Indicator 1.2.1., 1.2.2 and 1.2.3. are found to be relatively straightforward measures, but Indicator 1.2.4 allows more space of subjective evaluation. A four-point measurement scale can be considered for this indicator or based on additional pilot tests, this question could be refined. Concerning the level of political commitment, the consulted experts suggested that there are other aspects, which could indicate that climate change considerations are relatively high in the political agenda. For instance, the Chief Negotiator for the UNFCCC is assigned from the MoEU and not from the Ministry of Foreign Affairs (Turkey, MoEU 2019b), indicating that the government takes the convention seriously and assigned a representative with in-depth knowledge on the matter.

Table 47: Indicator cluster 1.3: Involvement of stakeholder groups (e.g. businesses; civil society) in environmental decision-making

Indicators	Score
1.3.1. Is there a formal mechanism (e.g. a National Council for Climate Change) to involve various stakeholders during the planning of policies and implementation activities of the environmental SDG in question?	0,5 – Yes, but restricted to some stakeholders
1.3.2. Are results of stakeholder consultations taken into consideration before finalizing policies and plans concerning the environmental SDG in question?	0,5 – To some extent
1.3.3. Are stakeholders involved in operative-level environmental decision-making relevant to the environmental SDG e.g. industrial or investment permitting procedures or in negotiating natural resource extraction and management activities)?	1 – Yes, as defined by law
Sub-total	***2/3***

Although it can also invite academicians, NGOs and other stakeholders, the leading climate change implementation coordination body, the Climate Change and Air Management Coordination Board of Turkey only involves business associations as regular members besides government bodies and authorities. The Committee is

required to meet at least once a year (Turkey, MoEU 2019a). The consulted experts suggested that the organization of these meetings remain ad-hoc, but during the preparation of INDCs or the preparation of relevant policies and plans, it meets more frequently. Laws and bylaws should be opened to public consultations. Moreover, laws with considerable economic impacts should also be assessed by Regulatory Impact Assessments and these also require stakeholder consultations. Concerning stakeholder involvement in policy development processes, the consulted experts suggested that public consultations concerning climate change strategies and plans are more likely to take place on a need basis, within the framework of various climate change project (e.g. funded by the European Union). For instance, for the development of the CCAP, 20 workshops were organized with the participation of 182 organizations, which were represented by a total of 487 experts (Turkey, MoEF, n.d.) At the same time, an assessment of the CCAP suggested that the development and the implementation process have not been sufficiently transparent and open to participation (Algedik 2013).

Additionally, under this question, for Indicator 1.3.1, the regularity of the stakeholder consultation meetings could be considered, while for indicator 1.3.2 and 1.3.3, it could be assessed whether the results of stakeholder consultations are taken into consideration before finalizing policies and plans. However, these questions would allow more space for opinion-based responses and therefore, their scoring methodology would require further considerations and refinement. Therefore, at this stage, they were not included in the set.

7.3.2 Component 2: Law implementation capacity

In order to assess countries' policy and law implementation capacities, three indicator clusters were proposed:

- Indicator cluster 2.1. Targeted government policy measures to implement laws
- Indicator cluster 2.2. Transparent and efficient system for enforcement
- Indicator cluster 2.3. Environmental impact assessment and permitting/licensing

The results for this component, concerning climate change goal implementation capacities of Turkey are presented in the following section.

Table 48: Indicator cluster 2.1. Targeted government measures to implement laws

Indicators	Score
2.1.1. Are climate policies and laws translated into concrete (quantified and time-bound) implementation measures?	0,5 – To some extent
2.1.2. Are measures defined by climate policies and laws are based on research and feasibility studies and thus considered realistic to implement?	0 – No
2.1.3. Do the institutions primarily responsible for the implementation of the relevant environmental SDG hold sufficient human capacity to translate environmental policies and laws into specific measures and support their implementation?	0,5 – To some extent
Sub-total	***1/3***

Under the Paris agreements, the INDC of Turkey concerns up to 21 % GHG emissions reduction by 2030 compared to the Business as Usual scenario. Concerning the implementation of the INDC, an analysis of the World Bank about the submitted INDC measures of Turkey could not identify a concrete timeline or budget for the proposed measures (World Bank 2016). The 2010-2020 Climate Change Strategy of Turkey was translated to the CCAP concerning the 2011-2023 period. To support the objectives set by the Strategy, the Action Plan includes a detailed list of over 500 implementation activities with defined timeframes, organizations responsible for the implementation and monitoring indicators. At the same time, no quantitative targets were defined for the implementation actions, and an earlier assessment suggests that to a large extent, it only contains BAU measures, which are not sufficient to decouple emissions from economic growth (Algedik 2013). It was also suggested that many of the implementation activities in the CCAP were defined for the 2011-2014/2015 period, these activities have not been updated since then (OECD 2019). Although the CCAP notes that the measures defined are based on a detailed assessment of their mitigation potential and their investment costs, research suggested that the measures set forward by the Action Plan and (especially by the INDCs) do not necessarily reflect research and feasibility findings and will not enable considerable reductions in emissions (Alkan, et al. 2018; Algedik 2013).

Concerning 2.1.3, the consulted experts noted that the MoEU holds sufficient institutional capacities for climate change management. However, the 2018 report of the EC about Turkey noted that the climate change knowledge of different government agencies is limited (EC 2018). To improve existing capacities, various capacity-building projects are being carried out to improve the capacities of different actors

participating in implementation (Turkey, MoEU 2018). At the same time, the World Bank assessment about the submitted INDC measures of Turkey suggested that Turkey did not identify exact capacity-building needs to support the implementation of the proposed INDC measures (World Bank 2016). Indicator 2.1.3 may require the introduction of a four-point scale and for this, supporting definitions could be developed during the course of future refinements.

Table 49: Indicator cluster 2.2: Transparent and efficient system for enforcement

Indicators	Score
2.2.1. Are there established target values for improvement for the environmental SDG in question?	0 – No
2.2.2. Is there regulation in place to monitor and enforce compliance with relevant environmental policies and laws?	0,5 – Partially
2.2.3. Are inspections processes planned according to international practices and follow a standardized approach concerning reporting and evaluation?	0,5 – Partially
2.2.4. Is there regulation in place that stipulates fines and sanctions concerning the environmental SDG in question and defines a method their collection and use?	0 – No
Sub-total	***1/4***

Due to its special status in the UNFCCC, Turkey had no legally binding target under the Kyoto Protocol to reduce its GHG emissions. Although Turkey made an emission reduction commitment under the Paris Agreement, and there are policies promoting low(er) emission activities, there are no specific (i.e. sectoral) emission reduction targets set. Turkey introduced a Continuous Emissions Monitoring system for monitoring industrial facilities with high-level pollution (Turkey, MoEU 2016a), but there are no limitations set on their GHG emissions. The established monitoring, reporting and verification (MRV) system also requires that the emission reports of the industrial facilities are verified by independent institutions, but since there are no restrictions, there are also no state inspections concerning GHG emissions. Consequently, there are also no applicable fines and sections.

Indicator 2.2.3. could be divided into two sub-questions as the first part of the question examines the existence of regular inspections and the second part concern the quality of these.

Table 50: Indicator cluster 2.3: Environmental impact assessment and permitting/licensing

Indicators	Score
2.3.1. Are there requirements to prepare EIAs before large development projects?	0,5 – To some extent
2.3.2. Is there an integrated environmental permitting and licensing system (e.g. IPPC) in place?	0,5 – Not fully developed
2.3.3. Does the environmental permitting/licensing system function efficiently?	0,5 – To some extent
Sub-total	***1,5/3***

Turkey introduced the first regulation concerning Environmental Impact Assessments (EIAs) in 1993 and has been updating it regularly since then in order to improve the evaluation processes (Bilgin 2015). The EIA regulation requires large infrastructure and industrial projects to undergo an obligatory EIA assessment, while small projects are subject to evaluation whether to carry out an EIA. At the same time, various challenges have been reported concerning the implementation of the EIA regulation, including the relatively small amount of cases subjected to an EIA, exemptions for economically important investments, weaknesses in technical guidance development, during data collection and stakeholder involvement (EC 2016; Tekayak 2014; Turkey, MoEU 2016a). Concerning Indicator 2.3.2., Turkey is moving towards the implementation of Integrated Pollution Prevention Control system, but it is not fully developed and operational (OECD 2019). The relevant legislation adopted in 2010 and updated in 2014, defines those facilities that need to apply for an environmental permit. Although there is a consolidated permit concerning some of the environmental media, other environmental issues require separate permits (Mavioglu et al. 2019). It was also suggested that the system does not support the best available technologies for emission control, and there have been cases when the rightfulness of the issued environmental permits have been questioned (Mavioglu et al. 2019; OECD 2019).

Indicator 2.3.2. could be better assessed on a four-point scale although it would also allow more space for subjective evaluation. Potentially the question can be divided into a few sub-questions, concerning the existence of guidelines, data collection protocols, the inclusiveness of stakeholder involvement or the possibilities for granting exemptions under EIAs. Indicator 2.3.3. assesses the efficiency of the

permitting/licensing system in place, therefore if they were not developed in a comprehensive manner, their functioning would be limited. Therefore, future test can consider the potential overlaps between 2.3.2. and 2.3.3.

7.3.3 Component 3: Financing capacity

Concerning capacities to finance environmental goal implementation, the following implementation capacity indicator clusters were proposed for the STMI:

- Indicator cluster 3.1. Allocation of earmarked public budget to environmental goals
- Indicator cluster 3.2. Use of financial incentives to mobilize private resources
- Indicator cluster 3.3. National capacity for efficient utilization of international support

The results for this component, concerning climate change goal implementation capacities of Turkey are presented in the following section.

Table 51: Indicator cluster 3.1. Allocation of earmarked public budget to environmental goals

Indicators		Score
3.1.1.	Are the exact financial requirements of programmed environmental actions and plans (set e.g. in action plans) known?	0 – No
3.1.2.	Is there a mechanism to ensure that resources are earmarked in annual government budget to implement all relevant environmental investments and programs?	0 – No
3.1.3.	Are there revenue collection activities for the implementation of the environmental goal in question (e.g. via the collection of environmental charges and taxes or the establishment of environmental funds)?	0,5 – To some extent
Subtotal		***0,5/3***

The CCAP of Turkey, published in 2011, suggested that *"in order to both integrate NCCAP actions with national investment programs and benefit from foreign financing mechanisms, detailed studies on the determination of the cost and mitigation potentials of the actions and the internal/external financing mechanisms are required to be initiated immediately"* (Turkey, Ministry of Environment and Urbanization 2011, 2). At the same time, no evidence was found that such calculations have been prepared since and the World Bank overview of submitted INDC measures also concluded that cost estimations concerning climate measures are very limited (World Bank 2016). As

discussed under 7.1.2, climate expenditures are not earmarked separately in the national budgets and under the Presidency for Strategy, which focuses on investment planning, there is no separate unit concerning climate investments (Strateji ve Bütçe Başkanlığı 2019). Turkey also does not have a carbon tax introduced and it cannot participate in the emission trading schemes established under the Kyoto protocol (OECD 2019). Research identified some relevant taxation measures, which can support emission reduction objectives (Didinmez and Sever 2018). However, assessments suggest that only 30% of emissions has a carbon price of 5-30 EUR per tons, while 10% of emissions has a price above 30 EUR (OECD 2016). While there exist some relevant revenue collection mechanisms, these are not directly linked to domestic climate financing.

In the case of indicator 3.1.1, the evaluation is based on the information provided in the national action plans. At the same time, it is possible that cost estimations exist at the responsible organizations, but these are not made publicly available. Indicator 3.1.2. partially overlaps with the indicator concerning budget prioritization (Indicator 1.2.3.), under political commitment to implementation, thus later, the sensitivity analysis of the STMI would need to reflect on this.

Table 52: Indicator cluster 3.2. Use of financial incentives to mobilize private resources

Indicators	Score
3.2.1. Are subsidy schemes, tax allowances/exemptions available for private sector actors that can motivate the implementation of relevant environmental SDGs.	0,5 – To some extent
3.2.2. Are there (green) investment schemes that can provide loans and grants to private sector actors to motivate the implementation of the relevant environmental SDGs?	0,5 – To some extent
3.2.3. Is the country a member of relevant international financing schemes?	0,5 – To some extent
3.2.4. Has the country phased-out of environmentally harmful subsidies (e.g. for fuel and pesticides)	0 – No
Sub-total	**1,5/4**

The 2011 CCAP set forward a 100% increase in energy efficiency incentives by 2011 (Turkey, MoEU 2011). The latest national communication noted a few tax incentives to improve energy and fuel efficiency as well as to support renewable energy promotion (Turkey, MoEU 2018), but there is no information whether this target had been achieved. Research also suggested that the introduced measures are limited both in

terms of availability and efficiency (Uslu et al. 2015). The latest national communication identified two funds, which can support businesses to lower their emissions, including the National Eco-Efficiency Programme and an energy efficiency program (Turkey, MoEU 2018), although the scope of these is limited to manufacturing businesses. The Turkish Development Bank and the Industrial Development Bank of Turkey also offer loans for renewable energy and energy efficiency projects, although these are not based on domestic funding but are funded by the European Investment Bank (OECD 2019). Since Turkey did not have emissions target set for 2020, it cannot participate in carbon emission trading activities under the Kyoto Protocol and as of 2019, due to its special Annex-1 status, it is also not eligible for funding from the Green Climate Fund (Turkey, MoEU 2018). At the same time, Turkey receives considerable funding from multilateral development banks. For example, it is a beneficiary of the World Bank-administered Climate Investment Funds. Turkey also supports fossil fuel use via tax exemptions and direct transfers (i.e., to poor families): according to OECD calculations, the amount of fossil fuel subsidies have increased from 433 million to 1 billion TRY between 2008 and 2016 (OECD 2018).

In the case of indicator 3.2.1 and 3.2.2. it was somewhat problematic to define "sufficiency" concerning available tax incentives and investment support schemes. The final scoring was based on the reviewed documents and peer-reviewed assessments and the outcomes of personal communication with the involved experts, but it remains a subjective evaluation to some extent. In the future, a four-point scale can be applied for these questions or the questions can be reformulated to support a more nuanced assessment.

Table 53: Indicator cluster 3.3. National capacity for efficient utilization of international support

Indicators	Suggested scoring
3.3.1. Does the country have a plan with concrete measures for attracting and coordinating international financial and technical support for the implementation of the environmental SDG in question?	0 – No
3.3.2. Is there a government body that coordinates international funds and support for the environmental SDG in question?	0,5 – To some extent
3.3.3. Is there sufficient capacity at the national level to attend negotiations of the relevant environmental conventions?	1 – Yes
3.3.4. Is there sufficient capacity at the national level to manage, monitor and report the implementation of projects financed and supported from international funds?	0,5 – To some extent
Sub-total	***2/4***

Turkey receives considerable international support for climate activities, including funding from the EU Instrument for Pre-Accession (IPA), multilateral climate funds (World Bank and EBRD) and also bilateral funds (Turkey, MoEU 2018; IPA II 2014 - 2020). At the same time, no evidence was found regarding the existence of a comprehensive strategy, which would establish linkages between the relevant national strategic objectives and the different sources of international financing available for climate change. The MoEU is the primary government body that benefits from climate change-related international support, but at the same time, various other ministries implement climate change projects supported by development financing. The Climate Change and Air Management Coordination Board has a Financing working group, which is tasked with the regular review of Turkey's cooperation with multi and bilateral donors (Turkey, MoEU 2019b). However, it only meets on an ad-hoc basis and it is without executive powers. Concerning human resources, in the latest national communication to the UNFCCC, it was suggested that the Turkish delegation attended all meetings of the UNFCCC as well as interim sessions leading up the meetings. (Turkey, MoEU 2018). Besides ministries, various research organizations, business associations and NGOs are involved in the implementation of climate change projects (Baglee et al. 2013). The consulted experts suggested that the capacity to implement climate change projects financed by international organizations is sufficient at the involved organizations. At the same time, there is also recognized need for further capacity-building (UN Turkey 2015).

There was limited evidence in the reviewed documents concerning indicator 3.3.1 and 3.3.4, therefore its evaluation was based on the outcomes of personal consultations. Indicator 3.3.4 is also more subjective and during the course of future pilot testing, a four-point scoring can be introduced, or the question can be reformulated.

7.3.4 Component 4: Knowledge creation capacity

Two implementation capacity indicator clusters were suggested to measure countries knowledge creation capacities in the STMI:

- Indicator cluster 4.1. Environmental education and training
- Indicator cluster 4.2. Research and scientific cooperation

The results for this component, concerning climate change goal implementation capacities of Turkey are presented in the following section.

Table 54: Indicator cluster 4.1.: Environmental education and training

Indicators	Suggested scoring
4.1.1. Is there a government decision (decree) or strategy/action plan to introduce education concerning the environmental SDG in question?	0,5 – To some extent
4.1.2. Is there a responsible body to coordinate environmental education activities in the country?	0,5 – To some extent
4.1.3. Are there environmental education curricula developed at the national level?	0,5 – To some extent
4.1.4. Are environmental considerations/modules integrated into higher-education curricula and vocational training?	0,5 – To some extent
Sub-total	***2/4***

Turkey does not have an education for sustainable development or a climate change education strategy. At the same time, the country recognized its obligation under the UNFCCC to provide climate change education and training and the Environmental Law stipulates the inclusion of environmental subjects in the school curricula from pre-school levels (Turkey, MoEU 2016b). In order to co-ordinate the development of climate change education and training and increase general awareness on the topic, an Education, Awareness-raising and Capacity-building working group was established under the Climate Change and Air Management Coordination Board (Turkey, MoEU 2019). This body is also responsible for developing policies concerning climate change education, carrying out research and collecting information on relevant national activities (Turkey, MoEUc 2016c)

The latest national communication to the UNFCCC suggested that climate change topics are included in educational activities, and courses of primary and secondary schools, as well as relevant courses are offered by various higher-education institutions (Turkey, MoEU 2018). However, no evidence was found for the existence of a comprehensive environmental education curriculum and for efforts to integrate climate considerations in a more holistic manner into the university education. Concerning vocational training, various capacity-building activities targeting government officials, municipalities, researchers and civil society actors could be identified. For example, the European Union co-financed "IklimIN" project provides climate change training opportunities to relevant stakeholders (in municipalities, at universities and civil society organizations) via different projects (www.iklimin.org). Besides, training programs are also implemented by NGOs, business associations and research institutions (Turkey, MoEU 2018; 2016; 2013).

It was suggested that indicator 4.1.4. would need to define what sufficiency would mean in terms of capacity-building or training activities. There during the course of further pilot studies, this question can be revisited and refined.

Table 55: Indicator cluster 4.2. Research and scientific cooperation

Indicators	Suggested scoring
4.2.1. Is there a strategy or plan that establishes research priorities, cooperation areas and technology transfer mechanisms concerning the environmental SDG in question?	0,5 – To some extent
4.2.2. Are national researchers supported to participate in relevant international research activities and collaborations?	1 – Yes
4.2.3. Are there privately-owned and run environmental research centers or laboratories in the country (concerning the environmental SDG in question)?	0,5 – To some extent
4.2.4. Is the/Are there national scheme(s) and/or bodies to support the transfer of environmentally friendly technologies to businesses by awareness-raising, consultancy and financing activities?	1 – Yes
Sub-total	**3/4**

The reviewed national communications indicated that various research projects have been implemented concerning climate change in Turkey by various governmental bodies, research institutions and NGOs (Turkey, Ministry of Environment and Urbanization 2018; 2016; 2013). One of the priorities set by the Scientific and

Technological Research Council of Turkey (TÜBİTAK) is to support the development of renewable energies and environmental technologies (www.tubitak.tr). As a result, it was suggested that between 2013 and 2018, over 500 research projects relevant to climate change mitigation have been supported (Turkey MoEU 2018). While the research programs are developed based on a baseline assessments of research needs and priorities and an Energy Sector Research and Development Projects Support Program was adopted in 2010 and updated in 2013, there was no evidence found for the existence of a comprehensive climate change research agenda. Coordinated by TÜBİTAK, Turkish researchers are also intensively participating in international research programs, especially via the European Union Research Framework Programmes (TURABDER 2016). Moreover, government and research institutions support their personnel to join international conferences and training concerning climate change and the Council of Higher Education funds the training of doctoral students in relevant research areas (Turkey, MoEU 2018). According to the information presented in the latest national communications to the UNFCCC (Turkey, Ministry of Environment and Urbanization 2018; 2016; 2013), climate research in Turkey is mainly funded by international organizations, government authorities and bodies and public universities. There are at the same time, some private universities, which carry out climate change-relevant research and private companies, seek to develop innovations primary with the aim of increasing energy efficiency of and reducing emissions from their own processes (CDP 2016). In order to co-ordinate the uptake of new technologies for emission reduction and climate change adaptation, a Technology Transfer working group was formulated under the Climate Change and Air Management Coordination Board (Turkey, MoEU 2019a). Targeting industrial companies, the CCAP also foresaw the support of companies climate-related research activities, as well as the preparation of a technology transfer guide on energy efficiency (Turkey, MoEU 2011). More recently, the government have been introducing various support policies to encourage companies in the uptake of clean and energy efficient technologies (OECD 2019).

7.3.5 Component 5: Monitoring capacity

The two indicator clusters, which are proposed to evaluate countries' environmental monitoring capacities are the following:

- Indicator cluster 5.1. Delineation of institutional mandates for monitoring; and

- Indicator cluster 5.2. Adequacy of data collection processes to provide sufficient, functional and regular statistics

The results for this component, concerning climate change goal implementation capacities of Turkey are presented in the following section.

Table 56: Indicator cluster 5.1. Delineation of institutional mandates for monitoring

Indicator	Suggested scoring
1.1.1. Is there a main body responsible for the coordination of monitoring activities?	1 – Yes
1.1.2. Are data collection responsibilities clearly defined?	1 – Yes
5.1.3. Is there data provision requirements for external actors (e.g. for companies) concerning the environmental SDG in question?	1 – Yes
5.1.4. Do institutions have sufficient capacity to regularly collect, process and store relevant data?	0,5 – To some extent
Sub-total	**3,5/4**

The Turkish Statistical Institute (TurkStat) is the main responsible body to gather and organize data concerning GHG emission and prepare the annual GHG emissions inventories and relevant ministries are required to provide the data necessary for the preparation of the annual inventories (Turkey, MoEU 2019). Since 2014, data provision requirements of approximately 900 manufacturing companies are also stipulated by the 2012 By-Law on Monitoring of Greenhouse Gas Emissions. At the same time, capacity limitations are indicated by the delay in the submission of the 6th and the 7th National Communication as well as the lack of full compliance with the general UNFCCC reporting guidelines concerning the review of implementation measures (OECD 2019).

Table 57: Indicator cluster 5.2. Adequacy of data collection processes

Indicators	Suggested scoring
5.2.1. Is data collected for all relevant environmental indicators?	0,5 – To some extent
5.2.2. Have clear data collection guidelines been developed?	0,5 – To some extent
5.2.3. Are data collection activities carried out regularly so that the available data is up to date?	0,5 – To some extent
5.2.4. Is the quality of the collected data validated and the data is processed for further analysis?	0,5 – To some extent
Sub-total	***2/4***

From a data availability point of view, GHG emissions data and relevant data on climate vulnerabilities are available on a yearly basis in a sectoral distribution (Turkey, MoEU 2018). While environmental data concerning other issues are less comprehensive, the guidelines defined by the UNFCCC concerning climate change data collections are stipulated by the relevant legislation adopted in 2012. At the same time, the latest EC enlargement policy progress report concerning Turkey (EC 2018) found that the GHG emission monitoring system is not in full compliance with the EU mechanism and the EU Emission Trading Directive. Information on progress with implementation actions are not collected, and the outcomes of implementation actions are not monitored, although a monitoring system for the CCAP was put in place earlier (OECD 2019). In order to ensure the quality of the national GHG emissions data, the Climate Change and Air Management Coordination Board adopted a quality assurance and quality control plan. While further efforts are being undertaken by the TurkStat to improve the quality of the monitoring system, the opportunities for verification are limited as besides the national system, additional emission calculations are not yet available (Turkey, MoEU 2018).

For the indicators considered under indicator 5.2, higher scores could be provided if only quantitative data on emissions and vulnerabilities are considered. While these are available in time and in a sufficient quality, progress with many of the "soft" implementation measures cannot be monitored. This is an important consideration because while the necessary data for reporting is collected, progress with the implementation of mitigation activities cannot be tracked quantitatively.

7.3.6 Component 6: Capacity to follow-up implementation

As discussed in 7.2.6, two indicator clusters are proposed for assessing countries' capacities to follow-up on the progress with implementation of environmental strategies and plans:

- Indicator cluster 6.1. Environmental reporting systems and
- Indicator cluster 6.2. Government accountability mechanisms

The results for this component, concerning climate change goal implementation capacities of Turkey are presented in the following section.

Table 58: Indicator cluster 6.1 Environmental reporting systems

Indicators	Suggested scoring
6.1.1 Is there a law that requires the preparation of general state of the environment reports concerning the environmental SDG in question?	1 – Yes
6.1.2. Is there a responsible body appointed to coordinate the preparation of state of the environmental reports?	1 – Yes
6.1.3. Is the necessary data available for the preparation of reports?	1 – Yes
6.1.4. Are stakeholders (including research institutions, NGOs) involved in the preparation of environmental reports?	0,5 – To some extent
Sub-total	***3,5/4***

The overall responsibility to prepare state of the environment reports was designated to the General Directorate of Environmental Impact Assessment, Permit and Inspection of the Ministry of Environment and Urbanisation (MoEU) (Turkey, MoEU 2016). The Law requires the preparation of the SoER every four year. Covering the 2011-2015 period, the first (and so far, only one) of these reports was published in 2016. Concerning climate change, it contains on overview of GHG emissions at the national level, information on sink areas, emission trading, adaptation and ODS eliminating activities as well as a short section on the evaluation of implementation activities (Turkey, MoEU 2016a). Historical emissions data, also in sectoral distribution, was available for the preparation of the report. Although the section on climate change indicates that the information was provided by relevant government agencies, it contains no indication of whether and if yes, how non-government actors were involved in the report preparation process. Moreover, the latest National Communications to the UNFCCC indicated that the thematic working groups, which were tasked with the

preparation of the communication, included various stakeholders both from academia, businesses and non-governmental institutions (Turkey, MoEU 2019).

Table 59: Indicator cluster 6.2 Government accountability mechanisms

Indicators	Suggested scoring
6.2.1. Do relevant environmental strategies require the preparation of regular progress review of their implementation?	0 – No
6.2.2.Are relevant data and information or (if available) implementation reports about climate change made publicly available on a timely basis?	0,5 – To some extent
6.2.3. Is the government required to report (e.g. to the parliament) on progress with the implementation of environmental strategies?	0,5 – To some extent
6.2.4. Is there a general auditor body to review progress with the implementation of the environmental SDG in question?	0,5 – To some extent
Sub-total	**1,5/4**

In order to track the implementation progress with the measures defined by the CCAP, it was noted that an *"electronic monitoring system"* was introduced, where actors involved in implementation could provide relevant information to provide information about the *"status of the actions in the NCCAP"* (Turkey, MoEU 2016b, 59). At the same time, no implementation/monitoring report could be identified concerning the CCAP and the latest EPR of the OECD also noted that the outcomes of those implementation actions which had a 2011-2015 timeframe in the CCAP had not been monitored (OECD 2019). The consulted experts suggested that there is no national legislation concerning the preparation of implementation reports of climate change policies. However, considering the scope, the National Communications to the UNFCCC (as international obligations) can be regarded to some extent as implementation reports. The Turkish Statistical Institution provides access to data on GHG emissions and the SOER report is also made available online. At the same time, the Law on Right to Information (2003) does not allow the disclosure of sensitive environmental information and public institutions can charge fees for or refuse data provision requests from the public (OECD 2019). Concerning indicator 6.2.3, the consulted experts noted that the Grand National Assembly of Turkey discusses environmental matters, but only on an ad-hoc basis and there are no regular sessions provisioned. For auditing, there is an Environmental Committee in the parliament that regularly discusses environmental matters, including climate change issues, however,

their exact role concerning implementation progress review is not stipulated by relevant legislation.

7.3.7 Results of the pilot test

Across the six components of the proposed STMI, Turkey scored overall at 54% concerning its implementation capacities for climate change mitigation goals. Component 2 (policy and law implementation/enforcement capacity) and Component 3 (Financing capacity) scored considerably lower.

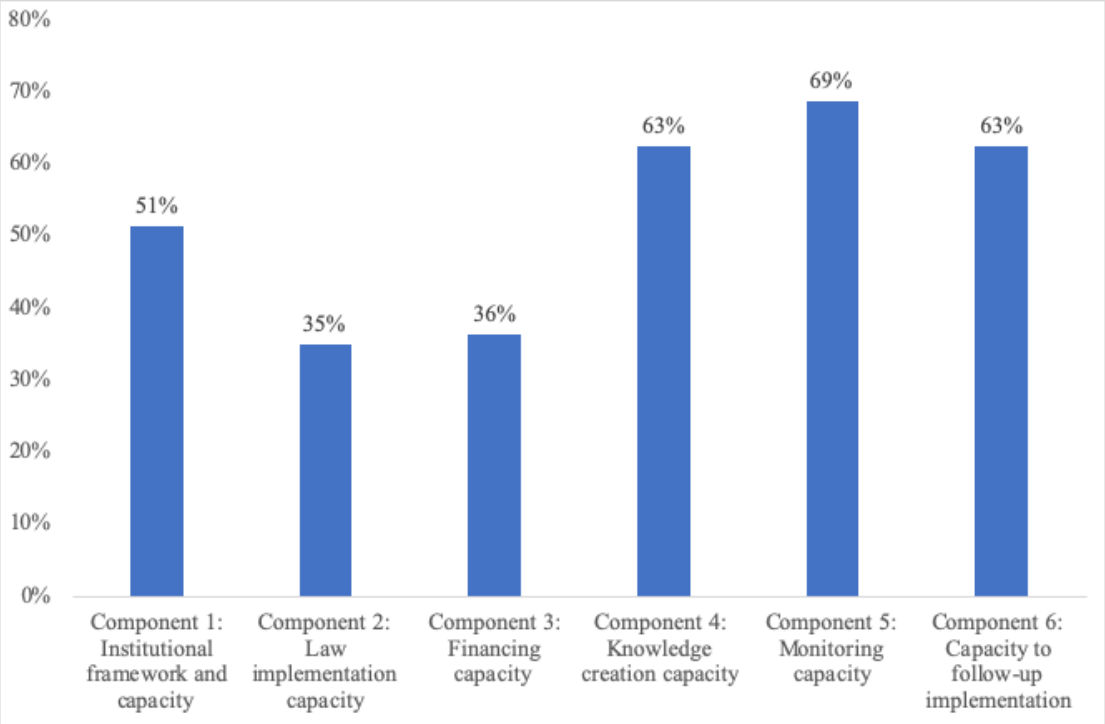


Figure 18: Scores for Turkey (as percentages of maximum scores), concerning climate change goal implementation.

An analysis of the sub-components (or indicator clusters) under each indicator, reveals further differences within each implementation capacity areas.

- *Institutional framework and capacities:* the analysis suggests that while the institutional framework is relatively well-established, political commitment to the implementation of climate change objectives is less secured.
- *Law implementation capacity:* the weakest performance was evaluated concerning the climate policy implementation capacities of the country, due to rough definition of implementation measures, the apparent lack of research and

feasibility studies as a basis for climate change mitigation measures and limited enforcement abilities

- *Financing capacity:* while Turkey scored low across all indicators under this issue, the weakest area of performance was budget allocation to climate change goal implementation activities, as climate change considerations have not been integrated into public budgeting activities as a stand-alone priority.
- *Knowledge creation capacity*: under this theme, research capacities were evaluated higher, while educational and awareness-raising capacities somewhat lower.
- *Monitoring and policy review capacity*: under both components, considerable differences could be observed between the assessed indicator clusters. While the legal and institutional frameworks were found to be relatively well established both for monitoring and reporting/policy review, capacities for the actual execution of these tasks were assessed to be considerably weaker.

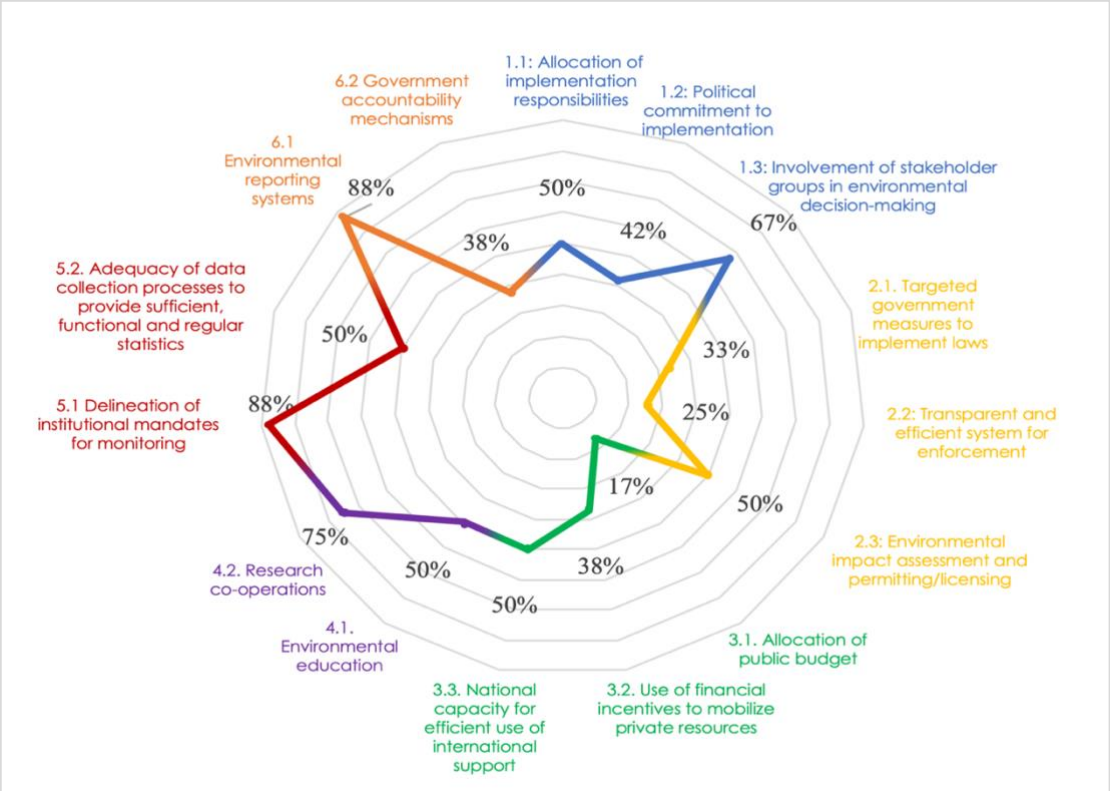


Figure 19: Scores for Turkey (as percentages of maximum scores), concerning the implementation of climate change mitigation goals.

7.3.8 Reflections on the results of the pilot testing

While the overall historical emissions of Turkey are relatively low, as a fast-growing economy, its GHG emissions have been quickly increasing in the last three decades. From 1990 to 2016 GHG emissions have increased by 135% and by 50% between 2005 and 2016 (Turkey, MoEU 2018) Therefore a strong decoupling of GHG emissions from its growing economy will be crucial in the coming decades. It has been suggested by research that Turkey is also highly vulnerable to climate change, therefore a variety of adaptation objectives will also need to be addressed.

The pilot testing has confirmed that while the institutional setting, which can support the country to address climate change issues, is more or less in place, policy implementation and monitoring seems to be weaker overall. It has already been suggested that the INDCs of Turkey are insufficient to decarbonize the Turkish economy (New Climate Institute and Climate Analytics 2019). If the implementation of these rather weak commitments will be further hampered by capacity challenges, then there is a very high risk for the country to remain more or less on the business-as-usual GHG emissions scenario pathway.

The results can also be compared to the outcomes of similar indices and assessments. For example, for the environmental policy implementation indicators of the Bertelsmann Foundation' Sustainable Governance Indicator sets, the evaluators assigned an overall score of five out of ten for Turkey (Bertelsmann Stiftung 2019). For the Climate Laws, Institutions and Measures index Turkey received a score of 0,381 out of an overall score of one – although the calculations reflect the status of climate policies in 2013 (Steves and Teytelboym 2013). In the 2019 edition of the Climate Change Performance Index, Turkey scored as "very low" performer on the climate policy evaluation component, however, these results were mainly due to the countries' fossil fuel promotion policies and the fact that the country has not ratified the Paris Agreement at the time of the evaluation (Germanwatch 2019).

This research also recognizes that besides capacity, there are various contextual factors, which can support or hamper environmental goal implementation efforts (also see chapter 8.2) . In case of Turkey, such factors may include the international status of the

country within the UNFCCC (and whether Turkey becomes eligible for international support); its relationship with the European Union (and as a result, eligibility for benefiting from various funding mechanisms); changes in population trends; potential variations in the current political status-quo and developments concerning the economic situation of Turkey. Since an implementation capacity index cannot directly account for such external factors, its results are to be considered with a certain degree of scrutiny and interpreted within the specific socio-economic context and trends of the analyzed country.

7.4 Considerations for constructing an implementation capacity index

To formulate an implementation capacity index (the STMI) from the proposed capacity indicators, various methodological steps are suggested by different guidelines of index construction (Guisselquist 2014; Nardo et al. 2008). These methodological steps consist of different statistical analyses, which can ensure the overall robustness of the structure, the selected indicators and their assigned weight and therefore secure a good level of validity of the results. To undertake such statistical calculations, a relatively large sample of at least 20 countries would be required. Since data collection for such a large sample was beyond the possibilities of this research and the country test was partial also in a sense that it focused on one specific environmental SDG, the next section will discuss how an implementation capacity index could be developed further and reflect on potential challenges during the process.

7.4.1 Measurement considerations

During the formulation of the indicators as well as subsequently during the pilot testing, some considerations emerged regarding the measurement of the proposed indicators.

The scores of governance indices are generally perception-based, assigned by the developers of the indices or other experts (Almassy and Pinter 2018). This means that the outcomes of the overall evaluation will, to a certain extent, depend on the professional background, level of experience and even the worldviews of the evaluator(s). The limitations of perception-based evaluation can be mitigated by formulating fact-based questions and/or involving more than one evaluator in the assessment with a wider diversity of experiences and potential positions.

For the pilot testing of the proposed implementation capacity indicators, first policy documents, research articles and relevant websites were screened and searched. Based on the document review, it was possible to answer approximately 80% of all the questions (or indicators). The remaining indicators were required consultations with national experts, who have more in-depth knowledge about climate change policies of Turkey.

Some evaluation questions were found to be more subjective and thus somewhat problematic to be assessed. For example, for indicator 1.1.4, it is debatable what can be considered as "regular" functioning for a coordination mechanism (i.e., if an institutional coordination mechanism exists but only required to meet once a year and only on an ad-hoc basis beyond that). The questions concerning the sufficiency of human capacities (2.1.3; 3.3.4; 5.1.4) were also challenging to measure, as it is relatively subjective what can be considered as "sufficient" capacity. It was also found that some questions may need to be tailored according to sectors and country contexts. For instance, concerning 2.2.3., in case forests are managed by states and not privatized, implementation may not require inspections but instead regular reporting by implementation bodies.

In order to refine the indicators, which are considered to have a more subjective nature, further pilot testing, consultation with stakeholders and statistical testing would be necessary. For instance, in the pilot study, a three point-scale was utilized, although when more systematic data collection would be carried out, a four-point scale could provide more informed results by distinguishing between a lower and an upper middle performance and thus providing a more nuanced evaluation. By applying statistical tests to compare governance capacities across countries and also across different environmental issues within the same country, the refinement of these indicators could further improve their relevance.

It was also recognized that the number of indicators clusters under the components and the number of indicators under the clusters are somewhat uneven. This is not necessarily a problem, but the relative contribution of the indicators to an overall index

score will need to be reflected, e.g. by normalizing the results or by assigning different weights to the different indicators.

Besides questions around the formulation of the measures, additional questions emerging from the pilot testing concerned on how to efficiently evaluate the indicators. The large majority of the environmental governance or general governance indices used expert evaluations as a scoring methodology. Expert-based evaluations could be more credible if a larger number of respondents can participate in the evaluation, however, it was recognized that the potential number of people (who are well vested in all relevant topics of the indicators) maybe be limited. During the indicator development process, systematic and then a Delphi-based computer-program supported document review was used for the identification of all potential implementation capacity factors (see section 4.4) This technic was used again during the pilot testing, and as discussed above, it was possible to find a relatively comprehensive answer for many of the evaluation questions. During the course of further pilot testing, this data collection methodology could be further developed and utilized, even with the application of more automatized, machine learning-based search technologies. Such automatization could considerably reduce the time and resources necessary for the assessment, and at the same time, improve the reliability and the credibility of the results.

7.4.2 Considerations for carrying out statistical assessments

For the construction of an index, once the indicators are selected and data is collected for the indicators, the results need to be evaluated via a sequence of statistical assessment method (Nardo et al. 2008). These include data imputation, multivariate analysis of the structure of the selected indicators; weighting and aggregation; uncertainty and sensitivity analysis.

First, missing data should be handled. To identify the appropriate **data imputation** solution, it is important to study the patterns of absence (Gelman and Hill 2007). Data may be missing completely randomly, may be missing at random, or not at random. For the imputation of missing data, and to obtain a complete dataset without missing values, three general methods may be applied: case deletion, single imputation or multiple imputations (Nardo et al. 2008). Our study of environmental governance indices

(Almassy and Pinter 2018) suggested that given the nature of such measures, missing data was quite a general problem. The developers of some indices took a more flexible approach to data imputation and suggested that "*using the best available information in a given time and place"* (Iribarnegaray and Seghezzo 2012, 2936) or simply omit indicators when data was not available (African Capacity Building Foundation 2013). At the same time, an analysis of the Global Innovation Index proved that the avoidance of data imputation could lead to distorted results (Saisana et al. 2017)**.** In case of the proposed goal implementation capacity indicators of this research, if information cannot be tracked down during the review of documents, the imputation of missing data can be performed via questionnaires or personal consultation with researchers, practitioners or stakeholders familiar with environmental goal implementation in a given country. Using a larger sample of questionnaire responses for the data input could further improve the reliability of the assigned scores.

As a next step in the construction process of the index, the structure of the selected indicators, and their appropriateness to the phenomena and the selected framework should be assessed by **multivariate analysis**, such as a factor or cluster analysis (Greco et al. 2018). Subsequently, to ensure the comparability of the indicators, normalization using different measurement units should be carried out (Nardo et al. 2008). Several normalization methods exist, including simple ranking, standardization on a common scale, and min-max or mean methods (Freudenberg 2003). In the case of the STMI, all indicators could be standardized in a 0–100 scale and presented as a percentage value of the maximum score for the assed indicators.

A subsequent step in the construction process is **weighting and aggregation,** when individual indicators are weighted according to a certain methodology and aggregated into a composite indicator. The weighting can be based on public consultation, which can track important values and policy aspects of the process, or on statistically more rigorous methods (Pinter et al. 2000). Since the former method is significantly subjective in character and the latter may disregard patterns of certain indicators, many composite indicators are equally weighted (Almassy and Pinter 2018; Nardo et al. 2008b). At the same time, research suggested that in case of linear aggregation, the strong and weak performances of certain components can compensate one another in such a way that they may not be reflected by the final value of the composite indicator

and this can be especially problematic when the composite indicator is used to measure the performance of countries or other individual units (Becker et al. 2017; Paruolo 2013; Böhringer and Jochem 2006). Our study of environmental governance indices (Almassy and Pinter 2018) only identified non-linear aggregation in a few cases, although other indices (such as the Environmental Democracy Index and the Sustainable Water Governance index) also recognized the potential need for assigning different weights (Worker and De Silva 2015; Iribarnegaray and Seghezzo 2012). For the construction of the STMI, different weights could be considered based on the questionnaire results concerning the overall importance of the eleven different implementation themes emerging from the document review (see section 4.5 and 7.1). In the questionnaire, three themes – international cooperation, research and monitoring frameworks – were prioritized somewhat lower. Implementation capacity factors emerging from these themes are included in the indicator clusters under the component of '*Financing capacity', 'Knowledge creation capacity' and 'Monitoring capacity'.* During the aggregation process of the STMI, the indicator clusters in question could receive a 0,75 or a 0,8 multiplier in order to account for their lower level of ranking compared. Concerning aggregation, given that the components of the STMI are built on each other and thus partially may overlap, the results of the four components may need to be presented separately without combining them into a single value (Saisana, pers. comm. 2014).

After weights are assigned and the indicator scores are aggregated, uncertainty and sensitivity analysis should be carried out to ensure the robustness of the developed STMI. In the course of this analysis, alternative development scenarios for steps one to six of the construction process should be tested, and influential uncertainties should be identified (Nardo et al. 2008). Research also suggested that this analytical step should be carried out during the construction of the index rather than afterward, so that the outcomes of the assessment can be built into the indicator (Saisana and Saltelli 2008). Our analysis of environmental governance indices (Almassy and Pinter 2018) suggested that uncertainty and sensitivity analysis have only been carried out in a limited number of cases and these assessments were not necessarily comprehensive. At the same time, for developing the STMI, sensitivity analysis could be crucial as their assessment and potentially their weighting may influence the overall results of the index.

Lastly, in order to ensure transparency and to provide more detailed information about the developed composite indicator, the final value of the STMI could be disaggregated into components in order to study their specific patterns as well as the overall correlation of the results can be tested against other similar indices. (Nardo et al. 2008b).

7.4.3 Presentation and application of the results

In order to present the results in an efficient and engaging manner, appropriate presentation and visualization methods should be selected for the composite indicators. Our study of environmental governance indices found that most initiatives used simple, tabular or bar chart formats while others were also completed with geographic representation of the results (Almassy and Pinter 2018). The results of the pilot test in this study were also presented with a bar and a radar chart, although if a wider set of results will be available, further ways of more interactive presentation can also be tested (e.g. with the use of a map).

The presentation of the results should also take into consideration the application purposes, for which such an index can be utilized. The STMI would be developed primarily to assess the status of environmental goal implementation capacities of countries and to evaluate their progress over time on specific implementation capacity factors. At the same time, the STMI could be also used for policy learning purposes. For example, via the engagement of policymakers, technical experts or researchers, various stakeholders can gain a more holistic, system-oriented understanding on environmental goal implementation capacity issues and be able to better identify leverage points, where environmental policy systems could be influenced significantly (Meadows 1999). For this latter purpose, a website could be developed, which would allow (invited) users to review previously calculated scores for their countries but as well as to suggest revisions to assigned scores and contribute to the validity of the measurement by providing scoring evaluations. These suggestions are further discussed in chapter 8.1 and 8.3.

Chapter 8 Discussion of findings

This chapter will discuss lessons learnt from the research about assessing environmental goal implementation capacities; provide an overview of external factors that may influence implementation beyond governance capacities and elaborate on how a set of implementation capacity indicator or the STMI could inform the operationalization of the environment-related SDGs as components of the post-2015 Development Agenda.

8.1 Lessons learnt for assessing environmental goal implementation capacities

The research hypothesized that state capacity, the ability of governments to implement policies, will have significant impact on the implementation outcomes of environmental SDGs and that a methodologically robust implementation capacity indicator set (and their composite) could support the assessment of governments' ability to prepare for implementing such environmental goals as well as offer insights on how implementation capacity of countries can be improved for better environmental outcomes. In the next section, I will reflect on this starting hypothesis by discussing the STMI development process, its outcomes and lessons by setting forward key points emerging from the research.

1. *There is a limited body of research on national capacities necessary for successful environmental goal implementation.*

The original idea of the dissertation research was to identify a set of environmental goal implementation capacity indicators from the literature and then focus on constructing and testing an index based on them. However, the literature review showed that while there are attempts to conceptualize, categorize and measure various aspects of good governance (Wu et al. 2018), there is much less work on assessing and measuring specifically *environmental* policy and goal implementation capacities (Almassy and Pinter 2018). Secondly, it was questioned whether and to what extent would the indicators used in general governance indices and governance assessment processes be relevant for environmental goal implementation evaluations. Many environmental problems require broader institutional coordination and stakeholder involvement, more

extensive international and regional cooperation both for implementation and monitoring, as well as different competencies to research and monitor environmental problems – capacity aspects, which are not necessarily relevant for implementing other socio-economic goals. As a result, the research first had to define what aspects should be included in an implementation capacity index.

2. *A systematic review of scientific literature and policy documents helped to identify a larger pool of implementation capacity factors that could potentially support the evaluation of environmental goal implementation capacities.*

To identify which aspects could be considered relevant for environmental goal implementation capacities, ca. 200 scientific articles and 300 policy documents were reviewed concerning 20 emerging economies in Southeast Asia and Europe. As discussed in chapter 2.2, there was limited information on national implementation experience with environmental goals (see e.g. Bondarouk and Mastenbroek 2018; Howes, et al. 2017; Castello et al. 2009). Moreover, very few peer-reviewed articles could be identified, that would provide a comprehensive summary of the MDG7 implementation experience and/or relevant environmental conventions and goals. Therefore, the research had to largely rely on grey literature, such as government reports, assessment of international organizations and think-tanks. The extensive use of grey literature as a basis for scientific research raised some methodological questions throughout the research (see chapter 4.4.1), however, compared to the reviewed scientific literature, policy documents discussed a considerably wider range of challenges that governments and policy practitioners may encounter during environmental goal implementation. If handled carefully, grey literature may also offer a diversity of perspectives, account for and thus reduce the research-policy gap and offer a broader evidence-base for policymaking and review (Adams et al. 2017). This research has shown that this is also valid for grey literature concerning environmental policy and goal implementation due to the complexity of environmental problems, the large variety of actors, who may be involved in implementation, the lack of broadly agreed theoretical considerations (see chapter 2.3.3) or the lack of common terminologies concerning environmental goal implementation capacities.

As discussed in chapter 4.4.3., the review of scientific and grey literature lead to the identification of ca. 200 implementation capacity factors. These were then clustered into 58 factors and grouped under 11 implementation themes. Usually, multiple references supported each of the 58 capacity factors in most of the 20 countries covered. Thus, the systematic review of scientific literature and policy documents highlighted the importance of improving implementation capacities for environmental goal implementation and it offered a strong evidence-base of the different capacity needs.

To validate the final list of the 58 implementation capacity factors, experts in the studied regions were also consulted. Moreover, in Stage 2 of the research, questionnaire respondents were also requested to provide feedback concerning the implementation capacity factors and suggest any additional ones, which in their view would be important for environmental goal implementation. While some of the respondents emphasized the overall importance of one or two factors (i.e. political commitment or stakeholder involvement), additional factors have not been suggested by the over 100 respondents. This indicates that the list of 58 implementation capacity factors is likely to sufficiently cover those major implementation capacity aspects, which are necessary for environmental goal implementation.

3. *The application of the stage-based policy implementation theory was useful for the organization of the implementation capacity factors but resulted in some potential overlaps, which would need to be addressed during future use of the indicators and/or the statistical testing of the implementation capacity index.*

A methodological question that emerged during the clustering process in Stage 1 of the research (chapter 4.4.3) was whether and to what extent the selected conceptual framework influenced the definition and organization of the implementation capacity factors. If a different conceptual framework were selected, such as the 5A concept of the Earth System Governance (ESG) theory (chapter 2.3.3), would a somewhat different list of implementation capacity factors have emerged from the review?

I suggest that the first list of the ca. 200 implementation capacity factors, which was the results of the document review (see chapter 4.4.2 and Annex 3b), would have been quite similar, irrespective of the conceptual framework used, as they were directly

derived from a large sample of literature sources. The created themes and the factors included under each theme were refined via consultation with experts from the studied regions and validated by using the questionnaire to collect feedback on the created implementation themes and the implementation capacity factors grouped under each theme. Although no major comment was received on these aspects, the overarching importance of some of the factors (e.g. political commitment and stakeholder involvement throughout the environmental goal implementation process) was mentioned by some of the respondents. At the same time, an other framework would have likely influenced the final list of the 58 implementation capacity factors because it would have resulted in the introduction of different themes and may have put a larger emphasis on different implementation capacity factors. For example, if the ESG had been applied, one of the implementation themes would have been "accountability". Although the final list of 58 implementation capacity factor does include indicators relevant for transparency and accountability, these appear under various implementation capacity themes, and most of them did not appear on the final list of 17 prioritized factors. In connection to this, it is also recognized that the categorization of some of the implementation capacity factors may be somewhat arbitrary. For instance, the placement of factor 4.5 '*adequate economic operations of environmental utility companies*' under '*Domestic financing'*, factor 6.5. '*Improved land ownership and management'* under *'Law implementation and Enforcement'* and factor 7.5 '*Integration of environmental considerations into privatization process'* under '*Stakeholder involvement'* could be debated. None of these were selected as priority implementation capacity factors by the majority of the questionnaire respondents and thus, the question emerges whether their placement (under somewhat misfitting themes) influenced the decision of some of the respondents whether or not to prioritize them. If all of these factors are clustered under an "accountability" theme of the ESG theory, some of them would have been prioritized by the respondents. In future processes, such limitations could be addressed if stakeholders are already involved in the clustering exercise (this point will be further covered under the next discussion point).

Moreover, by using the policy implementation framework, some of the capacity factors appeared multiple times in the different stages of the policy cycle. These included human, technical and financial capacities for implementation, law enforcement, research and monitoring (see themes 3, 6, 8 and 9). Similarly, institutional coordination

was emphasized concerning implementation, monitoring and reporting and participation in regional cooperation was emphasized both for research and monitoring (see chapter 5 and relevant sections of chapter 6). In order to ensure robustness, a decision was taken to consider those factors separately for the final list of 58 clustered indicators, which appear in the majority of the 20 countries and across multiple document types, and accordingly, the above-listed implementation capacity factors were included twice or more. Nevertheless, it should be recognized that there is an overlap among these factors, and a cluster or factor analysis would be important during the finalization process of the STMI in order to account for potential overlaps.

4. *The selection of the priority implementation capacity factors highlighted the importance of ontological considerations*

In stage 2 of the research, a questionnaire was developed to identify priority implementation capacity factors for the construction of the STMI (see chapter 4.5). To ensure that these factors (which would serve as the basis of the indicators of the STMI) are based on a common or at least converging preferences of a variety of actors involved in goal implementation, respondents were requested to choose up to three factors for each of the 11 implementation themes. The questionnaire was completed by 117 respondents, ensuring a large enough sample for a robust analysis. However, during the questionnaire development process, questions related to the influence of the language used for categorizing and describing the implementation capacity factors emerged.

As noted in chapter 2.3.3, broadly agreed goal implementation capacity categories could not be identified in the literature and the terminology used for identified capacity issues also varied. During the formulation of the 58 implementation capacity factors in the questionnaire, their wording was kept as clear and consistent as possible. In order to ensure this, I aimed to develop a consistent ontology for the identified implementation capacity factors, by building on the most frequently appearing terminologies in the studied ca 500. policy documents and scientific articles and by consulting with two environmental policy experts from the studied regions about the list prior to the launch of the questionnaire. Nevertheless, it is important to consider whether the categorization and wording used to describe the implementation capacity

factors in the questionnaire influenced responses. Had the 58 implementation capacity factors been presented as a single list or using different categories, would the questionnaire respondents have prioritized different factors? Did the wording of the implementation themes or implementation capacity factors have an impact on which factors were prioritized? Did the respondents across the two regions and associated with different institutions have the same understanding of the different terminologies? Would the final list of 17 selected implementation capacity factors have been different if the respondents had filled out the questionnaire in a group setting, where prior to the selection, the list of implementation capacity factors is discussed with other participants to establish a common understanding of the terminologies used? Ideally, sample size mitigates the potential risks of differences in understanding, thus it can be suggested that the list of prioritized 17 implementation capacity factors would have remained relatively similar as a result of the quite large sample size. However, a fully satisfactory answer could only be given to these questions, if the questionnaire were repeated with the same factors but using different categorization, with somewhat modified wording or with answers being collected in a group setting and the outcomes are compared and evaluated against each other.

These observations also resonated with previous research findings concerning ontological considerations for SDIs. Although not specifically concerning capacities related to environmental goal implementation, research emphasized the importance of a common ontology for describing and structuring sustainability knowledge (Kumazawa et al. 2009) and assessing sustainability problems (Janssen et al. 2009). A common ontology developed for indicators was suggested to ensure more consistency in measurement and reduce ambiguities around the interpretation of results (Fox 2017). They also highlighted the importance of stakeholder consultations and the involvement of future users in the indicator development process (Guergour and Boufaida 2016). A more robust terminology could have been ensured for the implementation capacity factors and indicators if there were more opportunity and resources to discuss several iterations of the list of the implementation capacity factors with a larger group of stakeholders and/or with a group of indicator experts. Initially, the primary list of ca. 200 implementation capacity factors could have been consulted in order to identify the overlaps and potentially missing aspects, followed by stakeholder consultations to agree on how to categorize and cluster the factors. In the next stage, the wording of the

clustered 58 implementation capacity factors could have also been discussed in order to ensure a common understanding of terminologies used and thus create a common language prior to the prioritization exercise.

5. *A balanced optimum should be sought between the robustness of the assessment and resource requirements for the evaluation of environmental goal implementation capacities.*

One of the central aims of the dissertation research was to explore whether and how qualitative aspects of environmental governance capacities can be measured in a comprehensive and scientifically sound manner. Based on the questionnaire responses, 17 implementation capacity factors emerged as priority concerns for environmental goal implementation, and in stage 3 of the research, these 17 factors were translated into 15 implementation capacity indicator clusters and 81 indicators (see chapter 7.2 and 7.3).

It emerged from the document review and discussions with the questionnaire respondents that countries' implementation capacities may vary based on the issue and the assessment of goal implementation capacities should take such differences into consideration. Therefore, the implementation capacity indicators were proposed to measure the implementation capacities of countries for different environmental goals separately (see chapter 7.2, table 38). Although this approach will increase precision, it will also increase complexity because implementation capacities for different environmental goals would need to be assessed during the course of separate assessments processes (requiring the identification and the review of issue-specific document sources and/or the identification and the involvement of experts with knowledge on the specific environmental issues).

Concerning the evaluation of the indicators, our review of environmental governance indices (Almassy and Pinter 2018) concluded that the assessment of qualitative environmental governance aspects is usually based on expert opinions. However, initiatives that supported the assessments of the indicators with defining three or four distinctive variables and precise scoring usually had more robust results. Therefore, a decision was taken to break down the 15 implementation capacity indicator clusters

into 3-4 indicators per cluster and allow yes/somewhat/no answers, using "traffic light" type (green/yellow/red) scoring. The indicators scored the presence/partial presence or lack of given implementation capacities and therefore, their subjectivity and resource requirement for data collection was low. A four-point Likert-scale was also considered for scoring the indicators. While this could be more robust and avoid a convenient but often not particularly meaningful middle score, the evaluation of the indicators becomes more complex and would require more evaluators to counter-balance subjectivity.

For the pilot testing of the indicators, mixed data collection was used: likely answers to all indicators were sought in scientific articles, policy and assessment documents, news articles or websites and then any missing data was complemented with information from country experts. The experts were requested to review the answers identified in the document sources and to provide an evaluation for those questions for which no definite answers could be identified. The information collected from document sources was largely satisfactory when a straightforward yes or no answer could be assigned to a given capacity indicator. The evaluation however required further consultation with country experts if such a definite yes or no answers could not be identified in the reviewed documents. As shown in chapter 7.3, the majority of the indicators fell into this category and received a 0, 5 score. This also means that on a four-point Likert scale, evaluators would also need to choose between the two middle-values, which would increase the polarity of the answers as they would have to clearly declare what direction they are leaning, even if not strongly.

Therefore, the traffic-light based tri-level scoring would be sufficient for a rough evaluation. Due to the limited number of the allowed answers, the evaluation could remain reasonably comprehensive and the indicators could easily be assessed based on available documentation and with the involvement of a few evaluators. However, if the assessment requires a more nuanced understanding of the state of implementation capacity indicators and tracks their potential progress over time, using a four-point Likert scale would be advisable. While for many of the indicators a four point-scale would feasible, in some cases, the original indicators would need to be altered and focus more on the quality of the capacity rather than its presence/absence. As a result, answers to many indicators would need to rely more heavily on expert opinions.

The introduction of a Likert-scale based evaluation approach would also raise some additional methodological questions for data collection. Since the indicators would be less driven by the direct measurement of the existence/non-existence of a given capacity, the identification of the evaluators and their potential influence of the evaluation outcomes would play a stronger role. What experience would qualify them to become evaluators? How would their worldviews, beliefs and background potentially impact the assessment? To what extent would the results of the assessment for different countries and over time be comparable, supposing that the assessment is carried out by different evaluators? Ideally, to mitigate the impact of these factors, answers should be sought from a larger pool of experts; outliers in answers should be filtered out and major discrepancies should be evaluated against each other (Nardo et al. 2008). Practical details, such as cost, level of effort, and the number of evaluators sufficiently familiar with the various themes, would have to be kept in mind.

6. *The challenge in creating an implementation capacity index is not only to develop a methodologically sound tool, but to create one which would be useful and used for assessment and policy learning*

Transforming implementation capacity indicators into an index would require various statistical assessment steps (see chapter 7.4). The assessments would involve carrying out an extensive data collection for at least 20 different countries and performing statistical testing that can help construct a robust index (Saisana pers. comm. 2016). In turn, statistical testing would allow to refine the composition of the clusters, the list of indicators, the scoring methodology as well as to assign weights to the different components, indicator clusters and indicators (if differential weighting is used).

Of course, such process would require considerable resources, beyond the scope of the current project. But before even raising this question, one needs to consider whether it is absolutely necessary to create an index from the indicators or the indicators themselves could be sufficient for capacity assessment. Although the two approaches are not mutually exclusive, they would require a different approach to measurement, and the results would be presented and communicated differently. An index, with the aggregation of individual indicators into a single a number, is often preferred by decision-makers, while an indicator set can increase transparency and could support

users in pinpointing specific capacity problems and identify matching solutions. In the latter case, the evaluation could be presented as a matrix of the indicator values.

To make a decision, consideration should be also given to how the results of an assessment would be used. My study of similar environmental governance indices and discussions with indicator experts and questionnaire respondents also highlighted that the challenge is not only to create an instrument that can assess implementation capacities on a regular basis, but it is actually useful and useable. I suggest that the implementation capacity indicators or the STMI could be used to complement qualitative assessments of environmental performance reviews, state of the environment reports, or environmental policy implementation reports. The set of the implementation capacity indicators could also be used as a self-assessment tool, where users may be able to modify terminologies or even add or replace indicators. In this latter case, opportunities for aggregation and country comparison may be reduced, but decision-makers and policy practitioners could better tailor the indicator sets to their national contexts and evaluate the status and progress on various implementation capacity factors and use it as a policy-learning tool. Chapter 8.3. will discuss application opportunities in further detail.

Lastly, discussions around the applicability of indicator systems or an index should also consider the extent to which they could predict whether a country is likely to achieve environmental goals and to what extent external factors would influence their environmental performance. The next section is dedicated to discussing such drivers and barriers and offers some options to account for them.

8.2 Drivers and barriers of environmental goal implementation beyond governance

An inclusive and transparent policy environment has been shown to have a positive impact on environmental performance, but at the same time, the success of environmental goal implementation also depends on context-specific, socio-economic factors (Howes et al. 2017; Gallego-Álvarez and Fernández-Gómez 2016; Jabbour et al. 2012). During the follow-up discussions, some of the questionnaire respondents did emphasize that the success of implementation also depends on circumstances that go

beyond capacity aspects, such as widespread poverty, high unemployment rates, political or economic crises. The following subsection will provide an overview and examples of external factors emerging from the literature review, the document review, questionnaire responses and personal communications following the analysis of the questionnaires. It will also discuss potential solutions to address external factors during the assessment of environmental goal implementation capacities.

8.2.1 Economic factors

It emerged from the research that the economic situation of a country has a major influence on how environmental goal implementation is approached. Economic factors are recognized to have both positive and negative impacts of environmental goal implementation capacities, but a lot depends on the political environment of a country and the priority it assigns to the environment. General economic and structural poverty problems can be tied to low implementation capacity, but uncontrolled economic growth without the introduction of a strong regulatory framework for environmental protection will only result in further degradation of environmental conditions.

Deterioration of the environment was often seen as a 'necessary' and thus acceptable consequence of economic and industrial development (Nazaj 2014; Weiland 2010). For instance, in Albania, the economic transition to the market economy was suggested to severely impact the forest resources of the country (Nehat and Shehu 2013; UN Albania 2005). The Philippines adopted GHG emissions reduction targets early-on, while simultaneously, it also launched projects to increase coal-based power generation (Solis 2005). In Myanmar and Cambodia, the negative environmental consequences of foreign investments into mining and damn projects were also noted (Kattelus et al. 2014; Poffenberger 2009). Economic priorities were also seen to potentially undermine environmental capacity development efforts, such as the implementation of the SEA Directive in Turkey (Unalan 2009).

Less developed countries also faced difficulties in environmental goal implementation, which are directly linked to a lower level of economic development or poverty (Nadic 2011). In the Lao PDR, it was noted that while poor people have high dependency on natural resources, socio-economic inequalities can impair their access to them (Lao PDR 2012; Lao PDR, Government and UN 2008). Similar observations were also made

in Albania (Metaj 2009). Economic downturns were also suggested to undermine environmental protection efforts (Rajovic and Bulatovic 2015). For instance, the 2008-2009 financial crisis slowed down the economic development of the Western Balkan countries and negatively impacted national budgets for environmental goal implementation e.g. environmental education activities in Serbia (Stanisic and Maksic 2014).

8.2.2 Political environment

While political commitment was selected by almost 80% of all respondents as a crucial implementation capacity factor, some suggested that conflicting political interests can be one of the largest implementation barriers. During follow-up conversations, some respondents also suggested that short-term political interests often disregard or overwrite environmental protection/sustainability needs and mentioned examples. For instance, the designation of Natura 2000 areas was often politicized due to the economic interest of public and private actors or resistance by citizens (Sotirov 2015). In Vietnam, some rural water management projects were found to be planned and designed according to the economic interest of government officials (Reis and Mollinga 2015). In Thailand, the introduction of wastewater fees was hampered by political interests due to the perceived low willingness of beneficiaries to pay (Simachaya 2009). Similar observations were made about climate change mitigation objectives: it was suggested that political inaction was often the result of (perceived) low public interest (Chomaitong and Perera 2014).

Governance structure was also suggested to influence the outcomes of goal implementation efforts (Taylor 2015). In Bosnia-Herzegovina, the institutional capacities of the national government are restricted, since some of the government functions are directly assigned to different autonomous entities, the Federation of Bosnia and Herzegovina and the Republik Srpska, as well as the local government Brcko District, respectively. Due to a fragmented governance structure, country-wide coordination on environmental goal setting and implementation is complicated and often limited (BiH, Ministry of Finance and Treasury and the UN CT 2013; BiH, Council of Ministers 2013)

Sacrificing environmental priorities for short term political interests may also be a limiting factor. In Indonesia, opportunities for afforestation program implementation were hindered by the need to secure support from coalition parties (Luttrell et al. 2014) In Vietnam, a political culture of limited transparency and weak stakeholder involvement was suggested to negatively affect the implementation of water supply projects in rural areas (Reis 2015). Political antagonisms turning into political crises can be especially detrimental for institutional infrastructures related to the environment, as it was documented in the case of Thailand (Marks 2011).

Historical factors may also contribute to the status and wielding of institutional capacity. The rule of the Khmer regime in Cambodia and the Indonesian occupation in Timor-Leste had long-lasting effects on the infrastructural and governance capacities of the country, which in turn also negatively affected national competencies for environmental policy implementation (Chong 2014). In Indonesia, public participation practices had been long limited due to a strong centralization of power until 1998 (Fleischman et al. 2014). The capacities of Albania and Croatia to transition to sustainable forest management were also shaped by historical forest governance approaches i.e., community versus state-governed management practices in the past (Weiland 2010). Armenia, after gaining independence, the country lost its forest education system (Sayadnay and Moreno-Sanchez 2006).

On a more positive note, external/supranational governance initiatives, such as the EU accession and the ASEAN, were also highlighted as important political drivers of environmental goal setting and implementation activities (Todic and Dusko 2014; Lao PDR, MoNRE 2013; Moldova, MoE 2013; UNECE 2011a; Soljan 2011; Malaysia, MoNRE 2009). At the same time, the real impact of these initiatives can be questioned: for instance, pressured by the European Union, Turkey signed the Kyoto protocol, but did not adhere to it (Erdogdu 2011) and in Bulgaria sustainability considerations for forest policies were mainly included in policy documents to fulfill EU and donor expectations, without resulting in real policy changes and presumably changes on the ground (Winkel and Sotirov 2011).

8.2.3 Technological factors

In some cases, the slow uptake of necessary technologies (or limited access) to promote environmental sustainability or green(er) economic development was also seen as a factor that goes beyond national implementation capacities. For example, Turkey, in its fifth National Communication to the CBD, suggested that concerning biodiversity protection *"there is no technology transfer in place to support research and development fitting to the country's needs"* (Turkey, Ministry of Forestry And Water Affairs 2014, 36). Technological restrictions (due to the high prices of newer and greener technologies) and limited technical expertise on these technologies were also outlined (Indonesia, MoE 2010). In other cases, infrastructural development or lack of infrastructure development affected environmental protection efforts negatively (Rajovic and Bulatovic 2015).

8.2.4 Accounting for external factors

This research recognizes that an implementation capacity indicator set (or index) cannot directly account for all external circumstances shaped by a variety of political and economic conditions. Accounting for these, e.g. with the development of a general score that shows whether a factor impacts goal implementation either positively or negatively, would be challenging because influencing circumstances may depend largely on the country context. Therefore, its results should be considered with a certain degree of scrutiny and interpreted within the specific socio-economic context and trends of the analyzed country.

Alternatively, using the set of implementation capacity indicators, the development of a more complex modeling framework could also be considered. Such a framework could include capacity trends, while also taking into account different external circumstances, which seem influential in a given country context. Taken forward the importance of stakeholder involvement in the index development process, as outlined in chapter 8.1, such an assessment of external influencing factors could also be part of discussions with the prospective users of the indicator set or the index.

8.3 Environmental goal implementation capacity indicators to support the operationalization of the environment-related SDGs

As suggested in chapter 8.1, a set of implementation capacity indicators or the STMI developed from the indicators could be used in different ways. First, as a quick assessment tool, it can roughly evaluate countries' preparedness to implement various environmental SDGs. Such assessment could be part of environmental goal implementation reports; the UNFCCC or the CBD country submissions; national state of the environment reports or environmental performance reviews, e.g. of UNECE and OECD. They could also be part of the voluntary national reviews of countries concerning their SDG implementation activities or the global sustainable development reporting initiative of the UN. As an added value, it could complement qualitative assessments of environmental policy and goal implementation efforts and provide a synthesis of these assessment reports structured around capacity aspects of implementation. Thus, the results would enable the developers of these assessments to highlight areas of strengths as well as capacity gaps for the implementation of specific goals or across different environmental SDGs and deliver a concise and quantified summary of these issues to decision- and policymakers. Data collection to evaluate the indicators would be also rather time and resource-efficient, since the information required to evaluate the implementation capacity indicators could be collected during the preparation process of the reports. The assessment could also be carried out at the sub-national level to evaluate (and potentially compare) the capacities of cities or regional/provincial governments to implement environmental SDGs or (with some revisions) as part of corporate sustainability reporting activities.

The set of implementation capacity indicators could also be used to support a more elaborated self-assessment of countries (or sub-national entities) to comprehensively evaluate their institutions and capacities to implement environmental goals (similar to the NCSA efforts of UNDP). This evaluation would allow a more nuanced evaluation (e.g. on a four-point Likert scale) and thus provide more specific details for capacity assessment as well as would support a more in-depth policy learning. The evaluation would require the involvement of future users in the assessment process: potentially from the selection of the indicators that will be evaluated throughout the actual

assessments of the indicators until the review of the results. Therefore, this evaluation would be also more time and resource-consuming compared to the first mode.

Concerning policy learning, our earlier research on environmental governance indicators highlighted that the process of data collection itself might have an important function, as new type of information is being collected, often with the involvement of stakeholders (Almassy and Pinter 2018). The involvement of users in the evaluation process can be an important value added in the assessment process, as it can enable decision-makers and policy practitioners to take a more system-oriented approach towards environmental goal implementation and associated capacities, discuss capacity needs within and among implementing institutions and other stakeholders as well as to comprehensively understand where the main the implementation capacity gaps occur.

To improve the usefulness of the implementation capacity indicators set or the STMI, it would be important to update the evaluations. Regular data collection could support monitoring progress towards addressing capacity gaps; support users in critically re-assessing their capacity needs and constraints and implement necessary policy and institutional changes. In the first case, when a rough evaluation is carried out as part of environmental goal implementation reports, the update of indicators could be tied to the submission of national communications or the preparations of environmental performance review updates. In the second case, updates to the indicators would require more efforts, but it would allow countries to reconsider previous indicator choices, measurement methodologies as well as to discuss and review progress on selected capacity indicators together with institutions and other stakeholders involved in implementation. Lastly, opportunities for cross-country comparison could be considered. International organizations or think-tanks could compile such assessments of implementation capacity indicators for multiple countries. Data collection could be carried out via computer-program supported document reviews (see 7.4.1), and results could be verified and completed when necessary via consultation with researchers and policy practitioners of the evaluated countries. At the same time, comparability of goal implementation capacities may be hampered by specific political and socio-economic conditions (as presented in 8.2) and therefore the interpretation of the results would need to be handled with a certain degree of caution.

Chapter 9 Conclusions

The thesis research was centered around the capacity dimensions of environmental SDG implementation. Experience with MDGs has shown that environmental goals are often not implemented sufficiently, and among other factors, the lack of adequate implementation capacity was one of the reasons (see chapter 2.2.2). Therefore, as countries are getting engaged in the implementation of SDGs, it can be very important to assess whether implementation capacities are adequate and if they are not, in what dimensions can they be improved (UN Environment 2019; Wu et al. 2018; Howes et al. 2017).

The main research question of the thesis aimed at investigating how global environmental goals are formulated, implemented and monitored at the national level – with the aim to use the lessons learnt to support national implementation of the environment-related SDGs. Through studying environmental goal setting and implementation practices related to the earlier MDG 7 targets, the research identified a set of implementation capacity indicators and possibilities for the eventual construction of a composite implementation capacity index. The research hypothesized that a set of methodologically robust implementation capacity indicators (and their composite) could support the assessment of governments' ability to implement environmental goals and thus, facilitate high-level analysis and comparison of countries' readiness to implement environmental SDGs. As a conceptual framework for the research, policy implementation theory and the concept of state capacity were applied. The research was conducted in three stages and identified 81 indicators in 15 indicator clusters that are suggested to comprehensively cover major environmental goal implementation capacity aspects, with primary emphasis on developing economies. The research also put forward a set of considerations for translating the indicators into an implementation capacity index (chapter 7.4 and 8).

The following sections will summarize the theoretical and practical contribution of this research as well as discuss potential future research directions.

9.1 Theoretical contribution

At the theoretical level, the research aimed at contributing to measure qualitative aspects of environmental goal implementation in a way that is comprehensive and scientifically sound. The starting hypothesis of the research suggested that state capacity is important in promoting better environmental outcomes and having robust implementation capacity indicators (and potentially their composite index) may have several benefits for decision-making and policy learning. In order to examine this hypothesis, the state-of-the-art literature on the intersection of environmental policy and goal implementation, capacity measurement and the construction of aggregate indices related to environmental governance was consulted. Moreover, the identification of the implementation capacity factors was built on a strong-evidence base emerging from a large pool of literature and policy documents and the selection of the priority implementation capacity factors was carried out with the involvement of potential future users. The research also attempted to follow best practice methodological guidelines during the development process of the indicators by building on the ten-step methodological recommendation of the OECD Composite Indicators Handbook (Nardo et al. 2018).

The research confirmed that progress towards environmental goals could often be linked to increased implementation efforts by governments; thus, state capacities do have a potentially important role in achieving the environment-related SDGs. The research also showed that constructing a methodologically-sound implementation capacity indicator set, based on a strong evidence-base and informed by the preferences of future users is possible. At the same time, it recognized that country contexts will influence environmental goal implementation processes and outcomes and there are also various external circumstances shaped by a variety of political and economic conditions that influence countries' willingness and ability to implement environmental goals. Nevertheless, the research suggests that countries' readiness to advance the implementation of environmental SDGs can be accelerated by offering a systematic overview of implementation capacity status and needs. Once recognized, documented and publicized, those needs and gaps can be more systematically addressed, not only by governments but also by other actors interested in environmental goal attainment. Such an assessment could also encourage countries to put more emphasis on monitoring

the outcomes of their policies and their goal implementation efforts and to use the lessons learnt during these review processes when developing a new strategy or planning for a new implementation phase. Lastly, the research also suggested that the time and resource needs of such assessments might be significantly reduced through the use of big data (see chapter 9.3)

The research also suggested that consideration should be given to the level of complexity in the interest of a robust capacity assessment without hampering its applicability in practice. The development process cannot be planned fully in advance and many of the methodological decisions should be made during the process. It was also concluded that for the sake of transparency and for ensuring stronger ownership of indices or indicator sets, indicator selection and index design should involve future users. Indices usually aim to foster policy learning by presenting the results to policy practitioners and decision-makers. However, indicator selection and index design itself could become an essential part of the learning process. In this regard, it is worth considering whether the set of disaggregated indicators or an aggregate index has more utility for potential users. The former can provide opportunities for "*quantitative storytelling"* (Saltelli and Giampietro 2017, 62.) as well as allow users to adjust individual indicators to national contexts and potentially to take external circumstances into consideration. While a single aggregate is easier to communicate, it may hide key details that are important for putting in place targeted and adequate implementation measures to meet environmental targets.

9.2 Practical contributions

Based on the empirical research about the MDG7 experience of 20 Southeast Asian and European countries, a large inventory of environmental goal implementation capacity aspects was identified in the research (see chapter 5 and 6). These aspects helped to systematically approach, better understand and address the implementation capacity requirements of environmental SDGs both in the studied regions but also beyond.

The research confirmed that the formulation of environmental goals can help focusing on environmental problems, especially if goals are also tied to quantified and time-bound targets. The environmental issues brought forward by the MDG7 targets (water,

energy, forest and biodiversity protection) started to be integrated into national planning frameworks by the mid-2000s and countries launched more comprehensive strategic and institutional frameworks to tackle them. In Southeast Asia, expectations of international donors to address environmental problems also increased countries' motivation, while in Southeast Europe, environmental policy development was driven by EU integration.

The research also showed that countries faced several challenges to implementation, many of which can be related to the capacities of government institutions. Accelerated progress on environmental issues could often be linked to increased government efforts to plan, enforce and monitor implementation. The most important capacity aspects that emerged from the research include the ability of governments to implement or enforce environmental laws; to provide sufficient funding and incentives for environmental issues; to clearly define allocation of implementation responsibilities and coordinate institutional efforts and to secure a broader societal support to environmental goal implementation via strong political commitment, education of citizens and involvement of stakeholders in decision-making (see chapter 6.12).

At the same time, the research also highlighted that governments usually prioritized environmental issues, which could be more strongly linked to socio-economic priorities. Moreover, environmental goal implementation was often hampered by political and economic circumstances, which were beyond capacity issues.

From a methodological point of view, the development of the implementation capacity indicators focused on securing a strong evidence-base, starting with an extensive document review that covered both the academic and grey literature. The selection process of priority implementation capacity factors (which eventually formed the basis of the indicators) was also informed by stakeholder responses to a questionnaire. The research also highlighted that in order to formulate an implementation capacity index (the STMI) from the proposed capacity indicators, various methodological steps are to be carried out in order to ensure the overall robustness of the constructed index. However, to undertake such statistical calculations, a relatively large sample of at least 20 countries would be required and data collection for such a large sample was beyond the possibilities of this research. Nevertheless, the research put forward a set of

propositions about how the implementation capacity index can be developed further (see chapter 7.4) and reflected on potential challenges during the construction process (see chapter 8.1).

Concerning the application of the developed indicators (and eventually the constructed STMI), two alternate modes emerged from the research. First, as a quick assessment tool, it could roughly evaluate countries' preparedness to implement various environmental SDGs as part of global sustainable development reports, environmental goal implementation reports and provide a synthesis of these reports structured around capacity aspects of implementation. Secondly, the set of implementation capacity indicators could also be used to support a more nuanced self-assessment of countries to comprehensively evaluate their institutions and capacities to implement environmental and deliver a concise and quantified summary of these issues to decision- and policymakers. Data collection (also to ensure regular updates) would be more time and resource-efficient in the first case and would require the involvement of future users in the assessment process in the second case. Lastly, cross-country comparisons could be considered if the results are handled with a certain degree of caution.

9.3 Future research directions

Future research ideas emerging in connection with this dissertation research may include improvements to the definition of what capacity dimensions are worth monitoring and how the method of their measurements can be finetuned; exploring the feasibility of the construction of an actual index from the defined indicators; the exploration of innovative data collection methodologies, which can enable the evaluation of the implementation capacity indicators in a resource-efficient way and thus support their potential transformation into an implementation capacity index; the establishment of credible baselines; studying the modality and the conditions for using the indicators or the STMI (also in subnational contexts or potentially for corporate sustainability reporting of multinational enterprises); and collecting lessons learnt from applying the indicators (or an index) on the effectiveness of capacity development and ultimately the effectiveness of environmental goal and target implementation.

With regard to innovative data collection methodologies, it emerged from the research that a machine learning-based document review methodology could be developed and tested to identify and later evaluate potential capacity indicators. This would include the development of an algorithm to identify relevant secondary sources for analysis, the extraction of relevant information from the sources based on pre-defined keywords as well as an initial analysis of the existence or non-existence of implementation capacity aspects in the identified documents. Secondly, participatory data collection methods could also be explored, and indicators can be assessed with the involvement of future users of the STMI. This could be done through the establishment of a website where policy practitioners and researchers provide an initial evaluation of the indicators and supporting information sources. The results would become more robust over time, as different countries and their environmental goal implementation capacities (concerning various issues) are evaluated by an increasing number of country experts. Of course, both approaches would require the introduction of a validation process: expert reviews in the first case and document or reference reviews in the second.

Ultimately, this research suggests that the aim of assessing environmental goal implementation capacities is to enable policy and decision-makers, policy practitioners and other involved stakeholders to understand the importance of and learn about state capacities as enablers of environmental goal implementation; to support the systematic mapping of crucial aspects of implementation as well as to identify capacity gaps and improvement needs. This research has put forward a methodology that could enhance policy learning for improving environmental goal implementation capacities, while also identified applicability, utility and use of capacity indicators as topics worthy of further research.

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Annex 1: MDG7 progress between 2000-2015 in the studied countries

This annex provides a general overview of the studied countries' progress towards on the selected MDG7 targets between 2000 and 2015, the MDG implementation period. As discussed in chapter 4.1, the research focused MDG7 targets where progress at the country-level was measurable (measurement methodologies for the indicators were set and data was collected regularly). Out of the ten MDG7 indicators, six fulfilled these criteria. See Table 59.

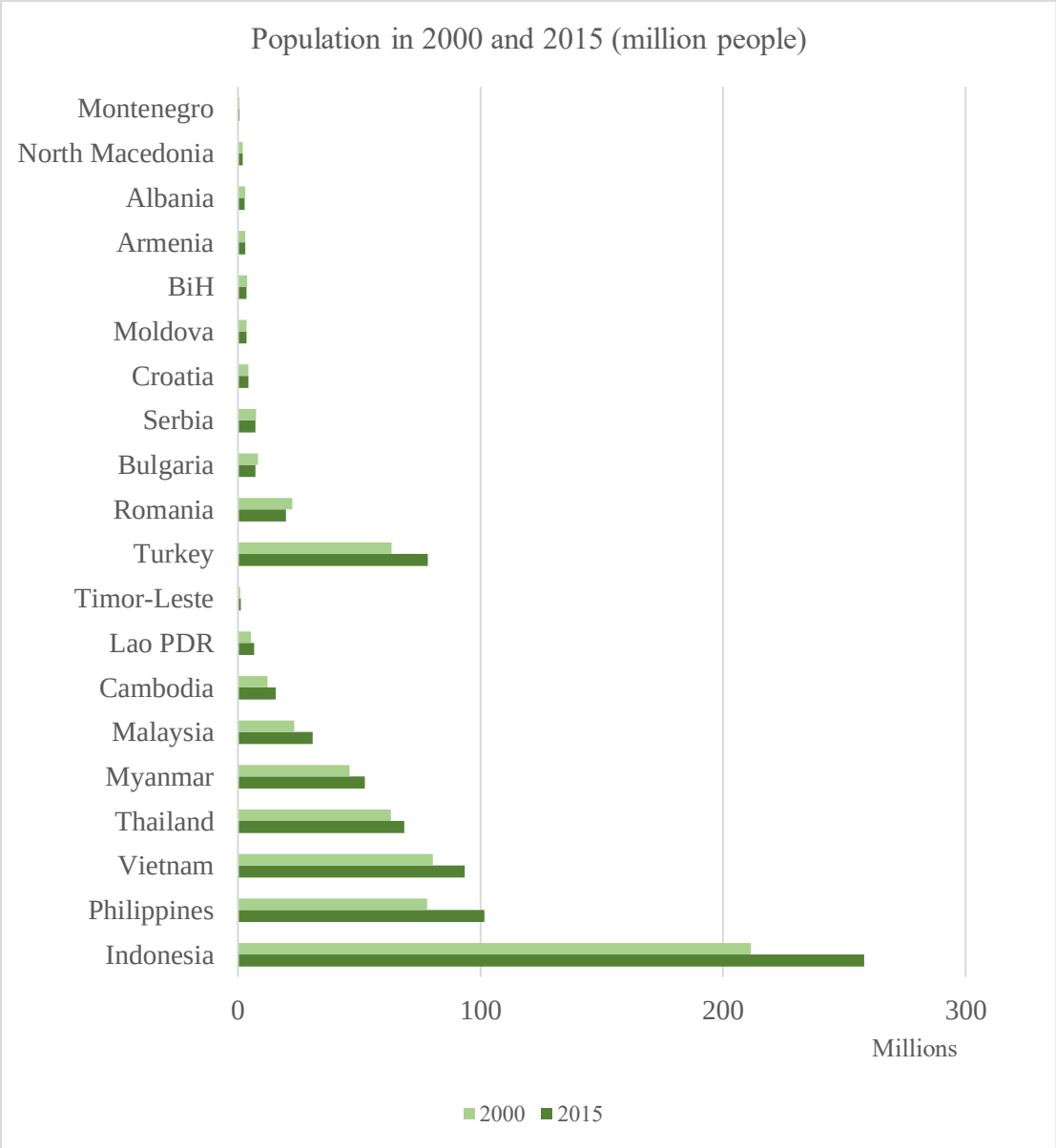
Table 60: Overview of the MDG7 targets, indicators and related MEAs

MDG targets	MDG7 Indicators	Related Protocol	*Included in the research*
Target 7. A	Land area covered by forest	*CBD*	*X*
	CO2 emissions	*Kyoto Protocol*	*X*
	Consumption of ozone-depleting substances	*Montreal Protocol*	*X*
	Fish stocks within safe biological limits	*CBD*	
	Total water resources used	*n.a.*	
Target 7. B	Terrestrial and marine areas protected	*CBD*	*X*
	Species threatened with extinction	*CBD*	
Target 7.C	Population using an improved drinking water source	*n.a.*	*X*
	Proportion of population using an improved sanitation facility	*n.a.*	*X*
Target 7. D	Proportion of urban population living in slums	*n.a.*	

Source: Based on (UN 2015)

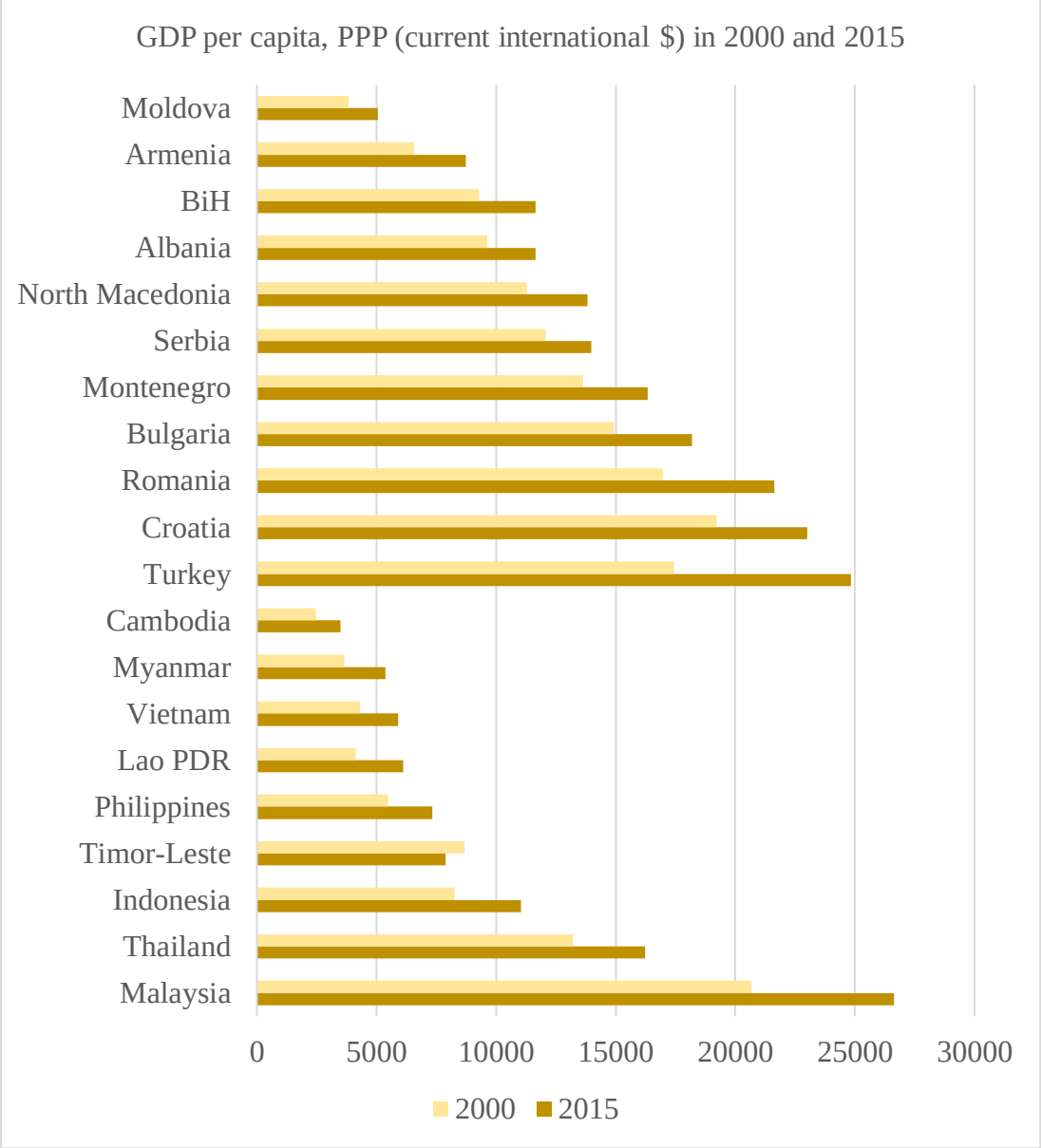
For the purposes of the research, 20 countries were selected from the Southeast Asian and the Southeastern European regions. As presented in the following section, these countries represented different income-levels and population sizes as well as demonstrated high or low performances across the selected MDG 7 issues. For the calculations, the latest available statistics were used from United Nations and World Bank databases (as of March 31 of 2019).

Population size and income-levels of the studied countries



Data source: World Bank (www.data.worldbank.org) 2019

Figure 20: Population trends of the studied countries between 2000 and 2015

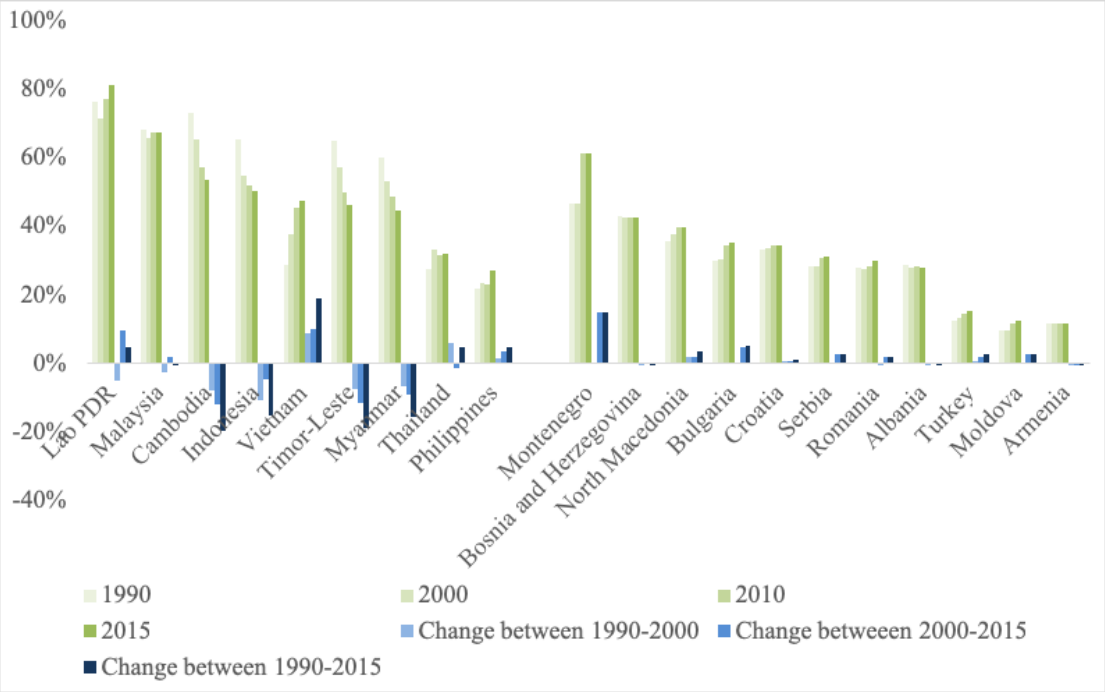


Data source: World Bank (www.data.worldbank.org) 2019

Figure 21: GDP per capita trends of the studied countries between 2000 and 2015

Proportion of land area covered by forest

The absolute change in forest cover at the global level between 1990-2015 was 1% (World Bank 2019). However, deforestation has somewhat slowed down after 2000: the annual forest loss has decreased from 8.3 million hectares in the 1990s to an average 5,2 million hectares after 2000 (UN 2015). The studied countries in the two regions however showed more diverse trends in forest area changes during the same period.

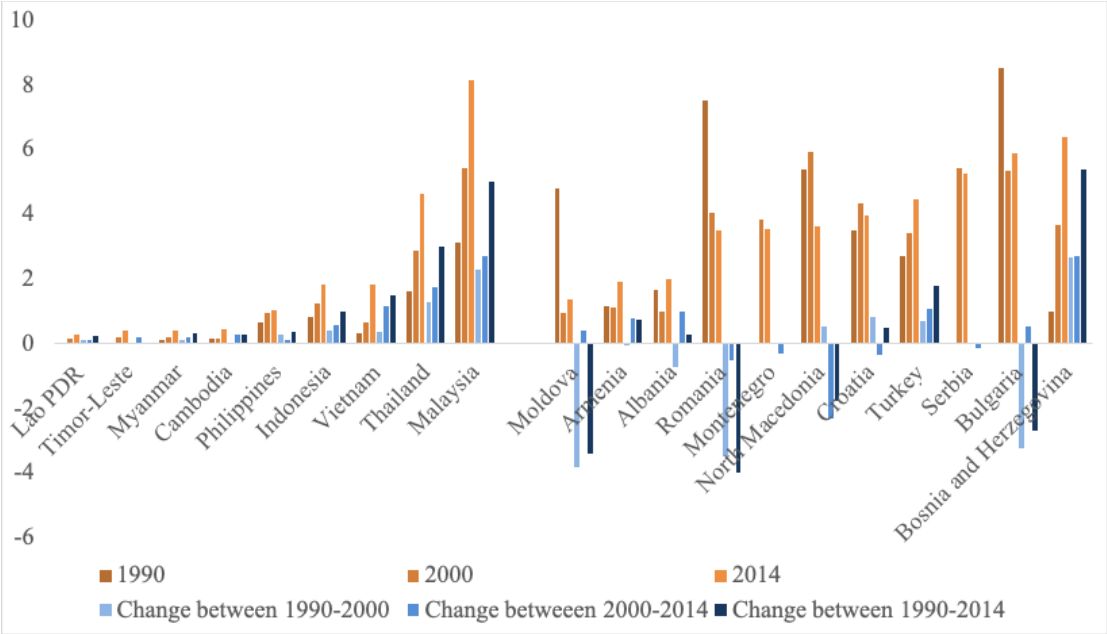


Source: Calculations based on World Bank 2019 and United Nations Statistics Division 2016

Figure 22: Change in the proportion of land area covered by forest, in percentage, between 1990 and 2015

CO2 emissions

Between 1990 and 2012, the world has experienced a 50% CO2 emissions increase, mostly as a result of increased emissions in developing countries (UN 2015). As a result, the per capita emissions of developing countries have also been rapidly increasing during the studied period (from 1.66 tones/person/year in 1990 to 3.5 tons/person/year in 2014), although this still remained well below the per capita CO2 emissions of developed countries (10.9 tons/person/year in 2010) (World Bank 2019; Pinter et al. 2015b). The trends in the studied countries are presented in Figure 23.



Source: Calculations based on World Bank 2019 and United Nations Statistics Division 2016 Data for the year 1990 for Armenia, Bosnia, Croatia, Macedonia and Moldova are from 1992, data for the year 2000 for Timor-Leste are from 2002 and for Montenegro and Serbia are from 2006

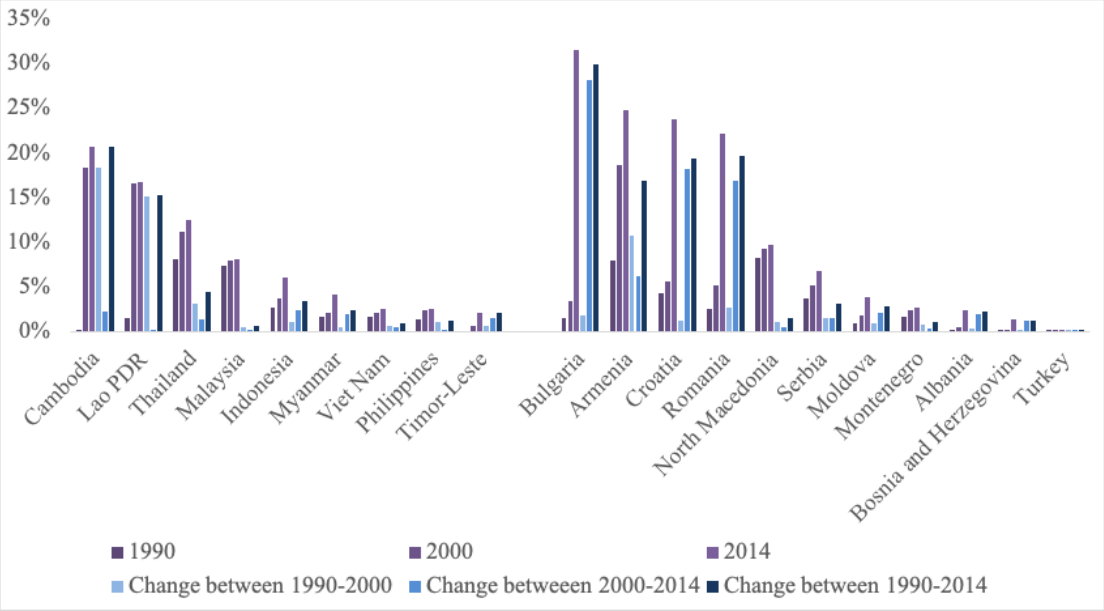
*Figure 23: Carbon dioxide emissions metric tons of CO2 per capita (CDIAC) in the studied countries, between 1990 and 2014**

Reductions of Ozone-Depleting Substances

In line with their commitments of the Vienna Convention and Montreal Protocol – most of the studied countries have phased-out or significantly decreased the use ODS during the studied period. However, according to the latest statistics Turkey, Indonesia, Thailand, Malaysia and the Philippines have not yet achieved full-phasing out as their ODS emissions varied between 136 – 863 ODP metric tons in 2013. (UN SD 2016).

Terrestrial and marine protected areas

At the global level, terrestrial and marine protected areas have almost doubled between 1990 and 2014: from 8,7% in 1990 to 11.3% in 2000 and up to 15,2% in 2014 (UN 2015). Compared to the global average, some of the studied countries have shown an even higher percentage of increase. At the same time, other studied countries still had less then 10% of protected area coverage in 2014. See Figure 24.



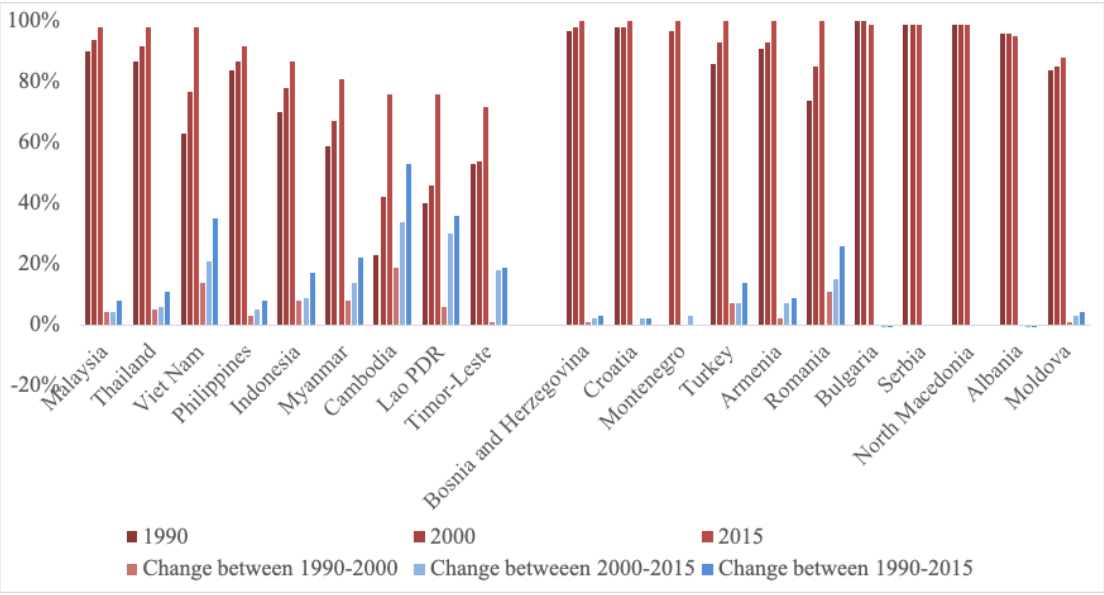
Source: Calculations based on United Nations Statistics Division 2016

** For some countries, the national data reported may differ*

*Figure 24: Absolute improvement terrestrial and marine protected areas in the studied countries in percentage between 1990-2014**

People with access to clean drinking water and improved sanitation.

The access of population to clean drinking water at the global level increased to from 76% to 91% between 1990 and 2015, reaching the global target of 90% (UN 2015). The overall progress on this target in the studied countries is presented in Figure 25.

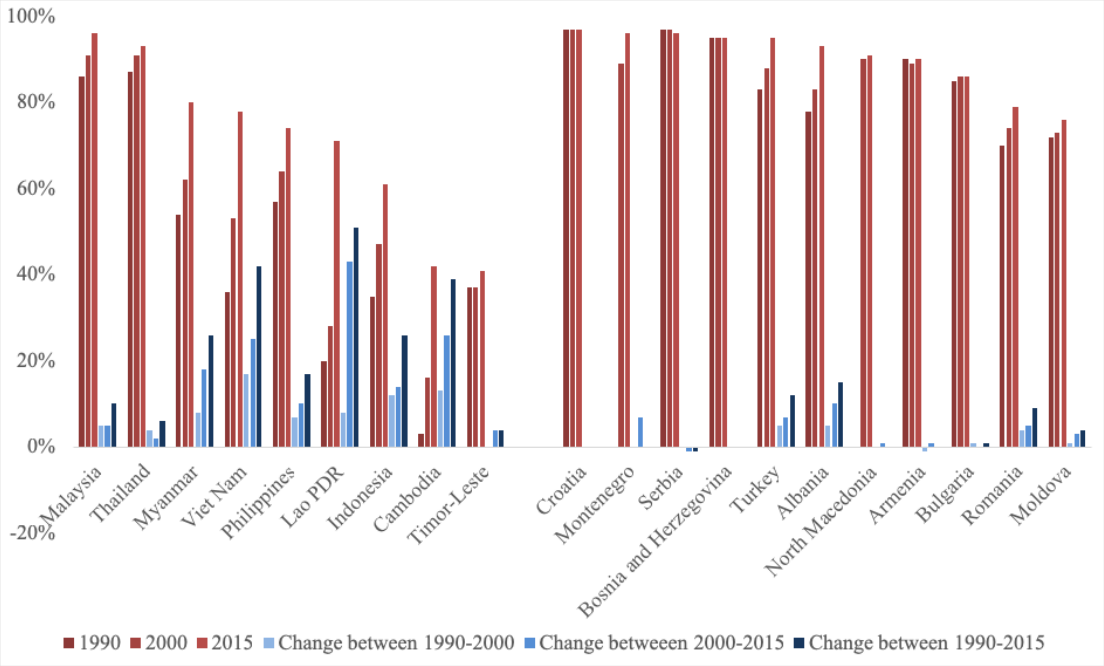


Source: Calculations based on the United Nations Statistics Division 2016

** 1990 figures for Albania and for Lao PDR are from 1994, for Armenia and for Moldova from 1992 and for Timor-Leste 1995 instead 1990*

Figure 25: Proportion of the population using improved drinking water sources in the studied countries, in percentage, between 1990 and 2015

Similar to access to drinking water, the percentage of people with access to improved sanitation has increased: from 54% to 68% between 1990 and 2015 (UN 2015). At the global level, this means that the progress was insufficient and the global target of 78% has not been reached. Trends in the studied countries are shown in Figure 26.



Source: Calculations based on the United Nations Statistics Division 2016

** 1990 figures for Myanmar are from 1991, for Armenia and for Moldova are from 1992, for Bosnia-Herzegovina and Lao PDR are from 1994 and for Timor-Leste are from 1996.*

Figure 26: Proportion of the population with access to improved sanitation in the studied countries, in percentage, between 1990 and 2015

Summary of overall trends and progress

Progress towards MDG7 targets showed a mixed picture in the studied countries. The established global targets concerning access to drinking water (target 7.8) and sanitation (target 7.9) were reached or exceeded in almost all of the studied European countries, but the majority of the studied Asian countries have progress towards but have not achieved these by 2015. See Table 61.

Except five of the studied countries, all others have successfully phased-out of using ODS, thus reaching target 7.3. When adopted the MDGs, no quantified targets were set for the issues of Target 1 of MDG7, including 7.1. the proportion of land area covered by forests, 7.2 carbon dioxide emissions and 7.6. the percentage of protected areas to total territorial. As shown in Table 61, during the studied period, deforestation continued in many of the studied Asian countries, but forest areas increased somewhat in most of the studied European countries – although many of these already had a relatively low level of forest cover in the 1990s. The CO2 emissions per capita values increased in the majority of the studied countries but in many of them remained below the global average of 4,98 mt per capita in 2014 (World Bank 2019). The percentage of protected areas to total territorial area increased during the MDG implementation period, however, the protected area coverages often did not reach the global average of 15,2% in 2014 (UN 2015).

Table 61: Status of the MDG7 indicators in the studied countries (cells in red indicate performances below the target/global average)

	7.1 Proportion of land area covered by forests *	**7.2 Carbon dioxide emissions metric tons of CO2 per capita ****	**7.3. Consumption of all Ozone-Depleting Substances in ODP metric tons*****	**7.6. Terrestrial and marine areas protected to total territorial area, percentage***	**7.8. Proportion of the population using improved drinking water sources, total*****	**7.9 Proportion of the population using improved sanitation facilities, total*****
	2015	***2014***	***2013***	***2015***	***2015***	***2015***
Southeast Asia						
Cambodia	53,57%	0,44	9,5	20,61%	76%	42,0%
Indonesia	50,24%	1,82	310,5	6,01%	87%	61,0%
Lao PDR	81,29%	0,29	1,6	16,66%	76%	71,0%
Malaysia	67,55%	8,13	449,9	8,04%	98%	96,0%
Myanmar	44,47%	0,41	3	4,07%	81%	80,0%
Philippines	26,96%	1,05	136,7	2,44%	92%	74,0%
Thailand	32,10%	4,62	863,3	12,49%	98%	93,0%
Timor-Leste	46,13%	0,40	0,3	2,09%	72%	41,0%
Vietnam	47,64%	1,82	4,2	2,54%	98%	78,0%
Southeast Europe						
Albania	28,16%	1,98	5,7	2,34%	95%	93,0%
Armenia	11,66%	1,90	4,5	24,75%	100%	90,0%
BiH	42,68%	6,38	5,1	1,28%	100%	95,0%

Bulgaria	35,22%	5,87	0	31,46%	99%	86,0%
Croatia	34,35%	3,97	0	23,69%	100%	97,0%
Moldova	12,44%	1,39	0,8	3,82%	88%	76,0%
Montenegro	61,49%	3,56	1	2,69%	100%	96,0%
North Macedonia	39,57%	3,61	0	9,70%	99%	91,0%
Romania	29,82%	3,52	8,1	22,09%	100%	79,0%
Serbia	31,10%	5,28	0,7	6,76%	99%	96,0%
Turkey	15,22%	4,48	147	0,23%	100%	95,0%

* Cells in red are below (worse) the global average of the respective indicator

** Cells in red are above (worse) the global averages of the respective indicators

*** Cell in red mark countries, which have not reached the global target

Data source: World Bank 2019; UN SD 2016. UN 2015

Research suggested that when evaluating the progress towards the MDG target, it should be also examined whether, compared to previous periods, the progress towards set targets have been accelerated during the MDG implementation period (Fukuda-Parr and Greenstein 2010). As presented above., many of the studied countries showed negative trends concerning target 7.1. and 7.2., although both the deforestation rates and the increase in the CO2 emission per capita rates have slowed down during the MDG implementation period compared to the period of 1990-2000. For the other MDG7 targets, most countries reached certain level of progress. At the same time, this progress does not necessarily happen at an increased rate (see cells in yellow in Table 62). Especially in case of target 7.6., the designation of protected areas slowed down during the 2000-2015 period. Progress towards target 7.8 and 7.9 was also slower during the MDG implementation period, although in many (but not in all) cases this happened when access to water was close to 100% and access to sanitation was above 90%.

Table 62: Annual progress rate towards the MDG7 indicators in the studied countries between 1990-2000 and during the MDG implementation period

Cells in red: negative trends; Cells in green: accelerated progress during the MDG implementation period; Cell in yellow: slower progress during the MDG implementation period, compared to progress in previous period (1990-2000)

	7.1 Proportion of land area covered by forests		**7.2 Carbon dioxide emissions metric tons of CO2 per capita (CDIAC)**		**7.3. Consumption of all Ozone-Depleting Substances in ODP metric tons**		**7.6. Terrestrial and marine areas protected to total territorial area, percentage**		**7.8. Proportion of the population using improved drinking water sources, total**		**7.9 Proportion of the population using improved sanitation facilities, total**	
Annual changes	1990-2000	2000-2015	1990-2000	2000-2014	1990-2000	2000-2013	1990-2000	2000-2015	1990-2000	2000-2015	1990-2000	2000-2015
Southeast Asia												
Cambodia	-0,79%	-0,79%	0,00	0,02	9,70	-5,83	1,83%	0,15%	1,90%	2,27%	1,3%	1,7%
Indonesia	-1,06%	-0,31%	0,04	0,04	545,12	-342,71	0,11%	0,15%	0,80%	0,60%	1,2%	0,9%
Lao PDR	-0,48%	0,65%	0,01	0,01	4,52	-2,91	1,51%	0,00%	0,60%	2,00%	0,8%	2,9%
Malaysia	-0,24%	0,12%	0,23	0,18	-175,87	-132,34	0,05%	0,01%	0,40%	0,27%	0,5%	0,3%
Myanmar	-0,67%	-0,59%	0,01	0,01	2,66	-1,57	0,04%	0,13%	0,80%	0,93%	0,8%	1,2%
Philippines	0,16%	0,23%	0,03	0,01	-41,29	-195,17	0,11%	0,00%	0,30%	0,33%	0,7%	0,7%
Thailand	0,59%	-0,08%	0,13	0,12	-187,96	-282,75	0,31%	0,09%	0,50%	0,40%	0,4%	0,1%
Timor-Leste	-0,75%	-0,75%	0,00	0,01	2,16	-1,42	0,06%	0,10%	0,10%	1,20%	0,0%	0,3%
Vietnam	0,89%	0,66%	0,04	0,08	-12,16	-1,29	0,05%	0,03%	1,40%	1,40%	1,7%	1,7%
Southeast Europe												
Albania	-0,07%	0,01%	-0,07	0,07	6,51	-3,96	0,03%	0,12%	0,00%	-0,07%	0,5%	0,7%
Armenia	-0,01%	0,00%	0,00	0,05	2,57	-1,41	1,07%	0,41%	0,20%	0,47%	-0,1%	0,1%
BiH	-0,05%	0,00%	0,27	0,18	17,10	-11,99	0,00%	0,08%	0,10%	0,13%	0,0%	0,0%
Bulgaria	0,04%	0,31%	-0,32	0,04	-233,39	-1,31	0,18%	1,88%	0,00%	-0,07%	0,1%	0,0%
Croatia	0,06%	0,04%	0,08	-0,02	-74,01	-12,55	0,12%	1,21%	0,00%	0,13%	0,0%	0,0%
Moldova	0,01%	0,17%	-0,38	0,03	0,11	-0,02	0,09%	0,13%	0,10%	0,20%	0,1%	0,2%
Montenegro	0,00%	1,00%	0,00	-0,02	3,17	-2,05	0,07%	0,02%		0,20%	0,0%	0,5%
North Macedonia	0,18%	0,13%	0,05	-0,15	25,93	-17,29	0,10%	0,03%	0,00%	0,00%	0,0%	0,1%
Romania	-0,01%	0,14%	-0,35	-0,03	-109,14	-23,29	0,27%	1,13%	1,10%	1,00%	0,4%	0,3%
Serbia	0,00%	0,19%	0,00	-0,01	7,79	-5,15	0,15%	0,10%	0,00%	0,00%	0,0%	-0,1%
Turkey	0,07%	0,13%	0,07	0,07	-276,90	-96,33	0,02%	0,00%	0,70%	0,47%	0,5%	0,5%

Data source: World Bank 2019; UN SD 2016. UN 2015

Annex 2a: Policy documents included in the review (published between 2000 and 2015)

	MDG progress report	UNFCCC report	Vienna Convention report	CBD report	NDS/NDP	SDS	SOER	EPR	NCSA	Rio+20 National Report	UNDP Assessment of Development Results	EC accession reports
Albania	2010 2005 2004	2009 (2002)	2013 2010	2014 2011 2007 (2003)	2007 2009 2014	n.d.	2009 2008 2007	2012	2006	2012	n.d.	2014- 2005
Armenia	2010 2005	2010	n.d.	2014 2009 2006 (2001) (2000)	2014	n.d.	2010	2002	2004	2012	2014	n.a.
BiH	2010 2013	2013 2009	2013 2010	2014 2011 2009 (2005)	2004	n.d.	2012 2010	2011 2004	2011/2010	n.d.	2009	2013- 2005
Bulgaria	2008 2003	2013 2011 2006	2013 2010	2014 2011 (2001)	2007 2014	n.d.	2010	2009	2004	n.d.	n.a.	n.a.
Croatia	2010 2005 2004	2014 2010 2007	2013 2010	2014 2011 2009 (2001)	2013 2006	2009	(2007)*	2014	2005	n.d.	2013	2013- 2005
North Macedonia	2009 2005	2014 2010 2003	2013 2010	2010 2005 2003	2007	n.d.	n.d.	2011 2002	2005	n.d.	n.d.	2013- 2005
Moldova	2013 2010	2013 2009	2013 2010	2014 2009	2013	n.d.	n.d.	2014 2005	2005	2012	2006	n.a.

	2005			2006 (2002)								
Montenegro	2013 2010 2005 2004	2010 2015	2013 2010	2014 2010	2013	n.d.	(2011)*	2014 2007	2007	2012	2006	2013- 2005
Romania	2010 2004	2014 2010 2007	2013 2010 2006	2014 2009 2005 2001	2007	2013	n.d.	2012 (2001)	2005	n.d.	n.a.	n.a.
Serbia	2009 2006 2005	2010	2013 2010	2014 2010	2007	2007	n.a.	2014 2007	2007	2012	2006	2013- 2005
Turkey	2010 2005	2013 2007	2013 2010	2010 2007 2004	(2014)* 2007	2012	2015	2008	n.d.	n.d.	2010	2013- 2007
Sub-total	*28*	*23*	*21*	*30*	*15*	*4*	*8*	*16*	*10*	*5*	*7*	*7*

*In national languages

	MDG progress report	UNFCCC report	Vienna Convention report	CBD report	NDS/NDP	SDS	SOER	EPA	NCSA	Rio+20 National Report	UNDP Assessment of Development Results	Other
Cambodia	2013 2010 2005 2001	2016 2002	2013 2010 2009	2014 2009 2007	2013* 2009 2008			2008	2007	2012	2010	
Indonesia	2011 2010 2007 2005 2004	2010	2013 2010	2015 2009 2005 2002	2010			n.d.	2005	n.d.	2010	AECEN 2008: Environmental Compliance and Enforcement Assessment
Lao PDR	2013 2010 2008 2004	2013	2013 2010	2016 2010	2011 2006			2008	2008	2012	2011	UNEP 2012: Environment Outlook
Malaysia	2015 2010 2005	2011	2013 2010	2014 2009 2005	2011 2006			n.d.	2008	n.d.	n.d.	
Myanmar	2011 2010 2005	2012	2013	2014 2009 2005	-2013			2013	n.d.	n.d.	n.d.	ADB 2013: Sectoral Assessment, Strategy and Road Map Raitzer 2015: Achieving Environmental Sustainability in Myanmar (ADB working paper)

Philippines	2014 2007 2005	2014 2000	2013 2010	2014 2009 2006 2002	2011 2006			n.d.	2005	n.d.	2009	
Thailand	2009 2004	2010	2013 2010	2014 2009 2005 2001	2012 (2008)*			2008	2009	n.d.	2011	World Bank Environmental Monitor 2011
Timor-Leste	2009 2004	n.d.	2013	2012	2011			n.d.	2009	2012	2003	
Vietnam	2013 2010 2005 2003 2002	2010	2013 2010	2012	2011 2006			2008	2006	2012	2003	IEED 2009 AECEN. 2005: Environmental Compliance and Enforcement Assessment
Subtotal	*31*	*10*	*17*	*25*	*15*			*5*	*8*	*4*	*7*	*7*
TOTAL	**59**	**33**	**38**	**55**	**30**	**4**	**8**	**21**	**18**	**9**	**14**	**14**

*In national languages

Annex 2b: Scholarly articles identified for the review (published between 2000 and 2015)

Europe

	List of relevant scholarly articles, published between 2000 and 2015 in peer reviewed journals
Multicountry	1. Andonova, Liliana B., and Ioana A. Tuta. 2014. "Transnational Networks and Paths to EU Environmental Compliance: Evidence from New Member States." Journal of Common Market Studies 52 (4): 775–93. *(Bulgaria, Romania)* 2. Avdibegovic, Mersudin, Dragan Nonic, Stjepan Posavec, Nenad Petrovic, Bruna Maric, Vojislav Milijic, Silvija Krajter, Florin Ioras, and Ioan Vasile Abrudan. 2010. "Policy Options for Private Forest Owners in Western Balkans: A Qualitative Study." NOTULAE BOTANICAE HORTI AGROBOTANICI CLUJ-NAPOCA 38 (1): 257–61 *(BiH, Croatia and Serbia)* 3. Fagan, Adam. 2010. "The New Kids on the Block - Building Environmental Governance in the Western Balkans." ACTA POLITICA 45 (1–2): 203–28. (*BiH, Serbia*) 4. Glück, Peter, Mersudin Avdibegović, Azra Čabaravdić, Dragan Nonić, Nenad Petrović, Stjepan Posavec, and Makedonka Stojanovska. 2010. "The Preconditions for the Formation of Private Forest Owners' Interest Associations in the Western Balkan Region." Forest Policy and Economics 12 (4): 250–63. *(BiH, Croatia, North Macedonia and Serbia)* 5. Khovanskaia, Maria, and Zsuzsanna Ivanyi. 2007. "Possibilities and Options for the Clean Development Mechanism and the Green Investment Scheme in Central and Eastern Europe: North Macedonian and Romanian Perspectives." Natural Resources Forum 31 (1): 1–10. (*North Macedonia, Romania*) 6. Mașcu, Simona. 2013. "Evolution of Environmental Tax Revenues in Post-Communist European Member Countries." Annals of the University of Oradea, Economic Science Series 22 (1): 472–80. *(Bulgaria, Romania)* 7. McKee, M., D. Balabanova, K. Akingbade, J. Pomerleau, A. Stickley, R. Rose, and C. Haerpfer. 2006. "Access to Water in the Countries of the Former Soviet Union." Public Health 120, no. 4: 364–72. (*Armenia, Moldova)* 8. O'Brien, Thomas. 2015. "Environmental Democratisation: Assessing the Impact of Democratisation on Environmental Capacity in South and Southeastern Europe." Political Studies 63 (3): 589 *(Bulgaria, Romania)* 9. Samwel, Margriet, and Sascha Gabizon. 2009. "Improving School Sanitation in a Sustainable Way for a Better Health of School Children in the EECCA and in the New EU Member States." Desalination 248 (1): 384–91. (*Armenia, Moldova, Romania, Bulgaria*) 10. Sikor, Thomas, Johannes Stahl, and Stefan Dorondel. 2009. "Negotiating Post-Socialist Property and State: Struggles over Forests in Albania and Romania." Development and Change 40 (1): 171–93. (Albania, Romania) 11. Soljan, Nina, and Seth Landau. 2011. "Green Energy Policies in South East Europe - The Impact of Prospective EU Membership." Renewable Energy Law and Policy Review 2 (4): 302. (*BiH, Croatia, Montenegro, Serbia)* 12. Sotirov, Metodi, Marko Lovric, and Georg Winkel. 2015. Symbolic Transformation of Environmental Governance: Implementation of EU Biodiversity Policy in Bulgaria and Croatia between Europeanization and Domestic Politics."ENVIRONMENT AND PLANNING C-GOVERNMENT AND POLICY 33 (5): 986–1004 *(Bulgaria, Croatia)*

	13. Stahl, Johannes, Thomas Sikor, and Stefan Dorondel. 2009. "The Institutionalisation of Property Rights in Albanian and Romanian Biodiversity Conservation." International Journal of Agricultural Resources, Governance and Ecology 8 (1): 57–73. 14. Taylor, Andrew. 2015. "Environmental Governance in Croatia and North Macedonia: Institutional Creation and Evolution." Environment and Planning C: Government and Policy 33 (5): 969–85. *(Croatia, North Macedonia*) 15. Veen, Peter, Josef Fanta, Ivan Raev, Iovu-Adrian Biris, Jacques de Smidt, and Bert Maes. 2019. "Virgin Forests in Romania and Bulgaria: Results of Two National Inventory Projects and Their Implications for Protection." BIODIVERSITY AND CONSERVATION 19 (6): 1805–19. *(Bulgaria, Romania)* 16. Vuletic, Dijana, Nenad Potocic, Silvija Krajter, Ivan Seletkovic, Christine Fuerst, Franz Makeschin, Zoran Galic, et al. 2010. "How Socio-Economic Conditions Influence Forest Policy Development in Central and South-East Europe." ENVIRONMENTAL MANAGEMENT 46 (6): 931–40. (*BiH, Croatia, Serbia)* 17. Weiland, Sabine. 2010. "Sustainability Transitions in Transition Countries: Forest Policy Reforms in South-Eastern Europe." Environmental Policy and Governance 20 (6): 397–407. (*Albania, Croatia*)
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	Armenia." Journal of Environmental Assessment Policy and Management 10 (3): 291. 5. Taslakyan, Lusine. 2010. "Armenia in International Environmental Conventions." Armenian Review 52: 113.
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Annex 3a: Draft analytical sheet for implementation capacity factors of international environmental goals

Policy stages	Features of the policy process	Country 1	Country 2	Country 3
Formulation	The vision of sustainable development is included in national development plans			
	Designated position/institution for achieving the goal is established within the president/ prime minister's office			
	National consultation process was carried out related to the issue			
	Mandatory targets and underlying indicators included in national legislation			
	The implementation of the goals is linked to national budget			
	….			
Implementation	Awareness-raising activities targeting political groups			
	Awareness raising activities targeting the general public			
	Human capacity building			
	Institutional capacity building			
	International market incentives			
	National market incentives			
	International technical assistance			
	National technical assistance			
	International financial assistance			
	National financial assistance			
	Stakeholder involvement through participatory approaches			
	……			
Monitoring	Monitoring system			
	Reporting system			
	…….			
Review	The government can be held accountable for achievement of the goals			
	…			

Annex 3b: Implementation capacity factors identified during the document review

Core Themes	Factors
Sustainable development/ environmental challenges are conceptualized at the highest level	1. The right to a healthy environment and to sustainable development is included in the constitution 2. Sustainable development issues are seen as a priority by politicians and citizens 3. The intention for an integrated approach towards environmental problems and policies is stated in long-term national development plans/constitution
Political and public commitment	4. Political will to adopt global goals (i.e. MDGs/CBD goals) at the national level (i.e.as national development goals) 5. Political will to support the implementation of environmental goals 6. Political and public support to subnational/local environmental actions 7. Public support to implement (international) environmental goals
Strategies	8. Vision and goals for placing the country to a more sustainable development pathway are defined and adopted 9. Vision and goals for defining the development pathway of the country are defined and adopted 10. Vision and goals related to the protection of the environment in the country are defined and adopted 11. Vision and goals related to environmental communication, education and training are defined and adopted 12. Sector specific vision and goal related to sustainable use and management of resources are defined and adopted 13. Vision and goals related to country's role in international (environmental) co-operation are defined and adopted
Adequacy/Characteristics of strategy development process	14. Strategy development process is adequate. i.e. Harmonized with each other, reflect the situation at the field, based on feasibility studies and are adaptive to changing conditions 15. Relevant strategies have been approved through standard political procedures, and therefore can be considered official state documents 16. Regular review and renewal of relevant strategies (i.e. update of water management strategy, designation of protection areas) 17. National ownership of development strategies is secured - Stakeholders are consulted throughout the strategy development process
Characteristics of strategies	18. Environmental principles and objectives are sufficiently mainstreamed into sectoral plans (i.e. transport, economic development) 19. Relevant strategy sets concrete goals, priorities and calculates/assigns necessary budget for it 20. Interlinkages among environmental issues and other issues (I.e. poverty) are recognized and considered in long-term planning - coherence 21. National level environmental goals are reflected in regional/local development (environmental) plans

Goal/Target setting	22. Quantified and time bound targets are set for international environmental goals and represent an obligation 23. Adopted international goals (i.e. MDGs) are contextualized according to national circumstances and translated into national, sectoral, regional and local goals and targets 24. Alignment of national objectives with transnational, regional goals (i.e. EU, ASEAN or neighboring countries) 25. Elements for monitoring progress towards goals and targets are introduced (i.e. environmental quality standards, indicators) and are adequate
Planning	26. Framework of planning measures are developed for the implementation of the relevant environmental goals (i.e. via sectoral strategies, action plans, management plans) 27. Framework of planning measures are developed for the implementation of the relevant MEA (i.e. via sectoral strategies, action plans, management plans) 28. Activity plans for targeting identified environmental problems are developed 29. Local environmental plans are systematically addressed: activity plans for addressing local environmental issues are developed
Characteristics of planning	30. There is coherence and congruity between strategic and planning documents (sectoral plans, urban and spatial plans etc.) 31. Environmental considerations are sufficiently mainstreamed into plans and programs 32. Integrated approaches to (land -use/water/natural resources) planning is applied
Budget planning	33. The implementation of the environmental goals is linked to government (investment) programming and budget is allocated for future implementation - both at the national and local level 34. Environmental investments are prioritized among other investments 35. There is planning of the utilization of international funds for environmental objectives
Legal framework	36. General law/legal framework on environmental protection is introduced 37. Relevant national legislation is introduced (i.e. water, forestry, renewables) - laws, sub-laws, regulations underlying the general environmental policy framework is introduced
Adequacy/Characteristics of legal framework	38. Legislation is adequate - it reflects the situation at the field and its impacts are carefully assessed 39. Relevant national legislation is harmonized vertically and horizontally (also with MEAs) 40. National law is harmonized with regional law (EU, ASEAN)
MEA national level formulation	41. Ratification of relevant MEAs (a legal framework that is broadly based on MEA requirements and international practice) 42. Inclusion of the MEA obligations into national strategies and planning framework 43. MEA focal points are established 44. The country participates meetings at international negotiations of MEA to represent the country's position 45. MEA strategies reflect the capacity of and the situation in the country 46. Responsibilities for implementing MEAs are identified 47. An MEA implementation plan is developed

Institutional set-up for formulation of policies	48. Designated institution for developing environmental policies is in place 49. The institutional set-up for mainstreaming environmental objectives into sectoral policies is established 50. The institutional set-up for developing and coordinating the implementation process of international environmental goals is established
Characteristics of institutional set-up for formulation	51. Balanced and transparent political system - No fragmentation and duplication in policymaking among different governance levels (i.e. between state and regional level) 52. Sufficient human capacity to design feasible legislation strategies, plans and programs (both at the national and the local level) 53. There is international support for developing environmental strategies
Institutional capacity for implementation	54. Stable and strong institutional framework for implementation of environmental goals (i.e. Network of institutions, Environmental agency, coordinating institutions and sectoral institutions and local institutions - and adequately coordinated) 55. Designated institution(s) for achieving/enforcing the environmental goals 56. Sufficient administrative infrastructure/capacity to implement relevant environmental goals and agreements 57. The institutional background for implementing environmental objectives at the regional and local level is established 58. Good human resource management practices, including adequate incentives system for workers; performance management system of employees; opportunities for professional growth; transparent hiring procedures, adequately elaborated job descriptions, competitive salaries 59. Institutional strengthening/reform to ensure sufficient and efficient administrative capacity 60. Preservation sufficient institutional memory is ensured, thus assuring the necessary continuity in implementation of environmental goals (continuity in knowledge transfer)
Institutional coordination of implementation	61. Vertical coordination (i.e. Coordination between entity/regional/cantonal/municipal levels) on environmental issues is ensured 62. Horizontal or Interinstitutional coordination to integrate environmental issues in a coherent and permanent manner - (inter-entity/inter-ministry- inter-municipal) 63. Institutional coordination for MEA implementation is functioning 64. The institutional set-up for coordinating implementation of environmental objectives with stakeholders is established 65. Decentralization of implementation responsibilities, empowerment of regional/local governments (water and forest management) 66. Delineation of implementation responsibilities (i.e. Permitting and inspection between national and local entities) 67. Information on duties of responsible governmental structures is available and adequate (not too fragmented) 68. Links between research and development institutions and those tasked with applying policies and practices is established - Scientific support to implementation exist and regularly and closely cooperates with line ministries
Decision making process	69. Sufficient influence of the relevant ministries (NGOs) and adequate positioning of environmental issues in the system of the general socio-political model

	70. Decision makers sufficiently integrate environmental issues into decision-making processes 71. Decision making procedures are not complicated and not long 72. Decision making is transparent
Institutional technical capacity	73. Sufficient capacity of institutions/companies to select and manage technologies (i.e. PRTR) 74. Technical capacity for implementation (methods and technologies i.e. for efficient and clean water use, early warning system for forest fires) 75. Technical capacity for enforcement (i.e. for inspections or for collection of environmental charges)
Human capacity	76. Sufficient human capacity to implement or enforce legislation 77. Sufficient human capacity for participation in international environment-related networks and implementation of MEAs (i.e. in ministries) 78. Scientific-technical and management potential at subnational/local level 79. Adequately qualified human capacity for implementation of environmental goals (National, regional and local level)
Awareness and support to implementation	80. Awareness of politicians about environmental protection, environmental goals and sustainable management or resources 81. Awareness of targeted groups about environmental protection (Business, project beneficiaries) 82. Awareness of general public about environmental protection or specific environmental problems 83. Provision of information/training is sufficient and regular on the scope of and obligations deriving from most MEAs, at national, regional and local levels (public and government)
Education	84. Environmental education is introduced into school curricula 85. Adult education for Sustainable Development is introduced 86. Teacher are trained to teach SD topics 87. Education programs are adequate reflecting various needs
Capacity building/Training	88. Capacity-building for training of government officials i.e. on legal requirements or technical aspects of MEAs or new methods for environmental management or managing public relations re environmental issues is sufficient Capacity building/training for stakeholders (NGOs, journalist, industries, project beneficiaries) is sufficient 89. Capacity-building is continuous and adequate to needs - with sufficient financing
Public financing capacity	90. Sufficient domestic financial capacity (of public institutions/government spending) is used to finance environmental expenditures and investments and management of sustainable resource management 91. Ability of institutions to mobilize financial resources for environmental objectives (also from non-governmental or private organizations) 92. Adequate resources have been mobilized for the operation of the management of environmental protection organization/institution that managing and implementing the relevant MEAs 93. Local communities have funds for environmental goals implementation 94. Stable macroeconomic environment/ adequate economic development

Economic instruments	95. Sufficient types of environmental taxes and charges are used for environmental objectives - polluter pays principle is implemented 96. Environmental charges are adequate (not below operating/pollution costs) 97. Market-based instruments for environmental protection are introduced and functioning 98. Financial incentives for adopting sustainable resource management principles (i.e. to the local governments to manage forests as carbon sinks) 99. Mechanisms to improve the effectiveness of economic instruments relevant to the environment
Private sector contribution	100. Domestic private investments into environmental objectives are promoted (with provision of incentives, with technology transfer or with PPPs) 101. Foreign investments into the environmental sector 102. Adequate economic management of private companies in the environmental sector 103. Environmental management requirements to companies are implemented 104. Integration of environmental issues into privatization processes 105. Price subsidy scheme for the poor to access to environmental services
Investments	106. New physical investments (related to environmental objectives) 107. Quality/Efficiency of existing environmental investments is adequate 108. Maintenance/improvement of existing infrastructure to improve environmental performance is carried out 109. Investments to improve the economic value of natural areas (forests, eco-tourism) 110. Investments for tackling of war damages/Industrial damages
Enablers to/Characteristics of investments	111. National co-financing mechanisms for environmental investments/introduction of sustainability practices 112. Investments are developed and realized taking into consideration relevant environmental considerations
Stakeholder involvement in implementation	113. Stakeholder involvement into environmental goal implementation (i.e. via a committee or board or via information campaigns) 114. Media regularly addresses and discusses environmental issues 115. Sufficient social capital to cooperate and volunteer in environmental activities (NGO, business, local authorities, academics)
NGO involvement in implementation	116. NGOs and private sector participate in decision-making and natural resource protection and maintenance 117. NGOs are involved in awareness raising and education activities 118. NGOs have access to sufficient financial support (from national authorities or from member fees) and their financing is transparent
Law/Strategy implementation actions	119. Laws implemented in practice to implement environmental goals (i.e. protected area designation or prohibiting ODS substances) 120. Concrete technical measures to implement laws (climate change mitigation, adaptation, forest protection) and strategies 121. Methodological solutions (technologies, innovations or good practice) promoted/transferred from other countries and used for implementing environmental goals 122. Adequate environmental permitting/licensing

Law enforcement	123. Efficient instruments for enforcement 124. Transparent system for enforcement (inspections, collection of sanctions and fines) 125. Illegal activities (logging, hunting, fishing, interventions into to the water supply system) are recognized and reduced 126. Anti-corruption measures are in place 127. Sufficient capacity of staff/adequate capacity building who are responsible for issuing permits and for inspections at all governance levels 128. Adequate operations of court services in environmental matters
Sustainable resource management	129. Sufficient and adequate measures are implemented for sustainable management of natural resources 130. Ecosystem approach for the conservation of biodiversity and sustainable use of its components in all relevant economic sectors - no overexploitation 131. Certification programmed are in use (i.e. for forestry, for buildings) 132. Improved land management and ownership (crucial for forest management and climate change mitigation)
International support to implementation	133. Sustained international funding for environmental projects implementation 134. Efficient utilization of funds 135. International technical assistance to implementation of environmental goals (i.e. approval and review of projects, implementation of measures)
Transnational co-operation	136. International co-operation for improved implementation (i.e. with developed countries) –e.g. triangular cooperation 137. Transboundary/Regional co-operation for improved implementation are identified and actively participated in
Research	138. Research infrastructure capacity is established and sufficient (to support policy making) 139. Research institutions regularly conducting basic and applied scientific studies related to environmental challenges 140. Priorities for research (addressing current problems or fulfilling MEAs) are identified and followed 141. Researchers have knowledge and know-how about modern technologies and disciplines 142. Researchers are motivated/committed to take up research in the field 143. Direct cooperation between research organizations and enterprises and increasing the share of private funding 144. Sufficient amount of funds to finance research projects
Scientific co-operation	145. Scientific cooperation, collaboration with international research institutions 146. Scientific cooperation, collaboration between national institutions
Basic data types necessary for monitoring activities	147. Indicators to measure progress towards environmental objectives are introduced (water or energy or biodiversity) 148. Physical assessment/Inventory development/Resource administration (water resources, fish stocks, pollutant release and fish stocks, PRTRs) - baseline data 149. Integrated spatial information system 150. Basic economic and social data is available for monitoring 151. Quantitative assessments (energy balances, vulnerability studies, socioeconomic effects of climate change and biodiversity losses)

Characteristics of collected data	152. Sufficiency of functional data 153. Data quality (i.e. harmonized collection methodology, data processing) 154. Continuity in data collections (permanent activity)
Data collection	155. Monitoring methodologies are agreed at the national level and fully reflect international methodologies, frequencies and sampling procedures (I.e. EU guidelines) 156. There is a sufficient physical system for data collection (i.e. for GHG, biodiversity and PRTR data) 157. Integrated environmental data system is introduced (to ensure coordination, data transparency and no data gaps) 158. The collected monitoring data and information is adequately processed for further utilization - the flow of data is adequate
Framework for monitoring	159. Monitoring framework is established (i.e. institutional framework and programs) 160. Institutions responsible for data collection provide sufficient, quality data on time for environmental monitoring/reporting activities - there is a data provision network 161. Improved coordination for more effectively use of existing monitoring capacities of stakeholders (line-ministries, subnational bodies, research, academic institutions, and in universities as well as in the private sector (information and human resources)) 162. Monitoring mechanisms to oversee the implementation of MEAs 163. Stakeholder involvement in monitoring activities 164. Private and public enterprises self-monitor and report on emissions and discharges in sufficient quality and quantity
Enablers to a functioning monitoring system	165. Sufficient political support to monitoring 166. Sufficient and adequate human capacity for monitoring 167. Sufficient technical capacity for monitoring (i.e. GIS or climate monitoring equipment) 168. Sufficient financial resources for monitoring
International support and co-operation for monitoring activities	169. International technical assistance to monitoring is provided 170. International support to fulfilling monitoring and reporting obligations is available 171. Involvement in regional/global monitoring initiatives (I.e. EU) and alignment of MDG indicators with these initiatives
Reporting	172. Reporting process is established 173. There is a dedicated institution and sufficient institutional capacity to develop reports 174. Reporting is prepared to inform policy development, facilitate co-operation and to improve implementation 175. International guidelines for the production of environmental reports are used 176. Fulfilment of international reporting obligations (regular and timely and adequate and complete reports)
Information provision about monitoring outcomes	177. Provision of environmental information is secured 178. The provision of information is institutionalized (either via a dedicated unit or a coordination unit) and transparent

Use of monitoring results	179. Regular review of implementation of MEAs/MDGs 180. Regular review of implementation of regulations and strategies 181. Regular review existing monitoring programs 182. Regular review of existing targets (to update them and adopt them to changed circumstances) 183. Monitoring results are applied as a basis for creating knowledge and possibly as a basis for changing the course of action and activities in terms of the implementation of goals (policy-oriented monitoring) 184. The government and its institutions can be held accountable for achievement of the goals and implementation of policies

Source: Compiled based on the documents listed in Annex 1A and Annex 1B

Annex 4: Final list of clustered implementation capacity factors and country examples

This annex presents an overview of the identified implementation capacity factors and supporting country examples, derived from national assessment documents and scientific articles (listed in Annex 2a and 2b). The table is organized in an excel file, according to the 11 implementation themes and the 58 implementation capacity factors and shows examples of evidence for each of the factors from all 20 studied countries. For most of the factors, there is more than one example per country from different source documents. For some factors in a few countries, no example could be identified, and these cells are marked with grey. The supporting examples were extracted from the source documents without alteration to the original text. After each example, the source document is referenced back to Annex 2a or Annex2b. Due to the large size of the table, the excel file is included at the following link:

https://drive.google.com/file/d/12rsVrHNlr8lBEHVAKTPXSeZDThE5dbcg/view?usp=sharing

Annex 5: Questionnaire for the identification of country-readiness indicators for the SDGs

Over the last decades, governments negotiated and adopted various environmental goals under different international regimes and agreements to tackle global environmental issues. Despite some progress, the realization of many of these goals remains out of close reach. In order to reduce the gap between ambitions and actual achievements in the future, we need to better understand what makes national implementation of environmental goals work and take that into consideration when planning the implementation of the recently adopted Sustainable Development Goals (SDGs).

This questionnaire was designed to identify the most important factors in the implementation of international environmental goals (such us the UNFCCC, the Montreal Protocol, the CBD or the MDG7 targets) at the national level. The geographic focus includes selected emerging economies of Asia and Europe. The questions below are based on an extensive document review that covered the implementation of MDG7 and related international environmental agreements in 20 countries in emerging Asia and Europe. Based on the most important factors of environmental goal implementation that will emerge through this questionnaire, a set of governance indicators will be developed to help proactively assess the capacity of countries to implement the environmental components of the SDGs.

Based on the indicators a **Sustainability Management Transition Index (STMI)** will be designed for high-level analysis and comparison of countries' readiness to implement environmental goals. The questionnaire is part of an independent research at the Central European University. Its results will be built both into a doctoral thesis and through participation in relevant scientific and policy fora inform the international discourse on implementing the SDGs and the Post-2015 Development Agenda.

Thank you for your time, efforts and support.

Respondent's information

Type of your institution

- Ministry
- Other governmental organization/Agency
- Non-governmental organization /Civil society organization/Association/Network/Initiative
- Research institution/University/Think-tank
- International organization/Intergovernmental organization/ Multilateral organization
- Corporation/business organization
- Other

Country or countries for which you answer the questions:

- Albania
- Bosnia-Herzegovina
- Bulgaria
- Croatia
- Macedonia
- Montenegro
- Moldova
- Romania
- Serbia
- Turkey
- Cambodia
- Indonesia
- Republic of Korea
- Lao PDR
- Malaysia
- Myanmar
- The Philippines
- Timor-Leste
- Thailand
- Vietnam

Years of experience in the field of environment:_____

How familiar are you with international environmental agreements?

	1	2	3	4	
Not at all					Very familiar

How familiar are you with the MDG process?

	1	2	3	4	
Not at all					Very familiar

How important is international cooperation to achieve environmental sustainability?

	1	2	3	4	
Not important					Very important

How important was the MDG process to promote environmental sustainability?

	1	2	3	4	
Not important					Very important

Questionnaire

Which are the most important factors for successful implementation of the environmental components of the global Sustainable Development Goals (SDGs)?

Please, choose up to maximum three factors from each group which are of critical importance for the implementation of environmental SDGs. Your choices will inform the selection of governance indicators for the Sustainability Transition Management Index.

1. Development of a strategic framework

1. Strategies/Policies/Plans are based on research and feasibility studies
2. Strategies/Policies/Plans are consulted with relevant stakeholders in the country
3. Strategies/Policies/Plans are harmonized and coherent
4. Strategies/Policies/Plans use integrated approaches towards socio-economic and environmental problems
5. Strategies/Policies/Plans set concrete; quantified and time-bound targets
6. Strategies/Policies/Plans are tailored to regional/local circumstances (e.g. with local environmental plans)

The three most important factors in order of importance:

No._____

No._____

No.____

2. Institutional framework for implementation

1. Designated national implementation institution(s)
2. Clear allocation of implementation responsibilities (e.g. among ministries; between national and local level)
3. (High-level) inter-institutional coordination mechanisms
4. Co-operation with research institutions to support decision-making with relevant scientific research results
5. Involvement of stakeholder groups in environmental decision-making (e.g. businesses; civil society)

The three most important factors in order of importance:

No._____

No._____

No._____

3. Institutional capacity for implementation

1. Political commitment to implementation
2. Qualified human capacity
3. Technical preparedness of implementing institutions (e.g. with equipment and infrastructure)
4. Financing for environmental goal implementing organizations
5. Empowerment of local governments to implement environmental goals

The three most important factors in order of importance:
No._____
No._____
No._____

4. Domestic financing for implementation

1. Stable macroeconomic environment/Adequate economic development
2. Allocation of earmarked public budget to environmental goals (e.g. for infrastructure development)
3. Use of environmental taxes and charges
4. Use of financial incentives to mobilize private resources (e.g. for technology improvement)
5. Profitable operation of environmental utility companies

The three most important factors in order of importance:
No._____
No._____
No._____

5. International support and international cooperation for implementation

1. Synchronized donor and recipient objectives
2. International financial support
3. International technical assistance (e.g. capacity-building or technology transfer)
4. National capacity for efficient utilization of international support
5. Transboundary/Regional co-operation

The three most important factors in order of importance:
No._____
No._____
No._____

6. Law implementation and enforcement

1. Targeted government measures to implement laws (e.g. designation of protected areas)
2. Environmental impact assessment and permitting/licensing
3. Transparent and efficient system for enforcement (e.g. inspections; collection of sanctions and fines)
4. Adequacy of the treatment of environmental matters by the courts
5. Improved land ownership (e.g. secured property rights)

The three most important factors in order of importance:
No._____
No._____
No._____

7. Stakeholder engagement

1. Programs to increase awareness (e.g. information campaigns or with regular media coverage)
2. Environmental education and training to target groups (e.g. NGOs; journalist; project beneficiaries)
3. Civil society involvement in environmental activities
4. Engagement of major companies to join voluntary environmental programs (e.g. environmental management systems or certification programs)
5. Integration of environmental considerations into privatization and concession processes

The three most important factors in order of importance:
No._____
No._____
No._____

8. Scientific research

1. Sufficient and adequate research infrastructure
2. Regular and systematic research programs
3. Cooperation between research organizations and businesses
4. Collaboration between national research institutions
5. Collaboration with international research institutions

The three most important factors in order of importance:
No._____
No._____
No._____

9. Monitoring framework

1. Clear institutional responsibility for monitoring (e.g. data collection)
2. Institutional mechanism to coordinate monitoring capacities
3. Sufficient and adequate human capacity for monitoring
4. Sufficient technical capacity for monitoring (e.g. monitoring equipment)
5. Sufficient financial resources for monitoring
6. Involvement in regional/global monitoring initiatives

The three most important factors in order of importance:
No._____
No._____
No._____

10. Data collection process (provision of environmental information)

1. Monitoring plans are developed (that establish quality standards and selects indicators)
2. Monitoring methodologies are harmonized and are in line with international guidelines
3. Baseline data (physical assessments; resource inventories) are available
4. Data collection processes are adequate to provide sufficient; functional and regular statistics
5. Integrated environmental information system is introduced (that collects and assesses all relevant data)

The three most important factors in order of importance:
No._____
No._____
No._____

11. Review of implementation

1. An environmental reporting process is established that informs policy and decision-makers
2. International reporting obligations are followed
3. Environmental goal implementation is regularly assessed (e.g. by the government)
4. Public access to environmental information is secured
5. Governments are held accountable for environmental goal implementation (e.g. with government performance auditing)

The three most important factor in order of importance:
No._____
No._____
No._____

Please rate the overall importance of the above groups for successful implementation of the environmental components of the global Sustainable Development Goals (SDGs).
Your choices will inform the weighting of governance indicators for the Sustainability Transition Management Index.

	Not important	Somewhat important	Important	Very important
1.Development of a strategic framework				
2. Institutional coordination for implementation				
3. Institutional capacity for implementation				
4. Domestic financing for implementation				
5. International support and cooperation				
6. Law implementation and enforcement				
7. Stakeholder engagement				
8. Scientific research				
9. Monitoring framework				
10. Data collection process				
11. Review of implementation				

Comments

Please add any additional and crucial implementation factors that you have found missing.

If you are interested to participate in an interview for the research, please, provide you email address.

Thank you for your time and support!

Annex 6a: Profile of the questionnaire respondents

In order to ensure that the results of the questionnaire are reliable and comparable and the competency of the respondents, the profile of the respondents were analyzed in detail first. The results of this analysis are presented below.

Respondents indicated on average 13,89 years of experience in the field of environment, with 13,78 years of experience of the European respondents and 13,85 years of experience of the Asian respondents. The experience level of respondents varied more at the country level: Malaysian respondents indicated an average 7 years of experience, while Croatian and Serbian respondents both had an average of 23,67 years of experience. See Table 62.

Table 63: Years of experience of the questionnaire respondents in the field of environment

Europe	Years of experience in the field of environment	Asia	Years of experience in the field of environment
Albania	11.60	Cambodia	13.80
Armenia	13.50	Indonesia	13.50
Bosnia and Herzegovina	10.00	Lao PDR	9.25
Bulgaria	10.20	Malaysia	6.33
Croatia	19.25	Myanmar	16.00
Macedonia	14.86	Thailand	13.00
Montenegro	11.29	The Philippines	19.67
Moldova	17.43	Timor-Leste	14.00
Romania	14.43	Viet Nam	12.00
Serbia	15.44		
Turkey	13.63		
Europe average	*13.78*	*Asia average*	*13.85*

Most respondents indicated that they are familiar with international agreements and also with the MDG process. On a scale from 1-4, they indicated an average 3,35 when asked about their level of familiarity with international environmental agreements and 3,09 when asked about their level of familiarity with the MDG process. European respondents indicated somewhat higher familiarity with both topics (3.52 and 3,23 respectively) and Asian respondents indicated on average somewhat lower figures (3,13 and 2,92). See Table 63.

Table 64: Level of familiarity of the questionnaire respondents with international environmental agreements and the MDG process

	Level of familiarity with international environmental agreements (1-4)	Level of familiarity with the MDG process (1-4)
Albania	3.00	3.20
Armenia	3.67	2.83
Bosnia and Herzegovina	3.50	3.40
Bulgaria	3.20	3.00
Croatia	3.75	2.75
Macedonia	3.57	2.86
Montenegro	3.71	3.57
Moldova	3.29	3.29
Romania	3.57	3.29
Serbia	3.56	3.22
Turkey	3.63	3.75
Europe average	*3.52*	*3.23*
Cambodia	*3.20*	*3.00*
Indonesia	*3.17*	*2.67*
Lao PDR	*2.80*	*3.00*
Malaysia	*2.25*	*2.25*
Myanmar	*3.00*	*3.25*
Thailand	*2.83*	*2.17*
The Philippines	*3.33*	*3.67*
Timor-Leste	*3.50*	*2.75*
Viet Nam	*3.80*	*3.00*
Asia average	*3.13*	*2.92*

Respondents both from Europe and Asia, considered international cooperation to achieve environmental sustainability highly important: on a scale from 1-4, on average they indicated 3,8 in both regions. However, the importance of MDG process to promote environmental sustainability was somewhat lower (3,34) among the respondents from both regions (3,21 and 3,51 respectively in Europe and Asia). While respondents from some countries, such as Cambodia or Vietnam found that the MDG process had high importance in promoting environmental sustainability, respondents from Croatia indicated that the MDG process was only somewhat important (in promoting environmental sustainability). This latter is probably also due to the fact that the MDG process has not received considerable attention in the country and was not very relevant to the development issues Croatia was facing in the wake of the EU accession process.

Table 65: Importance of international environmental agreements and the MDG process to promote environmental sustainability according to the questionnaire respondents

	Perceived importance of international cooperation to achieve environmental sustainability (1-4)	**Perceived importance of the MDG process to promote environmental sustainability (1-4)**		**Perceived importance of international cooperation to achieve environmental sustainability (1-4)**	**Perceived importance of the MDG process to promote environmental sustainability (1-4)**
Albania	4.00	3.60	Cambodia	3.80	3.80
Armenia	3.17	3.00	Indonesia	3.60	3.33
Bosnia and Herzegovina	4.00	3.33	Lao PDR	4.00	4.00
Bulgaria	4.00	3.60	Malaysia	3.25	2.25
Croatia	4.00	2.25	Myanmar	3.75	3.75
Macedonia	4.00	3.14	Thailand	3.67	3.33
Montenegro	3.57	3.29	The Philippines	4.00	3.56
Moldova	3.86	3.14	Timor-Leste	4.00	3.50
Romania	3.71	3.29	Viet Nam	4.00	3.83
Serbia	3.78	3.44			
Turkey	3.88	3.13			
Europe average	*3.80*	*3.21*	*Asia average*	*3.81*	*3.51*

The institutional background of the respondents shows a balanced mix between government and NGOs (42% and 56% respectively). Figure 27 shows a more detailed breakdown of organization types of the questionnaire respondents.

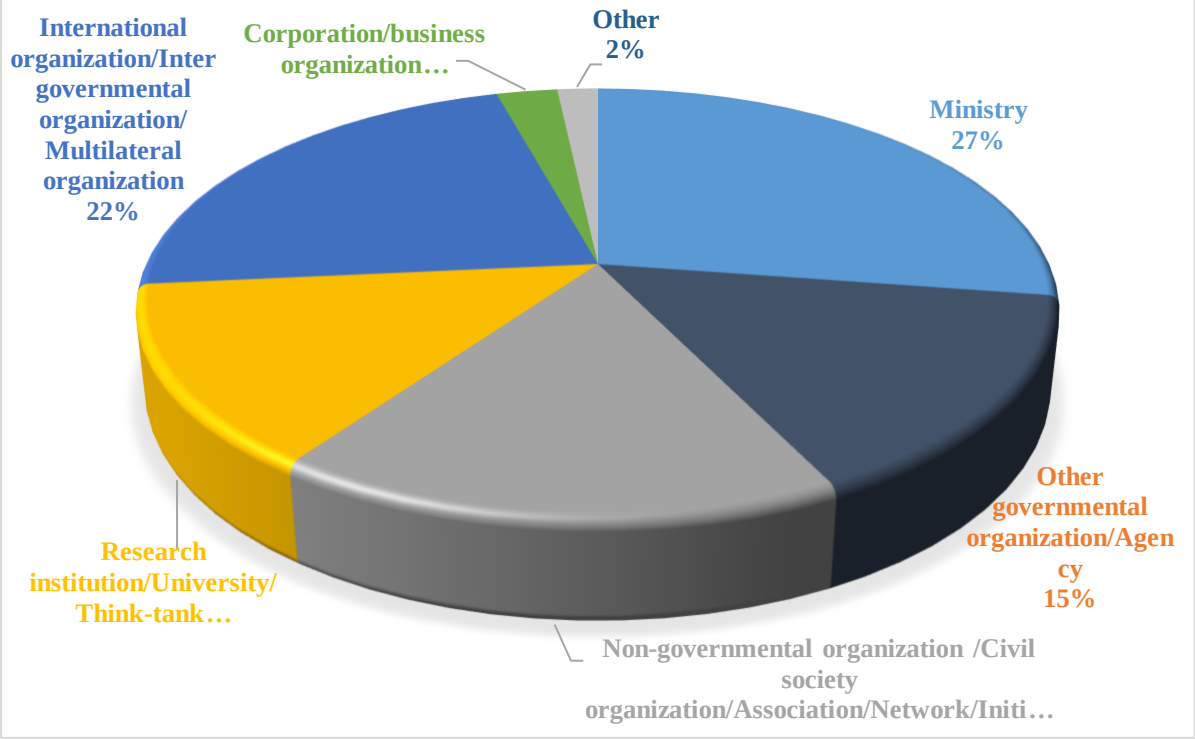

Figure 27: Submissions according to type of institutions

The percentage of respondents from government organizations was lower among the European submissions (37%) and higher among the Asian submissions (49%). Among institutional types, the biggest difference was among the submission from international/intergovernmental or multilateral organizations (31% from Europe versus 10% from Asia respectively). Regarding the distribution of years of experience, 16% of the respondents indicated 5 or fewer years of experience, 26% of the respondents 5-10 years of experience and 54% of the respondents had above 10 years of experience[6]. 4 respondents did not provide answer to this question.

Annex 6b: Selections of 1st, 2nd and 3rd priority choices of the total, Asian and European respondents concerning the 58 implementation capacity factors

		Total	Europe	Asia
1. Development of a strategic framework	1. Strategies/Policies/Plans are based on research and feasibility studies	50%	53%	45%
	2. Strategies/Policies/Plans are consulted with stakeholders	65%	60%	71%
	3. Strategies/Policies/Plans are harmonized and coherent	32%	28%	39%
	4. Strategies/Policies/Plans use integrated approaches towards socio-economic and environmental problems	64%	63%	65%
	5. Strategies/Policies/Plans set concrete; quantified and time-bound targets	42%	56%	22%
	6. Strategies/Policies/Plans are tailored to regional/local circumstances	43%	34%	55%
2. Institutional framework for implementation	1. Designation of lead national implementation institution(s)	42%	34%	53%
	2. Clear allocation of implementation responsibilities (e.g. among ministries; between national and local level)	79%	84%	71%
	3. Inter-institutional coordination mechanisms	39%	38%	41%
	4. Co-operation with research institutions to support decision-making with relevant scientific research results	57%	59%	55%
	5. Involvement of stakeholder groups in environmental decision-making	75%	76%	73%
3. Institutional capacity for implementation	1. Political commitment to implementation	79%	81%	76%
	2. Qualified human capacity	58%	68%	45%
	3. Technical preparedness of implementing institutions (e.g. with equipment and infrastructure)	33%	26%	43%
	4. Financing for environmental goal implementing organizations	64%	62%	67%
	5. Empowerment of local governments to implement environmental goals	61%	56%	67%
4. Domestic financing for implementation	1. Stable macroeconomic environment/Adequate economic development	57%	57%	57%
	2. Allocation of earmarked public budget to environmental goals	81%	76%	88%
	3. Use of environmental taxes and charges	59%	65%	51%
	4. Use of financial incentives to mobilize private resources (e.g. for technology improvement)	79%	81%	76%
	5. Adequate economic operation of environmental utility companies	16%	10%	24%
5. International support cooperation for implementation	1. Synchronized donor and recipient objectives	45%	53%	35%
	2. International financial support	62%	54%	71%
	3. International technical assistance (e.g. capacity-building or technology transfer)	68%	65%	73%
	4. National capacity for efficient utilization of international support	74%	71%	80%
	5. Transboundary/Regional co-operation	44%	49%	37%
6. Law implementation and enforcement	1. Targeted government measures to implement laws	77%	74%	82%
	2. Environmental permitting/licensing	67%	63%	71%
	3. Transparent and efficient system for enforcement	83%	85%	80%
	4. Adequacy of the treatment of environmental matters by the courts	38%	49%	24%

	5. Improved land ownership	23%	15%	35%
7. Stakeholder engagement	1. Public awareness-raising about environmental issues	60%	53%	69%
	2. Environmental education and training to target groups	76%	76%	73%
	3. Civil society involvement in environmental activities	65 %	64,7%	63 %
	4. Engagement of businesses in voluntary environmental activities	59%	66%	47%
	5. Integration of environmental considerations into privatization processes	34%	26%	45%
8. Scientific research	1. Sufficient and adequate research infrastructure	56%	57%	53%
	2. Regular and systematic research programs	62%	60%	63%
	3. Cooperation between research organizations and businesses	67%	71%	61%
	4. Collaboration between national research institutions	41%	37%	47%
	5. Collaboration with international research institutions	68%	68%	67%
9. Monitoring framework	1. Clear institutional responsibility for monitoring	78%	76%	80%
	2. Institutional mechanism to coordinate monitoring capacities	44%	35%	55%
	3. Sufficient and adequate human capacity for monitoring	49%	51%	45%
	4. Sufficient technical capacity for monitoring	38%	35%	41%
	5. Sufficient financial resources for monitoring	63%	71%	53%
	6. Involvement in regional/global monitoring initiatives	24%	24%	24%
10. Data collection processes	1. Monitoring plans are developed	53%	51%	55%
	2. Monitoring methodologies are harmonized and are in line with international guidelines	54%	53%	55%
	3. Baseline data (physical assessments; resource inventories) are available	57%	49%	69%
	4. Data collection processes are adequate to provide sufficient; functional and regular statistics	66%	65%	67%
	5. Integrated databases for environmental information system is introduced	62%	74%	47%
11. Review of implementation	1. Adequate environmental reporting process	73%	65%	84%
	2. International reporting obligations are followed	35%	41%	27%
	3. Environmental goal implementation is regularly assessed	52%	46%	61%
	4. Public access to environmental information is secured	61%	69%	49%
	5. Governments are held accountable for environmental goal implementation	74%	75%	71%

Annex 6c: Selections of 1st, 2nd and 3rd priority choices concerning the 58 implementation capacity factors, according to the type of institutions of the questionnaire respondents

		Int. org.	Ministry Gov. agency	NGOs CSOs	Research institution University Think-tank
1. Development of a strategic framework	1. Strategies/Policies/Plans are based on research and feasibility studies	38%	57%	55%	44%
	2. Strategies/Policies/Plans are consulted with stakeholders	81%	57%	60%	69%
	3. Strategies/Policies/Plans are harmonized and coherent	27%	37%	30%	19%
	4. Strategies/Policies/Plans use integrated approaches towards socio-economic and environmental problems	73%	63%	55%	81%
	5. Strategies/Policies/Plans set concrete; quantified and time-bound targets	38%	43%	50%	38%
	6. Strategies/Policies/Plans are tailored to regional/local circumstances (e.g. with local environmental plans)	35%	45%	50%	44%
2. Institutional framework for implementation	1. Designated national implementation institution(s)	35%	47%	40%	44%
	2. Clear allocation of implementation responsibilities (e.g. among ministries; between national and local level)	85%	82%	70%	81%
	3. Inter-institutional coordination mechanisms	54%	37%	25%	38%
	4. Co-operation with research institutions to support decision-making with relevant scientific research results	38%	63%	70%	50%
	5. Involvement of stakeholder groups in environmental decision-making (e.g. businesses; civil society)	77%	73%	85%	75%
3. Institutional capacity for implementation	1. Political commitment to implementation	88%	80%	85%	56%
	2. Qualified human capacity	69%	59%	40%	69%
	3. Technical preparedness of implementing institutions (e.g. with equipment and infrastructure)	23%	41%	30%	25%
	4. Financing for environmental goal implementing organizations	58%	65%	70%	69%
	5. Empowerment of local governments to implement environmental goals	54%	55%	75%	75%
4. Domestic financing for implementation	1. Stable macroeconomic environment/Adequate economic development	42%	71%	60%	38%

	2. Allocation of earmarked public budget to environmental goals (e.g. for infrastructure development)	88%	78%	75%	88%
	3. Use of environmental taxes and charges	73%	51%	70%	56%
	4. Use of financial incentives to mobilize private resources (e.g. for technology improvement)	77%	84%	65%	88%
	5. Adequate economic operation of environmental utility companies	15%	12%	20%	25%
5. International support cooperation for implementation	1. Synchronized donor and recipient objectives	65%	35%	50%	50%
	2. International financial support	42%	73%	70%	44%
	3. International technical assistance (e.g. capacity-building or technology transfer)	54%	73%	65%	81%
	4. National capacity for efficient utilization of international support	81%	69%	75%	81%
	5. Transboundary/Regional co-operation	54%	49%	25%	38%
6. Law implementation and enforcement	1. Targeted government measures to implement laws	81%	86%	70%	63%
	2. Environmental permitting/licensing	62%	78%	65%	50%
	3. Transparent and efficient system for enforcement	85%	84%	80%	88%
	4. Adequacy of the treatment of environmental matters by the courts	46%	31%	40%	50%
	5. Improved land ownership	15%	18%	40%	19%
7. Stakeholder engagement	1. Public awareness-raising about environmental issues	58%	63%	60%	56%
	2. Environmental education and training to target groups	77%	78%	85%	63%
	3. Civil society involvement in environmental activities	73%	59%	75%	56%
	4. Engagement of businesses in voluntary environmental activities	62%	59%	50%	69%
	5. Integration of environmental considerations into privatization processes	27%	41%	30%	38%
8. Scientific research	1. Sufficient and adequate research infrastructure	35%	59%	65%	69%
	2. Regular and systematic research programs	58%	65%	65%	44%
	3. Cooperation between research organizations and businesses	88%	57%	55%	69%
	4. Collaboration between national research institutions	27%	43%	45%	56%
	5. Collaboration with international research institutions	81%	71%	70%	56%
9. Monitoring framework	1. Clear institutional responsibility for monitoring	85%	71%	80%	81%
	2. Institutional mechanism to coordinate monitoring capacities	42%	39%	50%	50%
	3. Sufficient and adequate human capacity for monitoring	38%	55%	55%	50%

	4. Sufficient technical capacity for monitoring	31%	49%	25%	31%
	5. Sufficient financial resources for monitoring	69%	69%	50%	50%
	6. Involvement in regional/global monitoring initiatives	19%	20%	40%	31%
10. Data collection processes	1. Monitoring plans are developed (that establish quality standards and selects indicators)	38%	55%	65%	63%
	2. Monitoring methodologies are harmonized and are in line with international guidelines	50%	55%	60%	56%
	3. Baseline data (physical assessments; resource inventories) are available	65%	59%	40%	50%
	4. Data collection processes are adequate to provide sufficient; functional and regular statistics	65%	63%	65%	75%
	5. Integrated databases for environmental information system is introduced	69%	63%	65%	56%
11. Review of implementation	1. Adequate environmental reporting process	77%	78%	70%	69%
	2. International reporting obligations are followed	35%	39%	40%	19%
	3. Environmental goal implementation is regularly assessed	19%	69%	40%	75%
	4. Public access to environmental information is secured	85%	45%	70%	63%
	5. Governments are held accountable for environmental goal implementation	81%	65%	80%	75%

Annex 7: Examples of capacity indicators organized by policy implementation themes

Theme 1. Development of a strategic framework:

- Relevant research results are the basis for the formulation of environmental protection policies (BiH UNEP 2010, 73)
- Capacity to integrate climate change considerations in national development policies (Government of Philippines, UNDP and GEF 2005, 109)
- A mechanism for the harmonization and implementation of relevant strategies have been established (BiH UNEP 2010, 74)
- Index to measure the adequacy of legislation (Coskun and Gencay 2011)
- Existence of national climate change policy or law (Steves and Teytelboym 2013, 25)
- The existence and comprehensiveness of laws and policies governing on transparent forest planning and regional spatial planning (UNDP Indonesia 2012, 205)
- The existence and comprehensiveness of laws and policies governing on forest planning and regional spatial plan formulation involving all stakeholders (UNDP Indonesia 2012, 205)
- The country has developed a Local Environment Plan (African Capacity Building Foundation 2013, 428)
- The extent to which the law requires opportunities for public input for the preparation of environmental legislation (Worker and De Silva 2015, 29)
- Number of environmental strategies, programs and plans that take into account the objectives of environmental conventions (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 46)
- Degree of agreements in specific strategies, programs and plans (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 46)

Theme 2. Institutional framework for implementation:

- Dedicated climate change institution (Steves and Teytelboym 2013, 25)
- Organization of water management administration (Araral and Yu 2010, 5)
- Level of involvement of leading environmental institutions in the implementation of MEAs (BiH UNEP 2010, 110)
- Convention implementation units are established, and responsibilities are defined (Romania, UNDP and GEF 2005, 43)
- The existence of a joint management operating mechanism (BiH UNEP 2010, 111)

- Multi-stakeholder platform is established for natural resource management (African Capacity Building Foundation 2013, 463)
- Degree of integration of the objectives of the conventions into the work of the agencies (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 51)
- Inter-agency working group to implement the Nagoya Protocol (Philippines, NEDA 2014, Annex 3)
- Local development councils are set up (African Capacity Building Foundation 2013, 463)

Theme 3. Institutional capacity:

- Sufficient level of staff, skills, training, performance review and employment conditions in protected area management (Porej and Matic 2009, 44)
- The number of personnel who own sufficient qualification in carrying out regional planning for forest management (UNDP Indonesia 2012, 207)
- Adequate resources have been mobilized for the operation of the management of environmental protection organizations BiH UNEP 2010, 117)
- Functional capacity and balance of water management administrations (Araral and Yu 2010, 5)
- The amount of funds allocated to develop the process for participatory spatial planning (UNDP Indonesia 2012, 215)
- Number of officials trained at different ministries (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 31)
- Availability of necessary technical skills (BiH UNEP 2010, 118)
- There is a demonstrated commitment to protected area management (Porej and Matic 2009, 46)

Theme 4. Domestic financing capacity:

- Finance available for water investments (Araral and Yu 2010, 3)
- Existence of an independent water pricing body (Araral and Yu 2010, 4)
- Annually utilized funds for the implementation of forest, GHG emission reduction, RES or energy efficiency projects (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 56)
- Funding is adequate for protected are management activities (Porej and Matic 2009, 44)
- Number of local governments that have mainstreamed and budgeted for biodiversity objectives (Croatia, Environment Agency 2005, 77)
- Number of financed projects (Romania, UNDP and GEF 2005, 46)

Theme 5. International support and co-operation:

- Existence of an aid coordination policy and mechanism (African Capacity Building Foundation 2013, 428)

- The country has signed up to REDD (African Capacity Building Foundation 2013, 464)
- Availability technology transfer (BiH UNEP 2010, 118)
- Annually utilized development financing from various funds and financial sources for environmental projects (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 60)
- Number of international projects, funds from international sources (Croatia, Environment Agency 2005, 77)
- Allocated amount for co-financing international projects compared to the previous year (Romania, UNDP and GEF 2005, 43)
- Number of strategies and the extent to which they cover technology transfer- related issues (Romania, UNDP and GEF 2005, 47)

Theme 6. Law implementation and enforcement capacity:

- Number of projects were public notices were given seeking comments on the EIA or its terms of reference (Worker and De Silva 2015, p21)
- The extent the law requires adequate and effective remedies in cases relating to the environment (Worker and De Silva 2015, 44)
- The extent of forest areas which are designated and accepted by the parties (UNDP Indonesia 2012, 215)
- Level of understanding of the permit issuers that the permit granting mechanism aims at controlling and regulating forests (UNDP Indonesia 2012, 208)
- Sufficient number of prosecutors/judges and own adequate qualifications in forestry and environment (UNDP Indonesia 2012, 208)

Theme 7. Stakeholder engagement:

- Cooperation between stakeholders (BiH UNEP 2010, 112)
- Awareness of stakeholders (BiH UNEP 2010, 112)
- Number of press releases on environmental goals by different ministries (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 43)
- Existence of environmental educational plans (BiH UNEP 2010, 114)
- Number of officials trained at different stakeholder institutions (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 39)
- Number of trained teachers by area (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 31)
- The Constitution provides for CSO involvement in economic policymaking for NRM (African Capacity Building Foundation 2013, 462)

- Number of NGO activists who actively provide inputs for regional spatial and forest planning (UNDP Indonesia 2012, 215)
- The number of business representatives who are present and participate in meetings which discusses forest planning (UNDP Indonesia 2012, 215)

Theme 8. Research and scientific cooperation:

- Research on key social and ecological issues is consistent with the needs of protected area management (Porej and Matic 2009, 45)
- Critical research needs are identified and prioritized (Porej and Matic 2009, 45)
- Number of biodiversity projects increased, stocktaking of uncovered aspects of biological diversity started (Croatia, Environment Agency 2005, 77)
- Number of research projects (Philippines, NEDA, 2014, Annex3)
- Collaboration between research institutions (Philippines, NEDA 2014, Annex3)
- Connection between environmental research and environmental policy implementation policy (BiH UNEP 2010, 112)
- Number of academicians that actively provide input for regional and forest planning (UNDP Indonesia 2012, 215)
- Science and technology application (Araral and Yu 2010, 6)
- Allocated amount for research projects (Romania, UNDP and GEF 2005 45)
- Percentage of annually utilized funds from those allocated under the National Scientific Programme for Global Environmental Management (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 37)
- Use of traditional knowledge in environmental decision-making processes (BiH UNEP 2010, 113)

Theme 9. Institutional framework for monitoring:

- Existence of a National Strategy for the Development of Statistics (African Capacity Building Foundation 2013, 426)
- There is a Unit dedicated to the collection of data on environment in the Ministry of Environment, Ministry of Forest and Ministry of mining (African Capacity Building Foundation 2013, 471)
- The extent to which competent public authorities are mandated by law to regularly collect and update relevant environmental information (Worker and De Silva 2015, 16)
- Adequacy of the Convention implementation monitoring process (BiH UNEP 2010, 118)

Theme 10. Environmental data collection processes:

- Critical research and monitoring needs are identified and prioritized (Porej and Matic 2009, 45)
- Monitoring is timely and correctly (BiH UNEP 2010 118)

- Comprehensive computerized records of natural resources, in form of maps African Capacity Building Foundation 2013, 464)
- Validity of water data for planning (Araral and Yu 2010, 4)
- All known natural habitat types are identified and include in existing plans (Philippines, NEDA 2014, Annex3)
- There is a comprehensive inventory of the biological diversity throughout the region (Porej and Matic 2009, 46)
- Degree of compliance of required and provided data for reporting to environmental conventions (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 37)

Theme 11. Reporting and review processes:

- Information system set up, volume (type, number) and accessibility (levels) of data and information increased (Croatia, Environment Agency 2005, 77)
- Compliance of required and provided data for reporting to MEAs (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 37) in percentage
- Number of annual reports on the condition environment using the convention implementation indicators (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 37)
- Number of annual reports on the implementation of the strategies, programs, and development plans (Bulgaria, Ministry of Environment and Water, GEF and UNDP 2004, 36)
- Effective evaluations are carried out timely and correctly (BiH UNEP 2010, 77)
- Monitoring results are applied as a basis for creating knowledge and possibly as a basis… for changing the course of implementation activities (BiH UNEP 2010, 76)
- Extent to which the environment is enabling for transparency (African Capacity Building Foundation 2013, 462)
- To extent to which the law mandates (timely/affordable) access to environmental information to be provided upon request? (Worker and De Silva 2015, 10-11)
- The extent to which the law mandates the government to publish reports on the state of the environment periodically and at reasonable intervals (Worker and De Silva 2015, 17-18)
- Legal accountability of water sector officials (Araral and Yu 2010, 2)

Annex 8: Overview of the proposed components, implementation capacity indicator clusters, indicators of the STMI and their scoring methodology

Component 1: Institutional framework and capacity	Suggested scoring
1.1: Allocation of implementation responsibilities	
1.1.1. Is there an implementation plan for the environmental issue(s) in question, which defines the main responsible government body for each implementation measure?	*1 – Yes* *0,5 – To some extent* *0 – No*
1.1.2. Are there dedicated units in relevant ministries to support the implementation of the environmental SDG in question?	*1 – Yes in all* *0,5 – Yes, in some* *0 – No*
1.1.3.Are the responsibilities of the local governments clearly defined regarding the implementation of the studied environmental SDG?	*1 – Yes, defined by law* *0,5 – To some extent* *0 – No*
1.1.4 Is there an established institutional mechanism for the coordination of implementation activities among multiple actors?	*1 – Yes* *0,5 – Yes but with limited functioning* *0 – No*
1.2: Political commitment to implementation	
1.2.1. Are all relevant international environmental agreements signed and ratified?	*1 – Yes* *0,5 – Partially* *0 – No*
1.2.2. Is the environmental SDG in question included as a priority in the current national development strategy of the country?	*1 – Yes* *0,5 – Discussed but not as a stand-alone priority* *0 – No*
1.2.3. What is level of the main responsible body or unit, which is the primary responsible for the coordination and the implementation of the environmental goal in question?	*1 – Dedicated Ministry* *0,66 – Department* *0,33 – Dedicated Unit* *0 – None of the above*
1.2.4. Are environmental considerations supported and prioritized in budget planning/investment decision?	*1 – Yes* *0,5 – To some extent* *0 – No*
1.3: Involvement of stakeholder groups (e.g. businesses; civil society) in environmental decision-making	
1.3.1. Is there a formal mechanism (e.g. a National Council for Climate Change) to involve various stakeholders during the planning of policies and implementation activities of the environmental SDG in question?	*1 – Yes* *0,5 – Yes, but restricted to some stakeholders or ad-hoc* *0 – No*
1.3.2. Are results of stakeholder consultations taken into consideration before finalizing policies and plans concerning the environmental SDG in question?	*1 – Yes* *0,5 – To some extent* *0 – No*
1.3.3. Are stakeholders involved in operative-level environmental decision-making relevant to the environmental SDG e.g. industrial or investment permitting procedures or in negotiating natural resource extraction and management activities)?	*1 – Yes, defined by law* *0,5 – To some extent* *0 – No*

Component 2: Law implementation capacity	Suggested scoring
2.1. Targeted government measures to implement laws	
2.1.1. Are relevant environmental policies and laws translated into concrete (quantified and time-bound) implementation measures?	*1 – Yes* *0,5 – To some extent* *0 – No*
2.1.2 Are measures defined by environmental policies and laws are based on research and feasibility studies and thus realistic to implement?	*1 – Yes in all* *0,5 – To some extent* *0 – No*
2.1.3. Do the institutions primarily responsible for the implementation of the relevant environmental SDGs hold sufficient human capacity to translate environmental policies and laws into specific measures and support their implementation?	*1 – Yes/Mostly* *0,5 – To some extent* *0 – No*
2.2: Transparent and efficient system for enforcement	
2.2.1. Are there established target values for improvements to the environmental SDG in question?	*1 – Yes* *0,5 – For some targets* *0 – No*
2.2.2. Is there regulation in place to monitor and enforce compliance with relevant environmental policies and laws?	*1 – Yes* *0,5 – To some extent* *0 – No*
2.2.3. Are inspections processes planned according to international practices and follow a standardized approach concerning reporting and evaluation?	*1 – Yes* *0,5 – To some extent* *0 – No*
2.2.4. Is there regulation in place that stipulates fines and sanctions concerning the environmental SDG in question and defines a method of their collection and use?	*1 – Yes* *0,5 – To some extent* *0 – No*
2.3: Environmental impact assessment and permitting/licensing	
2.3.1. Are there requirements to prepare EIAs before large development projects?	*1 – Yes* *0,5. –With limited scope* *0 – No*
2.3.2. Is there a comprehensive, integrated environmental permitting and licensing system (i.e. IPPC)?	*1 – Yes* *0,5 – Not fully developed* *0 – No*
2.3.3. Does the environmental permitting/licensing system function efficiently?	*1 – Yes* *0,5 – To some extent* *0 – No*

Component 3: Financing capacity	Suggested scoring
3.1. Allocation of earmarked public budget to environmental goals	
3.1.1.Are the exact financial requirements of programmed environmental actions and plans (set e.g. in action plans) known?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.1.2.Is there a mechanism to ensure that resources are earmarked in annual government budget to implement all relevant environmental investments and programs?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.1.3.Are there revenue collection activities for the implementation of the environmental goal in question (e.g. via the collection of environmental charges and taxes or the establishment of environmental funds)?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.2. Use of financial incentives to mobilize private resources	
3.2.1. Are subsidy schemes, tax allowances/exemptions available for private sector actors that can motivate the implementation of relevant environmental SDGs.	*1 – Yes* *0,5 – To some extent* *0 – No*
3.2.2. Are there (green) investment schemes that can provide loans and grants to private sector actors to motivate the implementation of the relevant environmental SDGs?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.2.3. Is the country a member of relevant international financing schemes?	*1 – Yes* *0,5 – To some* *0 – No*
3.2.4. Has the country phased-out of environmentally harmful subsidies (e.g. for fuels and pesticides)	*1 – Yes* *0,5 – To some extent* *0 – No*
3.3. National capacity for efficient utilization of international support	
3.3.1. Does the country have a plan with concrete measures for attracting and coordinating international financial and technical support for the implementation of the environmental SDG in question?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.3.2. Is there a government body that coordinates international funds and support for the environmental SDG in question?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.3.3. Is there sufficient capacity at the national level to attend negotiations of the relevant environmental conventions?	*1 – Yes* *0,5 – To some extent* *0 – No*
3.3.4. Is there sufficient capacity at the national level to manage, monitor and report the implementation of projects financed and supported from international funds?	*1 – Yes* *0,5 – To some extent* *0 – No*

Component 4: Knowledge creation capacity	Suggested scoring
4.1. Environmental education	
4.1.1.Is there a government decision (decree) or strategy/action plan to introduce education concerning the environmental SDG in question?	1 – Yes *0,5* – To some extent 0 – No
4.1.2. Is there a responsible body to coordinate environmental education activities in the country?	1 – Yes *0,5* – To some extent 0 – No
4.1.3. Are there environmental education curricula developed at the national level?	1 – Yes *0,5* – *To some extent* 0 – No
4.1.4. Are environmental considerations/modules integrated into higher-education curricula and vocational training?	1 – Yes *0,5* – To some extent 0 – No
4.2. Research and scientific co-operation	
4.2.1. Is there a strategy or plan that establishes research priorities, cooperation areas and technology transfer mechanisms concerning the environmental SDG in question?	1 – Yes *0,5* – To some extent 0 – No
4.2.2. Are national researchers supported to participate in relevant international research activities and collaborations?	1 – Yes *0,5* – *To some extent* 0 – No
4.2.3. Are there privately-owned and run environmental research centers or laboratories in the country (concerning the environmental SDG in question)?	1 – Yes *0,5* – To some extent 0 – No
4.2.4. Is the/Are there national scheme(s) and/or bodies to support the transfer of environmentally friendly technologies to businesses by awareness-raising, consultancy and financing activities?	1 – Yes *0,5* – *To some extent* 0 – No

Component 5: Monitoring capacity	Suggested scoring
5.1. Delineation of institutional mandates for monitoring	
5.1.1. Is there a main body responsible for the coordination of monitoring activities?	*1* – *Yes* *0,5* – *Partially* *0* – *No*
5.1.2. Are data collection responsibilities clearly defined?	*1* – *Yes* *0,5* – *To some extent* *0* – *No*
5.1.3. Is there data provision requirements for external actors (e.g. for companies) concerning the environmental SDG in question?	*1* – *Yes* *0,5* – *To some extent* *0* – *No*
5.1.4. Do institutions have sufficient capacity to regularly collect, process and store relevant data?	*1* – *Yes* *0,5* – *To some extent* *0* – *No*
5.2. Adequacy of data collection processes to provide sufficient, functional and regular statistics	
5.2.1. Is data collected for all relevant environmental indicators?	*1* – *Yes* *0,5* – *For some* *0* – *No*
5.2.2. Have clear data collection guidelines been developed?	*1* – *Yes* *0,5* – *To some extent* *0* – *No*

5.2.3. Are data collection activities carried out regularly so that the available data is up to date?	*1 – Yes* *0,5 – To some extent* *0 – No*
5.2.4. Is the quality of the collected data validated and the data is processed for further analysis?	*1 – Yes* *0,5 – To some extent* *0 – No*

Component 6: Policy review capacity	**Suggested scoring**
6.1 Environmental reporting systems	
6.1.1 Is there a law that requires the preparation of general state of the environment reports concerning the environmental SDG in question?	*1 – Yes* *0 – No*
6.1.2. Is there a responsible body appointed to coordinate the preparation of state of the environmental reports?	*1 – Yes* *0 – No*
6.1.3. Is the necessary data available for the preparation of reports?	*1 – Yes* *0,5 – To some extent* *0 – No*
6.1.4. Are stakeholders (including research institutions, NGOs) involved in the preparation of environmental reports?	*1 – Yes* *0,5 – To some extent* *0 – No*
6.2 Government accountability mechanisms	
6.2.1. Do relevant environmental strategies require the preparation of regular progress review of their implementation?	*1 – Yes* *0,5 – To some extent* *0 – No*
6.2.2. Are relevant data and information or (if available) implementation reports of environmental SDGs made publicly available on a timely basis?	*1 – Yes* *0,5 – To some extent* *0 – No*
6.2.3. Is the government required to report (e.g. to the parliament) on progress with the implementation of environmental strategies?	*1 – Yes* *0,5 – To some extent* *0 – No*
6.2.4. Is there a general auditor body to review progress with the implementation of the environmental SDG in question?	*1 – Yes* *0,5 – To some extent* *0 – No*

Annex 9. Results of the pilot testing of the proposed implementation capacity indicators for the STMI – Turkey, implementation capacities of climate change mitigation goals

Component 1: Institutional framework and capacity

Indicator cluster 1.1: Allocation of implementation responsibilities	
Indicators	**Score**
1.1.1. Is there an implementation plan for the environmental issue(s) in question, which defines the main responsible government body for each implementation measure?	0,5 – Yes, in some
1.1.2.Are there dedicated units in relevant ministries to support the implementation of the environmental SDG in question?	0,5 – Yes, in some
1.1.3.Are the responsibilities of the local governments clearly defined regarding the implementation of the studied environmental SDG?	0,5 – To some extent
1.1.4.Is there an established institutional mechanism for the coordination of implementation activities among multiple actors?	0,5 – Yes, but with limited functioning
Indicator cluster 1.2: Political commitment to implementation	
Indicators	**Score**
1.2.1. Are all relevant international environmental agreements signed and ratified?	0,5 – Partially
1.2.2. Is climate change included as a priority in the current national development strategy of the country?	0,5 – Discussed but not as a stand-alone priority
1.2.3. What is level of the main government body or unit, which is the primary responsible for the coordination and the implementation of the environmental goal in question?	0,66 – Department
1.2.4. Are climate considerations supported and prioritized in budget planning/investment decision?	0 – No
Indicator cluster 1.3: Involvement of stakeholder groups (e.g. businesses; civil society) in environmental decision-making	
Indicators	**Score**
1.3.1. Is there a formal mechanism (e.g. a National Council for Climate Change) to involve various stakeholders during the planning of policies and implementation activities of the environmental SDG in question?	0,5 – Yes, but restricted to some stakeholders
1.3.2. Are results of stakeholder consultations taken into consideration before finalizing policies and plans concerning the environmental SDG in question?	0,5 – To some extent
1.3.3. Are stakeholders involved in operative-level environmental decision-making relevant to the environmental SDG e.g. industrial or investment permitting procedures or in negotiating natural resource extraction and management activities)?	1 – Yes, as defined by law

Component 2. Law implementation capacity

Indicator cluster 2.1. Targeted government measures to implement laws	
Indicators	**Score**
2.1.1. Are climate policies and laws translated into concrete (quantified and time-bound) implementation measures?	0,5 – To some extent
2.1.2. Are measures defined by climate policies and laws are based on research and feasibility studies and thus considered realistic to implement?	0 – No
2.1.3. Do the institutions primarily responsible for the implementation of the relevant environmental SDG hold sufficient human capacity to translate environmental policies and laws into specific measures and support their implementation?	0,5 – To some extent
Indicator cluster 2.2: Transparent and efficient system for enforcement	
Indicators	**Score**
2.2.1. Are there established target values for improvements to the environmental SDG in question?	0 – No
2.2.2. Is there regulation in place to monitor and enforce compliance with relevant environmental policies and laws?	0,5 – Partially
2.2.3. Are inspections processes planned according to international practices and follow a standardized approach concerning reporting and evaluation?	0,5 – Partially
2.2.4. Is there regulation in place that stipulates fines and sanctions concerning the environmental SDG in question and defines a method their collection and use?	0 – No
Indicator cluster 2.3: Environmental impact assessment and permitting/licensing	
Indicators	**Score**
2.3.1. Are there requirements to prepare EIAs before large development projects?	0,5 – To some extent
2.3.3. Is there an integrated environmental permitting and licensing system (i.e. IPPC) in place?	0,5 – Not fully developed
2.3.4. Does the environmental permitting/licensing system function efficiently?	0,5 – To some extent

Component 3: Financing capacity

Indicator cluster 3.1. Allocation of earmarked public budget to environmental goals	
Indicators	**Score**
3.1.1. Are the exact financial requirements of programmed environmental actions and plans (set e.g. in action plans) known?	0 – No
3.1.2.Is there a mechanism to ensure that resources are earmarked in annual government budget to implement all relevant environmental investments and programs?	0 – No
3.1.3.Are there revenue collection activities for the implementation of the environmental goal in question (e.g. via the collection of environmental charges and taxes or the establishment of environmental funds)?	0,5 – To some extent
Indicator cluster 3.2. Use of financial incentives to mobilize private resources	
Indicators	**Score**
	0,5 – To some extent

3.2.1. Are subsidy schemes, tax allowances/exemptions available for private sector actors that can motivate the implementation of relevant environmental SDGs.	
3.2.2. Are there (green) investment schemes that can provide loans and grants to private sector actors to motivate the implementation of the relevant environmental SDGs?	*0,5* – To some extent
3.2.3. Is the country a member of relevant international financing schemes?	*0,5 – To some extent*
3.2.4. Has the country phased-out of environmentally harmful subsidies (e.g. for fuel and pesticides)	0 – No
Indicator cluster 3.3. National capacity for efficient utilization of international support	
Indicators	**Suggested scoring**
3.3.1. Does the country have a plan with concrete measures for attracting and coordinating international financial and technical support for the implementation of the environmental SDG in question?	0 – No
3.3.2. Is there a government body that coordinates international funds and support for the environmental SDG in question?	0,5 – To some extent
3.3.3. Is there sufficient capacity at the national level to attend negotiations of the relevant environmental conventions?	1 – Yes
3.3.4. Is there sufficient capacity at the national level to manage, monitor and report the implementation of projects financed and supported from international funds?	0,5 – To some extent

Component 4: Knowledge creation capacity

Indicator cluster 4.1. Environmental education and trainings to target groups	
Indicators	**Suggested scoring**
4.1.1. Is there a government decision (decree) or strategy/action plan to introduce education concerning the environmental SDG in question?	0,5 – To some extent
4.1.2. Is there a responsible body to coordinate environmental education activities in the country?	0,5 – To some extent
4.1.3. Are there environmental education curricula developed at the national level?	0,5 – To some extent
4.1.4. Are environmental considerations/modules integrated into higher-education curricula and vocational training?	0,5 – To some extent
Indicator cluster 4.2. Research cooperations	
Indicators	**Suggested scoring**
4.2.1. Is there a strategy or plan that establishes research priorities, cooperation areas and technology transfer mechanisms concerning the environmental SDG in question?	0,5 – To some extent
4.2.2. Are national researchers supported to participate in relevant international research activities and collaborations?	1 – Yes
4.2.3. Are there privately-owned and run environmental research centres or laboratories in the country (concerning the environmental SDG in question)?	0,5 – To some extent
4.2.4.Is the/Are there national scheme(s) and/or bodies to support the transfer of environmental friendly technologies to businesses by awareness-raising, consultancy and financing activities?	1 – Yes

Component 5: Monitoring capacity

Indicator cluster 5.1 Delineation of institutional mandates for monitoring	
Indicator	**Suggested scoring**
5.1.1. Is there a main body responsible for the coordination of monitoring activities?	1 – Yes
5.1.2. Are data collection responsibilities clearly defined?	1 – Yes
5.1.3.Is there data provision requirements for external actors (e.g. for companies) concerning the environmental SDG in question ?	1 – Yes
5.1.4.Do institutions have sufficient capacity to regularly collect, process and store relevant data?	0,5 – To some extent
Indicator cluster 5.2. Adequacy of data collection processes to provide sufficient, functional and regular statistics	
Indicators	**Suggested scoring**
5.2.1. Is data collected for all relevant environmental indicators?	0,5 – To some extent
5.2.2. Have clear data collection guidelines been developed?	0,5 – To some extent
5.2.3. Are data collection activities carried out regularly so that the available data is up to date?	0,5 – To some extent
5.2.4. Is the quality of the collected data validated and the data is processed for further analysis?	0,5 – To some extent

Component 6: Capacity to follow-up implementation

Indicator cluster 6.1 Environmental reporting systems	
Indicators	**Suggested scoring**
6.1.1 Is there a law that requires the preparation of general state of the environment reports concerning the environmental SDG in question?	1 – Yes
6.1.2. Is there a responsible body appointed to coordinate the preparation of state of the environmental reports?	1 – Yes
6.1.3. Is the necessary data available for the preparation of reports?	1 – Yes
6.1.4. Are stakeholders (including research institutions, NGOs) involved in the preparation of environmental reports?	0,5 – To some extent
Indicator cluster 6.2 Government accountability mechanisms	
Indicators	**Suggested scoring**
6.2.1. Do relevant environmental strategies require the preparation of regular progress review of their implementation?	0 – No
6.2.2. Are relevant data and information or (if available) implementation reports about climate change made publicly available on a timely basis?	0,5 – To some extent
6.2.3. Is the government required to report (e.g. to the parliament) on progress with the implementation of environmental strategies?	0,5 – To some extent
6.2.4. Is there a general auditor body to review progress with the implementation of the environmental SDG in question?	0,5 – Occasionally