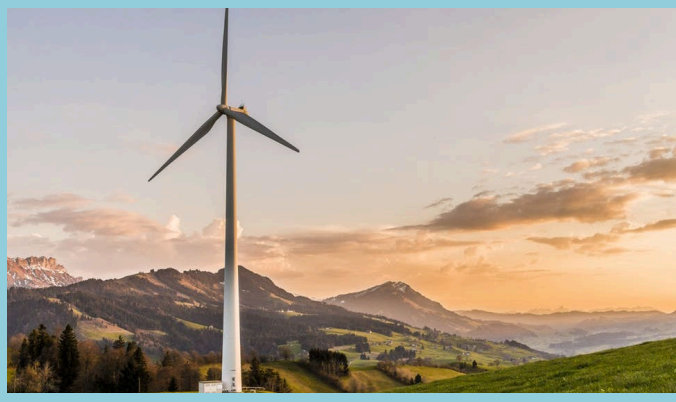
UNECE

Current state and development of the Shared Environmental Information System (SEIS)

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Republic of North Macedonia

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BACKGROUND

IMPROVED ENVIRONMENTAL MONITORING AND ASSESSMENT IN SUPPORT OF THE 2030 SUSTAINABLE DEVELOPMENT AGENDA IN SOUTH-EASTERN EUROPE, CENTRAL ASIA AND THE CAUCASUS.

Led by the United Nations Economic Commission for Europe (UNECE) and implemented together with the United Nations Environment Programme (UNEP), this project aims to strengthen the national capacities of seven target countries: Armenia, Bosnia and Herzegovina, Republic of North Macedonia, Georgia, Kazakhstan, Kyrgyzstan and Tajikistan. The target countries have requested support to improve environmental monitoring and assessment for the 2030 Agenda, highlighting the need to enhance the comparability of environmental statistics in the ECE region.

The project will focus on the following expected accomplishments:

- Strengthened capacities of national environmental authorities and statistical agencies to collect and produce required data and application of environmental indicators in accordance with the Shared Environmental Information System (SEIS) principles and practices.
- Improved accessibility and use of regularly updated and high-quality environmental indicators, within the framework of SEIS, to respond to international indicator-based reporting obligations, including monitoring progress towards the Sustainable Development Goals (SDGs).

The current report intends to address some of the national gaps and needs identified for this project on SEIS establishment and on the collection and management of environmental information and data for regular reporting, such as for the 2030 Agenda. The gap analysis also intends to address the use of environmental data and information in decision-making processes and communication.

The gap analysis review will serve multiple purposes, including defining existing gaps in data collection in the target country as a basis for developing training materials related to overcoming identified gaps and as a background paper for two national workshops with national officials and experts responsible for environmental data collection. It will also contribute towards the development of national roadmaps to monitor the SDG for each target country to support country ownership and future endorsement and implementation.

This project is funded by the United Nations Development Account and implemented by the United Nations Economic Commission for Europe in cooperation with the United Nations Environment Programme.

INTRODUCTION

The Republic of North Macedonia[1] is a landlocked country in the middle of the southern Balkan Peninsula. The country has a land area of 25,713 km^2. Forest ecosystems cover about 38.5 % of the country's land surface, and 44% is agricultural land. Mountains and hills cover about 79% of the total area. There are three big lakes of tectonic origin (Ohrid, Prespa and Doyran) and 43 small glacial lakes, approximately half of which are found on Sharr Mountains. There are 35 rivers, of which the Vardar River is the longest and the most important river; the Vardar basin comprises two-thirds of the territory. North Macedonia is a biodiversity-rich country with 28 key habitat types, and with the high level of endemism within species. Protected area covers 8.9% of the country's total area.

North Macedonia is an industrial and agricultural country. In 2016 the agricultural sector contributed with 11.5% share to GDP, including the value-added in the processing industry, and provided employment to 21.7% of the workforce, while the industrial processing industry contributed with 12.2 % to GDP.

A cross-cutting development priority of North Macedonia is an accession to the European Union, which is why it applies the European Union (EU) policy, including industrial policy on "green industry/processing" and EU SDG indicators. In April 2018 the European Commission started official membership talks with North Macedonia.

The main environmental problems of North Macedonia are:

- Air pollution in big cities[2,3];
- Vulnerability to the climate change-related issues (especially, the problem of water resources is important in terms of both quantity and quality[4])
- Waste management.[5]

In North Macedonia, the Ministry of Environment and Physical Planning (MEPP) is the main government body in charge of monitoring and environmental protection of air, water, biodiversity, protection against noise, radiation restoration of the polluted areas, solid waste and spatial planning. Within the framework of the "Industrial strategy of the Republic of North Macedonia for 2018-2027", the ministry has been identified as a key institution responsible for various aspects of sustainable development, climate change and circular/green economy.

North Macedonia has no Environmental Agency. Nevertheless, North Macedonian Environmental Information Centre (MEIC), which is a department within the Ministry of Environment and Physical Planning, gives expertise to MEPP regarding environmental data gathering, dissemination and reporting.

Primary task of the MEIC Department, as a part of the MEPP, is to establish, maintain and regularly update the base of relevant, properly processed (systematized and standardized), comprehensive, accurate, transparent and publicly accessible information on the state, quality and trends in all environmental segments (air, water, soil, noise, waste, nature and protected areas and items of

[1] Successor of Yugoslavia

[2] Квалитетна животната средина во Република Македонија, ГОДИШЕН ИЗВЕШТАЈ 2017

[3] Please see https://www.unenvironment.org/news-and-stories/story/most-polluted-capital-europe-you-didnt-even-know-about

[4] Third National Report of the Republic of North Macedonia to UNFCCC, pg. 59-60, 4.2.1.1. Climate Change impacts on water resources.

[5] Квалитетна животната средина во Република Македонија, ГОДИШЕН ИЗВЕШТАЈ 2017, Стратегија за животна средина и климатски промени 2014-2020 , part 5.2.2

nature). The primary function is carried out through data use and channeling from other information and statistical systems.

MEPP, i.e. MEIC, is the focal point with regard to environmental data in the country. MEPP has reporting obligations towards international bodies, such as European Environmental Agency (EEA), UNECE, European Statistical Office (Eurostat) and World Health Organization (WHO). Reporting obligations, both national and international, are executed by the MEIC.

STATUS AND DEVELOPMENT OF SEIS

Head of the Unit for Analysis and Reporting in Macedonian Environmental Information Centre is nominated as the SEIS focal point, a member of the Joint Task Force on Environmental Statistics and a member of the Working Group on Environmental Monitoring and Assessment (WGEMA). The Joint Task Force and the Working Group are established by the Economic Commission for Europe (ECE) Committee on Environmental Policy in order to review the progress in the establishment of SEIS.

In evaluating the SEIS performance status in 2016[6] in terms of availability and accessibility of the 67 SEIS data sets, North Macedonia, among other 50 countries, achieved 73% of data availability across all national websites. In addition, in the mid-term review on the establishment of SEIS[7] in 2018 North Macedonia reported the highest score for seven selected data flows.

There is a strong political commitment to the SEIS implementation forward through cooperation with EEA and reporting to EEA. The country actively implements the Shared Environmental Information System (SEIS) principles of open access to environmental data, production and sharing online the environmental data, including a set of 33 ECE environmental indicators.

The Republic of North Macedonia has recognized the importance of open data for economic and social development through open data platform[8], adherence to the Open Government Partnership[9] (OGP) and development of national action plans to response to OGP commitments. Three OGP commitments are referred to open data on reporting on environmental pollution, open data on climate change and development of climate policies in a participatory manner.

SEIS PILLAR I CONTENT

Environmental monitoring

In 2011 the Republic of North Macedonia officially decided to establish a national monitoring network[10] for air, water and noise, including specified measurement points, parameters and monitoring frequencies.

[6] ECE, 2016. Report on progress in establishing the Shared Environmental Information System in support of regular reporting in the pan-European region. ECE/BATUMI.CONF/2016/8.

[7] ECE, 2019. Mid-term review of the establishment of the Shared Environmental Information System. ECE/CEP/2019/7

[8] Please see https://www.otvorenipodatoci.gov.mk/en/about

[9] OGP provides an international platform for dialogue between countries, civil society. organizations, and the private sector. This forum contributes to the development of the open government.

[10] The Law on Environment. Please see http://www.moepp.gov.mk/wp-content/uploads/2014/10/Закон-за-животната-средина-пречистен-текст.pdf (The Article 33), Official Gazzete of R.Macedonia no. 53/05, 81/05, 24/07, 159/08,83/09, 48/10, 124/10, 51/11, 123/12, 93/13 и 44/15.

The main organizations, performing monitoring in the country, are:

- Subdivisions of the Ministry of Environment and Physical Planning (emissions into the air, soil, waste, biodiversity) and protected areas management offices;
- *Air monitoring*: MEIC runs State Automatic Monitoring System for Air Quality; Regional Centers of Public Health (CPH) under the Ministry of Health run their own air quality monitoring network;
- *Water monitoring*: National Hydrometeorological Service (monitoring of surface water and groundwater in terms of water level and water quality, weather forecasting, meteorology and climatology); The Hydrobiological Institute (lake Ohrid and its tributaries); The institutions of the Ministry of Health (MoH) and Regional Centers of Public Health (CPH) (monitoring of drinking water and the quality of bathingwater);
- Internal monitoring run by operators[11] (self-monitoring by enterprises);

However, some of the agencies, who perform monitoring, face the problems with non-functioning equipment[12], the lack of appropriate and modern laboratory equipment. There are also the laboratories, which work without official accreditation.[13]

The Law on Environment[14] allows the Ministry of environment to delegate the right to do environmental monitoring in compliance with the prescribed methodology to institution/authority/professional organizations.

For the moment, North Macedonia has established a regular monitoring of air quality, emissions into the air and water quality. There is a partial monitoring of forest health and soil contamination. General monitoring of biodiversity[15] and within the protected areas is being carried out partially by the state and scientific institutions on a project basis and/or is dependent on international projects.

Waste monitoring is carried out by MEPP and includes routine data collection of various waste streams.

Permanent monitoring, i.e. systematized measurement, and control of the state, quality and changes in the soil in terms of soil contamination [16] as environmental media do not exist in the Republic of North Macedonia.

When it comes to wastewater monitoring, North Macedonia is not covered by the wastewater generator operators.

Production of environmental indicators

[11]Legal or phical entity, whose activities cause emissions or use of natural resources.

[12]Hydrometeorological Service (HMS) faces difficulties in monitoring of some quality elements of surface and groundwater. Almost half of 115 hydrological stations are not operational and there is no ground water monitoring.

[13]There is no an official accreditation of laboratory calibration, and accuracy of data on air quality might be questioned.

[14]Закон за животна средина, http://www.moepp.gov.mk/wp-content/uploads/2014/10/Закон-за-животната-средина-пречистен-текст.pdf

[15]National Biodiversity Information System was developed under UNDP project, but it doesn't work.

[16]The City of Skopje in 2012 carried out a series of soil monitoring campaigns in the Skopje region focusing on heavy metals pollution.

North Macedonia has achieved progress in the production of 77 environmental indicators, which are published on unified national environmental indicator platform[17] run by the Macedonian Environmental Information Center. Indicators include methodology, metadata, definition, legislation framework, policy relevance, data set, visual presentation of data and are available for public, researchers and policy decision makers. These indicators have a good information provision and are easily accessible. The system provides the data in Macedonian and English languages.

Thirty-three ECE environmental indicators (23 from the main set and nine additional), published through 73 national environmental indicators on the unified platform of North Macedonian Ministry of Environment and Spatial Planning, have been analyzed with using the SEIS quality criteria. The following peculiarities and gaps were identified within the analysis of the main set of indicators (results of the detailed assessment are presented in Annex 1):

- Data sets of the ECE environmental indicators are available for all indicators under review, however some indicators require additional data sets[18];
- There are no linkages with specific EEA or ECE indicators where appropriate;
- Regarding clarity, all indicators are presented in Macedonian and English. Row data sets are downloadable in Macedonian and English languages at the Ministry webpage.
- The indicators are available through online national indicator platform of the Ministry, also through consolidated reports for a required year in pdf format, in the reports on environmental statistics, and for some indicators through annual statistical publications;
- The only source for data on land uptake is the EEA database Corine Land Cover 2018;
- Not all indicators fully meet the requirements of timeliness and punctuality. Some indicators do not contain data flows for all required years, particularly data flows of wastewater indicators;
- Some data on wastewater or forest should be more contextualized in compliance with international indicators, for instance ECE or EEA indicators.
- Data on ecoservice services or protection of water and soil through forest protection are missing;
- The metadata, narrative assessment of the indicators, key policy questions, recommendations for their application in the state environmental policy are available for all current national indicators;
- References to the internationally agreed techniques, methodologies of measurement and calculation are in place;
- The majority of indicators have references to the primary or secondary data source providers and institutions;
- Data are not available for the following ECE environmental indicators: C1. “Renewable freshwater resources”, C6. “Connection of population to public water supply”, C8. “Reuse and recycling of freshwater”, and C15. “Wastewater treatment facilities”.

Regarding the SEIS criteria, namely the usage of the data validation and revision procedures: the National Focal Point for Joint Task Force on Environmental Statistics and Indicators reported that all data were regularly assessed and validated by the data source.

The application of international methodologies recommended by EEA, United Nations Framework Convention on Climate Change (UNFCCC), Corine Land Cover and UNECE enables the comparison of North Macedonian data with data obtained from different countries and regular reporting to EEA, UNECE, Multilateral Environmental Agreements (MEAs) for the majority of indicators. The

[17] http://www.moepp.gov.mk/?page_id=746

[18] For example, in the main set of indicators on emissions into air and GHG emissions, disaggregated data are missing on GHG emission, per area/sq Km, GDP and per capita.

additional efforts are required to develop missing indicators or to improve some indicators in terms of their compatibility.

National green economy indicators defined by Organization for Economic Cooperation and Development (OECD) are still not developed. The additional information on this issue is provided in Annex III.

Use of environmental information

After the Republic of North Macedonia had adopted the proposal of Macedonian Environmental Information Centre on environmental indicators in 2017, the process of developing national environmental indicators started. Seventy-four national environmental indicators have been developed in line with the EEA indicators in addition to 75 environmental statistical indicators. Of these environmental indicators, 33 indicators are corresponding to the full list of 42 ECE environmental indicators.

The indicators presented on national indicator-based platform are used to continuously monitor and assess the state of the environment reflecting key trends. Moreover, they represent the basis for national and international reporting (for example, reporting to the European Commission, EEA, signed conventions and others). In addition, these indicators not only monitor environmental changes and the state of the environment, but also identify key issues for environmental protection and improvement and inform the public about the current state of affairs. The indicators are an indispensable tool to monitor the status of the sectoral policy goals and to develop strategies and action plans.

Reporting obligations are made available for each indicator. Sixty-three out of 73 indicators are used for international reporting under a broad range of international organizations, for instance, EEA, EUROSTAT, UNFCC, Convention on Biological Diversity (CBD), UNECE, Convention on Long-range Transboundary Air Pollution (CLRTAP), WHO, International Energy Agency (IEA), OECD, World Trade Organization (WTO) and Food and Agriculture Organization of the United Nations (FAO). Some indicators are integrative (joint indicators for two or all three conventions) and also can be used as input data for production of other indicators, for example, data on mineral fertiliser consumption are input in calculating GHG emissions.

SEIS PILLAR II INFRASTRUCTURE

Data collection

At the country level, the main organizations responsible for collection, production, storage, processing and sharing of environmental data are:

- The Macedonian Environmental Information Centre (MEIC), the Ministry of Environment and Physical Planning (MEPP);
- The State Statistical Office (SSO).

MEIC is an institution, which carries out environmental monitoring and collects data, mainly by exporting data into Excel files.

Environmental data on air, waste, emissions into the air, water quality and quantity are stored in the databases/information systems (ISs) of organizations and agencies, responsible for monitoring and data collection.

However, in some institutions information systems and corresponding databases are missing, for instance, there is no information system on forest monitoring and forest inventory. However, the design of the state-of-the-art forest monitoring system, tailored to the country's needs and conditions, has been the focus of a two-year project of FAO and the Macedonian Ministry of Agriculture, Forestry and Water Economy[19].

The National Biodiversity Information System, structured in a local and central database, does not operate. Furthermore, since a number of agencies store their data in hard copies, data are not easily accessible to external users.

National Book of Environmental Parameters provides information on data collection, data flows among institutions and environmental data management. However, it has not been updated since 2015.

Currently, MEPP and MEIC are working on development of the National Environmental Information System (NEIS) and National Environmental Monitoring Network (NEMN)[20]. NEIS should encompass all existing environmental information systems.

The State Statistical Office collects data related to environmental statistics in cooperation with MEPP and produces environmental indicators, available through publications, issued every two years. These environmental indicators, presented on the site of SSO[21], show the quality of the environmental media (water, air, soil), the environmental problems (depletion of the ozone layer and climate changes, environmental protection and loss of bio-diversity, waste production and management) and the sector's policy making (indicators related to agriculture, forestry, tourism and environmental protection policy instruments). Many of these environmental datasets are developed on a regular basis in response to the program requirements of public institutions and are not intended for statistical monitoring and reporting. Statistical Office, by disseminating these environmental data, gives a more comprehensive picture of the state of the environment in North Macedonia. State Statistical Office, as stated in the preface of publication Environmental Statistics 2017, also highlights the need for overall strengthening of the national system of environmental management and environmental reporting.

Processing and analysis

MEIC has established and manages a web-based Air Quality Management system (Airviro), which collects, validates and processes the air quality data. This system is connected to a web portal for air quality[22], which shows data in real-time. Data on air emissions are collected in Excel files; data are processed and stored in established calculations sheets.

Web portal of Pollutant Release and Transfer Register (PRTR)[23] enables online reporting on emissions into the air by the operators and provides a shared access to the PRTR register and data search.

Data on waste are supposed to be reported by the relevant entities through Waste Management Information System (eWMIS)[24], but the system is not operational yet, this is why data are available

[19]Please see http://www.fao.org/europe/news/detail-news/en/c/1194305/

[20]The twenty-four-month project is financed by EU IPA II program with expected start date in end of 2018 year.

[21]Please see http://www.stat.gov.mk/PrikaziPoslednaPublikacija_en.aspx?id=20

[22]Please see http://air.moepp.gov.mk/?page_id=175&lang=en

[23]Please see http://ripz.moepp.gov.mk/

[24]Please see http://ewmis.moepp.gov.mk/

in hard copy. Environmental statistics report[25] states the problem of weak capacities of the local self-government units, especially regarding municipal waste and wastewater management.

Hydrometeorological Service uses software to collect data on surface and groundwater in terms of water level and water quality from automatic hydrology stations and carries out data verification and its online availability.

Dissemination of environmental information

The Ministry of Environment and Physical Planning through its department of the Macedonian Environmental Information Centre and State Statistical Office issues on the unified platform (the website of the Ministry of Environment and Physical Planning) the following publications:

- annual reports on the quality of the environment;
- biennial report on environmental indicators;
- biennial report on environmental statistics;
- biennial environmental indicator reports;
- four-year reports on the state of the environment;
- regularly reports to EEA, UNECE and MEAs;

In addition, some environmental data are available through annual statistical publications on the webpage of the State Statistical Office as publications and raw data.

The MEPP disseminates data and corresponding databases through web platforms such as unified national environmental indicators platform, a platform for climate change[26], a platform on persistent organic compounds[27]. On the national platform, the links to corresponding data source are presented. MEPP's portal also provides links to other web-portals such as water portal[28], PRTR, air quality portal, National Hydrometeorological Service[29]. Mostly, data are available in Macedonian, while environmental indicators are presented in Macedonian and English. There is no interactive visual presentation of environmental indicators.

SEIS PILLAR III COOPERATION

Basis and practice of inter-agency exchange of environmental information

[25]Environmental statistics, 2017.
[26] Please see http://www.klimatskipromeni.mk/#/index/main, http://www.unfccc.org.mk/Default.aspx?LCID=229
[27]Please see http://www.pops.org.mk
[28]Please see http://www.meteo.gov.mk/index.php?option=com_content&view=section&id=3&Itemid=4&lang=mk, doesn't work, but link on https://uhmr.gov.mk/ works.
[29]http://www.moepp.gov.mk/?page_id=901 Управата за хидрометеоролошки работи

Based on the Law on the Environment[30], all bodies, which perform environmental monitoring and, therefore, produce environmental data, are obliged to submit data to the state administration, responsible for the affairs of the environment.

For some data flows, all the data that come from some legal entities go to the Administration for the Environment, which is the part of MEPP, where data verification and validation first should take place. After that, the data in hard copy is submitted to the MEIC. The Macedonian Environmental Information Centre (MEIC) with its three units[31] collects, processes, regularly updates and disseminates information on the state of the environment (air, water, soil, noise, waste, nature, protected areas, soil degradation and contamination, land-use change, erosion and salinization).

Inter-sectoral exchange: producers vs. users of information

Currently, the Law on the Environment provides legal ground for preparation of annual environmental reports, biennial environmental indicator-based reports and four-year the state-of-the-environment reports.

Environmental reports have been published from 2003 to 2017. Environmental indicator-based reports are available for 77 indicators separately on the portal of MEPP[32], the European environment – state and outlook 2000 (SOER) and SOER 2017. MEIC and MEPP, in cooperation with other bodies, organizations and institutions, which produce environmental data, prepare these reports.

The State Statistical Office, in cooperation with the Ministry of Environment and Physical Planning and MEIC, prepares the publications on environmental statistics in Macedonian and English languages. The publications contain the number of environmental indicators, which are presented only in text format and as graphs.

International exchange and reporting

Within the SEIS framework, indicators are calculated and published for reporting under multilateral environmental conventions.

In recent years the Republic of North Macedonia has reported towards the United Nations Framework Convention on Climate Change, the Convention on Long-range Transboundary Air Pollution (CLRTAP), the Convention on Biological Diversity, Bern Convention and United Nations Convention to Combat Desertification (UNCCD). These reports are prepared and summarized by the MEIC/MEPP with the exception for reports under UNFCCC, which are prepared by the outsourced consultancy.

Environmental monitoring and production of a comprehensive set of environmental indicators, including regular reporting at the international and national levels, are essential prerequisites for environmental analysis at various scales. It is reflected in the MEPP's Strategic Plan for 2019-2021.

SEIS PRINCIPLES AND CONCLUSIONS

[30]The Law on Environment http://www.moepp.gov.mk/wp-content/uploads/2014/10/Закон-за-животната-средина-пречистен-текст.pdf (The Article 33), Official Gazzete of R.Macedonia no. 53/05, 81/05, 24/07, 159/08,83/09, 48/10, 124/10, 51/11, 123/12, 93/13 и 44/15

[31]Unit for Analytics and Reporting, Unit for Cadastre and Modelling, Unit for Information Technology.

[32]Please see http://www.moepp.gov.mk/?page_id=746

Overview of SEIS principles

North Macedonia has been achieving a definite progress in production and implementation of three SEIS elements: content, infrastructure and cooperation. The National Strategy for environmental data management of 2002, aimed at the establishment of the Shared Environmental Information System (SEIS), increased data exchange and data availability in terms of timeliness, access and quality. The Shared Environmental Information System (SEIS) promotes cooperation between data providers and data users and provides maximum benefit to the existing data infrastructure. Last but not least, the National Strategy became a good starting point for SEIS establishment.

The country proves its commitments towards the implementation of SEIS principles by making its data, indicators and data sets available and easily accessible for the general public by fulfilling reporting obligations and enabling comparisons at the appropriate geographical scales. Data are collected from primary sources and shared with others for many purposes. Moreover, an open data policy is the general policy of the Republic of North Macedonia.

Development of National Environmental Monitoring Network (NEMN) and the National Environmental Information System (NEIS), that integrate all existing information systems, would be a step forward towards implementation of SEIS.

The country's Environmental and Climate Change Strategy for 2014-2020 foresees, as a specific goal, a well-developed Shared Environmental Information System that enables easy exchange and access to environmental information.

Establishing SEIS, North Macedonia develops and implements short and long term programs and activities. Some of them can be implemented simultaneously.

The main priorities of the SEIS implementation in North Macedonia in 2019 are:

- Production of missing data flows for missing ECE indicators;
- Development of Green Growth indicators;
- Increased application of official environmental indicators in the reports on SDGs and Green Growth indicators;
- Improved online access to environmental information, namely the development of WEB GUI services of integrated access to the national environmental indicators; availability of historical data and possibility to download environmental data for research and statistical purposes.

The expected results of the SEIS practice and principles implementation in North Macedonia are:

- Improvement of environmental assessment at the local level;
- Strengthening the inter-agency cooperation at the national level;
- Availability of the trained experts;

SDG MONITORING AND REPORTING FRAMEWORK

Country approach to Sustainable Development Goals (SDGs) reporting

The Republic of North Macedonia is implementing the 2030 Agenda for Sustainable Development. Therefore, the Cabinet of the Deputy Prime Minister in charge of Economic Affairs intends to

update the Rapid Gap Assessment, strengthen the National Council for Sustainable Development and establish a working group for each SDG.

All resident United Nations agencies in the country, including UNECE, will support it in adapting the SDGs to local conditions and establishing a system to monitor their implementation[33].

In the prior period, the State Statistical Office has continuously invested efforts in the production and integration of the set of indicators that helped to evaluate a progress of the implementation of the sustainable development concept. Indicators are defined by the European Strategy for Sustainable Development (SDS) and are calculated according to the European Statistics Standards, which ensures their international comparability. The statistics platform[34] includes the EU Sustainable Development Indicators. Primarily, the statistical work plan was aimed at producing a set of EU SDG indicators. However, the State Statistical Office (SSO) preferred to provide a new framework to assess the implementation of SDGs and progress made by the country towards the 2030 United Nations Agenda Goals.

The nationalisation of SDGs is still ongoing process coordinated by the department for Regional and Sustainable Development in the Sector of Economic Policies, Structural Reforms[35] and Investments, and the State Statistical Office. In 2019 the SSO has issued the publication on Sustainable Development Goals in Macedonian and English languages[36].

It is important to take stock of major national and sector development policies that are relevant for the implementation of the SDGs and to identify challenges to better articulate actions on the ground. National SDGs indicator-based framework should be built. Moreover, the technical working group, which supports the National Council for sustainable development, considers SDGs to be the most important topic of negotiation on EU accession.

The Strategic Plan for 2018-2020 of the State Statistical Office, which will be implemented[37] by 31 October 2019, consists of SDGs indicators, including EU SDGs.

According to the main principles of the UN official statistics, the statistical platform MakStat has the following minimum characteristics:

- is managed by the national statistics agency;
- includes official statistics and metadata in accordance with the specified standard methodology;
- is accessible to the public;

User feedback on the products and services is provided through a survey conducted by the State Statistical Office. One of the priorities of the Strategic Plan of the State Statistical Office for 2017-2019 is the enhanced cooperation and communication with users, continuous measurement of user needs and satisfaction, and confidence-building in statistics.

Overview of the 'readiness 'of UNECE indicators for SDGs monitoring and reporting

[33] Partnership for Sustainable Development United Nations Strategy for 2016-2020, United Nations Country team, Skopje.

[34] Please see http://www.stat.gov.mk/

[35] Cabinet of the Deputy Prime Minister in charge of Economic Affairs and Coordination of Economic Departments, Skopje.

[36] The link to download data doesn't work.

[37] Through the IPA 2015 Multi-Beneficiary Statistical Cooperation Programme.

For the SDGs framework that composes of 26 SDGs targets and 31 corresponding SDGs indicators (Annex 2), the Republic of North Macedonia shows the following results of the "readiness" of UNECE indicators for SDG monitoring:

- The indicators 14.1.1 "Index of coastal eutrophication and floating plastic debris density" and 14.5.1 "Protected marine area" are not relevant since it is a land-locked country.

- Eleven indicators (marked in blue color) have been developed at the national level and are used for reporting to global SDG indicators;
- For 4 global indicators, data were obtained by World Health Organization and World Bank only for 2016 (6.1.1, 3.9.1, 3.9.2, 3.9.3);
- National indicators for 14 global environmental indicators (marked in red) have not been developed;
- Data for 11 indicators are obtained through national environmental indicator-based platform and annual statistical publications. In terms of data availability for these SDG indicators the analysis shows the following:

    1. For the SDG indicator 2.4.1. "Proportion of agricultural area under productive and sustainable agriculture" is expressed by the ratio of area under productive and sustainable agriculture and agriculture land area. The corresponding national indicator is an indicator "Areas under Organic Farming (ha)" is the European Environmental Agency (EEA) indicator developed with the EEA methodology and is the EU SDG indicator set. Time series are available for target years (2015-2017). The UNECE indicators F1 and F2 on irrigation, fertiliser consumption and gross nitrogen balance are developed and can be used as sub-indicators for ensuring a comprehensive assessment of indicator 2.4.1.
    2. The SDG indicator 6.3.2 "Proportion of bodies of water with good ambient water quality" indicates an ambient water quality that does not damage ecosystem function and human health according to the core ambient water quality parameters. The indicators such as "Nutrients in freshwater" and "BOD concentration of ammonium in the rivers" are developed as national and UNECE indicators C10 and C11. Time series are available for 2015 and 2016. The indicators are also directly linked to the indicator 6.3.1 on "Proportion of wastewater safely treated". This indicator is expressed as a percentage of population connected to primary, secondary and tertiary wastewater treatment.
    3. The SDG indicator 7.2.1 "Renewable energy share in the total final energy consumption" is the ratio of consumption of the energy from all renewable sources and total final energy consumption. This indicator is developed as the national -and UNECE indicator G4 "Renewable energy consumption". Time series are available for 2015 and 2016. It is also the EU SDG indicator.
    4. The SDG indicator 7.3.1 "Energy intensity" is measured in terms of primary energy and GDP. Energy intensity is obtained by dividing the total energy supply over GDP. This indicator is developed as the national and UNECE indicator G3 "Energy intensity". Time series are available for 2015 and 2016. It is not a part of the EU SDG indicator set.
    5. For the SDG indicator 9.1.2 "Passenger and freight volumes by mode of transport", there are two corresponding national and UNECE indicators. The National and UNECE indicator H1 "Passenger transport demand" and H2 "Freight transport demand". H1 presents data on passenger volume (passenger kilometres) by mode of the transport (without air transport), while H2 provides data on the freight volume by mode of transport (road and rail) in (tonne kilometres).

6. For the SDG indicator 11.6.2 "Annual mean levels of fine particulate matter (i.e. PM2.5 and PM10) in cities (population weighted). Data are available for PM10 concentration for two cites -Skopje and Bitola- while for PM2.5, data are obtained from the World Bank database. Urban population exposure to the air pollution by particulate matter is a part of the EU SDG indicator set.
7. The SDG indicator 11.6.1 "Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban waste generated by cities" is the ratio of adequately discharged urban solid waste and total tonnage of the waste generated by the city. On the one hand, waste landfilling on controlled landfills is the prevailing process in the final waste management in the Republic of North Macedonia, percentage of waste landfilling is high, ranging from 80% on controlled to 20% on uncontrolled landfills. There are data on generated municipal waste (in tonnes). Solid waste management is essential for the sustainability of the cities and these indicators show a lack of the regional integrated systems for municipal solid waste management. On the other hand, recycling rate of municipal waste is a part of the EU SDG indicator set, which could imply a possible nationalisation of this SDG.
8. The SDG indicator 15.1.1 "Forest area as a proportion of total land area" available through national statistics[38] as the national and UNECE indicator. National data on forestry are provided to the Food and Agriculture Organization by countries in the form of standard reports, which includes the original data and source references and descriptions of how these data have been used to estimate the forest area for different points over time. This indicator is a part of the EU SDG indicators set.
9. The SDG indicator 15.1.2 "Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas and by ecosystem type" includes data on protected areas, terrestrial and freshwater key biodiversity areas. The national and UNECE indicator D1 could serve as a baseline for further development of this indicator. Sufficiency of terrestrial sites designated under the EU habitats directive and common bird index are a part of the EU SDG indicator set.
10. The SDG indicator 15.5.1. "Red List index" is available as a national and UNECE D4 indicator.
    The SDG indicator 12.4.2 "Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment" is available as a national and UNECE I2 indicator. The methodology for development of this indicator is in progress. Generation of waste excluding major mineral wastes is a part of the EU SDG indicator set.

For some indicators such as SDG 12.5.1 "National recycling rate, tons of material recycled" the methodology is still under development by the United Nations[39]. According to statistics, the percentage of the recycled packaging waste circulating on the internal market in 2016 was 39.47%[40] while recycling rate for municipality waste was 0.9%.

Data provider for SDG indicator 12.2.2 "Domestic material consumption, domestic material consumption per capita and domestic material consumption per GDP" is the National Statistical Office with data sets in the domain of agriculture, forestry, fisheries, mining and energy statistics. The Domestic Material Consumption (DMC) is a standard material flow accounting (MFA) indicator

[38] MakStatIzbor, 2018.
[39] Please see https://unstats.un.org/sdgs/metadata?Text=&Goal=12&Target=12.5
[40] Statistical Yearbook 2016, 02. Environment and Geography.

that shows the apparent consumption of the materials in a national economy. Resource productivity is a part of the EU SDG indicator set for SDG target 12.

Data for 11 indicators obtained through national environmental indicator-based platform and annual statistical publications could be used as a baseline for either indicators' "nationalization" or further development of the indicators in line with SDG methodology. The list of national environmental indicators is presented in Macedonian and English.

GAPS AND SUGGESTED ACTIONS

Establishment of SEIS in the Republic of North Macedonia gives a strong impetus to meet its political commitments towards EU principles since Macedonia plans to join the European Union. Moreover, with the development of SEIS, North Macedonia benefits from governmental support to the policy of open data, promotion of the e-government and Open Government Partnership. However, there are still gaps that need to be addressed that are mainly related to a proper option of technical solutions (for example, hardware and software, primarily, an open source where appropriate); besides, the country should ensure data validation procedures.

The Republic of North Macedonia is devoted to sustainable development, this why reporting on sustainable development indicators (SDI) has been a part of the statistical agenda. The State Statistical Office of the Republic of North Macedonia compiles all available indicators in the unified statistical system to report on sustainable development. The first step towards the implementation of SDGs will be a drafting of SDGs monitoring framework and "nationalization" of SDGs. Current SDI data sets would be a good baseline for compiling the national SDG data sets.

Furthermore, shortly soon North Macedonia plans to start the process of developing OECD Green Growth indicators.

The table below summarizes the gaps of North Macedonia in environmental information and suggests long-term and short-term measures for making progress in SEIS implementation.

Gaps	Long-term actions not directly associated with the UNDA Project	Short-term actions which can be taken by partners of the UNDA Project
Indicators framework web-platform is not used as the primary source for all environmental reports. Environmental reports are missing visualization tools that enable the interactive presentation of the environmental indicators.	Develop WEB GUI services for integrated access to national environmental indicators platform which includes historical data presentation, visualization tools and dynamic rows for the research and statistical purposes.	Ensure full compliance with the requirements of the SEIS indicators' quality criteria.
Data providers mainly provide data for indicators in Excel files	Facilitate data exchange through development of Application of Programing Interfaces (APIs) to upload data automatically from	

through emails within the given timeframe.	available databases of data providers.	
The Republic of North Macedonia does not develop Green Growth indicators based on previous reported sustainable development indicators.	Initiate collaboration with OECD Task Force regarding implementation of OECD Green Growth indicators.	Develop some Green Growth indicators from existing data/indicators in close collaboration with MEIC and SSO.
UNECE indicators, which are already developed in the country, are not always used for "nationalization" of SDGs indicators.	Use the developed UNECE indicators for "nationalization" of SDGs indicators.	Develop with support of SSO the relevant SDG indicators in line with the Strategic Plan for 2018-2020 of the State Statistical Office.
Some environmental indicators miss linkages with relevant SDGs.		Supplement some environmental indicators with the links to the corresponding SDGs.
In a number of state agencies information is partially stored in hard copies and there are incomplete databases.	Provide state agencies with complete databases and support the process of development of environmental databases and data exchange based on modern innovative technologies, software solutions (APIs) and respective open data policies.	
Sometimes environmental information is not updated respectively.	Data for indicators-based web platform should be updated annually where it is possible to have internationally comparable data.	Introduce changes to the Law on Environment in the part of timeframe of environmental reporting and frequency of report publication.
Internationally agreed updated methods of analysis, calculations and environmental monitoring recommendations are not applied enough.	Increase application of internationally agreed updated methods of analysis, calculations and environmental monitoring recommendations.	Carry out trainings to maintain the required level of qualification and the use of international standards in the implementation of environmental monitoring.
Data on waste are not reported by responsible entities through Waste Management Information System (WMIS)[41], because the system is not operational yet,	Align the WMIS with the national legislation on data collection and make it operational.	

[41] Please see http://ewmis.moepp.gov.mk/

besides, data are collected in hard copy.		
Weak capacities of the local self-government units, especially, regarding municipal waste management and wastewater management.	Strengthen the capacities of local self-government by adequate training programs on data collection and reporting. Ensure support in terms of funds, software and help desk.	
Worn-out instruments and equipment for environmental monitoring.	Supply monitoring networks and laboratories with modern technical and analytical equipment.	
Some UNECE environmental indicators are missing the required data sets (Please see Annex 1).	Increase the number of data sets within the UNECE environmental indicators.	Strengthen cooperation between SSO and other data providers in terms of data collection and data availability.
There is no regular monitoring of forestry (forest cadastre) and data on soil are missing. Data on soil erosion are available only for year 1995.	Develop and implement monitoring systems, including soil monitoring. Currently FAO has worked with the Ministry and an independent entity, the national Faculty of Forestry, to assess the methodology for implementation of a national forest inventory while strengthening their knowledge base and establishing a broad consensus on how to monitor the status, use and changes over time of Macedonian forests.	
Lack of funds for maintenance of monitoring equipment.	Provide funds for maintenance of monitoring equipment.	
There is no a platform to implement and support SDGs in the country.	Develop national SDGs framework, including on monitoring and reporting under SDGs, and platform for SDGs reporting should be established.	When developing SDGs platform, SEIS concept should be introduced and promoted.

Generic points for action are given in National Road Map

In order to enhance national SEIS concept and SDG reporting national roadmap suggest actions below:

- Develop and publish the chosen SDGs indicators using SEIS concept;
- Ensure development of missing ECE indicators and regular updates of the existing ones;
- Initiate and develop "green growth" indicators;
- Continue building capacity of relevant ministries regarding usage and interpretation of EEA CORINE Land cover database and other global open free databases;
- Ensure the production of information in compliance with common international standards that meet the environmental policy requirements;
- Provide funds for maintenance of monitoring equipment;
- Ensure the creation of complete environmental databases in governmental bodies, based on innovative technologies and software solutions;
- Promote learning of open free software solutions in educational curriculums;
- Boost development of all categories/interactions of e-government such us government-to-citizens (G2C), government-to-business (G2B), government-to-employees (G2E) and specially government-to-government (G2G);
- Develop and put into practice the information sharing systems/APIs for all ministries, agencies and organizations, which produce such data;
- Harmonize the data formats and accelerate the transition to the use of recommended international methods and calculations to facilitate the data sharing and comparative analysis;
- Establish regular monitoring of forestry (forest cadastre) and data on soil;
- Ensure environment for successful development (which is ongoing) of the National Environmental Information System (NEIS) and the National Environmental Monitoring Network (NEMN)[42]. NEIS should encompass all existing environmental information systems;
- Develop missing information systems to cover all environmental data in the country in a structured way;
- Strengthen the public awareness and education at all levels emphasising the aspect of transparency

CONCLUSIONS

Recently North Macedonia has implemented a number of activities and measures to boost the development of environmental information production, collection and sharing in compliance with the SEIS pillars (content, cooperation and infrastructures). In addition, the country is working on the national indicator-based web platform, which can be a good starting point for the production of new indicators. The web platform should be well presented to a broader public for different purposes, well visualized and complimented with analysis.

A further step would be the successful finalization of the National Environmental Information System (NEIS) and National Environmental Monitoring Network (NEMN). NEIS should encompass all existing environmental information systems in the country in a structured way.

North Macedonia in collaboration with international organizations continuously builds its capacity regarding data collection, its transparency, availability, use and reporting.

[42]The 24-month project is financed by EU IPA II program with expected start date in end of 2018 year.

In the review based upon self-assessments[43] on seven data flows, covering three ECE environmental indicators (Air pollution and ozone depletion, water and biodiversity) national performance score for North Macedonia was 90%[44], and it was rated as good performance[45].

In 2018 when reporting to the European Environment Agency and the European Environmental Information and Observation Network (Eionet), the Republic of North Macedonia managed to achieve a data flow score of 100 % against agreed reporting criteria (timeliness and data quality for all data flows)[46]. Core data flows, cover 11core data flows in the areas of air quality, air emissions, biodiversity, greenhouse gas inventory, industrial pollution and water. As this score in 2017 was 70%, North Macedonia archived tremendous progress in reporting to EEA.

Macedonia, as a Non-Annex I Party to the United Nations Framework Convention on Climate Change (UNFCCC), has been developing Inventory of the greenhouse gases (GHGs) since 2000 as a part of its National Communications on Climate Change and Biennial Update Reports. Up to now, three National Communications (2003, 2008 and 2014) and the First and Second Biennial Update Reports (2015, 2017) have been delivered to UNFCCC.

Within Convention on Biodiversity North Macedonia developed National Biodiversity Strategy and action plan for 2018 – 2023 and have delivered five national reports[47].

[43] ECE, 2018. Mid-term review report on the establishment of the Shared Environmental Information System, ECE/CEP/2019/7.

[44] 83% performance score for water, 93% for air pollution and ozone depletion and biodiversity.

[45] Range of 76-95% is considered as a good performance.

[46] Please see https://www.eea.europa.eu/about-us/countries-and-eionet/eionet-data-flows/eionet-core-data-flows-2018

[47] Please see https://www.cbd.int/reports/search/?country=mk

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ANNEX I EVALUATION OF SELECTED UNECE INDICATORS AGAINST THE CRITERIA OF THE SEIS ASSESSMENT FRAMEWORK

Core indicators							
Indicators (no. of data flows)	**Accuracy**	**Relevance**	**Time-liness &punctuality**	**Accessi-bility**	**Clarity**	**Comparability**	**Inst / org arrange-ments**
Air emissions (16)	+/-	+/-	+/-	+	+	+	+
Air quality (4)	+	+/-	+/-	+	+	+	+
OSD consumption (8)	+/-	+/-	+/-	+	+	+	+
Air temperature (1)	+	+	+	+	+	+	+
Precipitation (1)	+	+	+	+	+	+	+
GHG emissions (2)	+	+/-	+/-	+	+	+	+
Renewable water res (1)	-	-	-	-	-	-	
Water abstraction (3)	+/-	+/-	+	+	+/-	+/-	+/-
Water use (4)	+/-	+/-	+/-	+	+/-	+/-	+
Water supply (1)	+/-	+/-	+	+	+	+/-	+
BOD and NH_4 in rivers (2)	+	+	+	+	+	+	+
Nutrients in freshwater (5)	+	+	+	+	+	+	+
Pop. connected to WWT (1)	+/-	+/-	-/+	+/-	+/-	+/-	+
WWT facilities (1)							
Polluted wastewater (2)	-/+	-/+	-/+	-/+	-/+	-/+	+/-
Protected areas (1)	+	+	+	+	+	+	+
Forests and woodland (1)	+	+/-	+	+	+	+	+
Threatened and protect. species (2)	+	+/-	+	+	+	+	+
Land uptake (2)	+/-	+/-	+/-	+	+	+/-	+

Final energy consumption (2)	+	+	+	+	+	+	+
Primary energy supply (2)	+	+	+	+	+	+	+
Waste generation (2)	+/-	+/-	+	+/-	+	+/-	+
Hazardous waste management (6)	+/-	+/-	+	+	+/-	+	+
Additional indicators							
Indicators (no. of data flows)	**Accuracy**	**Relevance**	**Timeliness &punct-uality**	**Accessibility**	**Clarity**	**Comparability**	**Inst/org arrange-ments**
Household water use per capita (3)	+/-	+/-	+/-	+/-	+/-	-/+	+
Conn. to public water supply (1)	+/-	+/-	+/-	+/-	+/-	-/+	+
Water losses (3)	+/-	+/-	+/-	+/-	+/-	+/-	+
Fertiliser consumption (4)	+/-	+/-	-/+	+/-	+	+/-	+
Pesticide consumption (3)	+	+	+	+	+	+	+
Passenger transport (3)	+/-	+	+	+	+	+	+
Freight transport (3)	+/-	+	+	+	+	+	+
Age of motor vehicles (5)	+	+	+	+	+	+	+
Env protection expenditures *	+	+	+	+	+	+	+

* indicator is not reviewed by the UNECE Join Task Force on Environmental Statistics and Indicators.

The main source of data the Statistical State Office and Environmental Indicator Platform run by Macedonian Environmental Information Centre and the Ministry of Ministry of Environment and Physical Planning

The applied rating scale:

+	all is well
+/-	not all is well
- / +	all is not that well
-	all is not well

List and definitions of UNECE environmental indicators: https://www.unece.org/env/indicators.html

Independent review results

ACCURACY

The review below presents analysis of production, collection and sharing of the UNECE environmental indicators in North Macedonia and its correlation with the national indicators of North Macedonia.

Therefore, when it comes to data accuracy, data source provider is presented for each indicator. For transport, energy, waste from economic activities indicators, where State Statistical Office is a data provider, procedures of data verification are done in accordance with the SSO regulations. For other indicators data validation is done by MEIC, MEPP, Hydrometeorological Service and other data providers.

Air emissions and ozone depletion indicators: North Macedonia produces seven national indicators on emissions into the air, which correspond to the UNECE A1 indicator. Macedonian Environmental Information Center is responsible for data validation of data. MEPP has been organizing trainings and preparing manuals on data validation for data providers to PRTR and for MEIC. One national indicator corresponds to A2 indicator "Ambient air quality in urban areas". Data are presented for three towns: Vales, Bitoal and the capital-Skopje. Data are validated by MEIC. A3 indicator "Consumption of ozone-depleting substances (ODS)" is made available as a one national indicator. The national measures on ozone layer protection have resulted in the complete elimination of the consumption of ODSs in the Republic of Macedonia.

Climate change indicators: Two national indicators correspond to B1 "Air temperature" and B2 "Atmospheric precipitation". The data source - Hydrometeorological Service of Republic of North Macedonia - validates data. B3 "Greenhouse gas emissions" is reported to UNFCCC and presented also as a national indicator. Data are validated under UNFCCC reporting obligations. There is an additional national and UNFCCC indicator "Projections of Greenhouse Gas Emissions".

Water indicators: C1 "Renewable water resources" doesn't have a national indicator, which is why It is not reported to UNECE. Indicators C2. "Freshwater abstraction", C3. "Total water use", C4. "Household water use per capita", C5. "Public water supply", C7. "Water losses" are presented through the national indicator "Use of freshwater resources". The State Statistical Office is a data provider. However, data on the Census of Population, Households and Dwellings is provided by SSO just for 2002. Indicators C10 "BOD and NH_4 in rivers" and C11 "Nutrients in freshwater" are presented through two corresponding national indicators. The Macedonian Environmental Information Center manages the database and validates data on water, which are submitted by data providers, carrying out water quantity and monitoring of the quality. Indicator C14 "Population connected to wastewater treatment" is presented as a national indicator "Urban wastewater treatment". Indicator C16 "Polluted (non-treated) waste waters" is not presented as a national indicator. However, data on urban wastewater treatment (C14) and data on discharge of treated wastewater from industry and mining exist and should be further developed in collaboration with SSO.

Biodiversity indicators: D1 "Protected areas", D3 "Forests and other wooded land", D4 "Threatened and protected species" and D5. "Trends in the number and distribution of selected species" (national indicator is diversity of species) are presented with corresponding national indicators.

Land and soil indicators: Land uptake is presented with E1 "Land uptake and Soil erosion" data. The EEA database Corine Land Cover obtains data on land uptake.

Energy indicators: G1 "Final energy consumption", G2 "Total primary energy supply", G3 "Energy intensity" and G4 "Renewable energy consumption" are presented with corresponding national indicators.

Waste indicators: I1 "Waste generation" and I4 "Final waste disposal" are presented with national indicators on municipal waste generation. I2 "Management of hazardous waste" is presented with corresponding national indicator. Data are validated by MEPP.

Additional indicators:

Agriculture indicators: F2 "Fertilizer consumption" and F4 "Pesticide consumption" are presented with corresponding national indicators. Data provider is SSO's Yearbook.

Transport indicators: H1 "Passenger transport demand", H2 "Freight transport demand", H3 "Composition of road motor vehicle fleet by fuel type" and H4 "Age of road motor vehicle fleet" are presented with corresponding national indicators.

Environmental financing indicator: J1 Environmental protection expenditure is presented with corresponding national indicator.

RELEVANCE

North Macedonia provides full methodology which includes policy relevance, key policy issues and message, definition, assessment, trends, data sets, trends, reporting obligations and metadata for each indicator. Indicators presented in this way enables its broad applications and deep analysis.

Data on transport, energy, water quality, protected areas, hazardous waste management pesticide consumption, precipitation and temperature are rated as "all is well". There no available data for existed WWT facilities, this is why the indicator is rated as "all is not that well (-/+). All other indicator is rated as "not all is well", mainly due to missing data sets required by UNECE. More detailed analysis for each indicator are given below.

Air emissions and ozone depletion indicators: Currently data on emissions of the main pollutants per area(t/km2) are missing[48]. Emissions of the main pollutants per unit of GDP could be calculated. Data on daily average limit values are missing for O3 and NO2. Annual average limit value is missing for O3. Regrading A3 (ODSs), there is inconsistency in reporting. There is data available only for HCFC-22 as ODP tons (time series for 1995-2016) on national indicator platform while environmental statistics provide data for HCFC-141b (time series for 2011-2016).

Climate change indicators: For B3 indicator data on aggregated GHG emissions per capita, per square kilometer and per unit of GDP are missing.

Water indicators: Data on "Freshwater abstraction" used in national indicator should be in line with C1 UNECE indicator. Data on C4 "Household water use per capita" and C5 "Public water supply, population connected to water supply" are missing. C3 "Total water use": total data on freshwater use per unit of GDP is missing. Data on C7 "Water losses" should be also presented also

[48] Please see http://ripz.moepp.gov.mk/Search/MapSearchLiteAccordion

as percentage of water losses. Data on "Household water use per capita" (C4) are missing. For C10 and C11, data on minimum values, maximum values and number of samples and distance to mouth or downstream frontier (km) are missing. For indicator C14 "Population connected to wastewater treatment" data are presented as percentage of population with and without public sewerage network (with type of treatment of wastewater from the public sewerage network). Data on population connected to a wastewater collecting system without subsequent treatment are missing.

Biodiversity indicators: For D3 indicator, there are no data on primary forests and forest function such as protection of soil and water and ecosystem services, cultural or spiritual values, but there is data on deforest within protected areas, which is calculated for 2010-2016. For D5, there are data on the number and distribution of some selected species.

Land and soil indicators: For E1 Corine classifications and classes could give some data on land uptake, percentage of the total changes of urban land.

Waste indicators: Through national indicator platform I2 is presented with data on households, including household per capita and GDP at PPP. Data sets on waste generated from economic activities could be provided from SSO[49]. Data on waste from economic activities per unit of GDP also should be calculated and reported. I4 "Final waste disposal" is presented with national indicator, which includes data on disposal of municipal waste on landfills (managed and non-managed). However, environmental reports that provide data on waste reuse and recycling are provided by business entities who deal with waste (system operators). Environmental report of 2018 provides also data on waste incineration with energy recovery. National indicator provides data required for reporting under UNECE I2 indicator.

Agriculture indicators: Regrading F2, there are data sets on consumption of mineral fertilizers but no data on consumption of organic fertilizers organic fertilizers. This indicator could be developed with data on share of area under organic agricultural production in cultivable, total agricultural area and data on total area under crop.

Transport indicators: Data on H1 and H2 "Passenger transport" and "Freight transport demand" are available for passenger road and railway transport. H3 and H4 are presented with required data sets.

TIMELINESS AND PUNCTUALITY

This part presents timeseries for each indicator. For majority of the indicators there are established dataflows. However, data on soil erosion are available only for 1995 and C14 "Population connected to wastewater treatment" is presented through timeseries for 2000-2008.

Air emissions, ozone depletion indicators: Indicators A1 and A2 are presented as annual and disseminated through web-platforms and reports. Last update is done for 2017. For A3 data are presented for 2016.

Climate change indicators: Indicators B1 and B2 are presented as annual and disseminated through web-platforms and reports. Last update is done for 2017. B3 is available in the Second Biennial Update Report (SBUR) on Climate Change to UNFCCC and was updated last time in 2014. Indicators C2, C3, C4 and C5 are available for 1990- 2014.The State Statistical Office provides data

[49]Amount of waste by economic activity.

for 2017 and 2018 on public water supply system by water sources. This indicator should be fulfilled with missing time series. C10 is presented through 2000-2016. C11 is presented through 2000-2016, although measurements of phosphorus in lake Ohrid are missing for 2015-2016. Time series on nitrates in lakes are available for 2000-2013, although data on Prespa Lake are missing for 2012-2103. C14 is presented through timeseries of 2000-2008. The majority of indicators fully meet the quality criteria, but for soil erosion data are available only for 1995, while for urban wastewater treatment data are presented for 2008.

Biodiversity indicators: Timeseries for D1 are 1990-2017. Timeseries for D3 are 1990-2016. Timeseries for D4 are 2003—2017. Timeseries for D5 are 2012-2017.

Land and soil indicators: As Corine land Cover is used to obtain information on E1, there is a four-year cycle of reporting on percentage of the total changes of urban land (2000, 2006, 2012, 2018). However, data on soil erosion are available only for 1995.

Energy indicators: The indicators G1, G3, G2 and G4 are available for 2000-2016.

Waste indicators: For I1 and I4 time series are 2003-2017, for I2 are 2011-2017.

Agriculture indicators: For F2 and F4, timeseries are 2000-2012.

Transport indicators: For H1, H2 and H3 timeseries are 1990-2016, for H3, timeseries are 2003-2016. For J1, timeseries are 2010-2016.

AVAILABILITY

Key environmental Indicators are accessible through an integrated platform that provides an access to indicators, corresponding datasets and links to data providers. Indicators, presented on this platform, could be also found in corresponding publications. All the indicators are easily accessible for users and presented in a user-friendly format, besides, raw data/excel files are available. Additionally, data could be available through environmental reports, environmental statistics and statistical publications. All indicators (except missing indicators) are marked "all is well". More detailed analysis regarding availability is presented below.

Air emissions and ozone depletion indicators: Indicators A1 and A2 are available through the integrated national indicator-based platform with datasets and pdf publications, report on environment and statistics on environment. Additionally, A1 is presented through PRTR while A1 as real time data through http://air.moepp.gov.mk/. A3 is presented through the national indicator-based platform with datasets (time series [50] and statistics on environment for 2012).

Climate change indicators: B1 and B2 are presented on integrated national indicator platform with datasets, statistics on environment (2012-2016) and report to UNFCCC. B3 is presented on the integrated national indicator-based platform with datasets, statistics on environment (2012-2016) and report to UNFCCC, although national platform on climate change (http://klimatskipromeni.mk/inventar#/index/main) currently doesn't provide data set on GHG inventory.

Water indicators: C2, C3, C4, C5, C7 and C14 are available on the national indicator-based platform. However, the Statistical Office provides data for 2017 and 2018 on public water supply system by

[50] Although the source to the platform www.ozoneunit.gov.mk doesn't work.

water sources. C10 and C11 are available on the national indicator-based platform and presented as well in the reports on environment and environmental statistics.

Biodiversity indicators: D1, D3 D4, D5 are presented on thenational indicator-based platform. Official statistics is a data provider for D3.

Land and soil indicators: Data obtained from Corine Land Cover are easily available on the national indicator-based platform and the EEA database. E1 "Soil erosion" is also available on the national indicator-based platform.

Energy indicators: G1, G3, G2 and G4 are available on the national indicator-based platform and through official statistics. Official data provider is SSO.

Waste indicators: I1 is available on the national indicator-based platform (household waste) and through official statistics (waste on economic activities). I4 is available on the national indicator-based platform (data on municipality waste) and through environmental reports (data on waste reuse and recycle). I2 is available through the national indicator platform (household waste) and through environmental reports.

Agriculture indicators: F2 is available through the national indicator-based platform (but raw data set is not accessible) and in the statistical yearbooks. F4 is also available through the national indicator-based platform and in the statistical yearbooks.

Transport indicators: H1, H2, H3 and H4 are available through the national indicator-basedplatform andin the statistical yearbooks.

Environmental financing indicator: J1 is available through the national indicator-based platform and in the statistical yearbooks.

CLARITY

For all indicators (A1, A2, A3, B1, B2,B3, C2, C3, C4, C5, C7, C10, C11, C14, D1, D3, D4,D5, E1, E2, G1, G2, G3, G4, I1, I2, F2, F4, H1, H2, H3, H4 and J1) data are presented in both the English and Macedonian languages with narrative explanation and key questions. Metadata are available. Indicators are presented as text, charts and graph. No interactive visualization is available. I4 indicator should be developed with data on waste reuse and recycled and waste incineration. Data could also be presented in another official language (Albanian); however, funds are not sufficient. All indicators (except missing indicators) are rated as "all is well".

COMPARABILITY

For all indicators internationally agreed procedures are applied. Moreover, for each indicator that is available on the national environmental platform there is a reference to international corresponding indicator (ECE, EEA, CSI). All indicators (except missing indicators) are rated as "all is well". More detailed analysis regarding comparability is given below.

Air emissions and ozone depletion indicators: For indicator A1 calculations are in line with the Guidelines of UNECE/EMEP Convention on Long-Range Transboundary Air Pollution (LRTAP Convention) as well as application of the SNAP – selective nomenclature of air pollution. Data are reported to EEA and available through Eionet data base: http://cdr.eionet.europa.eu/mk/un/clrtap/inventories/envwovm7g/. A2 "Air quality" data are reported to EEA in accordance with the EU Directives. A3 "Consumption of ozone-depleting substances (ODS)" are reported to UNEP- Secretariat for Ozone Layer Protection and Multilateral Fund of the Montreal Protocol.

Climate change indicators: B1 and B2 are reported to the World Meteorological Organization and UNFCCC. B3 is calculated under reporting obligations to UNFCCC.

Water indicators: National indicator "Use of freshwater resources" which includes indicators C2, C3, C4 and C5 is reported to OECD/Eurostat. It is in line with EEA CSI 18 indicators. For C10 and C11 calculation is based on the methodology established by the European Environment Agency's Monitoring and Information Network for Inland Water Resources (EUROWATERNET), determined by the European Topic Centre for water resources under the European Environmental Agency. C14 is reported to EUROSTAT.

Biodiversity indicators: D1 and D4 are reported to the European Environmental Agency and to the Secretariat of the Bern Convention. D3 is reported to UNECE. D5 is reported to UNEP/CBD Secretariat, UNEP/CMS Secretariat, AEWA, EUROBATS, BC/CE Secretariat

Land and soil indicators: E1 "Land uptake" is available in the EEA database Corine land cover. For E2 two models are used for assessment: Global Assessment of Soil Degradation–GLASOD and the Pan-European Soil Erosion Risk Assessment (PESERA).

Energy indicators: For G1, G2 and G3, Energy Statistics Methodology of Eurostat is used.

Waste indicators: National indicators on municipal waste (which is part of I1 and I4) are reported to EUROSTAT. I2 is reported to Eurostat.

Agriculture indicators: F2 and F4 are the UNECE indicators.

Transport indicators: For H1, the methodology of data collection has been harmonized at the EU level, but the estimated data have been used for the purposes of data calculation on the transport by passenger car. H2, H3 and H4 are reported to Eurostat.

Environmental financing indicator: J1 is reported to OECD/Eurostat.

INSTITUTIONAL ARRANGEMENTS

For all presented indicators there is a legal mechanism for regular production and exchange of data. In addition, there is an institutional mechanism for regular reporting at national or/and international level (EEA, ECE, MEAs). All indicators (except missing indicators) are rated as "all is well". More detailed analysis regarding institutional arrangements is presented below.

Air emissions and ozone depletion indicators: For air emissions indicators there is a legislative framework, including the National Environmental Action Plan (NEAP II). For air quality indicators, there is a legislative framework in the form of laws and bylaws, including a five-year National Plan for Air Protection. For A3 "Consumption of ozone-depleting substances (ODS)", there is a legislative framework, which includes NEAP II of 2006 and the Country Programme for Phasing-out Substances that Deplete the Ozone Layer (1996).

Climate change indicators: For B1 and B2 there is a legislative framework, which includes ratification of the United Nations Framework Convention on Climate Change and the Kyoto Protocol. For B3, the United Nations Framework Convention on Climate Change and the Kyoto Protocol were ratified, they are a part of legislative framework.

Water indicators: For C2, C3, C4, C5, C7, C10, C11 and C14, there is legislative framework, which includes the National Environmental Action Plan – 2, the Environmental Monitoring Strategy, Environmental Data Management Strategyand Strategy for Waters. There is the policy for sustainable use of water resources, based on the Sixth Environmental Action Programme and Framework Water Directive requirements.

Biodiversity indicators: For D1 and D5, there is a legislative framework, which includes the Draft-National Biodiversity Strategy with Action Plan (2018-2023) and the Draft-National Strategy for Nature Protection (2017-2027). For D3 there is a legislative framework.

Land and soil indicators: For E1, there is a legislative framework. Data are collected by land information survey, however, up to now Corine Land cover has been used. For E2, there is a legislative framework, which includes the Second National Environmental Action Plan 2006 and Thematic Soil Strategy (COM 231 of 2006).

Energy indicators: For G1, G2, G3 and G4, there is a legislative framework, which includes the national strategies (Strategy for Energy Efficiency, Strategy for Energy Development and Strategy for Utilization of Renewable Energy Sources (RES) by 2020).

Waste indicators: For I1, I2 and I4 there is a legislative framework, which includes the Second National Environmental Action Plan and Strategy for Waste Management by 2020 and the ratified Basel Convention (relevant for I2).

Agriculture indicators: For F2 and F4, there is a legislative framework, which includes the Second National Environmental Action Plan

Transport indicators: For H1, H2, H3 and H4, there is a legislative framework, which includes the National Strategy for Transport.

Environmental financing indicators: For J1, there is a legislative framework on statistics, which includes the Regulation 691/2011 of 6 July 2011 of the European Parliament and of the Counciland Regulation 58/97 of 20 December 1997 for structural business statistics – SBS.

ANNEX II STATUS AND ASSESSMENT OF SDG ENVIRONMENTAL INDICATORS

SDG indicators	National indicators of North Macedonia	National indicators monitoring data	UNECE Indicators
SDG target 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil			
2.4.1 Proportion of agricultural area under productive and sustainable agriculture	Arable land thousand ha[51] Sown areas thousand ha Perennial plantsthousand ha Areas Under Organic Farming (ha)	2015 2016 2017 415 417 417 277 281 277 0,51 0,63 0,56	F1. Irrigation F2. Fertilizer consumption; F3. Gross nitrogen balance (developed[52] and available).
SDG target 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination			

[51]Please see http://www.stat.gov.mk/Default_en.aspx

[52]Please see http://www.moepp.gov.mk/?page_id=2937&lang=en

SDG indicators	National indicators of North Macedonia	National indicators monitoring data	UNECE Indicators
3.9.1 Mortality rate attributed to household and ambient air pollution	3.9.1a Number of deaths caused by registered social-domestic toxication cases per 100,000 population	2015 2016 2017 125[53] 103[54]	A1. Emissions of pollutants into the atmospheric air; A2. Ambient air quality in urban areas. (developed and available)
3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene	Infectious and parasitic diseases per 100,000 population cases	2015 2016 2017 0.1[55]	C5. Water supply industry and population connected to water supply industry; C6. Connection of population to public water supply; C9. Drinking water quality; C14.Population connected to wastewater treatment C6 is not developed
3.9.3 Mortality from unintentional poisoning	per 100,000 populationcases female (per 100,000 female population)	2015 2016 2017 N/d 0.3[56]	F4. Pesticide consumption. Developed and available

[53]Please see http://apps.who.int/gho/data/view.main.GSWCAH37v
[54]Please see https://data.worldbank.org/indicator/SH.STA.AIRP.MA.P5?view=chart
[55]Please see https://data.worldbank.org/indicator/SH.STA.WASH.P5?view=chart
[56]Please see https://data.worldbank.org/indicator/SH.STA.POIS.P5.FE

SDG indicators	National indicators of North Macedonia	National indicators monitoring data	UNECE Indicators
SDG target 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all			
6.1.1 Proportion of population using safely managed drinking water services	6.1.1.a Proportion of households with centralized water supply %	2015 2016 2017 n/d 83%	C5. Water supply industry and population connected to water supply industry; C6. Connection of population to public water supply; C9. Drinking water quality.
SDG target 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations			
6.2.1 Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water	6.2.1.a Proportion of population using safely managed sanitation facility % 6.2.1.b Proportion of population using hand-washing facility with soap and water % 6.2.1.c Proportion of population using sanitary-hygienic services defined by sanitation norms %	2015 2016 2017 n/d n/d	C4. Household water use per capita; C5. Water supply industry and population connected to water supply industry[57]; C14. Population connected to wastewater treatment.
SDG target 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally			
6.3.1 Proportion of wastewater safely treated	6.3.1.a Proportion of insufficiently treated wastewater %	2015 2016 2017	C16. Polluted (non-treated) wastewaters. [58]
6.3.2 Proportion of bodies of water with good ambient water quality	2015 2016 0,257 0,203		C10. BOD and concentration of ammonium in rivers;

[57] Environmental statistics for 2017- Data availabale only for year 2002.
[58] Data are available only for 2008, http://www.moepp.gov.mk/?page_id=4990

SDG indicators	National indicators of North Macedonia	National indicators monitoring data	UNECE Indicators
	1.14 1.02 0.26 0.32		C11. Nutrients in freshwater. Developed and availabale.
SDG target 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity			
6.4.1 Change in water use efficiency over time	No data		C3. Total water use; C4. Household water use per capita; C7. Water losses.
6.4.2 Level of Water Stress: freshwater withdrawal as a proportion of available freshwater resources	%	2015 2016 2017 Data available for 2014[59]	C1. Renewable freshwater resources; C2. Freshwater abstraction.
SDG target.6 6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes			
6.6.1 Change in the extent of water-related ecosystems over time	No data		D1. Protected areas; D2. Biosphere reserves and wetlands of international importance (indicator is not currently developed)
SDG target 7.1 By 2030, ensure universal access to affordable, reliableand modern energy services			
7.1.1 Proportion of population with access to electricity	%	2015 2016 2017 n/d	G5. Final electricity consumption
SDG target 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix			
7.2.1 Renewable energy share in the total final energy consumption	%	2015 2016 2017 15,3 14.2 n/d	G1. Final energy consumption; G4. Renewable energy consumption.

[59] Please see http://www.moepp.gov.mk/?page_id=4955&lang=en

SDG indicators	National indicators of North Macedonia	National indicators monitoring data	UNECE Indicators
SDG target 7.3 By 2030 double the global rate of improvement in energy efficiency			
7.3.1 Energy intensity measured in terms of primary energy and GDP	kgoe/000 EUR	2015 2016 2017 295.20 276.17 n/d .	G3. Energy intensity
SDG target 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all			
9.1.2 Passenger and freight volumes, by mode of transport	Passenger volume million pkm Freight volumes million tkm	2015 2016 9441 9344 7037 7168	H1. Passenger transport demand; H2. Freight transport demand.
SDG target 9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities			
9.4.1CO2 emission per unit of value added	kg/mln.dram	2015 2016 2017 n/d	B3. Greenhouse gas emissions
SDG target 11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries			
11.3.1 Ratio of land consumption rate to population growth rate	No data		E1. Land uptake; E2. Area affected by soil erosion.
SDG target 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management			
11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban waste generated, by cities	% Generated municipal waste (in tonnes)	2015 2016 2017 39.47 786182 796585 786881	I3. Waste reuse and recycling;(not developed) I4. Final waste disposal.

SDG indicators	National indicators of North Macedonia	National indicators monitoring data	UNECE Indicators
11.6.2 Annual mean levels of fine articulate matter (i.e. **PM2.5**[60] and **PM10**[61]) in cities (population weighted) average concentration □g/m^3 Percentage of population exposed to PM10 concentrations exceeding annual limit values	2015 2016 2017 31.97 29.59 29.72 88.5 79.44 75.31		A2. Ambient air quality in urban areas.
SDG target 12.2 By 2030, achieve the sustainable management and efficient use of natural resources			
12.2.1 Material footprint, material footprint per capita, and material footprint per GDP	2015 20162017		C2. Freshwater abstraction; D3. Forests and other wooded land; E1. Land uptake.
12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP	Domestic material consumption in thousand tonnes Domestic material consumption per capitadram Domestic material consumption per GDP %	2015 2016 2017 15620.6 15417.8	C3. Total water use; G1. Final energy consumption; G5. Final electricity consumption (G5 not currently developed).
SDG target 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment			
12.4.2 Hazardous waste generated per capita and	kg per capita	2015 2016 2017	I2. Management of hazardous waste; I3. Waste reuse and recycling. **I2, I3 not available**

[60] PM2.5 air pollution, mean annual exposure https://data.worldbank.org/indicator/EN.ATM.PM25.MC.M3?locations=MK

[61] Please see http://www.moepp.gov.mk/?page_id=5849, Annual mean concentration of PM 10 for Skopje.

SDG indicators	National indicators of North Macedonia	National indicators monitoring data	UNECE Indicators
proportion of hazardous waste treated, by type of treatment		0.01 10.48	
SDG target 12.5By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse			
12.5.1 National recycling rate, tons of material recycled	2015 2016 2017		I2. Management of hazardous waste; I3. Waste reuse and recycling; I4. Final waste disposal.
SDG target 14.1By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution			
14.1.1 Index of coastal eutrophication and floating plastic debris density	For North Macedonia the indicator is not relevant. The country has no outlet to the sea		C12. Nutrients in coastal seawaters **NA**
SDG target 14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information			
14.5.1 Coverage of protected areas in relation to marine areas	For North Macedonia the indicator is not relevant. The country has no outlet to the sea		D1. Protected areas.
SDG target 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements			
15.1.1 Forest area as a proportion of total land area	%	2015 2016 2017 44.5; 44.38; 43.64[62]	D3. Forests and other wooded land.
15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type	%	2015 2016 2017 8.94; 8.94 8.94	D1. Protected areas

[62]MakStat, 2018.

SDG indicators	National indicators of North Macedonia	National indicators monitoring data	UNECE Indicators
SDG target 15.2 By 2020, promote the implementation of sustainablemanagement of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally			
15.2.1 Progress towards sustainable forest management	2015 2016 2017 **NO data**		D3. Forests and other wooded land.
SDG target 15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation neutral world			
15.3.1 Proportion of land that is degraded over total land area	%	2015 2016 2017 Data are available for year 1995	E2. Area affected by soil erosion.
SDG target 15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development			
15.4.1 Coverage by protected areas of important sites for mountain biodiversity	2015 2016 2017		D1. Protected areas.
SDG target 15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species			
15.5.1 Red List Index	15.5.1.a Threatened and protected species, incl. species registered in the Red Book Total number of endangered verterbrate species Total number of protected verterbrate species Total number of endangered invertebrate species Total number of endangered invertebrate species	(2015-2017) 122 189	D4. Threatened and protected species

SDG indicators	National indicators of North Macedonia	National indicators monitoring data	UNECE Indicators
	Registered in the Red Book, -Included in the specially protected natural areas	28	
	- 15.5.1.a.2 Registered high and low plant species, of which:	543	
	- total	223	
	Number of protected plant species (vascular, moss, lichens)	132	
	Number of protected +endangered species of mosses	196+165	
	Number of protected +endangered species of algae	72+30	
	Number of protected +endangered species of funghi		
	- High plant species registered in the Red Book Included in the specially protected natural areas		
SDG target 15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species			
15.8.1 Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien	**No data**		D6. Invasive alien species Not developed

SDG indicators	National indicators of North Macedonia	National indicators monitoring data	UNECE Indicators
SDG target 15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts			
15.9.1 Progress towards national targets established in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011-2020	**No data**		D4. Threatened and protected species.

ANNEX III SUPPLEMENTARY INFORMATION

Monitoring the development of a green economy in North Macedonia

Since 2000 the Statistical State Office has been issuing publications on Sustainable Development to help the Republic of North Macedonia to assess national trends in the socio-economic, environmental and institutional dimensions of sustainable development. The evaluation process is based on a set of Sustainable Development Indicators (SDIs) that are structured in accordance with the EU SDI set. The policy framework for the environment and sustainable development consists of the National Strategy for Sustainable Development (NSSD) for 2010–2030 and the annually revised National Programme for the Adoption of the Acquis.

The Environmental and Climate Change Strategy of North Macedonia for 2014- 2020 highlights the importance of environment protection, which results in sustainable growth.

The industrial strategy of the Republic of North Macedonia for 2018-2027 has been identified as a key document, dealing with various aspects of sustainable development, climate change, circular and green economy.

North Macedonia develops strategic documents, covering the green economy, that are based on the European Commission regulation on environmental-economic accounts[63]. Macedonian government through the State Statistical Offices should initiate work on the development of Green Growth indicators taking into account its data collection and SDIs reporting experience in compliance with the EU Strategy on sustainable development. Macedonian Environmental Information Centre could be a counterpart in this process.

The Republic of North Macedonia could use the OECD framework on Green Growth indicators to continue producing environmental indicators.There are already data available on air pollution, GHG emissions, land use, material productivity, environmentally related taxation, organic farming and use of pesticides and fertilisers and related gross nutrient balances, energy use, renewable energy, water resources and water use. These indicators should be presented at a broader scale, for instance, they could include statistics on economic growth.

The Environmental Action Programme (EAP) Task Force, with OECD serving as secretariat, has already supported the implementation of Green Growth policies in Eastern Europe, the Caucasus and Central Asia. It supports the national high-level cross-ministerial policy negotiations (1-2 times/year) to promote green economic development in interested countries. Its work also aims at reinforcing the establishment of the Shared Environmental Information System in the pan-European region.

[63]EC 538/2014