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COMMITTEE ON ENVIRONMENTAL POLICY
CONFERENCE OF EUROPEAN STATISTICIANS
through their
Joint Intersectoral Task Force on Environmental Indicators

jointly with
UNITED NATIONS STATISTICS DIVISION

JOINT MEETING ON ENVIRONMENTAL INDICATORS

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NATIONAL REVIEW OF THE APPLICATION OF ENVIRONMENTAL INDICATORS

Submitted by the former Yugoslav Republic of Macedonia[1]

I. ACHIEVEMENTS

Twenty indicators from *UNECE Indicator Guidelines* have been adopted as national environmental indicators of the former Yugoslav Republic of Macedonia. According to the Law on Environment, annual Indicator Reports are produced on the basis of adopted indicators.

The establishment and development of environmental indicators in the former Yugoslav Republic of Macedonia was driven by the need to identify indicators of relevance for the environmental state monitoring and policy creation, in line with the EEA Core Set of Indicators (CSI). These indicators should respond to the key environmental policy issues on national level.

The Government, at its Fifth Session held on 15 May 2007 adopted the Draft Environmental Indicators developed by the Macedonian Environmental Information Centre thus initiating the process of identification of the national set of indicators.

Based on the conclusions adopted by the Government and Decision no. 10-2323/29 of 14 September 2007 signed by the Minister of Environment and Physical Planning, by way of decision of the Government, 12 Working Groups were established, one for

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each chapter. These working groups verified and updated the proposed environmental indicators of the former Yugoslav Republic of Macedonia, with indicators specific on national level. During this process, special attention was paid to the recommended core set of indicators of the European Environmental Agency, specific for the former Yugoslav Republic of Macedonia.

The forty indicators were completed and the Government adopted them in July 2008 year.

1. Classification of environmental indicators

All indicators in a set have been classified in accordance with the framework known by its abbreviation DPSIR, comprising the following concepts: **D**riving forces – **P**ressures - **S**tate – **I**mpacts – **R**esponses, where each phase transmits its own meaning. This framework is particularly important and clear with regard to environmental policy creation.

Indicators are also classified by their type into five categories, namely: **A** = descriptive indicator, **B** = performance indicator, **C** = efficiency indicator, **D** = Policy-effectiveness and **E** = Total Welfare indicators.

2. Presentation of environmental indicators

In order to present indicators in a comprehensive manner, their information and data are presented by brief description of the indicator, prepared in accordance with the template established by the European Environmental Agency, which is also harmonized with the presentation of environmental indicators under the Guidelines for the Application of Environmental Indicators prepared by the Working Grup on Environmental Monitoring and Assessment.

Quantitative values of a given indicator are expressed mostly as annual values for a given period, and presented by means of **diagrams, tables** and **maps.** They are then followed by explanations interpreting the trend and the possible causes, as well as the measures undertaken and planned to improve or preserve the current status of the environment. Each indicator is accompanied by a symbol making assessment of individual indicators and showing the trend of presented data and specified targets.
All adopted environmental indicators are presented in the Table below:

LIST OF INDICATORS

NO	Title of the indicator	Code	Compliance with other indicators			DPSIR		Trend
			EEA CSI	SDI	Thematics			
1 AIR POLLUTION AND OZONE DEPLETION								
1	EMISSIONS OF ACIDIFYING SUBSTANCES	MK NI 001	001		AP1	P		
2	EMISSIONS OF OZONE PRECURSORS	MK NI 002	002		AP19	P		
3	EXCEEDANCE OF AIR QUALITY LIMIT VALUES IN URBAN AREAS	MK NI 004	004		AP14	S		
4	CONSUMPTION OF OZONE DEPELTING SUBSTANCES	MK NI 006	006		OD3	P		
2 NATURE AND BIODIVERSITY								
5	THREATENED AND PROTECTED SPECIES	MK NI 007	007		BDIV20	S/I		
6	DESIGNATED AREAS	MK NI 008	008		SEBI 2010 - 7	P		
7	SPECIES DIVERSITY	MK NI 009	009		BDIV9	S		
3 CLIMATE CHANGE								
8	GREENHOUSE GAS EMISSIONS AND REMOVALS	MK NI 010	010	SDI	CC5	P		
9	PROJECTIONS OF GREENHOUSE GAS EMISSIONS AND REMOVALS	MK NI 011	011	SDI	CC14	P		
4 SOIL								
10	LAND TAKE	MK NI 014	014		TE090 TE091	P		
11	PROGRESS IN MANAGEMENT OF CONTAMINATED SITES	MK NI 015	015		TE117	P		
12	FOREST FIRES	MK NI 038			TE065	P		
5 WASTE								
13	MUNICIPAL WASTE GENERATION	MK NI 016	016		WMF8	P		
6 WATER								
14	USE OF FRESHWATER RESOURCES	MK NI 018	018	SDI	WQ3	P		
15	OXYGEN CONSUMING SUBSTANCES IN RIVERS	MK NI 019	019		WEU5	S		
16	NUTRIENTS IN FRESHWATER	MK NI 020	020		WEU2 WEU3	S		
17	BATHING WATER QUALITY	MK NI 022	022		WEU15	S		
18	URBAN WASTE WATER TREATMENT	MK NI 024	024	SDI	WEU21	P		
19	DRINKING WATER QUALITY	MK NI 039			WEU13	S		
20	IRRIGATED LAND	MK NI 040		SDI	WQ4	D		

NO	Title of the indicator	Code	Compliance with other indicators			DPSIR	Trend
			EEA CSI	SDI	Thematics		
7 AGRICULTURE							
21	GROSS NUTRIENT BALANCE	MK NI 025	025		Agri02	P	
22	AREA UNDER ORGANIC FARMING	MK NI 026	026		IRENA 07 Agri22	P	
23	MINERAL FERTILISER CONSUMPTION	MK NI 08			IRENA 08	D	
24	CONSUMPTION OF PESTICIDES	MK NI 09			IRENA 09 Agri24	D	
8 ENERGY							
25	FINAL ENERGY CONSUMPTION BY SECTOR	MK NI 027	027	SDI	EE18	D	
26	TOTAL ENERGY INTENSITY	MK NI 028	028	SDI	EE23	P	
27	TOTAL ENERGY CONSUMPTION BY FUEL	MK NI 029	029	SDI	EE24	D	
28	RENEWABLE ENERGY CONSUMPTION	MK NI 030	030	SDI	EE26	P	
29	RENEWABLE ELECTRICITY	MK NI 031	031	SDI	EE27	P	
9 FISHERY							
30	FISH STOCK CHARACTERISTICS	MK NI 041			FISH 3	S	
10 TRANSPORT							
31	PASSENGER TRANSPORT DEMAND	MK NI 035	035		TERM12	D	
32	FREIGHT TRANSPORT DEMAND	MK NI 036	036		TERM13	D	
11 HEALTH							
33	AIR POLLUTION AND LEAD IN BLOOD - LEVEL OF LEAD IN CHILDREN'S BLOOD	MK NI 042			AP14, ENHIS RPG4_Chem_Ex2	S	
34	MORTALITY DUE TO RESPIRATORY DISEASES (J00 - J99) - INFANTS	MK NI 043			ENHIS Air_E2	S	
35	INCIDENCE OF CHILDHOOD LEUKAEMIA	MK NI 044			ENHIS RPG4_Rad_E1	S	
36	INCIDENCE OF MELANOMA IN PEOPLE AGED UNDER 55 YEARS	MK NI 045		SDI	ENHIS RPG4_Uvrd_E1	S	
37	MORTALITY FROM TRAFFIC ACCIDENTS - CHILDREN AND YOUNG PEOPLE	MK NI 046		SDI	ENHIS Traf_E1	S	
12 TOURISM							
38	TOURIST TRURB-OVER IN THE REPUBLIC OF MACEDONIA 1 International tourist visits 2 Foreign tourists stay 3 Domestic tourist visits	MK NI 047		SDI	TOUR12 TOUR 33	P D	
39	TOURISM SCALE AND FACILITIES INTENSITY	MK NI 048			TOUR 14	I	
40	ROLE OF TOURISM IN ECONOMY	MK NI 049		SDI	TOUR 35	D	

II. PROBLEMS

The problems faced with by the working groups in the preparation of environmental indicators are mostly related to environmental data itself, namely:

– lack of data, especially lack of historical data to be compared with the present state, to conduct analysis of phenomena course and development and estimate the trends of the future development;
– lack of relevant dsata to serve the goals of reporting through environmental indicators;
– quality, i.e. format of data which in most cases required detailed analysis, checking and reprocessing;
– non-continuous data collection by the relevant instituions and organizations resulting in lack of data for certain periods/years and impossibility to track the trend of the given phenomenon;
– existing data is owned by different institutions and regular data/information flow has not been established yet, although the legal grounds to that end has been provided.

III. FUTURE ACTIVITIES

Indicators development is a dynamic process which is subject to continuous updating and improvement. According to the experiences from other countries and international institutions, we are convinced that environmental indicators are effective and useful tool in environmental reporting and efficiency in the implementation of environmental policies.

According to the Law on Environment, the proposed environmental indicators will serve as reporting basis at annual level, and the working groups are obliged to update and improve the respective environmental indicatirs on continuous basis.

Working groups may propose indicators under additional chapters not elaborated as yet, but deemed to be relevant for the observation of the state of the environment in the former Yugoslav Republic of Macedonia (e.g.: noise, chemicals, etc.)**.**

IV. 10 SELECTED INDICATORS

With reference to the 10 indicators selected as subject for discussion at the meeting, the following indicators have been adopted as national indicators in accordance with the relevant legal requirements. The main characteristics of each of those indicators are given below.

MK-NI 001 - EMISSIONS OF ACIDIFYING SUBSTANCES

- **Definition:** The indicator tracks the trends in anthropogenic emissions of acidifying substances, i.e. acidifying processes in the air. These substances include nitrogen oxides, ammonia, and sulphur dioxide. Their acidifying power is weighted by their acidifying potential.
- **Units:** - Ktonnes (acidifying equivalent)
- **Data source (s):** State Statistical Office, Energy balance of the country – Report by the Government; Cadastre of Air Polluters and Pollutants; Data from measurements in companies – major polluters: Database on motor vehicles of the

Ministry of Interior; Project: Introduction of CORINAIR Inventory Methodology of the Ministry of Environment and Physical Planning, Spatial Plan of the former Yugoslav Republic of Macedonia.

- **Temporal coverage:** 2002 – 2006.
- **Methodology for indicator calculation:** CORINAIR methodology for inventory and application of the SNAP – selective nomenclature of air pollution.
- **Problem:** There is no data available before 2002 to identify the quantity of emissions of acidifying substances, proper trend is not possible.

MK-NI 010 - GREENHOUSE GAS EMISSIONS AND REMOVALS

- **Definition:** The indicator shows the quantities of greenhouse gas emissions on national level. The emissions are presented by greenhouse gas type. The indicator provides information on emissions in the following sectors: energy, industrial processes, agriculture, land use change and forestry and waste.
- **Units: -** Tonnes CO2-equivalent
- **Data source (s):** First and Second National Communications of the former Yugoslav Republic of Macedonia under the United Nations Framework Convention on Climate Change.
- **Temporal coverage:** 1990 – 2002.
- **Methodology for indicator calculation:** IPPC Methodology for GHG Inventories development.
- **Any other international reporting obligation:** UNFCCC.
- **Problem:** lack of national emission factors

MK - NI 027 - FINAL ENERGY CONSUMPTION BY SECTOR

- **Definition:** The indicator shows final energy consumption which is energy supplied to meet the demand of the final consumers and is calculated as the sum of final energy consumption from all sectors, namely industry, transport, agriculture, households, etc.
- **Units:** thousand tonnes of oil equivalent (ktoe), percentage (%).
- **Data source (s):** State Statistical Office.
- **Temporal coverage:** 1995 – 2005.
- **Methodology for indicator calculation:** Energy Statistics Methodology Eurostat F4, 1998.
- **Problem:** None.

MK-NI 018 – USE OF FRESHWATER RESOURCES

- **Definition:** The indicator shows how total water abstraction puts pressure on freshwater resources and is an important factor in the establishment of water abstraction rate through monitoring of water use efficiency by different economic sectors on national level.
- **Units:** mio. m3 per year.
- **Data source (s):** State Statistical Office, Water Management Administration, Public Water Supply and Sewerage Enterprise.
- **Temporal coverage:** 1990 – 2004.
- **Methodology for indicator calculation:** Data is collected and processed by sectors and types of industry.
- **Problem:** Data is available only for certain sectors. Possibility to collect data on river basin level, as this has been so far done at municipal level and it is shown at the level of whole country in the indicator.

SSO activities

In order to revise the surveys on public water supply and public sewage, the methodological instruments were developed during 2008. Revised surveys are currently ongoing, reported units are Public Water Supply and Sewerage Enterprises. The main task is provided data to be published in 2009 for the first time. The surveys are with annual periodicity; the data is going to be published annually, which could be the base for providing mentioned indicator.

MK-NI 039 – DRINKING WATER QUALITY

- **Definition:** This indicator shows the exceedance of limit values set in Drinking Water Directive and its amendment which entered into force in 2003 and in the Rulebook on drinking water safety, as well as the guideline values set for the quality of drinking water by the World Health Organization.
- **Units:** - Number of aerobic mesophilic bacteria in 1 ml, Number of coliform bacteria in 100 ml, Number of thermo-tolerant coliform bacteria in 100 ml, concentration of physico-chemical pollutants in mg/l, Parameters for radiological safety of drinking water in bekerels/l and total indicative dose in mSV/l.
- **Data source (s):** Republic Institute for Health Protection.
- **Temporal coverage:** 2001 – 2006.
- **Methodology for indicator calculation:** Standard methodology for monitoring of drinking water quality in line with the number of monitoring points and frequency defined in the Rulebook on drinking water safety .
- **Problem :** None.

MK-NI 014 – LAND TAKE

- **Definition:** The indicator tracks the changes in and current status of agriculture, forest and other semi-natural land taken by urban and other artificial land development. It includes areas sealed by construction and urban infrastructure as well as urban green areas and sport and leisure facilities.
- **Units:** changes in land cover, at five-year intervals, presented in % of the total area of the country and % of the various land cover types.
- **Data source (s):** State Statistical Bureau, Energy Balance of the country – Governmental Report; Cadastre of Air Polluters and Pollutants, Data from the measurements of the companies main polluters, Motor Cars Database of the Ministry for Interior, CORINAIR project of the Ministry for Environment and Physical Planning, National Spatial Plan.
- **Temporal coverage:** 2000.
- **Methodology for indicator calculation:** CORINE Land Cover.
- **Problem:** there is no historical data, proper trend is not possible; this will be overcome with the completion of the second phase of CORINE LandCover 2006.

MK-NI 08 – MINERAL FERTILIZER CONSUMPTION

- **Definition:** This indicator shows the consumption of mineral fertilizers, by presenting total amounts in tonnes consumed substances, and their application per hectare cultivated land area. Mineral fertilizers are substances containing chemical elements required for plants growth, especially nitrogen, phosphorus and potassium.
- **Units:** Total amounts in tonnes consumed mineral fertilizers, and their application per hectare cultivated land area (kg/ha).
- **Data source (s):** State Statistical Office**.**
- **Temporal coverage:** 2000-2005.
- **Methodology for indicator calculation:** standardized statistical methodology.
- **Problem:** Data on the quantity of consumed mineral fertilizers contains certain

extent of uncertainty, especially when originating from private sector. Some of the values have been obtained by estimation.

SSO note

The data which is used from the State Statistical Office about this indicator refers only to enterprises, the data for individual sector is not available for now.

MK-NI 016 – MUNICIPAL WASTE GENERATION

- **Definition:** The indicator presents municipal waste generation, expressed in kg per person, and the method of treatment (recycling, composting, landfill and incineration), expressed as a percentage of total municipal waste treatment. Municipal waste refers to waste collected by or on behalf of municipalities; the main part originates from households, but waste from commerce and trade, office buildings, institutions and small businesses is also included.
- **Units:** kilogramme per person per year, percentage
- **Data source (s):** National Waste Management Plan, MEPP.
- **Temporal coverage:** 2004 – 2005.
- **Methodology for indicator calculation:** Estimates and annual reports by municipalities.
- **Problem:** there is no historical data, available data is provided from the Project on waste management, proper trend is not possible.

SSO "waste" activities

One of the prioritized activities in environmental issues at SSO is waste statistics development. Within the SIDA project of development environmental statistics in the Balkan, SSO started with developing waste statistics by the end of 2007. All methodological instruments in accordance with the Waste Statistics Regulation 2150/2002 and national legislation were developed. A pilot Survey on waste from industries was successfully provided in September 2008, a full-scale survey is planned to be provided in September 2009.

Also, in accordance with the national legislation and EWStat Regulation the activities of planning and providing the survey on municipal waste were undertaken.

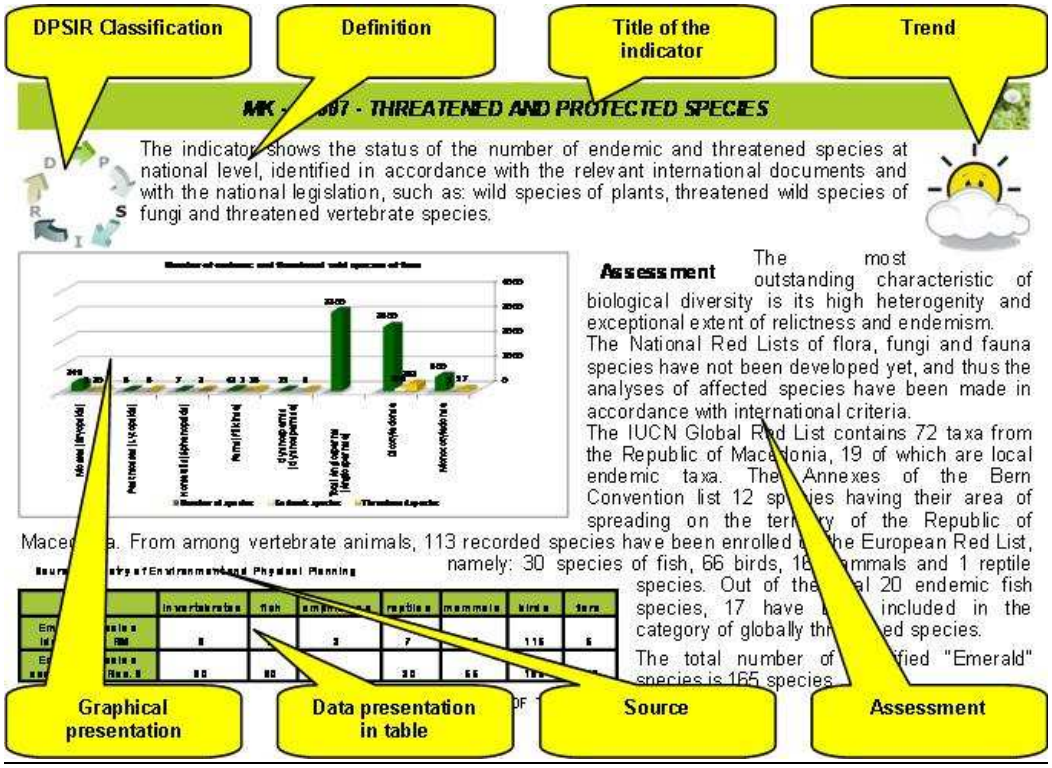
The whole methodological instruments were established in 2008.

The survey is currently ongoing, the expectations are the data to be produced and published for the first time by the end of June 2009. The survey is going to be conducted and published annually.

It would be the solid base for producing the indicator on municipal waste generation.

V. USE OF MODERN PRESENTATION FORMATS

Our National Environmental Indicator Report is published as hard copy (printed) and disseminated on the MEPP's official web site. The Report has large version intended for experts interested in more details and popular pocket version containing simple information on indicator trends presented in user-friendly and easy to understand way. Please, see the illustration below explaining the structure of each indicator in space-effective and clear manner.


DPSIR Classification
Definition
Title of the indicator
Trend
MK - 007 - THREATENED AND PROTECTED SPECIES
The indicator shows the status of the number of endemic and threatened species at national level, identified in accordance with the relevant international documents and with the national legislation, such as: wild species of plants, threatened wild species of fungi and threatened vertebrate species.
Assessment
The most outstanding characteristic of biological diversity is its high heterogenity and exceptional extent of relictness and endemism.
The National Red Lists of flora, fungi and fauna species have not been developed yet, and thus the analyses of affected species have been made in accordance with international criteria.
The IUCN Global Red List contains 72 taxa from the Republic of Macedonia, 19 of which are local endemic taxa. The Annexes of the Bern Convention list 12 species having their area of spreading on the territory of the Republic of Macedonia. From among vertebrate animals, 113 recorded species have been enrolled in the European Red List, namely: 30 species of fish, 66 birds, 16 mammals and 1 reptile species. Out of the total 20 endemic fish species, 17 have been included in the category of globally threatened species.
The total number of identified "Emerald" species is 165 species.
Graphical presentation
Data presentation in table
Source
Assessment