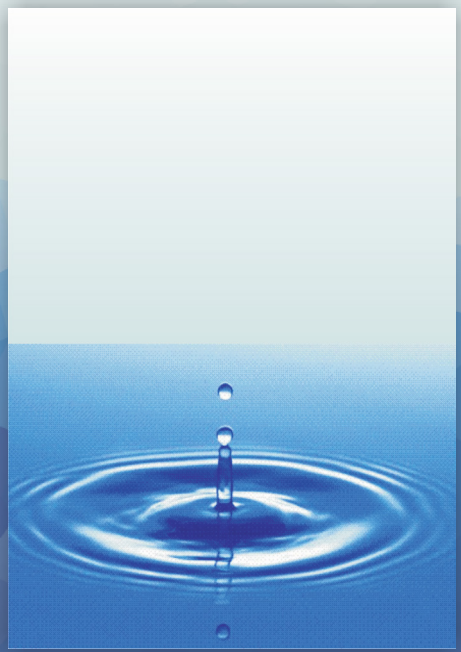
WATER



Definition

The water exploitation index (WEI) is the mean annual total abstraction of freshwater divided by the mean annual total renewable freshwater resource at the country level, expressed in percentage terms.

Units

- Water exploitation index - WEI (%); water abstraction for irrigation, public water supply, manufacturing industry and energy cooling (mio. m^3 per year).

Policy relevance of the indicator

List of relevant policy documents:

The National Environmental Action Plan - 2 and Environmental Monitoring Strategy and Data Management Strategy.

The policy for sustainable use of water resources based on the Sixth Environmental Action Programme and Framework Water Directive requirements.

National strategy on waters.

Legal grounds

The Law on Waters prescribes the basic planning documents for protection, maintenance and constant improvement of the disposable water resources and rational use of the available water quantities.

Basic planning and water management development documents in the Republic of Macedonia are:

- The National water strategy
- Water Master Plan of the Republic of Macedonia and
- River Basin Management Plans.

The Law specifies that the maintenance and improvement of water regime is carried out on the basis of River Basins Management Plans. Such Plans contain the environmental protection goals, good status of surface water bodies (good quantitative status and chemical status, including good environmental potential) and of the groundwater resources (quantitative status and chemical status).

Use of water for different purposes is specified under the Decree on Water Classification, according to which

water is divided into five different classes based on the level of pollution, while water characteristics are determined on the basis of classes and purposes for which water can be used.

Targets

No specific targets.

Key policy issue

Is water resources approximation based on water resources sustainability?

Key message

In the period 2002 – 2011, oscillatory trend was tracked in freshwater resources use. Particular rise was recorded in 2004 where the processing industry is the main user of the affected surface and ground water. Variability of data could be conditioned by discontinuity of industrial processes.

Figure 1. Water exploitation index

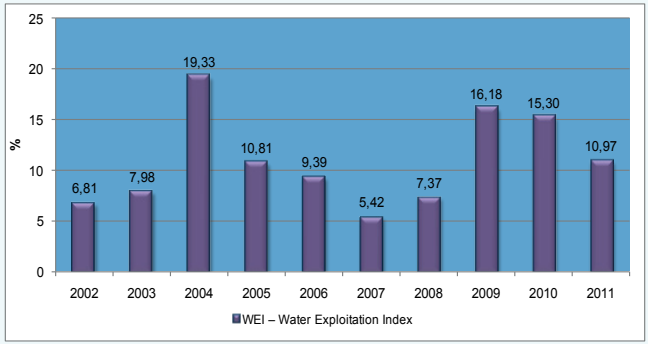
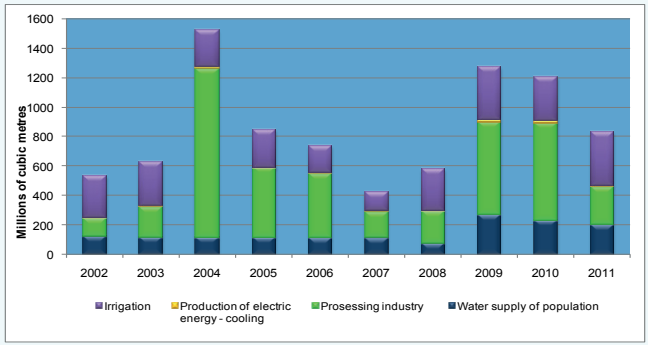


Figure 2. Freshwater resources use by sectors



Assessment

In the period 2002 – 2011, rising trend was tracked in freshwater resources use in the country. Particular rise was recorded in 2004. Processing industry is the main user of abstracted fresh surface and ground waters, especially in 2004. There has been discontinuity of industrial processes, reflected in water abstraction.

Methodology

- Methodology for the indicator calculation

Data is collected and processed by sectors and types of industry.

Water Exploitation Index (wei) is calculated by the mean annual total abstraction of freshwater divided by the mean annual total renewable freshwater resource at the country level.

Where: totABS = mean annual value of total water abstraction for all purposes; LTAA = long term annual mean value of freshwater resources, where data is expressed in average for a period of at least 20 consecutive years. Unit =%

Data specification

Title of the indicator	Source	Reporting obligation
Use of freshwater resources	– State Statistical Office – Water Management Administration – Public Water Supply and Sewerage Enterprise	– OECD/EUROSTAT

Data coverage:

Table 1: Water exploitation index

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
WEI – Water Exploitation Index	6,81	7,98	19,33	10,81	9,39	5,42	7,37	16,18	15,30	10,97

Table 2: Use of freshwater resources by sectors

Millions of cubic metres/year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	LTAA
Water supply of population	126	122	119	118	116	115	79	273,8	235	205	
Prosessing industry	122	203	1146	478	436	175	215	622	659	254	
Production of electric energy - cooling	7	10	12	1	6	12	8	18,1	18	15	
Irrigation	281	293	245	255	182	126	278	360	293	360	
Total use of freshwater resources	536	628	1522	851	740	427	580	1274	1205	864	7874,2

General metadata

Code	Title of the indicator	Compliance with CSI/ EEA or other indicators		Classification by DPSIR	Type	Linkage with area	Frequency of publication
MK NI 018	Use of freshwater resources	CSI 018	Use of freshwater resources	P	A	- water	annual

Definition

The key indicator for the oxygenation status of water bodies is the biochemical oxygen demand (BOD) which is the demand for oxygen resulting from organisms in water that consume oxidisable organic matter.The indicator illustrates the current situation and trends regarding BOD and concentrations of ammonium (NH_4) in rivers.

Units

- Annual average BOD after 5 or 7 days incubation (BOD_5/BOD_7) is expressed in mg O_2/l and annual average total ammonium concentrations in micrograms N/l.

Policy relevance of the indicator

List of relevant policy documents:

The National Environmental Action Plan - 2,

The Environmental Monitoring Strategy and Environmental Data Management Strategy,

Strategy for Waters has been developed in order to establish long-term policy that will secure sustainable development of waters by meeting the demands of all water users, protecting waters against pollution and pollution control.

The Law on Waters transposing the following EU Directives into the national legislation:

- Framework Water Directive (FWD) 2000/60/EEC, according to which, by the year of 2015, rivers in EU should achieve good ecological status or good ecological potential.

- Directive on nitrates (91/676/EEC), the goal of which is to reduce nitrates and pollution by organic matter originating from agricultural lands.

- Directive on urban wastewater treatment (91/271/EEC) aimed at reducing the pollution from sewerage and industrial wastewater treatment plants.

The Law on Environment has transposed the Directive on Industrial Pollution Prevention and Control (IPPC) 96/61/EEC is aimed at control and prevention of water resources pollution by industry.

Legal grounds

The Law on Waters prescribes the main planning documents for water protection, maintenance and permanent improvement of available water resources and sustainable use of available water quantities.

The main planning documents for water management planning and development include:

- The National Strategy for Waters
- Water Management Master Plan of the Republic of Macedonia, and
- River basin management plans.

For the purpose of maintenance and improvement of the quality of water and establishment of the adequacy of water for use for different purposes, the Law on Waters specifies classification of waters and categorization of water bodies, as well as specification of deadline for achievement of the water quality goals for each water category and specification of the minimum standards for water quality and environmental protection goals for all water bodies. According to the Law, management plan will be adopted for each river basin, in order to achieve the environmental protection objectives.

The Decree on categorization of water courses, lakes, accumulations and water resources (1999) specifies the quality of water by specific classes of water in water bodies, lakes, accumulations and groundwater resources. This Decree also establishes five categories of water courses.

Targets

Reduction and prevention of water pollution and thus achievement of good ecological status or potential of waters. RequirementsoftherelevantEUDirectiv es, namelyFWD, on urban wastewater treatment, on nitrates, on hazardous substances, as well as Directives on drinking and bathing waters, have been transposed in the Law on Waters).

Key policy issue

Has pollution of rivers by biochemical oxygen demand (BOD_5) and ammonium not noted increase?

Key message

During the assessed period from 2002 to 2011, significant reductionin BOD_5 and concentrations of ammonium in rivers was tracked in the Republic of Macedonia in 2003, 2009 and 2010, and slight in crease in BOD_5 concentration and ammonium concentration was tracked in 2022. The rest of the period is characterized with stable trend in BOD_5 concentrations. As far as ammonium concentrations are concerned, there are significant variations in the rivers every year. At some monitoring stations, located on the rivers Crna Reka and Vardar, eutrophic water status with high BOD value was recorded. These results could reflect the status of inefficient treatment of urban and industrial wastewaters in the country, as well as the inadequate protection of river basins.

Adequate protection of rivers, and especially the introduction of regular wastewater treatment in the country, is the top priority of the policy at both national and local levels.

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Figure 1. Biochemical oxygen demand (BOD_5) in rivers

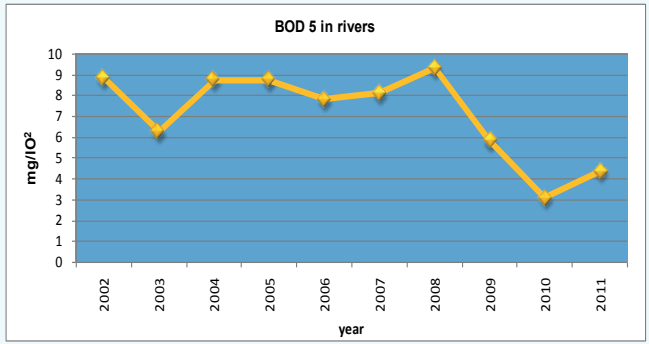


Figure2. Biochemical oxygen demand (BOD_5) in rivers by river

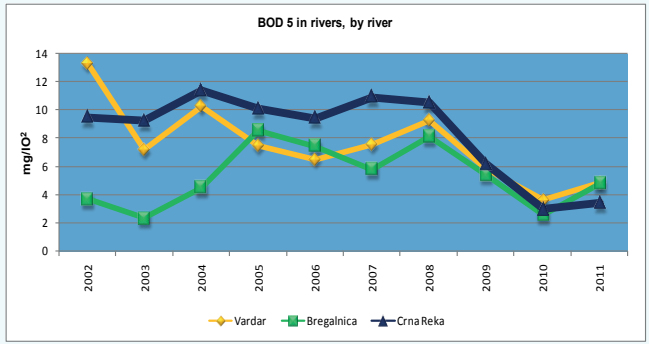


Figure3. Total ammonium in rivers

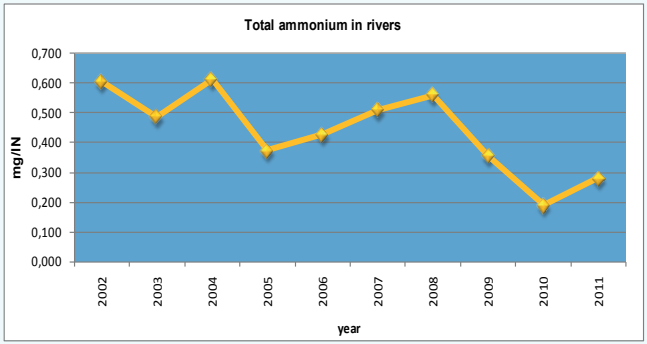
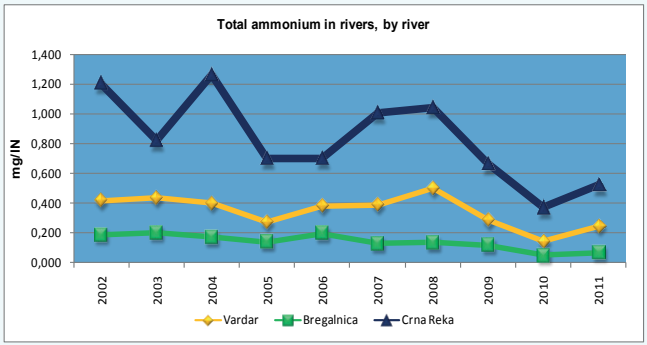


Figure4. Total ammonium in rivers by river



Assessment

After end of oscillating BOD_5 and ammonium concentrations was tracked int he rivers in the Republic of Macedonia at certain measuring points in the period 2002-2011. Drop in BOD 5 and ammonium concentrations was tracked in 2009 and 2010. Eutrophic status with high BOD was particularly recorded in two rivers: Crna Reka and Vardar. These results could reflect the status of inefficient treatment of urban and industrial wastewaters in the country, as well as the inadequate protection of river basins.

Methodology

- Methodology for the indicator calculation

Indicators calculation is based on the methodology established by Eurowaternet, determined by the European Topic Centre for water under the European Environmental Agency.

This process defines the manner of selection of the monitoring stations, the types of parameters to be monitored, as well as thefrequency of their collection

Data specification

Title of the indicator	Source	Reporting obligation
Oxygen consuming substances in rivers	– MEPP – HMA – HBI	– EEA

Data coverage:

Table 1: BOD_5 in the rivers

Year	2002	2003	2004	2005	2006	2007	2008	2009	2008	2009	2010	2011
BOD_5 (mg/lO_2)	8,81	6,25	8,72	8,7	7,79	8,08	9,29	5,82	9,29	5,82	3,09	4,36

Table 2: BOD_5 in the rivers, by individual river (mg/lO_2)

River/Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Vardar	13,28	7,18	10,27	7,46	6,52	7,55	9,27	5,88	3,67	4,86
Bregalnica	3,68	2,36	4,50	8,55	7,44	5,79	8,09	5,41	2,60	4,79
Crna Reka	9,47	9,22	11,38	10,08	9,41	10,91	10,51	6,16	3,00	3,44

Table 3: Total ammonium in the rivers

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total ammonium(mg/lN)	0,60	0,49	0,61	0,37	0,43	0,51	0,56	0,36	0,19	0,28

Table 4: Total ammonium in the rivers, by river (mg/lN)

River/Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Vardar	0,42	0,43	0,40	0,27	0,38	0,39	0,50	0,29	0,15	0,25
Bregalnica	0,19	0,20	0,17	0,14	0,20	0,13	0,14	0,12	0,05	0,07
Crna Reka	1,20	0,82	1,27	0,70	0,70	1,01	1,04	0,67	0,37	0,53

General metadata

Code	Title of the indicator	Compliance with CSI EEAor other indicators		Classification by DPSIR	Type	Linkage with area	Frequency of publication
MKNI 019	Oxygen consuming substances in rivers	CSI 019	Oxygen consuming substances in rivers	S	A	- water	annual

Definition

Concentrations of orthophosphate and nitrate in rivers, total phosphorus and nitrate in groundwater bodies. The indicator can be used to illustrate geographical variations in current nutrient concentrations and temporal trends.

Units

- Concentration of nitrate is expressed as mg nitrate (NO_3)/l, and orthophosphate and total phosphorus as mgP/l.

Policy relevance of the indicator

List of relevant policy documents:

The National Environmental Action Plan - 2 and the Environmental Monitoring Strategy and Environmental Data Management Strategy.

Strategy for Waters has been developed in order to establish long-term policy that will secure sustainable development of waters by meeting the demands of all water users, protecting waters against pollution and providing pollution control.

The Law on Waters transposing the following EU Directives into the national legislation:

- Framework Water Directive (FWD) 2000/60/EEC, according to which, by the year of 2015, rivers in EU should achieve good ecological status or good ecological potential.

- Directive on nitrates (91/676/EEC), the goal of which is to reduce nitrates and pollution by organic matter originating from agricultural lands.

- Directive on urban wastewater treatment (91/271/EEC) aimed at reducing the pollution from sewerage and industrial wastewater treatment plants.

The Law on Environment has transposed the Directive on Industrial Pollution Prevention and Control (IPPC) 96/61/EEC is aimed at control and prevention of water resources pollution by industry.

Legal grounds

The Law on Waters prescribes the main planning documents for water protection, maintenance and permanent improvement of available water resources and sustainable use of available water quantities.

The main planning documents for water management planning and development include:

- The National Strategy for Waters
- Water Management Master Plan of the Republic of Macedonia, and
- River basin management plans.

For the purpose of maintenance and improvement of the quality of water and establishment of the adequacy of water for use for different purposes, the Law on Waters specifies classification of waters and categorization of water bodies, as well as specification of deadline for achievement of the water quality goals for each water category and specification of the minimum standards for water quality and environmental protection goals for all water bodies. Such plans contain environmental protection objectives in order to achieve good status of surface water bodies (good quantitative and chemical status, including also good ecological potential) and ground water resources (good quantitative status and chemical status).

The Decree on categorization of water courses, lakes, accumulations and water resources (1999) specifies the quality of water by specific classes of water in water bodies, lakes, accumulations and groundwater resources. This Decree also establishes five categories of water courses

Under the Law on Waters, authorities responsible for health protection are obliged to carry out monitoring of waters intended for human consumption and bathing waters, and for undertaking measures for active protection of the population against communicable diseases of high social and health relevance. The competent institutes perform microbiological parasitological, hygienic, toxicological and biochemical analyses within the scope of their activity.

Programme for preventive health protection performs monitoring over the quality of surface waters at all points of health interest, in order to enable timely undertaking of measures for population protection. Waters used as drinking water sources, sports and recreation and primary agricultural production are of highest interest.

Targets

The indicator is not related directly to the requirements of a single Directive. Ecological quality of surface water requiring reduction of eutrophication and nutrient

concentrations is a target specified in several Directives, namely:

- Directive on drinking water (98/83/EC) – maximum permissible concentration of nitrates is 50 mg/l;
- Directive on abstraction of surface water intended for drinking (75/440/EEC) requires nitrates concentration of 25 mg/l.
- Directive on nitrates (91/676/EEC) requires identification of groundwater bodies where the annual concentration exceeds or may exceed 50 mg/lnitrates.
- Directive on urban wastewater treatment (91/71/EEC) specifies reduction of the pollution caused by organic matter as its objective.

Key policy issue

Has the nutrients concentration in water courses shown rising trend?

Despite of the absence of continuous monitoring of the status of groundwaters quality in the Republic of Macedoniaduring the last years, it can be stated that the concentration of nitrates in drinking water has been in a stable environmental health status.

With regard to rivers, increased annual mean value of nitrates was recorded in 2003 in the river of Bregalnica, while the highest annual mean value of orthophosphates was recorded in 2004 in the River of Vardar. The remained period up to 2011 is characterized by fall in the annual mean value of orthophosphates in rivers.

Throughout the investigation period, the Lake of Ohrid has sustained its oligotrophic nature as shown on the Table on the concentrations of phosphorus and nitrates. Significantly higher concentration was found in the waters of the Lake of Prespa, thus increasing the risk of Lake's water eutrophication.

Figure 1. Nitrates and orthophosphatesin rivers

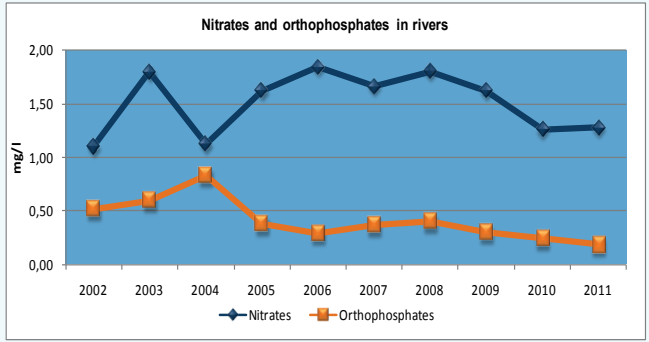


Figure2. Nitratesin rivers by river

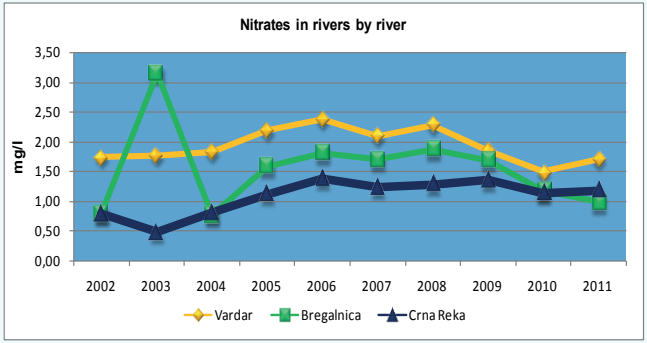


Figure3. Orthophosphatesin riversby river

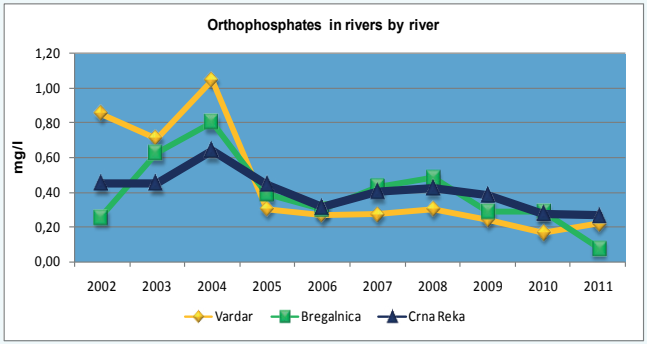


Figure 4. Total phosphorous in lakes

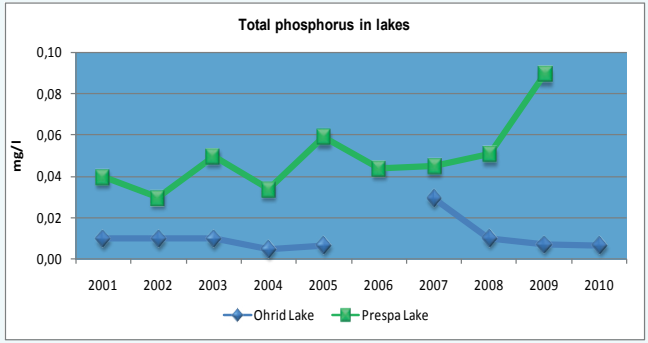
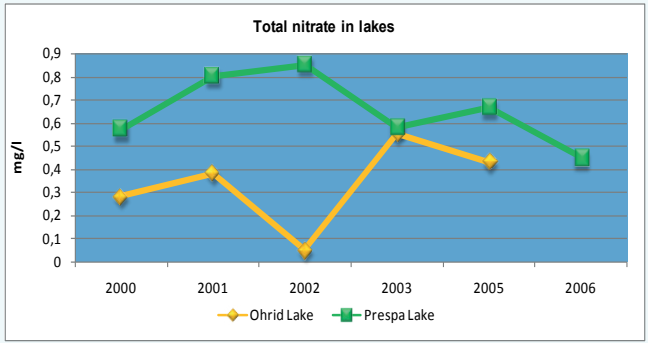


Figure 5. Total nitrate in lakes



Assessment

Annual mean concentrations of nitrates and orthophosphates have remained relatively stable since the beginning of 1990's. It has been found out that the concentration of these parameters is higher at certain measuring points of Vardar River.

Analysis of the results from the measurements in the plagial parts of OhridLake throughout the period has confirmed the oligotrophic nature with relatively stable concentrations of phosphorus (below 0.015 mg./l), with higher concentrations of phosphorous (0.030 mg/l)recorded in 2007 in Ohrid Lake and nitrates concentrations within permissible limits (mean annual concentrations below 0.55 mg/l). Concentrations are significantly higher in Prespa Lake, where organic compounds are found at high levels, thus increasing the risk of Lake's water eutrophication.

Methodology

- Methodology for the indicator calculation

The calculation of the indicator is based on the methodology established underEurowaternet, established by the European Topic Centre for waters of the European Environmental Agency.

Under this process, the manner of selection of monitoring stations is defined and the type of monitoring parameters and the frequency of their collection are specified.

Data specification

Title of the indicator	Source	Reporting obligation
Nutrients in freshwater	– MEPP – HMA – HBI	– EEA

Data coverage:

Table 1: Nitrates and orthophosphate in rivers

Nutrients/year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Nitrate(mg/lN)	1,11	1,80	1,13	1,62	1,85	1,67	1,81	1,63	1,26	1,28
Orthophosphate(mg/lP)	0,52	0,60	0,83	0,38	0,30	0,37	0,40	0,31	0,25	0,19

Table 2: Nitrate (mg/lN)in rivers by river

River/year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Vardar	1,73	1,76	1,82	2,17	2,37	2,08	2,27	1,85	1,49	1,70
Bregalnica	0,80	3,14	0,76	1,58	1,80	1,69	1,87	1,69	1,17	0,98
Crna Reka	0,78	0,49	0,81	1,12	1,37	1,23	1,28	1,35	1,13	1,17

Table 3: Orthophosphates (mg/lP)in rivers by river

River/year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Vardar	0,85	0,71	1,05	0,31	0,27	0,27	0,30	0,24	0,17	0,22
Bregalnica	0,26	0,62	0,80	0,39	0,30	0,43	0,48	0,29	0,29	0,08
Crna Reka	0,45	0,45	0,64	0,44	0,32	0,40	0,43	0,38	0,28	0,27

Table 4: Total phosphorus in lakes

Lake/year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ohrid Lake	0,01	0,01	0,01	0,01	0,01		0,03	0,01	0,01	0,01
Prespa Lake	0,04	0,03	0,05	0,03	0,06	0,04	0,05	0,05	0,09	

Table 5: Total nitrate in lakes

Lake/year	2000	2001	2002	2003	2005	2006
Ohrid Lake	0,28	0,38	0,05	0,55	0,43	
Prespa Lake	0,57	0,8	0,85	0,58	0,67	0,45

General metadata

Code	Title of the indicator	Compliance with CSI/ EEAor other indicators		Classification by DPSIR	Type	Linkage with area	Frequency of publication
MKNI 020	Nutrients in freshwaters	CSI 020	Nutrients in freshwater	S	A	– Water	Annually

Definition

The indicator describes the changes over time in the quality of designated bathing waters in terms of compliance with standards for microbiological parameters (total coliforms and faecal coliforms) and physicochemical parameters (mineral oils, surface-active substances and phenols) introduced by the EU Bathing Water Directive (76/160/EEC).

Units

- The data is expressed in a form of percentage of inland bathing waters with mandatory standards and levels specified in guidelines for microbiological and physicochemical parameters..

Policy relevance of the indicator

List of relevant policy documents

The National Environmental Action Plan - 2 and the Environmental Monitoring Strategy and Environmental Data Management Strategy.

Bathing Water Directive (76/160/EEC) requires the countries to designate water bodies intended for bathing and carry out monitoring of their quality during the bathing period. Water bodies designated for bathing are those water bodies designated by the competent authorities and those where bathing has been practiced traditionally by high number of swimmers. The bathing period is determined in accordance with the period during which the highest number of swimmers is present. Qualitative monitoring takes place on daily basis during the bathing season, as well as two weeks before the commencement of the bathing season. 95% of the samples have to comply with mandatory standards.

Legal grounds

Law on Waters, Decree on categorization of water courses, lakes, accumulations and water resources.

Targets

It is necessary that all water bodies designated for bathing comply with mandatory values of water quality specified in Bathing Water Directive and the provisions of the Law on Waters..

Key policy issue

Has the quality of bathing water improved?

Key message

The quality of lake water is at mainly satisfactory level. However, there are rivers which with their entry into the lakes contribute to deterioration of the quality of lake water. The percentage of samples with non-compliant quality is still very high (especially for physical and chemical parameters) Settlements around the three natural lakes are among the rare ones with wastewater treatment plants available in the country.

Approximation of the national legislation and standards in this area with the EU Bathing Water Directive should continue.

Figure 1.Quality of bathing freshwater - lakes

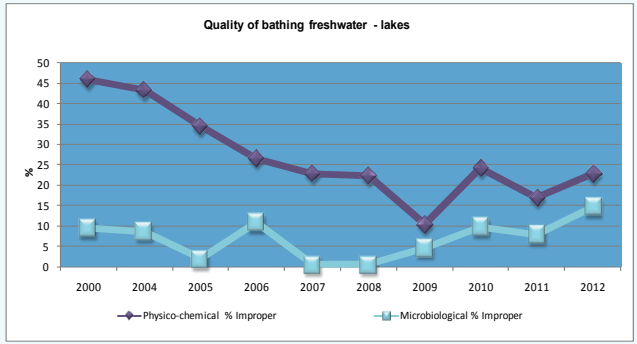
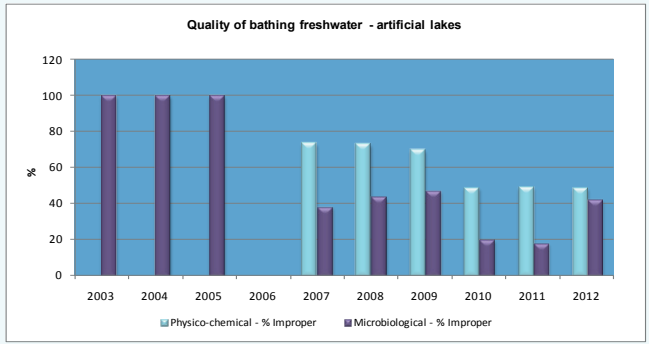


Figure2.Quality of bathing freshwater – artificial lakes



Assessment

The greatest proportion of water areas in the country belongs to natural lakes, the shores of which are used for recreation purposes. Thequalityofwater in these lakes is threatened by discharges of wastewater, uncontrolled use of lake waters for agricultural and tourismpurposes, as well as by weather conditions. Apart from natural lakes, there are artificial lakes - water accumulations in the Republic of Macedonia, used for both recreation and economic purposes.

The problems of bathing water quality protection in the lakes are closely related to the implementation of one of the highest priorities in the country›s environment protection - construction of adequate wastewater treatment facilities.

As international waters, the waters of the biggest natural lakes, i.e. Ohrid and Prespa, are also subject of bilateral and trilateral agreements between the Republic of Macedonia, Republic of Albania and Republic of Greece, respectively.

Methodology

- Methodology for the indicator calculation

Standard methodology for sampling - annual data.

Data specification

Title of the indicator	Source	Reporting obligation
Bathing water quality	– Public Health Institute of the Republic of Macedonia	– WHO

Data coverage:

Table 1: Bathing water quality – lakes

Parameter	Physico-chemical	Microbiological
Year/ % Improper	% Improper	% Improper
2000	45,80	9,47
2004	43,13	8,63
2005	34,37	1,93
2006	26,54	10,81
2007	22,83	0,63
2008	22,29	0,63
2009	10,42	4,69
2010	24,22	9,75
2011	16,95	7,9
2012	22,76	14,63

Table 2: Bathing water quality – artificial lakes

Year	Number of samples	Physico-chemical % Improper	Microbiological % Improper
2003	18	0	100
2004	20	0	100
2005	16	0	100
2006			
2007	83	73,49	38,55
2008	63 ph.c.; 57 mic.	73,01	43,86
2009	63 ph.c.; 57 mic.	69,8	47,3
2010	98 ph.c.; 98 mic.	48.97	20.4
2011	87 ph.c.; 87 mic.	49.42	18.4
2012	82 ph.c.; 82 mic.	48.78	42.68

General metadata

Code	Title of the indicator	Compliance with CSI/ EEAor other indicators		Classification by DPSIR	Type	Linkage with area	Frequency of publication
MKNI 022	Bathing water quality	CSI 022	Bathing water quality	S	B	– shore – water	annually

Definition

This indicator shows the exceedance of limit values set in Drinking Water Directive (80/778/EEC) and its amendment (98/83/EC which entered into force in 2003) and in the Rulebook on drinking water safety (Official Gazette of the Republic of Macedonia No.57/04), as well as the guideline values set for the quality of drinking water by the World Health Organization (WHO, 2004 and 2006).

Exceedance of drinking water quality limit values occurs when the concentration/dose of the pollutant exceeds the limit values specified in the above listed regulations.

Where more than one limit values exist (see the section on Policy goals), the indicator shall adopt the most strict case.

Units

- Numberofaerobicmesophilicbacteriain 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.

Policy relevance of the indicator

List of relevant policy documents:

The National Environmental Action Plan - 2 (2006) sets the improvement of the quality of drinking water through reduction of emissions of the main pollutants into surface and groundwaters as its main objective. The same document specifies the primary measure to be applied: to strengthen the processes of drinking water quality monitoring and assessment.

The 1999 National Environmental Health Action Plan (NEHAP) sets two main objectives:

- Reduction and minimization of health risks for the population through provision of drinking water for every citizen, which is safe from health point of view, sufficient in quantity, with guaranteed microbiological, organoleptical and physico-chemical composition, compliant with national standards and WHO Guidelines, as well as waters intended for sports and recreation and healthy food production;

- Reduction of exposure to toxic chemicals through water originating from agriculture and industry.

The NEHAP also sets the following priorities:

- approximation of the legislation on the quality of

ambient and drinking waters with the recommendations of the EU (approximation completed in 2004) and with the WHO Guidelines;

- introduction of disincentive prices for non-earmarked consumption of drinking water by commercial and non-commercial users and restrictive prices for the population in circumstances of draught for the purpose of consumption streamlining (implemented under the Law on Drinking Water Supply and Urban Wastewater Collection);

- establishment of sanitary protection zones around water supply sources in order to prevent contamination of anthropogenic origin (permanent process performed and most of the public utilities have established zones in line with the Elaborates for sanitary protection zones developed by the Public Health Institution RIHP and other authorised vocational institutions);

- completion of the process of construction of municipal and industrial wastewater treatment systems;

- monitoring of the quality of surface and groundwaters, especially at drinking water abstraction, places intended for sports and recreation and points for abstraction of water for irrigation, monitoring of discharged untreated and treated municipal and industrial wastewaters in accordance with EU and WHO Guidelines (monitoring is performed regularly and continuously by the Public Health Institute - Skopje and the 10 Regional public health centers with their local units);

- although the pilot project for fluoridation of milk consumed by pre-school children has been initiated, introduction of drinking water fluoridation as the most efficient, the least costly and socially and medically most fair means for massive caries prophylaxis has remained as public health option.

Legal grounds

Law on Health Protection, Law on Waters, Programme for preventive health protection in the Republic of Macedonia for 2011, Law on Drinking Water Supply and Urban Wastewater Collection, Decree on Water Classification, which in its Article 2, specifies five classes of surface watercourses, lakes and accumulations and ground water resources.

The Law on Food and Food stuffs and Materials in Contact with Food, in its Article 4 includes drinking water as food.

Rule book on drinking water safety (sets frequency of drinking water safety control).

In the Law on Nature Protection, one of the main goals defined in Article 4, item 6 of the Law is the securing of the right of citizens to a healthy environment.

The following EU Directives have been transposed in the new legal acts:

Drinking Water Directive (80/778/EEC) and its amendment (98/83/EC which entered into force in 2003).

Targets

The Rulebook on drinking water safetyspecifies the limit values for the parameters monitored in drinking water in terms of human health protection.

Limit values of concentrations of certain parameters in drinking water:

- According to the said Rulebook, limit values have been specified for the purpose of human health protection, harmonized with the EU Directive and WHO Guidelines on the quality of drinking water (2004).

Key policy issue

What progress has been made in reducing the concentrations of pollutants in urban and rural environments in order to reach drinking water limit values specified in the Rulebook?

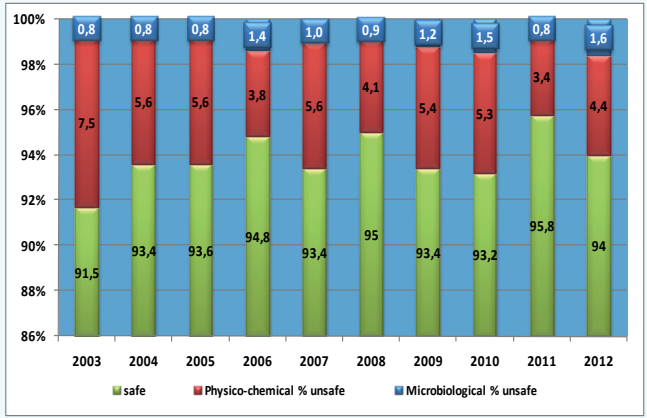
Key message

Bacteriological contamination of drinking water in rural environments, where no regular disinfection of drinking water is carried out in local water supply systems.

Drinking water quality

Access to safe drinking water in the Republic of Macedonia amounts 93% (period from 2003 to 2006) with a note that population in urban areas has 99% access to safe drinking water and 78% of rural population has access to health safe drinking water, while the rest is exposed at occasional risk of bacteriological pollution of drinking water.

Figure 1.Drinking water quality in percentage



Assessment

Quality of drinking water

Sanitary and hygienic condition of facilities and health safety of analyzed water samples are, generally, satisfactory, i.e. within the expected limits compared to previous years. In the period 2003-2012, the percentage of unsafe samples based on physical and chemical analysis ranged between 3.4 and 7.5 %, while the percentage of unsafe samples based on microbiological analysis ranged between 0.8 and 1.6%. The most frequent causes of unsafe findings in the physical and chemical include absence of residual chlorine or increased content of iron in raw water and in very few samples it is due to increased content of nitrites from dag or drilled wells of individual users.

With bacteriologically positive findings, the cause is mostly increased number of aerobic mesophile bacteria. Toxic parameters are within the prescribed legal norms.

In the segment of health safe drinking water supply in rural populated places, the deficiencies in terms of undefined sanitary protection zones around drinking water sources, lack of adequate equipment for drinking water filtering and disinfection and inappropriate technical maintenance, have been constantly present. Therefore, there is high percentage of bacteriologically unsafe (9-25%).

Methodology

- Methodology for the indicator calculation

Drinking water quality

Data is, generally, representative for the whole urban area in the Republic of Macedonia. The indicator is subject to modifications from year to year, depending on the introduction of new wastewater treatment plants and in line with the enhanced trend of rural population coverage with safe drinking water supply.

- Data uncertainty

Data is, generally, representative for the whole urban area in the Republic of Macedonia. Representativeness of monitoring selection is in accordance with the requirements of Directive 98/83/EC.

Data specification

Title of the indicator	Source	Reporting obligation
Drinking water quality	– PHC – 10 Regional – Public Health Institute of the Republic of Macedonia	– European Environmental Agency – Exchange of data on drinking water quality, based on the Council decision on the establishment of reciprocal exchange of information and data on drinking water quality (98/83/EC). – World Health Organization - ENHIS – Drinking water quality, in line with the WHO Guidelines on drinking water quality of 1987 and 2004, respectively.

Data coverage:

Table 1: Drinking water quality in percentage

Year	safe	Physico-chemical	Microbiological
		% unsafe	% unsafe
2003	91,5	7,5	0,8
2004	93,4	5,6	0,8
2005	93,6	5,6	0,8
2006	94,8	3,8	1,4
2007	93,4	5,6	1,0
2008	95	4,1	0,9
2009	93,4	5,4	1,2
2010	93,2	5,3	1,5
2011	95,8	3,4	0,8
2012	94	4,4	1,6

General metadata

Code	Title of the indicator	Compliance with CSI/ EEAor other indicators		Classification by DPSIR	Type	Linkage with area	Frequency of publication
MK NI 039	Drinking water quality	WEU13	Drinking water quality	S	A	– Water quality	Annually

Definition

The indicator tracks the trend in irrigated areas in a given time interval on the whole territory of the Republic of Macedonia, as well as total quantities of consumed water on the entire territory and proportion of irrigated land compared to the total cultivable land area.

Units

- Area of irrigated land (expressed in hectares), quantity of water used for irrigation expressed in cubic meters consumed at annual level, % of irrigated land in the total cultivable land area.

Policy relevance of the indicator

List of relevant policy documents:

The National Environmental Action Plan - 2 and Environmental Monitoring Strategy and Data Management Strategy.

The policy for sustainable use of water resources based on the Sixth Environmental Action Programme and Framework Water Directive requirements as transposed in the national Law on Waters.

Legal grounds

The Law on Waters provides for integrated approach, specifying the conditions and the manner of waters use and allocation, protection against harmful impacts of water, as well as standards and values for water quality and control of pollution, while taking into account integration of measures and activities for water protection in all development, strategic, planning and programme documents.

The main planning documents for water management planning and development include:

- The National Strategy for Waters
- Water Management Master Plan of the Republic of Macedonia, and
- River basin management plans.

The National Strategy for Waters is aimed at establishing long-term policy to ensure sustainable use of water by meeting the demands of all users with adequate quality water in sufficient quantities, rational and cost-effective consumption of waters, water protection against contamination and contamination control.

The Water Master Plan of the Republic of Macedonia

provides for integrated planning and implementation of programmes and measures, technical and economic solutions for rational water use, protection of waters against contamination and protection against harmful impacts of water, based on the principles of sustainable development and the timeframe for their implementation.

The River Basins Management Plans enable maintenance and improvement of water regime. Such Planscontainthe environmental protection goals, good status of surface water bodies (good quantitative status and chemical status, including good ecological potential) and ground water resources (good quantitative status and chemical status).

Use of water for different purposes is specified under the Decree on Water Classification, according to which water is divided into five different classes based on the level of pollution, while water characteristics are determined on the basis of classes and purposes for which water can be used.

Targets

No specific targets.

Key policy issue

Is the water abstraction based on water-sustainability?

Key message

An uneven trend in water use for land irrigation was observed in the period between 2002 and 2011, due to weather conditions in the given year, as well as to organization all restructuring of the sector. Particular fall in water use for land irrigation was recorded in 2006 and 2007.

Data is not part of the official statistics published in the country.

Figure 1.Use of water resources

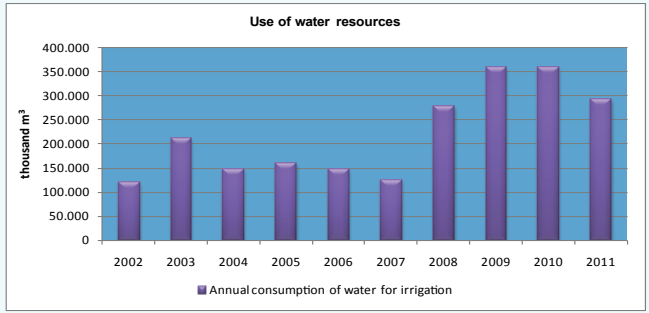


Figure 2.Total area irrigated

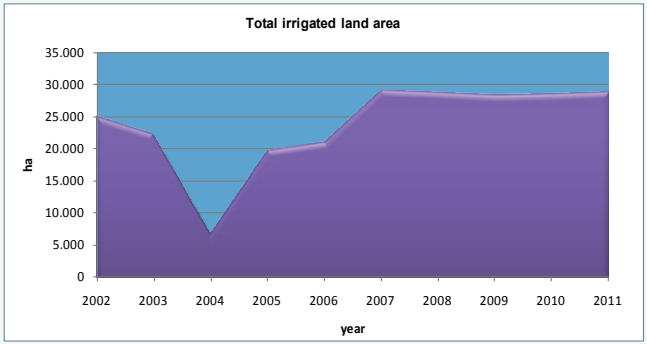
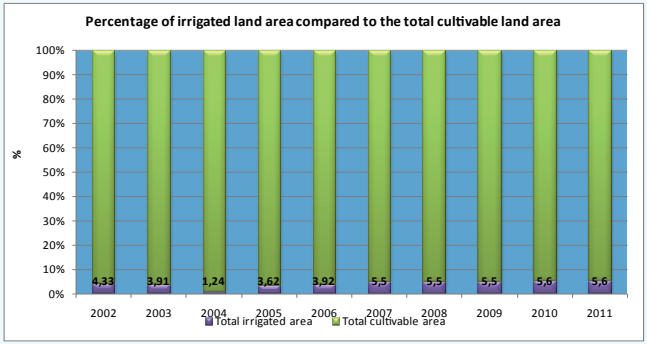


Figure3.Percentage of irrigated area relative to total cultivated land area



Assessment

Figure 2 shows the whole irrigated land area for the period 2002-2011, reflecting anuneventrendinwater useforlandirrigation. Thereisanevident data that the quantity of water consumed by this sector in 2004 was significantly lower compared to the entire successive interval. This is due to the favorable weather conditions in 2004, when increased number of precipitation and increased water masses were noted. Figure 3presents the percentage of irrigated land area compared to the entire cultivable land area in the Republic of Macedonia, showing that the percentage is really low with the average being below 5% for the entire time interval, except from 2007 to 2011 when higher percentage was recorded, reaching 5.6%.

Methodology

- Methodology for the indicator calculation

Data is collected and processed by years.

Data specification

Title of the indicator	Source	Reporting obligation
Irrigated land	– State Statistical Office	– OECD/EUROSTAT

Data coverage:

Table 1: Use of water resources

(thousand m^3)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Annual consumption of water for irrigation	281.400	293.300	244.800	255.100	182.000	125.500	278.000	360.000	360.000	293.000

Table 2: Area of irrigated land*

h/y	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total irrigated land area	22.267	6.967	19.787	21.038	29.059	28.690	28.281	28.476	28.791

*Data covers only land area irrigated in agricultural cooperatives and agricultural companies

Table 3: Total cultivable land

h/y	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total cultivable land area	569.000	560.000	546.000	537.000	526.000	521.000	513.000	508.967	511.316
Total irrigated land area	22.267	6.967	19.787	21.038	29.059	28.690	28.281	28.476	28.791

Table 4: Percentage of irrigated area compared to total cultivable area

%	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total cultivable land area	100	100	100	100	100	100	100	100	100
Total irrigated land area	3,9	1,2	3,6	3,9	5,5	5,5	5,5	5,6	5,6

General metadata

Code	Title of the indicator	Compliance with CSI/ EEA or other indicators		Classification by DPSIR	Type	Linkage with area	Frequency of publication
MKNI 040	Irrigated land	WQ4	Irrigated land	D	A	– Water	Annually