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NATIONAL REVIEW OF THE APPLICATION OF ENVIRONMENTAL INDICATORS

Submitted by the Republic of Serbia

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EVALUATION OF FURTHER SIX INDICATORS FROM THE *UNECE INDICATOR GUIDELINES*

Indicator	A. Effective inter-agency cooperation mechanisms to produce the indicator	B. Data quality assurance and control procedures for the	C. Publication of the indicator in statistical compendiums and state-of-the-environment
BOD and concentration of ammonium in rivers	**Monitoring and Management of water resources in Serbia is within the jurisdiction of the Ministry of Agriculture, Trade, Foresty and Water Management. Hidromed Institute of Serbia is engaged, for the needs of Ministry, in collecting data that are listed in the table. Agency for Environmental Protection (SEPA) does not participate in development of monitoring programs, it only data processing that come through its implementation.**	**Hidromed Institute of Serbia has an Accreditation and a ISO certificate for methods and for laboratory. The institution that submits the data to the Agency, should ensure it's quality.**	**Indicator was published in the Environmental State Report 2006, 2007, 2008, 2009 and 2010 of Serbia (SEPA).**
Nutrients in fresh water	**Monitoring and Management of water resources in Serbia is within the jurisdiction of the Ministry of Agriculture, Trade, Foresty and Water Management. Hidromed Institute of Serbia is engaged, for the needs of Ministry, in collecting data that are listed in the table. Agency for Environmental Protection (SEPA) does not participate in development of monitoring programs, it only data processing that come through its implementation.**	**Hidromed Institute of Serbia has an Accreditation and a ISO certificate for methods and for laboratory. The institution that submits the data to the Agency, should ensure it's quality.**	**Indicator was published in the Environmental State Report 2006, 2007, 2008, 2009 and 2010 of Serbia (SEPA).**
Nutrients in coastal seawaters	**….**	**….**	**….**

Area affected by soil erosion	**Data on the protection against damaging effects of water are compiled from regular reports of business entities dealing with water management, protection against damaging water effects and construction of hydro facilities, i.e. which activity is defined in the following sections: Construction (divisions 42 – Civil engineering and 43 – Specialized construction activities) and Professional, Scientific and Technical Activities (division 71 - Architectural and engineering activities), according to Classification of Activities.** **The reports of the statistical survey, conducted by the Statistical Office of the Republic of Serbia (SORS) related to protection against floods, used to be collected three-annually in the period 1993-2008. However, due to climate changes, unpredictable periodicity of flood occurrence, as well as due to users' requests, the survey has been conducted annually since 2009.** **Survey is still in development stage since there are some issues in jurisdictions around the management of flood damage and erosion at the local and national level.**	**….**	**Indicator was published by SORS in Statistical Yearbook 2000, 2003, 2006, 2009, 2010, Ecobulletin 2005-2006, 2007-2008, 2009, Statistical Release 2009, 2010 and on web-site: *www.stat.gov.rs* and as part of the Environmental State Report of Serbia , 2006, 2007, 2008, 2009 and 2010, published by SEPA.**
Pesticide use	**….**	**….**	**….**
Consumption of ozone-	**….**	**….**	**….**

Question A.	Effective inter-agency cooperation mechanisms to produce the indicator
Please describe cooperation arrangements, if any, which have been established in your country to collect the necessary data for the indicator. These may involve statistical agencies, ministries of water	

Question B.	Data quality assurance and control procedures for the production of the indicator
Please describe data quality assurance and control procedures for the production of the indicator. The description should cover problems met, solutions found and possible further steps envisaged or needed.	

Question C.	Publication of the indicator in statistical compendiums and state-of-the-environment reports
Please present the evidence of the indicator publication in statistical compendiums and state-of-the-environment reports (titles, names of the publishing houses, cities and years of the publications, languages,	

The description of the indicators is available online at: www.unece.org/env/documents/2007/ece/ece.belgrade.conf.2007.inf.6.e.pdf

Time series data on the indicators for 1990-2010, Table 1. Biochemical oxygen demand (BOD_5) and concentration of ammonium in rivers: *Serbia*

Name of river	Danube												
Distance to mouth or downstream frontier (km)	579.5												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			12	12	11.5	12	12	21	23	20.5	12	11	10.5
BOD_5	Mg of O_2 /liter			2.92	2.68	2.92	3.19	2.75	2.91	2.61	2.54	2.4	2.2	2
Ammonium	µg of N/liter			120	120	160	140	120	130	190	100	70	80	60

Name of river	Danube												
Distance to mouth or downstream frontier (km)	5.5												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			8	8	9	11	10	9	17	19.5	10.5	11	12
BOD_5	Mg of O_2 /liter			2.4	2.23	2.29	2.21	2.9	3.1	2.35	2.53	2.24	1.92	2.1
Ammonium	µg of N/liter			110	210	60	160	70	20	90	110	170	120	130

Name of river	Danube												
Distance to mouth or downstream frontier (km)	313.5												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010

Sampling frequency - average	Per sampling period			8	10	10	10	10	9	10	19	11	11	11
BOD_5	Mg of O_2 /liter			2.65	2.61	2.83	2.54	2.44	2.13	2.92	2.46	2.53	2.3	2.1
Ammonium	µg of N/liter			250	190	270	280	240	320	270	100	110	90	80

Notes:

The sampling period concerns the whole year.
Distance to downstream frontier.
Analytical method for determining of BOD5 is EPA 360.2. Analytical method for determining ammonia ion is SRPS ISO 7150-1.

Time series data on the indicators for 1990-2010, Table 1. Biochemical oxygen demand (BOD_5) and concentration of ammonium in rivers: *Serbia*

Name of river	Sava												
Distance to mouth or downstream frontier (km)	200												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			11	10	12	11.5	11.5	23	21.5	22	21.5	12	12
BOD_5	Mg of O_2 /liter			1.42	2.23	2.39	2.19	1.17	1.33	1.29	1.23	1.19	1.05	1.6
Ammonium	µg of N/liter			100	150	70	100	30	10	30	10	10	30	80

Name of river	Sava												
Distance to mouth or downstream frontier (km)	17												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			12	11.5	12	12	11.5	22.5	20	22	21	11.5	12
BOD_5	Mg of O_2 /liter			3.5	1.96	2.33	2.06	2.22	2.36	2.44	2.21	2.33	2.42	1.9
Ammonium	µg of N/liter			100	180	60	130	70	60	40	30	50	50	50

Name of river	Sava												
Distance to mouth or downstream frontier (km)	103.6												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			11	12	12	11.5	11.5	20.5	23.5	21.5	22.5	12	12
BOD_5	Mg of O_2 /liter			1.85	1.99	2.49	1.95	1.58	1.23	1.4	1.3	1.23	1.26	1.3
Ammonium	µg of N/liter			100	160	60	90	20	10	30	10	10	30	40

Notes:

The sampling period concerns the whole year.
Distance to downstream frontier.
Analytical method for determining of BOD5 is EPA 360.2. Analytical method for determining ammonia ion is SRPS ISO 7150-1.

Time series data on the indicators for 1990-2010, Table 1. Biochemical oxygen demand (BOD_5) and concentration of ammonium in rivers: *Serbia*

Name of river	Velika Morava												
Distance to mouth or downstream frontier (km)	237.2												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			9	8	9.5	10.5	9.5	20	24	24	22.5	12	12
BOD_5	Mg of O_2 /liter			4.94	4.14	4.04	2.95	1.93	2.2	2.24	1.6	2.27	2.28	2.4
Ammonium	µg of N/liter			140	140	70	90	30	10	20	10	10	30	150

Name of river	Velika Morava												
Distance to mouth or downstream frontier (km)	21.7												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			12	10.5	11.5	11	9.5	22	21	19.5	19.5	10.5	12
BOD_5	Mg of O_2 /liter			3.38	3.57	3.65	3.55	3.13	2.68	2.88	2.94	2.87	3.93	3.5
Ammonium	µg of N/liter			130	140	60	80	50	10	40	50	10	160	270

Name of river	Velika Morava												
Distance to mouth or downstream frontier (km)	154.1												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			11	9	10.5	9.5	12	22.5	20	21.5	18	11	10
BOD_5	Mg of O_2 /liter			4.15	4.62	2.47	3.06	n.a.	2.35	1.78	2.62	2.03	3.62	1.9
Ammonium	µg of N/liter			60	150	60	80	40	10	30	10	10	70	160

Notes:

The sampling period concerns the whole year.
Distance to downstream frontier.
Analytical method for determining of BOD5 is EPA 360.2. Analytical method for determining ammonia ion is SRPS ISO 7150-1.

Time series data on the indicators for 1990-2010, Table 2a. Nutrients in freshwater - rivers: *Serbia*

Name of river	Danube												
Distance to mouth or downstream frontier (km)	579.5												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			12	12	12	12	12	21	23	22	12	11	11
Phosphates as P	µg/liter			46	45	48	37	46	34	40	40	53	44	46
Nitrates (NO3)	µg/liter			2140	2020	2070	1910	1990	2040	1900	1830	1880	1870	2120

Name of river	Danube												
Distance to mouth or downstream frontier (km)	5.5												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			8	9	9	11	11	11.5	17	21	9.5	11	12
Phosphates as P	µg/liter			184	519	169	63	31	53	197	190	117	200	118
Nitrates (NO3)	µg/liter			1620	1120	1610	1560	1350	1410	1620	1290	1040	960	630

Name of river	Danube												
Distance to mouth or downstream frontier (km)	313.5												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			8	10	10	10	11	9	10	19	12	11	11
Phosphates as P	µg/liter			33	45	49	69	48	59	53	43	43	47	70
Nitrates (NO3)	µg/liter			1500	1430	1450	1330	1620	1330	1190	1310	1460	1310	1400

Note:

The sampling period concerns the whole year.

Distance to downstream frontier.

The analytical method for determining nitrates is APHA AWWA WEF 4500-NO3. The analytical method for determining phosphates is APHA AWWA WEF 4500-P.

Time series data on the indicators for 1990-2010, Table 2a. Nutrients in freshwater - rivers: *Serbia*

Name of river	Sava												
Distance to mouth or downstream frontier (km)	200												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			11	10	12	12	11.5	21.5	24	23	23	12	12
Phosphates as P	µg/liter			49	43	63	57	28	78	53	59	62	44	51
Nitrates (NO3)	µg/liter			560	820	1260	1040	1140	1170	1100	1260	1450	1030	760

Name of river	Sava												
Distance to mouth or downstream frontier (km)	17												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			12	12	11.5	12	12	23.5	24	24	23	12	12
Phosphates as P	µg/liter			23	32	62	65	65	63	59	51	69	48	29
Nitrates (NO3)	µg/liter			860	660	1020	730	1080	1090	1160	780	640	690	420

Name of river	Sava												
Distance to mouth or downstream frontier (km)	103.6												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			11	12	12	12	11.5	21	23.5	23	23.5	12	12
Phosphates as P	µg/liter			46	41	57	47	30	62	46	50	52	36	36
Nitrates (NO3)	µg/liter			590	880	980	1000	990	1100	1020	1070	1330	970	740

Note:

The sampling period concerns the whole year.
Distance to downstream frontier.
The analytical method for determining nitrates is APHA AWWA WEF 4500-NO3. The analytical method for determining phosphates is APHA AWWA WEF 4500-P.

Time series data on the indicators for 1990-2010, Table 2a. Nutrients in freshwater - rivers: *Serbia*

Name of river	Velika Morava												
Distance to mouth or downstream frontier (km)	237.2												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			9	8	11	10.5	12	22	21	24	22.5	12	11.5
Phosphates as P	µg/liter			175	155	123	113	74	106	82	121	135	120	85
Nitrates (NO3)	µg/liter			1030	1590	1630	1740	1650	1720	1650	1870	1950	1720	540

Name of river	Velika Morava												
Distance to mouth or downstream frontier (km)	21.7												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			12	11	12	11.5	11	23.5	24	22	23.5	11.5	12
Phosphates as P	µg/liter			366	117	103	108	70	112	92	111	120	121	107
Nitrates (NO3)	µg/liter			1500	1300	1740	1810	1600	1880	1820	3700	2130	1400	1050

Name of river	Velika Morava												
Distance to mouth or downstream frontier (km)	154.1												
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period			11	10	10.5	10	11.5	24	23	24	23	12	11
Phosphates as P	µg/liter			110	173	133	122	82	122	97	129	140	128	106
Nitrates (NO3)	µg/liter			1030	1160	1950	1810	1570	1930	1870	1920	2040	1580	810

Note:

The sampling period concerns the whole year.

Distance to downstream frontier.

The analytical method for determining nitrates is APHA AWWA WEF 4500-NO3. The analytical method for determining phosphates is APHA AWWA WEF 4500-P.

Time series data on the indicators for 1990-2010, Table 2b. Nutrients in fresh water - lakes: *Serbia*

Name of lake	Vlasina												
Name of measuring station	Vlasina(A)												
Surface area (km^2)	14.11												
Maximum depth (m)													
Mean depth (m)													
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period								1	1	1	1	1	1
Total phosphorus as P	µg/liter								31.5	23.1	60.5	27.5	16.3	18.3
Nitrates (NO3)	µg/liter								102.1	337.5	367.4	373.8	273.9	125

Name of lake	Vlasina												
Name of measuring station	Vlasina(B)												
Surface area (km^2)	14.11												
Maximum depth (m)													
Mean depth (m)													
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period								1	1	1	1	1	1
Total phosphorus as P	µg/liter								42.3	35	45.5	46.7	18.3	17.5
Nitrates (NO3)	µg/liter								101.7	422.5	116.6	324	222.2	200

Name of lake	Vlasina
Name of measuring station	Vlasina(C)
Surface area (km^2)	14.11
Maximum depth (m)	
Mean depth (m)	

	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period								1	1	1	1	1	1
Total phosphorus as P	µg/liter								20.3	20.5	56.7	4.6	17.4	40.6
Nitrates (NO3)	µg/liter								19.7	500	521.7	268.8	100	100

Note:

The sampling period concerns the seasonal period from June to September.

The analytical method for determining nitrates is APHA AWWA WEF 4500-NO3. The analytical method for determining Total phosphorus is APHA AWWA WEF 4500-P.

Time series data on the indicators for 1990-2010, Table 2b. Nutrients in fresh water - lakes: *Serbia*

Name of lake	Celije												
Name of measuring station	Celije(A)												
Surface area (km^2)													
Maximum depth (m)													
Mean depth (m)													
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period								1	1	1	1	1	1
Total phosphorus as P	µg/liter								36.9	49.2	44.8	37.2	29	55.1
Nitrates (NO3)	µg/liter								970.1	689	301	750.6	249.4	250

Name of lake	Celije												
Name of measuring station	Celije(B)												
Surface area (km^2)													
Maximum depth (m)													
Mean depth (m)													
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period								1	1	1	1	1	1
Total phosphorus as P	µg/liter								28.6	83.5	47.6	104	48.8	97.8
Nitrates (NO3)	µg/liter								765.2	410	285.7	448.4	269.6	172.5

Name of lake	Celije
Name of measuring station	Celije(C)
Surface area (km^2)	

Maximum depth (m)														
Mean depth (m)														
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period								1	1	1	1	1	1
Total phosphorus as P	µg/liter								49.9	84	65	93.8	28.5	70.2
Nitrates (NO3)	µg/liter								729.2	423.8	100	700	225	125

Note:
The sampling period concerns the seasonal period from June to September. The analytical method for determining nitrates is APHA AWWA WEF 4500-NO3. The analytical method for determining Total phosphorus is APHA AWWA WEF 4500-P.

Time series data on the indicators for 1990-2010, Table 2c. Nutrients in fresh water - groundwater: *Serbia*

Name of water object	Pozarevac(1NPP-3)													
Type of measuring station (shallow well, deep well, spring)	well													
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period						1	2	1	2	2	2	1	1
Nitrates (NO3)	µg/liter						16100	14850	22840	16770	17045	17850	16060	5800

Note:
The sampling period concerns the whole year. Type of measuring station should be presented in compliance with national legislation (including explanation)

Time series data on the indicators for 1990-2010, Table 2c. Nutrients in fresh water - groundwater: *Serbia*

Name of water object	Bac(18NP0081)													
Type of measuring station (shallow well, deep well, spring)	well													
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sampling frequency - average	Per sampling period						1	1	1	1	1	1	1	1
Nitrates (NO3)	µg/liter						400	15	15	30	30	20	400	500

Note:
The sampling period concerns the whole year. Type of measuring station should be presented in compliance with national legislation (including explanation) The analytical method for determining nitrates is APHA AWWA WEF 4500-NO3.

Time series data on the indicators for 1990-2010, Table 4. Area affected by erosion: *Serbia*

Areas affected by water erosion														
	Unit	1990	1995	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total agricultural land	Km^2			51186		51069			50740			50550	50580	50966
No affect (tolerable)	Km^2													
Share in total agricultural land	%													
Light affect	Km^2													
Share in total agricultural land	%													
Moderate affect	Km^2													
Share in total agricultural land	%													
Strong affect	Km^2													
Share in total agricultural land	%													
Extreme affect	Km^2													
Share in total agricultural land	%													
Total affect	Km^2			3486		284			1635			1221	3201	2623
Share in total agricultural land	%			6.8		0.6			3.2			2.4	6.3	5.1
Areas affected by wind erosion														
	Unit	1990	1995	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total agricultural land	Km^2													
No affect (tolerable)	Km^2													
Share in total agricultural land	%													

Light affect	Km^2													
Share in total agricultural land	%													
Moderate affect	Km^2													
Share in total agricultural land	%													
Strong affect	Km^2													
Share in total agricultural land	%													
Extreme affect	Km^2													
Share in total agricultural land	%													
Total affect	Km^2													
Share in total agricultural land	%													
Total areas affected by erosion (water and wind)														
	Unit	1990	1995	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total agricultural land	Km^2			51186		51069			50740			50550	50580	50966
No affect (tolerable)	Km^2													
Share in total agricultural land	%													
Light affect	Km^2													
Share in total agricultural land	%													
Moderate affect	Km^2													
Share in total agricultural land	%													
Strong affect	Km^2													

Share in total agricultural land	%													
Extreme affect	Km^2													
Share in total agricultural land	%													
Total affect	Km^2			3486		284			1635			1221	3201	2623
Share in total agricultural land	%			6.8		0.6			3.2			2.4	6.3	5.1

Glossary:	
Erosion: Water and wind erosion is measured as net loss of soil (in tons per hectare per year).	
Erosion – Classification (the same for both water and wind erosion):	
No affect (tolerable):	Net loss lower than 6 tons/hectare/year
Light affect:	Net loss 6.0 – 10.9 tons/hectare/year
Moderate affect:	Net loss 11.0 – 21.9 tons/hectare/year
Strong affect:	Net loss 22.0 – 32.9 tons/hectare/year
Extreme affect:	Net loss higher than 33 tons/hectare/year
Note: If your country applies classification for the severity of erosion different from that presented above, provide the data according to the national classification and give the detailed explanation of the national system. If data for 1990 or other year is not available, fill in "n.a.".	

More information:
Assessment and Reporting on Soil Erosion, Technical Report 94/2003, European Environment Agency 2003, http://www.eea.europa.eu/publications/technical_report_2003_94

Time series data on the indicators for 1990-2010, Table 5. Pesticide use: *Serbia)*

Substance	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Insecticides – consumption	ton													
Herbicides and desiccants – consumption	ton													
Fungicides and bactericides – consumption	ton													
Plant regulators – consumption	ton													
Rodenticides – consumption	ton													
Others (e.g. mineral oils) – consumption	ton													
Total consumption (all pesticides)	ton													
Total arable and permanent cropland	1000 hectare	5095	5112	5074	5077	5072	5078	5075	5074	5066	5053	5055	5057	5052
Pesticide use per unit of land	Kg/hectare													

Note:

Data should relate to pesticide consumption in agriculture, forestry and gardening. Otherwise, kindly indicate if data refer to sales, distribution or imports for use in particular sectors. If data for 1990 or other year is not available, fill in "n.a.".
Data should be expressed in active ingredients (A.I.). Therefore, calculate the volume of A.I. contained in individual products and then include it in the relevant group in table 3. Alternatively, the data may be reported by: consumption in commercial products; sales; distribution or imports for use in the agricultural sector.

Glossary:

Insecticide:	Pesticide used against insects
Herbicide:	Pesticide against unwanted plants (weed)
Desiccant:	Hygroscopic substance that induces or sustains a state of dryness
Fungicide:	Pesticide for the control of fungi and oomycetes
Bactericide:	Pesticide for the control of bacteria
Plant regulator:	Pesticide that retards the growth of plants
Rodenticide:	Pesticide for the control of rodens

Active Ingredients: A pesticide product has two main components: the Active Ingredient(s) and the inert (other) ingredient(s). The active ingredient is the specific compound designed to adversely effect a pest. Pesticide active ingredients are generally not applied in their pure form, but are usually included in formulations with inert ingredients that improve their storage, handling, application, effectiveness, or safety. Content of active ingredient is obviously presented either in pesticide product documentation or on the pesticide product packaging.

More information:

Comprehensive information on pesticides can be found at the FAO page http://www.fao.org/agriculture/crops/core-themes/theme/pests/en.

The detailed list of pesticides including chemical substances and example of trade names of commercial products can be found at http://www.fao.org/economic/ess/ess-agri/ess-resource-meth/en (Questionnaires, Pesticides, 2010, Annex I)

Time series data on the indicators for 1990-2010, Table 5a. Pesticide application by agricultural organisations: *Serbia*

Substance	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Insecticides – consumption	ton													
Herbicides and desiccants – consumption	ton													
Fungicides and bactericides – consumption	ton													
Plant regulators – consumption	ton													
Rodenticides – consumption	ton													
Others (e.g. mineral oils) – consumption	ton													
Total consumption (all pesticides)	ton													
Total arable and permanent cropland (as of end of the year)	1000 hectare		5112	5074	5077	5072	5078	5075	5074	5066	5053	5055	5057	5052
Pesticide use per unit of land	Kg/hectare													

Note:

Data cover pesticide application in agriculture. Data are provided in terms of physical weight,but not in terms of active substance

Data should relate to pesticide consumption in agriculture, forestry and gardening. Otherwise, kindly indicate if data refer to sales, distribution or imports for use in particular sectors. If data for 1990 or other year is not available, fill in "n.a.".
Data should be expressed in active ingredients (A.I.). Therefore, calculate the volume of A.I. contained in individual products and then include it in the relevant group in table 3. Alternatively, the data may be reported by: consumption in commercial products; sales; distribution or imports for use in the agricultural sector.

Glossary:	
Insecticide:	Pesticide used against insects
Herbicide:	Pesticide against unwanted plants (weed)
Desiccant:	Hygroscopic substance that induces or sustains a state of dryness
Fungicide:	Pesticide for the control of fungi and oomycetes
Bactericide:	Pesticide for the control of bacteria
Plant regulator:	Pesticide that retards the growth of plants
Rodenticide:	Pesticide for the control of rodens

Active Ingredients: A pesticide product has two main components: the Active Ingredient(s) and the inert (other) ingredient(s). The active ingredient is the specific compound designed to adversely effect a pest. Pesticide active ingredients are generally not applied in their pure form, but are usually included in formulations with inert ingredients that improve their storage, handling, application, effectiveness, or safety. Content of active ingredient is obviously presented either in pesticide product documentation or on the pesticide product packaging.

More information:

Comprehensive information on pesticides can be found at the FAO page http://www.fao.org/agriculture/crops/core-themes/theme/pests/en.

The detailed list of pesticides including chemical substances and example of trade names of commercial products can be found at http://www.fao.org/economic/ess/ess-agri/ess-resource-meth/en (Questionnaires, Pesticides, 2010, Annex I)

Time series data on the indicators for 1990-2010, Table 5b. Pesticide application in forestry: *Serbia*

Substance	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Insecticides – consumption	ton													
Herbicides and desiccants – consumption	ton													
Fungicides and bactericides – consumption	ton													
Plant regulators – consumption	ton													
Rodenticides – consumption	ton													
Others (e.g. mineral oils) – consumption	ton													
Total consumption (all pesticides)	ton													
Total arable and permanent cropland	1000 hectare		5112	5074	5077	5072	5078	5075	5074	5066	5053	5055	5057	5052
Pesticide use per unit of land	Kg/hectare													

Note:

Data cover pesticide application in forestry. Data are provided in terms of physical weight,but not in terms of active substance

Data should relate to pesticide consumption in agriculture, forestry and gardening. Otherwise, kindly indicate if data refer to sales, distribution or imports for use in particular sectors. If data for 1990 or other year is not available, fill in "n.a.".
Data should be expressed in active ingredients (A.I.). Therefore, calculate the volume of A.I. contained in individual products and then include it in the relevant group in table 3. Alternatively, the data may be reported by: consumption in commercial products; sales; distribution or imports for use in the agricultural sector.

Glossary:	
Insecticide:	Pesticide used against insects
Herbicide:	Pesticide against unwanted plants (weed)
Desiccant:	Hygroscopic substance that induces or sustains a state of dryness
Fungicide:	Pesticide for the control of fungi and oomycetes
Bactericide:	Pesticide for the control of bacteria
Plant regulator:	Pesticide that retards the growth of plants
Rodenticide:	Pesticide for the control of rodens

Active Ingredients: A pesticide product has two main components: the Active Ingredient(s) and the inert (other) ingredient(s). The active ingredient is the specific compound designed to adversely effect a pest. Pesticide active ingredients are generally not applied in their pure form, but are usually included in formulations with inert ingredients that improve their storage, handling, application, effectiveness, or safety. Content of active ingredient is obviously presented either in pesticide product documentation or on the pesticide product packaging.

More information:

Comprehensive information on pesticides can be found at the FAO page http://www.fao.org/agriculture/crops/core-themes/theme/pests/en.

The detailed list of pesticides including chemical substances and example of trade names of commercial products can be found at http://www.fao.org/economic/ess/ess-agri/ess-resource-meth/en (Questionnaires, Pesticides, 2010, Annex I)

Time series data on the indicators for 1990-2010, Table 6a. Consumption of ozone-depleting substances (calculated levels in tons of substances): *Serbia*

Substance	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CFCs	ton	*	*	*	*	*	*	*	*	234.68	53.63	76.86	19.5	0
Halons		0	0	0	0	0	0	0	*	0	0	0.6	0	0
Other fully halogenated CFCs		n.a.	0	0	0	0	*	0	0	0	0	0	0	0
Carbon tetrachloride		n.a.	34.1	30	30	0	0	0	1.5	1.4	1.04	1.9	1.4	0
Methyl chloroform		n.a.	12	0	0	0	0	0	0	0	0	0	0	0
HCFCs		n.a.	n.a.	*	*	*	*	*	*	169.3	165.54	128.52	160.85	141.36
HBFCs		n.a.	n.a.	0	0	0	0	0	0	0	0	0	0	0
Bromochloromethane		n.a.	n.a.	n.a.	n.a.	0	0	0	0	0	0	0	0	0
Methyl bromide		n.a.	25.5	0	0	0	0	0	0	0	0	0	0	0

Note:

Calculated levels of consumption mean production plus imports minus export of controlled substances. However, any export of controlled substances to non-Parties (to the Montreal Protocol) is not to be subtracted in calculating the consumption level of the

CFCs: Chlorofluorocarbons (CFC-11, CFC-12, CFC-113, CFC-114 and CFC-115)

Halons: halon 1211, halon 1301 and halon 2402

Other fully halogenated CFCs: CFC-13, CFC-111, CFC-112, CFC-211, CFC-212, CFC-213, CFC-214, CFC-215, CFC-216, CFC-217

HCFCs: Hydroclorofluorocarbons

HBFCs: Hydrobromofluorocarbons

ODP: Ozone depleting potential

Time series data on the indicators for 1990-2010, Table 6b. Consumption of ozone-depleting substances (calculated levels in tons of ODP): *(Serbia)*

Substance	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CFCs	Ton of ODP	1448.8	819.6	309.7	263.3	371.7	412	282.8	52.1	233.8	53.5	76.7	19.2	0
Halons		0	0	0	0	0	0	0	0.9	0	0	1.8	0	0
Other fully halogenated CFCs		n.a.	0	0	0	0	0.1	0	0	0	0	0	0	0
Carbon tetrachloride		n.a.	37.5	33	33	0	0	0	1.7	1.4	1.1	2.1	1.5	0
Methyl chloroform		n.a.	1.2	0	0	0	0	0	0	0	0	0	0	0
HCFCs		n.a.	n.a.	5.2	6.6	6.6	0	14.6	18.8	9.1	9.2	7.4	9	7.8
HBFCs		n.a.	n.a.	0	0	0	0	0	0	0	0	0	0	0
Bromochloromethane		n.a.	n.a.	n.a.	n.a.	0	0	0	0	0	0	0	0	0
Methyl bromide		n.a.	15.3	9.5	14.8	6.6	6.2	0	3	0	0	0	0	0
Total		1448.8	873.6	357.4	317.7	384.9	418.3	297.4	76.5	244.3	63.8	88	29.7	7.8

Note: Values presented in Table 6a should be multiplied by appropriate values of ODP, as presented in the next sheet.

ODP Values of the Most Important ODS

Note: Only the ODP values of the most important ODS are listed below. Other ODS are rarely used and thus of little significance for reporting and assessing compliance. For a complete list of ODP values of controlled substances refer to the Annexes of the

Group of substances	Substance	ODP
Annex A, Group I	CFC-11	1.0
	CFC-12	1.0
	CFC-113	0.8
	CFC-114	1.0
	CFC-115	0.6
Annex A, Group II	Halon-1211	3.0
	Halon-1301	10.juin
	Halon-2402	06.juin
Annex B, Group I	CFC-13	1.0
	CFC-111	1.0
	CFC-112	1.0
	CFC- 211 – CFC-217	1.0
Annex B, Group II	Carbon tetrachloride	01.janv
Annex B, Group III	Methyl chloroform	0.1
Annex C, Group I	HCFC-21	0.04
	HCFC-22	0.055
	HCFC-31	0.02
	HCFC-123	0.02
	HCFC-124	0.022
	HCFC-133	0.06
	HCFC-141b	0.11
	HCFC-142b	0.065
	HCFC-225	0.07
	HCFC-225ca	0.025
	HCFC-225cb	0.033
Annex E, Group I	Methyl bromide	0.6

Source: 1997 Update of the Handbook for the International Treaties for the Protection of the Ozone Layer, Montreal Protocol, Annexes A, B, C and E

More information:
Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer, Eighth edition, UNEP 2009 (in English), http://ozone.unep.org/Publications
Handbook on Data Reporting under the Montreal Protocol, UNEP 1999 (in English and Russian); http://ozone.unep.org/Data_Reporting/Data_Reporting_Tools.