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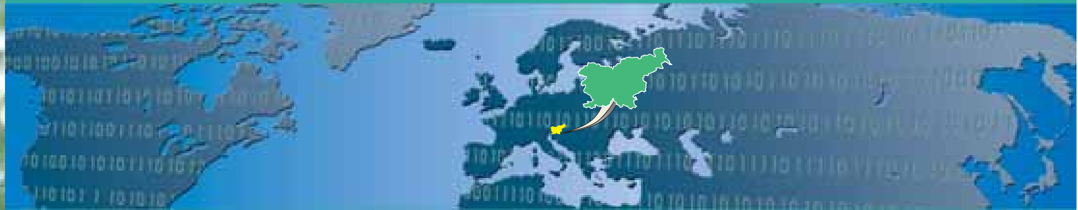

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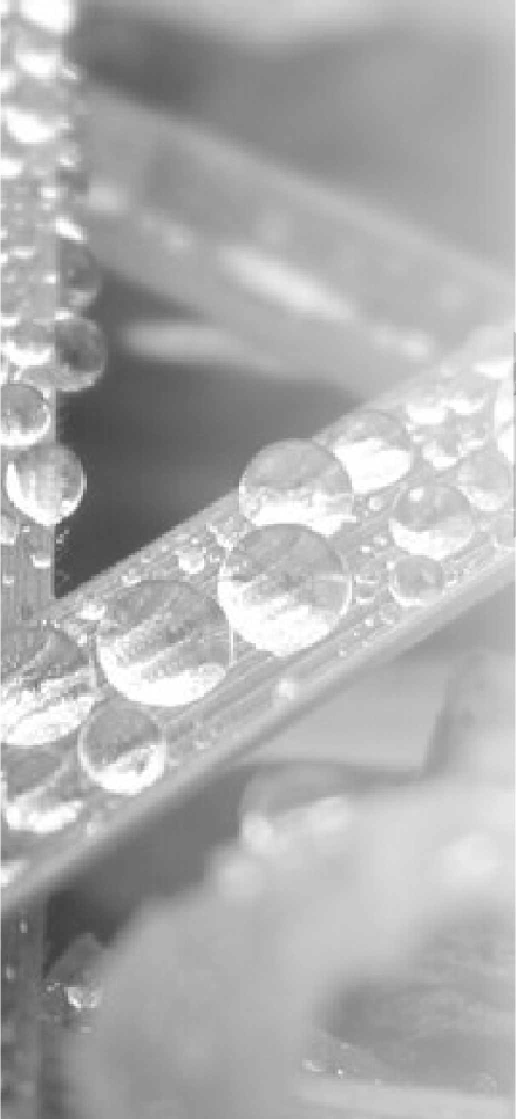
Water – from the source to the outflow

Ljubljana, March 2014



COLLECTION
BROCHURES

STATISTICAL OFFICE OF THE REPUBLIC OF SLOVENIA

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Water – from the source to the outflow

Ljubljana, March 2014

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Photo: Dušan Jože Dimc

FOREWORD

Water is a renewable natural resource. It is a prerequisite for life on Earth. Slovenia has a lot of water, but this wealth is not equally distributed; neither in space nor in time. With the looming climate change, water resources are perhaps our most important strategic resource. With increased pressures on the environment and thus also on water resources, we must be aware of the current state of water and our water management to be able to understand and appropriately assess the quality and availability of water for use and not just to rely on the impression that many water resources are still available. Water statistics can help us do just that.

This publication from the Brochures Collection is our first on water and the third in the series of environmental brochures (the title of the first one was Environmental Indicators for Slovenia, and of the second one Environment, Energy and Transport in Figures). It is a comprehensive overview of information on water resources in Slovenia and our water management and of the results of statistical collection of data on water. It brings data on water resources and the state of waters in our country, on water supply and use, and on treatment of waste water. It also shows investment in water management.

The data shown in charts, tables and info graphics are supplemented with commentary.

The story of water concludes with an overview of the most important emphases. Extensive and detailed information is available on the SI-STAT Data Portal.

Genovefa Ružić,
Director-General

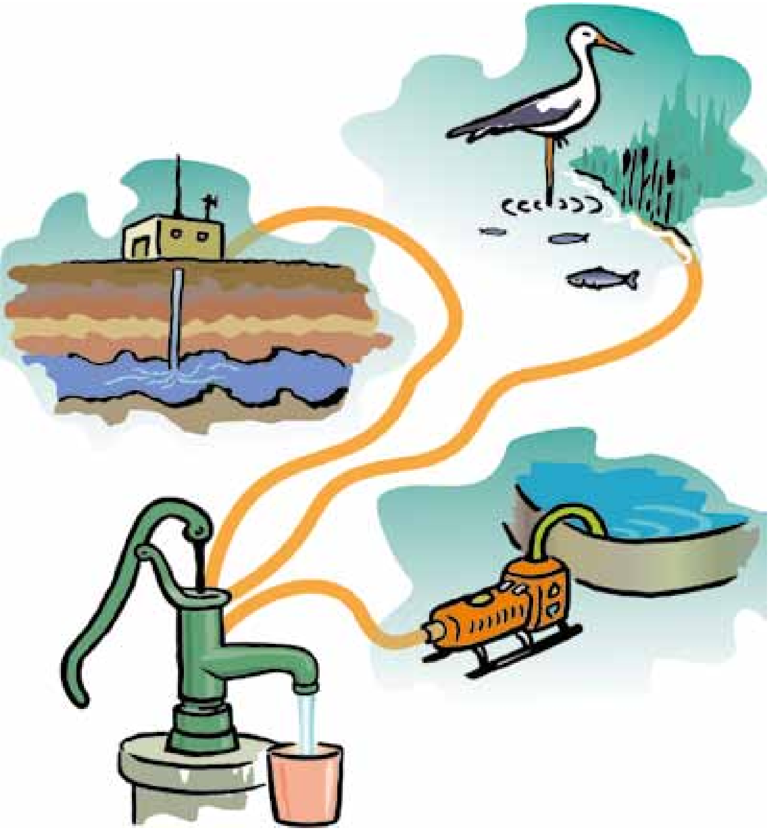

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Photo: Mojca Žitnik


Photo: Dušan Jože Dimc

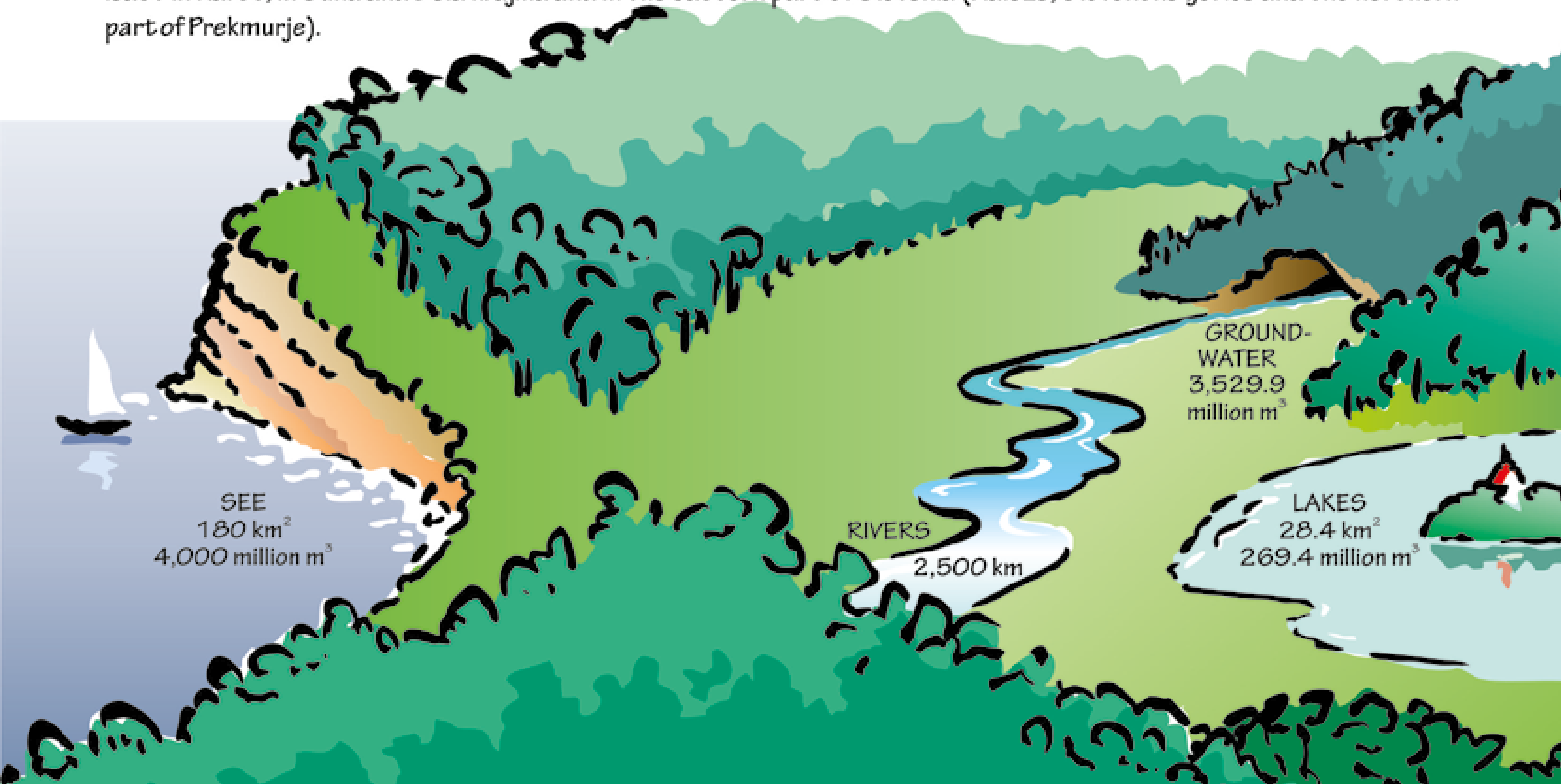

Photo: SOkol, ARSO


Photo: SOkol, ARSO

WATER RESOURCES IN SLOVENIA

In terms of the quantity of water, Slovenia is among the water-richest countries in the world; however, this quantity is unequally distributed in space. The available quantity of water depends on the climate, relief, hydrological and geological conditions.

Most water is in the western and northern parts of Slovenia, which have the largest quantities of precipitation, and the least in Karst, in Suha and Bela krajina and in the eastern part of Slovenia (Haloze, Slovenske gorice and the northern part of Prekmurje).



1.1 Running waters

Slovenia has an area of around 20,000 km^2 and 59 rivers in total length of about 2,500 km. The territory of Slovenia is divided into the Danube river basin and the Adriatic Sea basin and within them into Mura, Drava and Sava sub-basins, and the Soča river basin and the Adriatic rivers basin.

Table 1: The longest rivers and their catchment areas, Slovenia, 2002

	Altitude m		Catchment area in Slovenia km^2	Length of watercourse km			
						in Slovenia	
	at source	at outflow		total	abroad	total	of which at the border
Drava	340	175	3,259	707	565	142	25
Mura	250	130	1,375	438	343	95	67
Sava[1)]	833	132	10,724	947	727	221	4
Kolpa	313	130	1,015	294	176	118	118

1) With Sava Dolinka (Source Zelenci).

Source: MKO

The Danube river basin covers 81% of the territory of Slovenia (16,423 km^2) and the Adriatic Sea basin only 19% (3,851 km^2). The Danube river basin includes our longest rivers: Sava, which is 221 km long from the source of Sava Dolinka in Zelenci to the border with Croatia, followed by Drava (142 km), Kolpa (118 km) and Mura (95 km). A special feature of the Kolpa River is that it is a border river and that almost half of its length is along the border with Croatia.

Data in Table 1 clearly show that Sava has the largest catchment area in Slovenia. Due to its flow Drava has the greatest volume of water; in some places its average flow is over 320 m^3 per second.

1.2 Standing waters

Standing waters cover only 0.3% of Slovenia's territory; almost half of these waters are artificial.

Our largest natural lakes – both of glacial origin – are Lake Bohinj and Lake Bled. Lake Bohinj has an area of 3.3 km^2, a volume of 92.5 million m^3 and the greatest depth of 45 m. Lake Bled has an area of 1.4 km^2, a volume of 25.7 million m^3 and the greatest depth of 31 m. Other natural lakes are smaller; their total area is less than 1.7 km^2. Lake Cerknica is an intermittent lake; at its largest, its surface area is over 24 km^2 and depth only 3 m. However, these surface area and depth are only short-lived.

Standing waters are also artificial lakes, high and low marshes, fishponds, pools, wetlands, artificial reservoirs, smaller retarding basins and some other waters as a result of environmental interventions. Artificial retarding basins and reservoirs cover about 25 km^2 and contain about 150 million m^3 of water.


Photo: SOkol, ARSO

Table 2: Some natural lakes, artificial retarding basins and river reservoirs , Slovenia, 2002

	Area km^2	Depth m	Volume million m^3
Natural lakes			
Lake Bohinj	3.28	45.0 1)	92.5
Lake Bled	1.43	31.0 1)	25.7
Lake Cerknica	24.00 2)	3.0 3)	76.0 1)
1st Triglav Lake (Jezero pod Vršacem)	0.0047	5.0 3)	...
2nd Triglav Lake (Rjava mlaka)	0.012	10.0 3)	...
3rd Triglav Lake (Zeleno jezero)	0.0041	2.5 3)	...
4th Triglav Lake (Jezero v Ledvici)	0.0233	15.0 3)	...
5th Triglav Lake (Dvojno jezero)	0.005	8.5 3)	...
6th Triglav Lake (Dvojno jezero)	0.004	5.5 3)	...
7th Triglav Lake (Črno jezero)	0.0075	6.0 3)	...
Artificial retarding basins			
Ledavsko jezero	2.18	3.0 3)	5.7
Velenjsko jezero	1.35	55.0 1)	25.0
Pernica I,II	1.23	3.0 3)	3.4
Šmartinsko jezero	1.07	10.0 1)	6.5
Klivnik- Mola	1.03	18.0 1)	8.5
Slivniško jezero	0.84	12.0 1)	4.0
Vogršček	0.82	20.0 1)	8.5
Gajševsko jezero	0.77	3.0 3)	2.6
Gradišče	0.51	3.0 3)	0.9
Družmersko jezero	0.50	65.0 1)	10.0
River reservoirs			
Vuhred	2.4	5.0 3)	11.2
Mariborski otok	2.4	6.0 3)	13.8
Vuzenica	1.95	4.0 3)	7.5
Ožbalt	1.5	7.0 3)	10.9
Vrhovo	1.43	6.0 3)	8.65
Dravograd	1.4	4.0 3)	5.6
Mavčiče	1.0 1)	12.0 1)	...
Fala	0.9	5.0 3)	4.4
Moste	0.69	12.0 3)	8.0
Zbiljsko jezero	0.69	3.0 3)	6.0

… not available 1) maximum, 2) minimum, 3) average

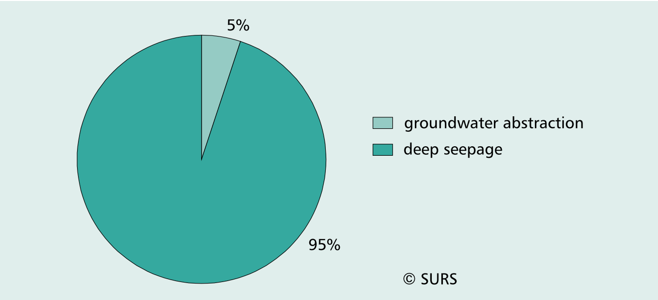
Source: ARSO

1.3 Groundwater

Groundwater is found in greater depth in the aquifers of the Ljubljana Basin (on average between 20 and 25 m below surface), in the valley of Kamniška Bistrica and in places in the Vipava Valley. Groundwater levels in Apaško, Mursko and Prekmursko polje are much shallower. (More: Chart 1)

Around two thirds of the water stock are in the central part of the country (i.e. Sava River basin), while the water stock is the lowest in the north-eastern part (Mura River basin) with predominantly granular porosity of the bed and the far south-eastern part (coastal area) with predominantly karstic fissure porosity of the bed.

Chart 1: Ratio between groundwater abstraction and deep seepage, Slovenia, 2011



Source: ARSO

The ratio between groundwater abstraction and deep seepage shows the level of consumption of total renewable quantity of groundwater. In 2011, the share of groundwater abstraction in the entire Slovenia was 5%. The shares were the highest in the Drava Basin (51%), the Mura Basin (26%), and the Sava Basin and the Ljubljana Marshes (25%).

Table 3: Renewable quantity of groundwater per person, Slovenia, 2011

Groundwater body	Renewable quantities of groundwater		Renewable quantities of groundwater per person
	mm	1,000 m³/year	m³/year
Savska kotlina in ljubljansko barje	248	192,060	404
Savinjska kotlina	130	14,132	234
Krška kotlina	104	10,006	952
Julijske alpe v porečju Save	378	296,154	8,393
Karavanke	286	115,251	13,711
Kamniško-Savinjske alpe	212	235,658	5,532
Cerkljansko, Škofjeloško in Polhograjsko	239	202,774	2,991
Posavsko hribovje do osrednje Sotle	97	172,927	1,058
Spodnji del Savinje do Sotle	82	113,826	733
Kraška Ljubljanica	237	309,735	5,011
Dolenjski kras	158	529,887	2,767
Dravska kotlina	103	44,029	272
Vzhodne Alpe	101	128,147	1,362
Haloze in Dravinjske gorice	57	33,976	564
Zahodne Slovenske gorice	32	24,341	284
Murska kotlina	54	32,025	419
Vzhodne Slovenske gorice	29	8,804	296
Goričko	28	13,757	622
Obala in Kras z Brkini	166	262,333	2,100
Julijske Alpe v porečju Soče	493	402,592	24,345
Goriška Brda in Trnovsko Banjška planota	269	387,460	3,844

3 highest values 3 lowest values

Source: ARSO

The quantity of precipitation seeping into aquifers depends on the structure of soil and can differ significantly. In 2011, there was 3,530 million m^3 of renewable groundwater or 1,726 m^3 per person per year. The quantity of renewable groundwater per person was the largest in the Julian Alps in the Soča River basin (24,000 m^3) and in Karavanke (13,000 m^3), and the smallest in the Savinja Basin (234 m^3), the Drava Basin (272 m^3), western Slovenske gorice (284 m^3) and eastern Slovenske gorice (296 m^3).

Photo: SOkol, ARSO

Photo: SOkol, ARSO

1.4 Sea

Table 4: The Gulf of Trieste and the Slovenian sea, 2012

Area	Surface km^2	Share %
The Gulf of Trieste	551	100
central part	474	86
border area	77	14
Slovenia's part	180	32.7
of which the Gulf of Koper	18	3.2
of which the Gulf of Piran	19	3.4

Source: ARSO

Slovenian sea is part of the Gulf of Trieste in the Adriatic Sea; it covers 180 km^2 of the 551 km^2 of the Gulf of Trieste.

The aerial distance from the border with Italy to the border with Croatia is 17 km, but because the coastline is so jagged, it is 46.6 km long.

The Slovenian sea is very shallow (about 20 m deep). It is the deepest in the Piran Punta area, just over 37 m.

The Slovenian part of the Gulf of Trieste contains around 4 km^3 of water.

Photo: Mojca Žitnik

STATE OF WATERS IN SLOVENIA

On average the state of waters in Slovenia – rivers, groundwater and standing water – is GOOD.

2.1 Running waters

Pollution of Slovenian rivers comes primarily from point sources (e.g. discharge of industrial and municipal waste water) and from leaching of urban and agricultural areas. In addition, water is also polluted by diffuse sources, particularly intensive arable farming and livestock production, fish farming and part of the industry, and disperse settlement (due to bad waste water management).

Table 5: Chemical state of larger rivers, Slovenia

	2009	2010
Mura	good	good
Drava	good (poor only at Lake Ptuj)	good
Sava	good	good
Krka	good	good
Soča	good	good
Kolpa	good	good

Source: ARSO


Photo: Dušan Jože Dimc

In 2009, the chemical state of rivers was assessed at 85 monitoring sites. The chemical state was assessed as good on 95% of these sites and as poor on 5% of these sites. In 2010, the chemical state of rivers was assessed at 81 monitoring sites, and at those assessed as good and those assessed as poor in the previous year.

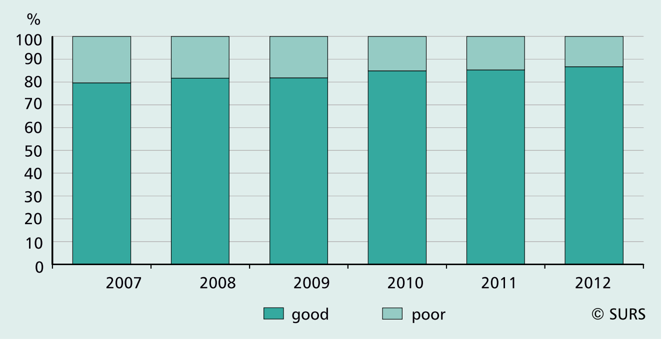
The ecological state of waters reflects the quality of the structure and operation of water ecosystems depending on surface waters.

The ecological state of rivers in Slovenia was assessed in 2009 and 2010; in both years the state was assessed as almost very good as regards biochemical oxygen demand (BOD_5) and as good in view of other pollutants.

2.2 Groundwater

The rate of discharge for groundwater is slower than for surface waters, so its self-cleaning capacity is lower and groundwater is more susceptible to pollution. The greatest threat to groundwater comes from nitrates and pesticides and their breakdown products generated by incorrect and excessive use of fertilisers and plant protection products, particularly in the north-eastern part of Slovenia. In individual areas water is polluted also by volatile hydrocarbons and by heavy metals which are generated by industry, incorrect waste management, transport and similar activities.

Chart 2: Assessment of the chemical state of groundwater, Slovenia



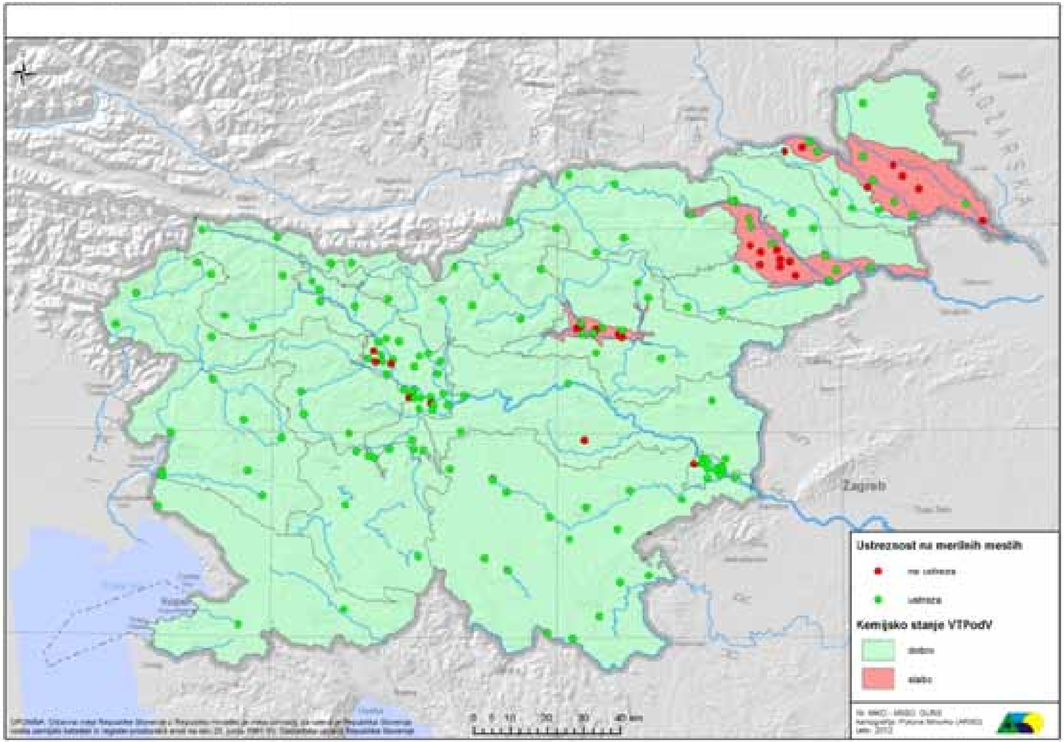
Source: ARSO

Chart 2 shows that the chemical state of groundwater in Slovenia improved; in 2012 more than 86% of groundwater was assessed as good. The share of groundwater whose chemical state was assessed as poor declined by 7 percentage points in the 2007–2012 period.

In the 2007-2012 period the quality of groundwater was monitored at 21 aquifers. At most of them (16) the chemical state of groundwater was good, which means that pollution of the body of water ranged from 0% to 30%. In the Drava and Mura Basins the state was poor all year round, since 30-50% of the body of water was polluted. In eastern Slovenske gorice pollution covered almost 70% of the body of water in 2007 and then decreased to around 30% in 2008. In the Krško Basin the chemical state of groundwater was poor in 2008 and 2009, but then it improved and in 2011 only 9% of the body of water was still polluted.

Photo: SOkol, ARSO

Map 1: Chemical state of groundwater, Slovenia, 2012



Map 1 shows the latest state of the quality of groundwater. We can see that in 2012 inappropriate chemical state of groundwater (marked with a red dot) was detected in the Lower Savinja Valley, at Dravsko-Ptujsko polje and on the Mura Plain.

The green dot represents the adequate chemical state of groundwater.

The chemical states are either good (green surface) or poor (red surface).

Source: ARSO (http://www.arso.gov.si/vode/podzemne%20vode/publikacije%20in%20poro%C4%8Dila/Kemijsko_stanje_2012.jpg , http://www.arso.gov.si/vode/podzemne%20vode/)

2.3 Standing waters

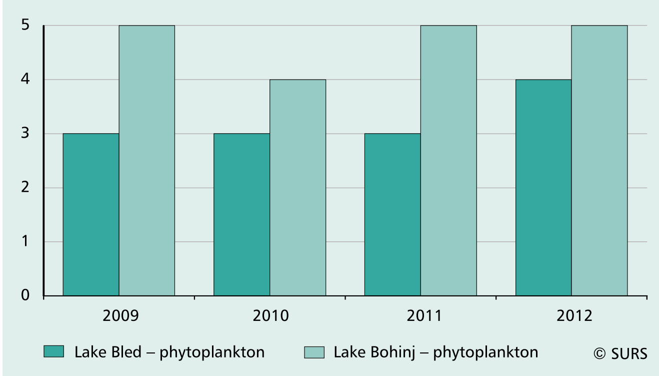
The input of nitrogen and phosphorus nutrients accelerates the ageing process (eutrophication) in permanent natural lakes such as Lake Bled and Lake Bohinj.

Between 2009 and 2012 the chemical state of both Lake Bled and Lake Bohinj almost did not change; in all these years it was assessed as good.

In this period the ecological state of Lake Bohinj was assessed as very good; only in 2010 it was assessed as good. Due to the pollution with nutrients (particularly phosphates), by 2011 the ecological state of Lake Bled was assessed as moderately good and in 2012 as good.

Levels: 5 – very good (>0.80 REK), 4 – good (>0.60–0.79 REK), 3 – moderately good (>0.40–0.59 REK), 2 – poor (>0.20–0.39 REK), 1 – very poor (<0.20 REK).

Chart 3: Ecological state of the two largest lakes in Slovenia



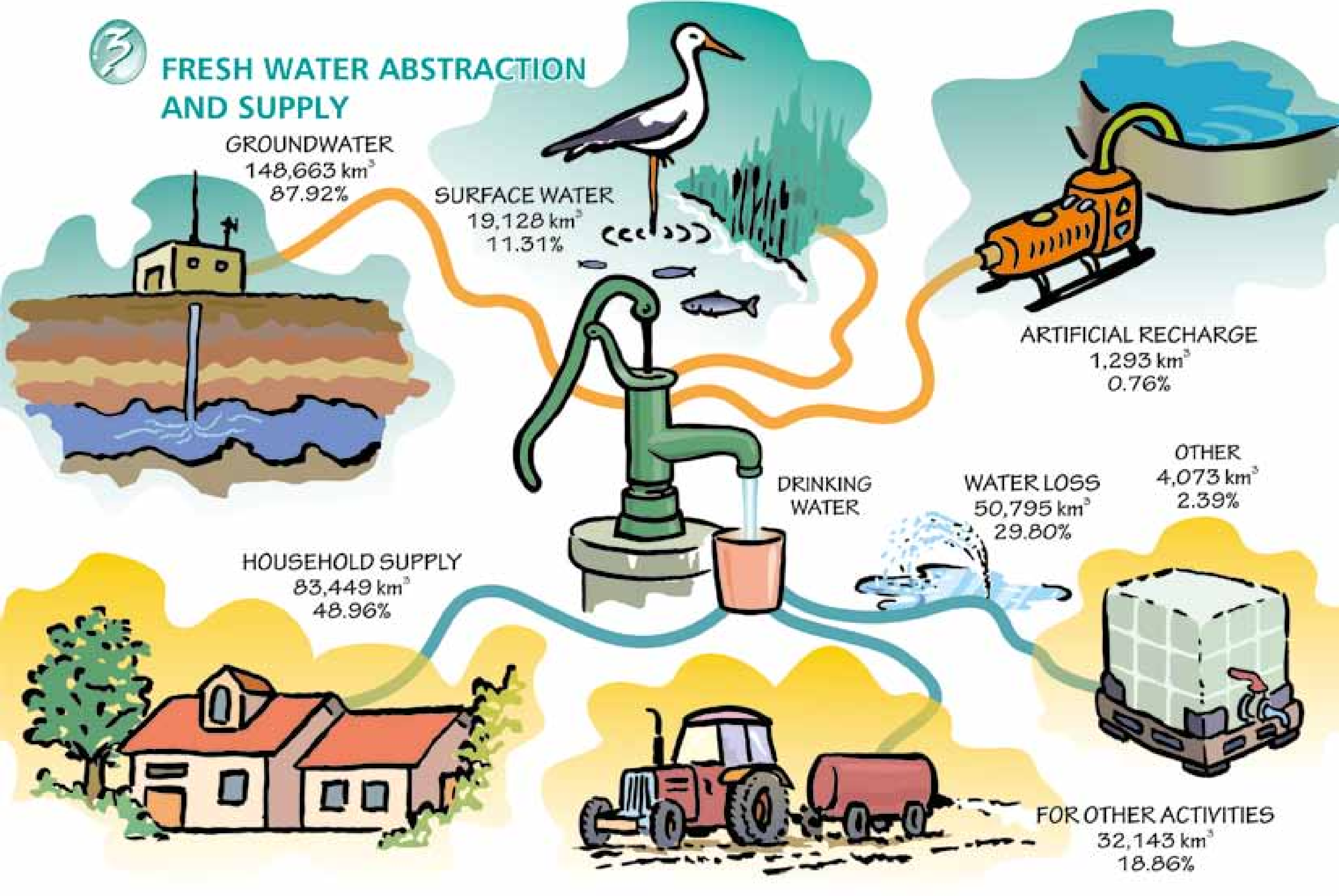
Source: ARSO


Photo: SOkol, ARSO


Photo: SOkol, ARSO


Photo: Urška Gale

FRESH WATER ABSTRACTION AND SUPPLY



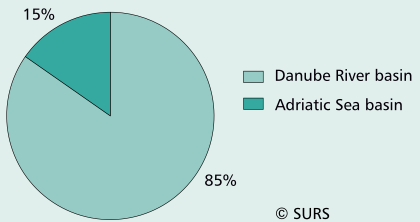
3.1 Water abstracted in Slovenia

Water in Slovenia is supplied through the public water supply or with direct abstraction from water resources (self-supply). In 2012, the total length of the water supply network was 21,656 km, and it had 487,953 connections.

In Slovenia water for the public water supply is abstracted from groundwater and running water. In 2012, the highest share of water for the public water supply was abstracted from groundwater (73%), which includes groundwater, springs of groundwater and springs of groundwater with surface water affluence. 23% of water was abstracted from running water, i.e. water from natural lakes and artificial reservoirs, artificial recharges and other running water, and the remaining 4% from other resources, i.e. water taken over from other water supply systems.

Between 2002 and 2012 the quantity of water abstracted for the public water supply declined by 10% and varied between the years. In 2012, 161.7 million m^3 of water was abstracted for the public water supply or on average 82 m^3 per person.

Chart 4: Abstracted water by river basins, Slovenia, 2012



Source: SURS

Table 6: Abstracted water by water resources, Slovenia

1,000 m^3

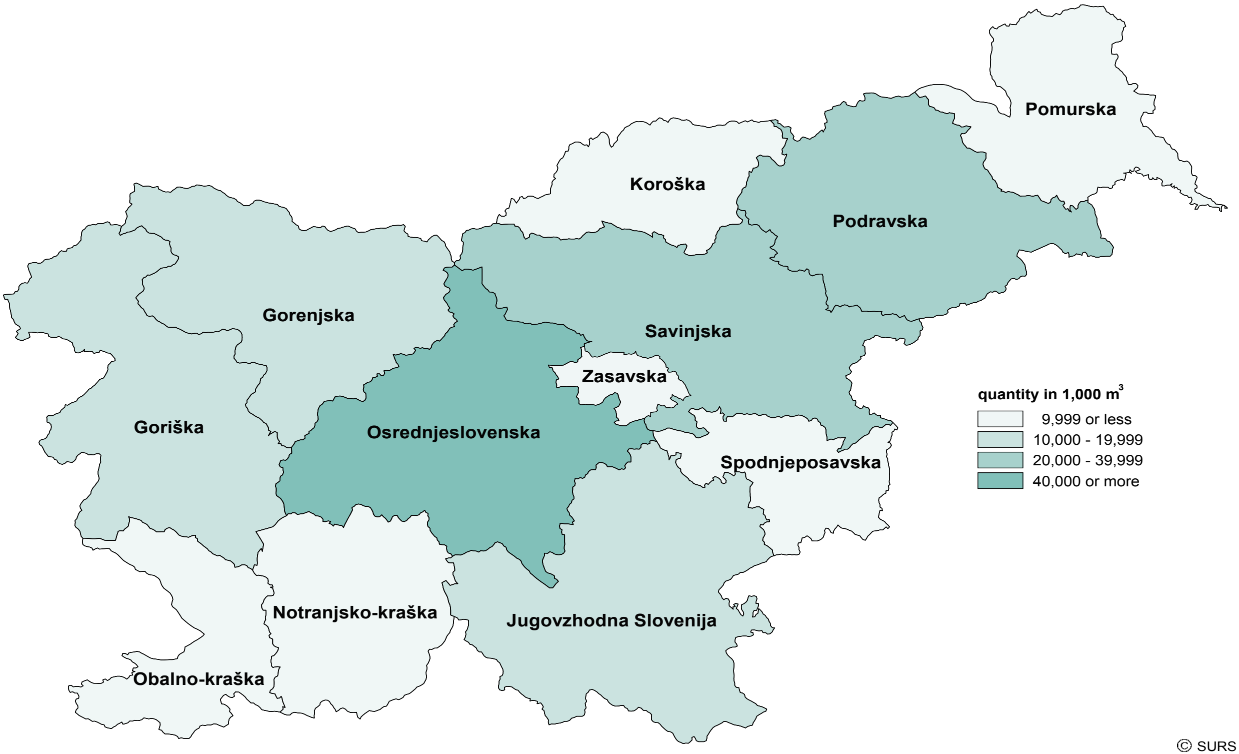
	Total	Groundwater	Running water
2002	187,109	182,104	5,005
2003	178,691	174,063	4,628
2004	162,465	157,991	4,474
2005	163,460	159,141	4,319
2006	166,207	162,831	3,376
2007	167,411	163,532	3,879
2008	166,715	162,307	4,408
2009	165,132	160,739	4,393
2010	166,223	162,255	3,968
2011	169,084	164,821	4,263
2012	161,731	123,079	38,652

Source: SURS

Most of the water for the public water supply is abstracted from the Danube River basin (around 85%), which is in line with hydrographical characteristics of Slovenia. In 2012, 143 million m^3 of water was abstracted from the Danube River basin and 26 million m^3 from the Adriatic Sea basin.

As much as 73% of water for the public water supply was abstracted from groundwater.

Map 2: Water abstracted for the public water supply by statistical regions, Slovenia, 2012

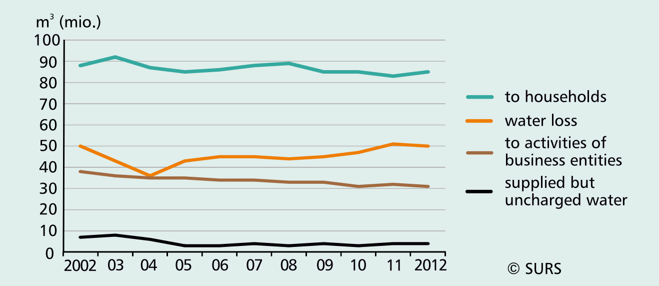


Source: SURS

3.2 Water supplied in Slovenia

Water from the public water supply is supplied to households and various economic activities (agriculture, mining and quarrying, manufacturing, electricity supply, etc.) as well as for fire-fighting, road cleaning, etc. Water for fire-fighting and road cleaning is supplied but not charged.

Chart 5: Quantity of water supplied from the public water supply, Slovenia



Source: SURS

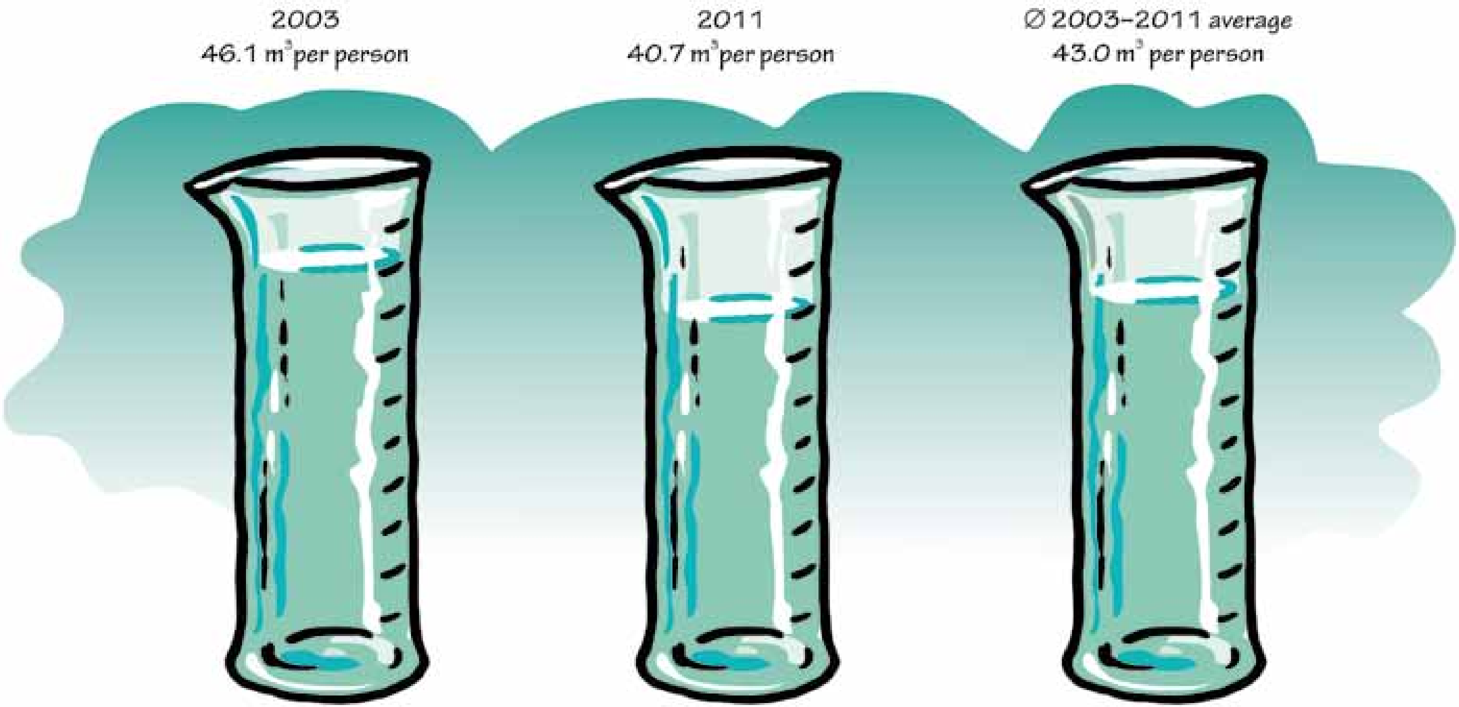
The highest share of water from the public water supply is supplied to households (around 50%); around 18% is supplied to various economic activities and the share of supplied but uncharged water dropped from 4% in 2002 to 2% in 2012. Much water is lost within the distribution network (around 30%). In addition to the quality of water, water loss which is the result of the out-dated and damaged water system is the main problem in water supply. In 2012, water loss decreased by about 2.5% compared to the previous year. It varied greatly since 2002 and in 2012 almost equalled water loss in 2002. In 2012, almost 50 million m^3 of water was lost.

Water consumption in households shows small annual variations between 2002 and 2012. In total, water consumption increased by 0.2% in ten years.

50% of water from the public water supply is supplied to households.

30% of water is lost within the distribution network.

4 WATER CONSUMPTION



A person in Slovenia consumes on average increasingly less water.

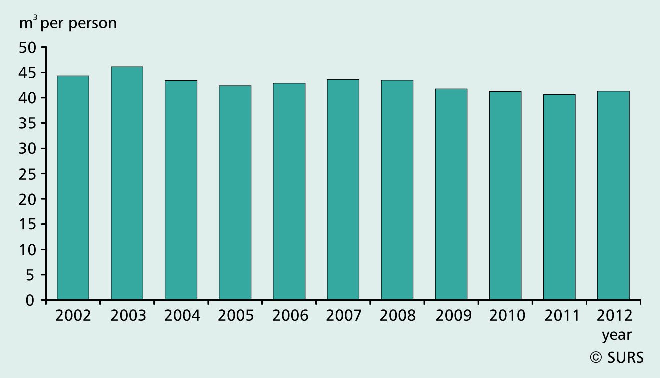
4.1 Consumption of water from the public water supply

In 2012, 82 m^3 of water per person was provided (abstracted for the public water supply) in Slovenia, of which 58 m^3 of water per person was consumed for various needs (for households 41 m^3 per person and for various economic and non-economic activities 17 m^3 per person).

Households consumed about 114 litres of water per person per day in 2012. In the 2002-2012 period annual water consumption in households per person varied between 40 m^3 and 45 m^3. Between 2008 and 2011 the quantity of water consumed per person per year decreased; by 2011 it went down by 6.5%.

Photo: Mojca Žitnik

Chart 6: Water from the public water supply consumed by households, per person, Slovenia



Source: SURS

Household water consumption increased slightly again in 2012.

4.2 Water used for irrigation

Table 7: Irrigation water by water resources, Slovenia

1,000 m³

	Water resources – TOTAL	Groundwater	Running water	Other (reservoirs, lakes and water supply)
2003	6,383	325	1,963	4,095
2005	2,309	102	244	1,963
2010	1,608	180	295	1,133
2011	3,147	252	663	2,232
2012	2,235	249	769	1,217

Source: SURS

The largest consumers of water in agriculture are irrigation systems. The irrigation infrastructure is one of the important indicators of the development of agricultural production in a country. Sustainable water consumption for irrigation is determined by two factors: local water availability and size of irrigated area with regular supply, and the development of irrigation systems, irrigation techniques and practices. Irrigation systems are divided into large and small.

In 2012, 2.2 million m³ of water was consumed for irrigation; around 85% of this water was abstracted from reservoirs, lakes and the public water supply, around 14% from running waters and only 1% directly from groundwater.

Data in Table 7 show that the quantity of water consumed for irrigation varied significantly between the years. The largest quantity of water was abstracted for irrigation in 2003 (6.3 million m³ or almost four times the quantity abstracted in 2010, when it was the smallest with 1.6 million m³).

Table 8: Irrigation of land by irrigation method and type of land, Slovenia

ha

	TOTAL	By method		By type of land				
		sprink-ling	drop by drop	arable land and kitchen gardens	orchards, olive groves, ...	green-houses, vine-yards, ...	snow-making	other
2003	2,741	2,598	143	2,088	632	-	-	21
2005	1,812	1,717	95	1,252	560	-	-	-
2010	3,501	2,685	816	2,541	626	-	-	334
2011	3,851	3,449	402	2,266	710	83	438	354
2012	2,029	1,699	330	676	355	241	443	314

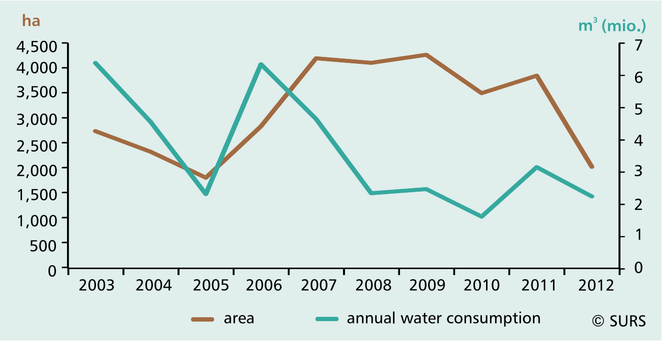
- no occurrence of event

Source: SURS

More than 2,000 hectares of land were irrigated in 2012; the largest part of this area (33% of total irrigated area or 676 hectares) was arable land and kitchen gardens. The second largest irrigated (in order to make snow) area was ski slopes (22%), followed by orchards and tree nurseries (18%) and greenhouses, vineyards and grassland (12%). 15% of irrigated land was categorised as »other«, which includes sports fields (golf, football, tennis, etc.) and lawns.

In Slovenia two methods of irrigation are used: sprinkling and the drop by drop system. In the 2003-2012 period sprinkling was the predominant method (in 2012 it was used on 1,699 hectares or 71% of irrigated land). Drop by drop is a more effective method, since using this system leads to decreased water consumption and increased yield. This system is thus mainly used for producing crops that achieve higher prices on the market.

Chart 7: Quantity of water consumed for irrigating agricultural land, Slovenia



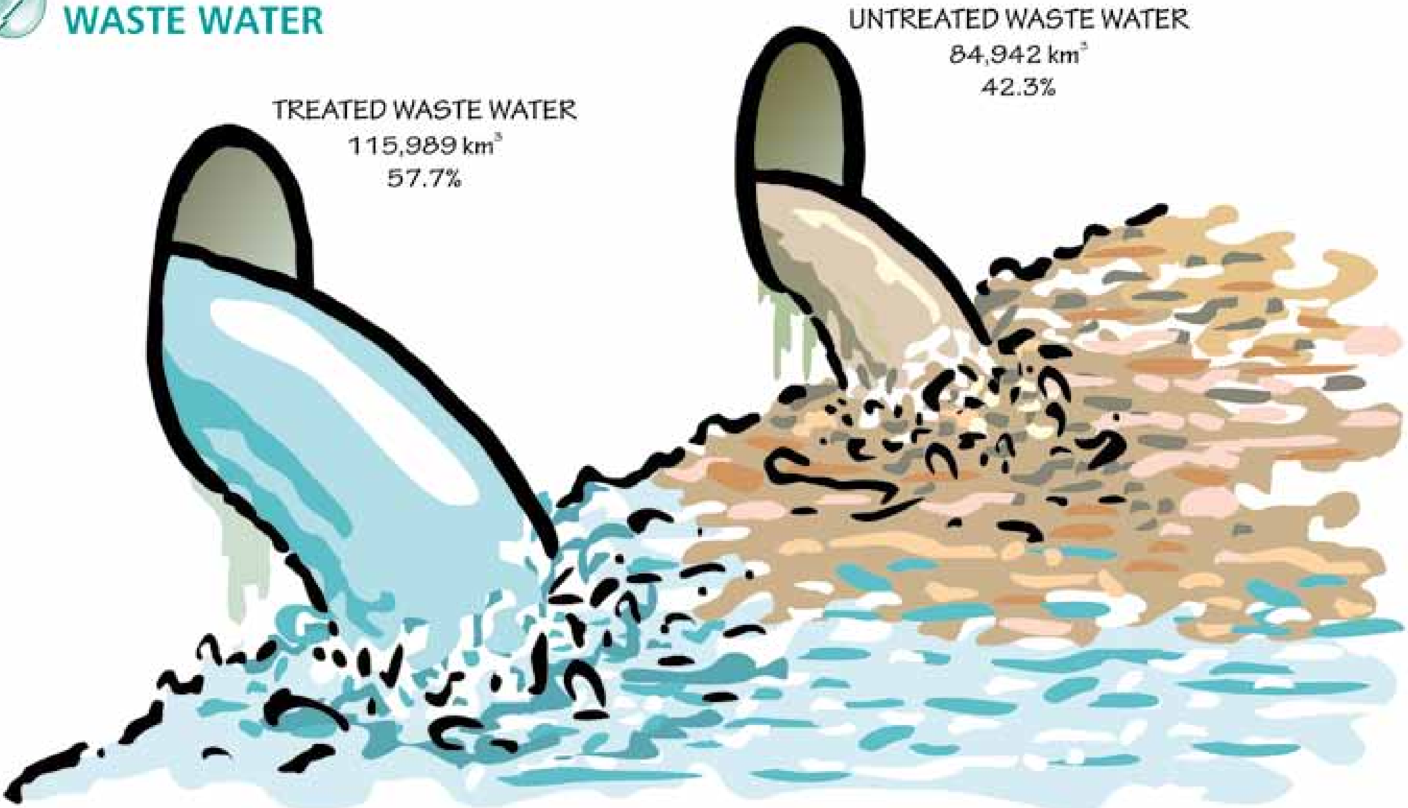
Source: SURS

Chart 7 shows the ratio between water consumed for irrigation in the 2003-2012 period and the area of irrigated land. The variations show that water consumption per unit of irrigated land has become more favourable, which means that modern irrigation methods are more economical. In any case, water consumption depends to a large extent on climate conditions.

In 2012, the area of irrigated land decreased significantly; partly because the irrigation systems did not operate and partly because they were abandoned.

The quantity of water consumed for irrigation depends on the area of irrigated land and climate changes (dry periods).

5 WASTE WATER



In 2012, the total length of the sewage network was 8,096 km, and it had 240,272 connections.

5.1 Origin of waste water

In 2012, 200.9 million m³ of waste water of different origin was discharged into the public sewage system, of which almost 60% of other waste water (run-off rain water, etc.), 29% from households, 7% from industrial activities (of which 86.8% from manufacturing, 8.0% from mining and quarrying, 4.7% from electricity supply, 0.6% from construction), around 4% from other activities and only 0.2% from agriculture, forestry and fisheries.

Households generated about 1% less municipal waste water than in 2011. Household water consumption also declined.

Table 9: Waste water by source of pollution, Slovenia

1,000 m³

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
TOTAL	**125,421**	**128,144**	**143,299**	**148,952**	**153,781**	**156,015**	**168,477**	**173,326**	**151,465**	**200,931**
from agriculture	1,006	1,607	272	512	547	548	542	506	449	417
from mining and quarrying	99	109	136	648	383	682	1,735	1,465	1,072	1,153
from manufacturing	24,094	18,641	17,094	17,491	18,390	16,132	14,696	12,516	12,493	12,493
from electricity supply	278	347	449	1,197	755	605	827	575	856	678
from construction	297	240	282	272	269	302	389	275	120	89
from other activities	8,279	8,807	11,070	6,866	8,310	7,710	9,288	8,931	9,078	7,938
from households	77,484	76,345	72,773	74,573	68,977	70,564	63,445	59,395	59,115	58,587
other waste water	13,884	22,048	41,223	47,393	56,150	59,472	77,555	89,663	68,272	119,597

3 highest values 3 lowest values

Source: SURS

In the 2003-2012 period the quantity of waste water gradually increased; only in 2011 it was lower than a year before. In 2012 it was thus 60% larger than in 2003, mostly due to the quantity of other waste water, which in this period jumped from 13.8 million m³ to 119.5 million m³. In the observed period the quantity of waste water also increased in mining and quarrying, in electricity supply and in other activities. On the other hand, it decreased in agriculture, forestry and fisheries, in manufacturing, in construction and in households.

The quantity of waste water generated by households decreased from 77.4 million m³ in 2003 to 58.5 million m³ in 2012, i.e. by 24%.

The quantity of waste water from households and industry is decreasing.

5.2 Waste water treatment

Table 10: Waste water by place of discharge, Slovenia

1,000 m³

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
TOTAL	**125,421**	**128,144**	**143,299**	**148,952**	**153,781**	**156,015**	**168,477**	**173,326**	**151,465**	**200,931**
Untreated waste water – Total	**40,625**	**33,313**	**66,019**	**44,818**	**38,806**	**41,664**	**52,509**	**46,416**	**46,450**	**84,942**
Untreated waste water – into groundwater	3,886	4,048	3,827	11,384	4,790	13,219	12,412	13,347	6,489	3,920
Untreated waste water – into surface water	36,739	29,265	62,192	33,434	34,016	28,445	40,097	33,069	39,961	81,022
Treated waste water – Total	**84,796**	**94,831**	**77,280**	**104,134**	**114,975**	**114,351**	**115,968**	**126,910**	**105,015**	**115,989**
Treated waste water – into groundwater	2,062	956	455	452	549	894	648	702	3,366	996
Treated waste water – into surface water	82,734	93,875	76,825	103,682	114,426	113,457	115,320	126,208	101,649	114,993

3 highest values

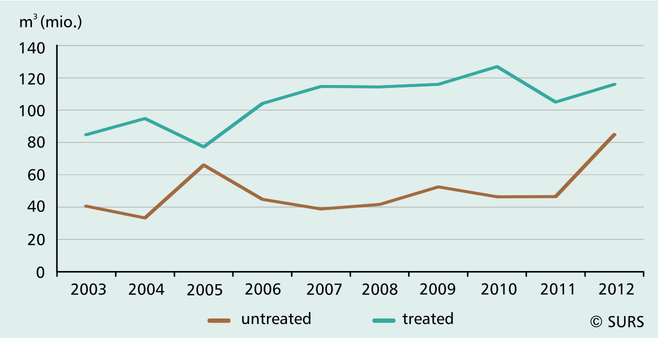
Source: SURS

According to the latest data for 2012, around 58% of waste water was treated before being discharged from the sewage system. Compared to the previous year, the quantity of treated waste water went up by 14% and the quantity of untreated waste water by 83%.

In 2012, 84.9 million m³ of waste water was untreated, of which around 94% was discharged directly into surface water and around 6% into groundwater. 115.9 million m³ of waste water was treated; almost all this water was discharged into surface water (around 99%) and less than 1% into groundwater.

More than half of waste water is treated before being discharged from the sewage system.

Chart 8: Quantity of treated and untreated waste water, Slovenia



Source: SURS

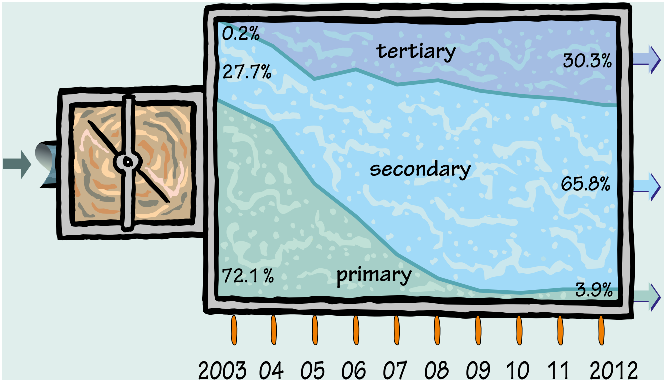
In Slovenia the share of treated waste water gradually increased between 2003 and 2010, except in 2005, when due to the breakdown of one of the treatment plants it went down. In 2011, the share of treated waste water decreased again, this time because less waste water was generated. In 2012, both the quantity of treated and untreated waste water went up again.

Photo: Tamino Petelinšek, STA

5.3 Treatment of waste water at municipal treatment plants

By comparing individual waste water treatment levels in the observed 2003-2012 period we can see that the quantity and share of primary treated waste water dropped significantly, while the quantity and share of secondary and tertiary treated waste water increased. Primary treatment is treatment of municipal waste water with physical and/or chemical procedures that include sedimentation of solid particles, secondary treatment is biological treatment with secondary sedimentation and tertiary treatment is supplementary to secondary treatment and involves the removal of nitrogen, phosphorus and other pollutants that influence the quality of water or its use.

Waste water by treatment levels, Slovenia



In 2012, the quantity of primary treated waste water decreased significantly over the 2003-2012 period; only 4% of waste water (4 million m^3) was primary treated. Around 66% of waste water was secondary treated and around 30% of waste water was tertiary treated. More waste water was treated in 2012 than a year before: 13% more with primary treatment, 7% with secondary treatment (76.3 million m^3 of waste water) and around 19% more with tertiary treatment (35.1 million m^3 of waste water). The increase in the quantity of treated waste water in 2012 is the result of the increase in waste water generation.

Secondary and tertiary waste water treatments are on the rise.

5.4 Treatment of waste water by statistical regions

In 2012, the highest share of waste water generated per region was treated in Jugovzhodna Slovenija (93%), followed by Obalno-kraška (91%), Pomurska (over 88%) and Gorenjska and Notranjsko-kraška (85% each). The lowest share of waste water generated per region was treated in the Osrednjeslovenska statistical region (44%).

Map 3: Quantity of treated waste water by statistical regions, Slovenia, 2012

Source: SURS

INVESTMENTS AND CURRENT EXPENDITURE FOR WASTE WATER MANAGEMENT

In 2011

environmental protection investment amounted to EUR 281 million,

of which investment in waste water management amounted to EUR 62 million.

Investment in waste water management is declining; current expenditure for waste water management is rising.

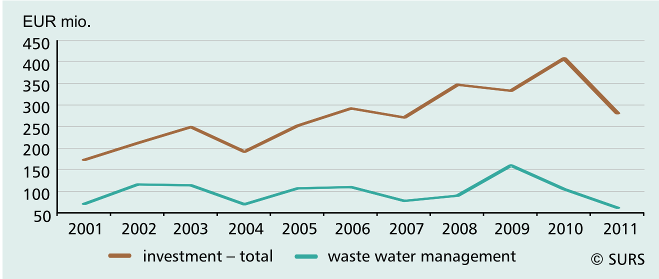
6.1 Investment in waste water management

EUR 62 million was invested in waste water management in 2011, which is 22% of total environmental protection investment.

In the 2001–2011 period investment in waste water management declined by almost 13%. It varied in individual years; in 2009 it grew the most (by almost 78%) over the previous year. Then it started to decline again and in 2011 it dropped by EUR 43 million or 59% compared to the previous year.

Investment in waste water management has been declining strongly since 2009.

Chart 9: Environmental protection investment and investment in waste water management, Slovenia



Source: SURS

6.2 Current expenditure for waste water management

Current expenditure for waste water management amounted to EUR 92.6 million or 20% of total environmental protection expenditure in 2011; it increased by 2.5% over the previous year.

Between 2001 and 2011 current expenditure for waste water management steeply increased. In 2001, it amounted to only EUR 38.7 million and in 2011 already to EUR 92.6 million.

Current expenditure for waste water management is rising.

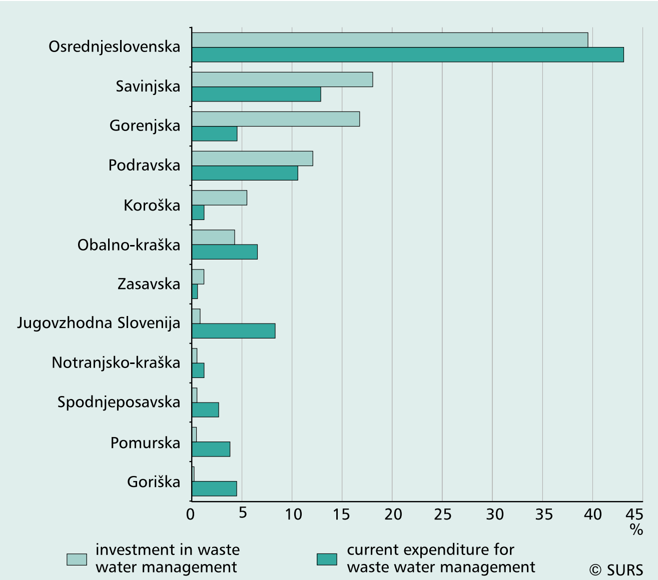
Chart 10: Current environmental protection expenditure and current expenditure for waste water management, Slovenia

Source: SURS

6.3 Expenditure for waste water management by regions

In 2011, most funds for investment in waste water management were invested in the Osrednjeslovenska statistical region (EUR 24.5 million or 39.5% of total investment in the country), followed by Savinjska (EUR 11.2 million or 18.1%) and Gorenjska (EUR 10.4 million or 16.8%); investment was the lowest in the Goriška statistical region (EUR 0.1 million or 0.2% of total investment).

Chart 11: Share of expenditure for waste water management, by statistical regions, Slovenia, 2011



Source: SURS

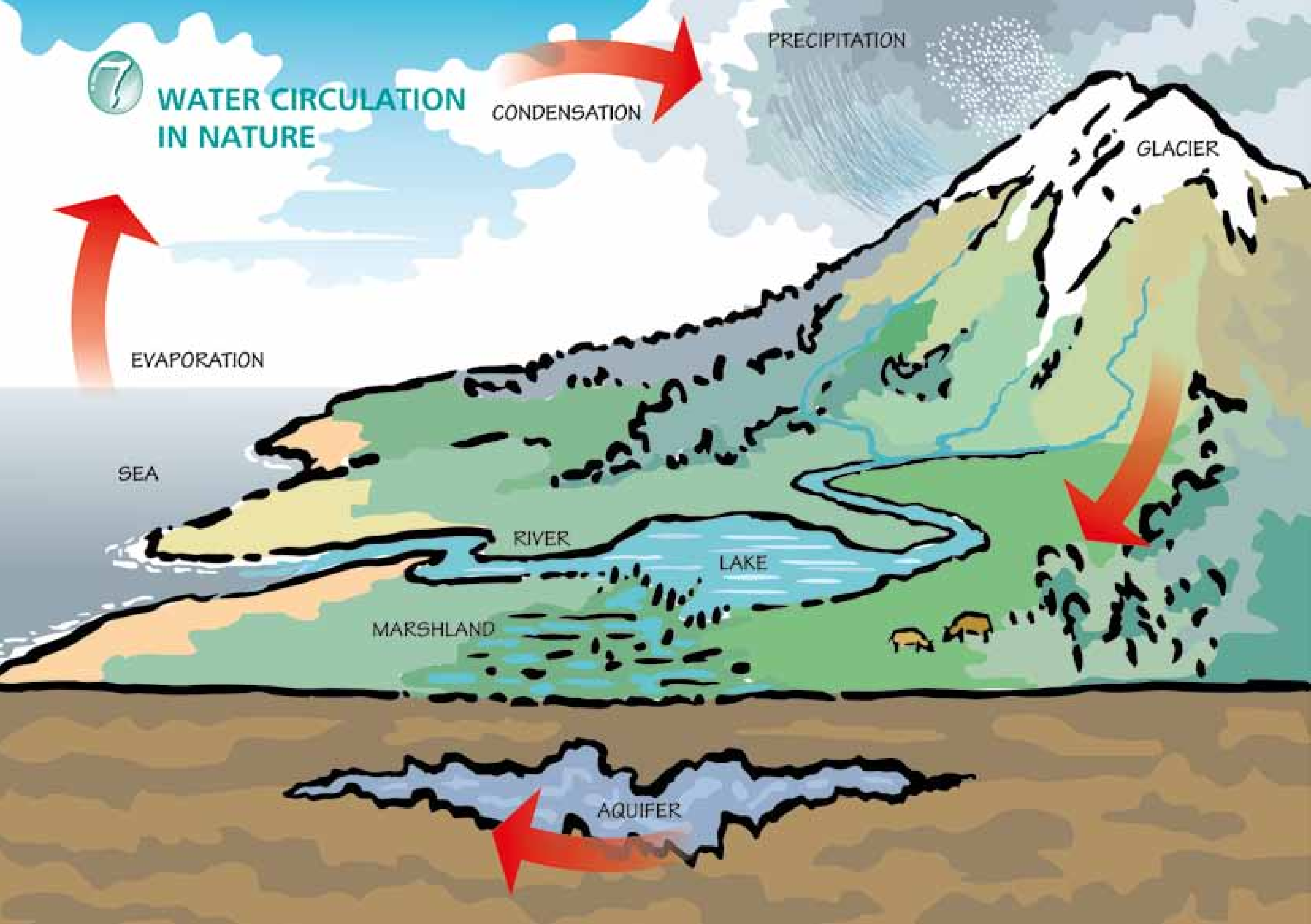
The share of current expenditure for waste water management was also the highest in the Osrednjeslovenska statistical region (EUR 39.9 million or 43.1% of total current expenditure in the country).

Osrednjeslovenska was followed by Savinjska (EUR 11.2 million or 12.9%) and Podravska (EUR 10.6 million or 11.4%).

Zasavska spent the least on waste water management (EUR 0.5 million or less than 1% of total current expenditure in the country).

Most money for waste water management is spent in the Osrednjeslovenska statistical region.

7 WATER CIRCULATION IN NATURE



Water circulates in nature and also in our brochure:

WATER RESOURCES:
Slovenia has:
- 2,500 km of rivers,
- 60.8 km^2 of standing waters,
- 180 km^2 of sea and
- 3,530 million m^3 of renewable groundwater.

STATE OF WATERS:
- On average, the state of our waters is GOOD.
- The chemical state of groundwater is improving; in 2012 more than 86% of groundwater was assessed as good.

FRESH WATER ABSTRACTION:
- 73% of water for public water supply was abstracted from groundwater.
- 85% of water for public water supply was abstracted in the Danube River basin.
- Most water was abstracted in Osrednjeslovenska (28%), and the least in the Zasavska statistical region (1%).

FRESH WATER SUPPLY:
- In 2012, as much as 50% of all fresh water from the public water supply was supplied to households.
- In the same year, 30% of water was lost in the distribution network.

WATER CONSUMPTION:
- A person in Slovenia consumed in 2012 on average 41 m^3 of water or 114 litres of water per day.
- In production and service activities 17 m^3 of water per person was consumed in 2012.
- For irrigation, 2.2 million m^3 of water was used in 2012; 33% of irrigated land was arable land and kitchen gardens, 22% ski slopes, 18% orchards, olive groves and tree nurseries, 12% greenhouses, vineyards and permanent grassland, and 15% sports fields and lawns.

WASTE WATER AND ITS DISCHARGE:
- In the 2003-2012 period, household waste water generation decreased by 24%.
- Most waste water was discharged from sewage systems into surface water and before doing that only 58% of water was treated.
- Most waste water (more than 80%) was treated before discharge in the Jugovzhodna Slovenija, Obalno-kraška, Pomurska, Gorenjska and Notranjsko-kraška statistical regions and the least (only 44%) in the Osrednjeslovenska statistical region.
- In 2012, 4% of waste water was primary treated, more than 65% was secondary treated and more than 30% was tertiary treated.

Investment in waste water management has been declining since 2009. In 2011, it represented only 22% of environmental protection investment. Current expenditure for waste water management is growing. In 2011, it represented 20% of total environmental protection expenditure.

DEFINITIONS OF SOME CONCEPTS

A **water resource** is a source of water that is collected for public water supply or for the technological process and cooling in enterprise. Water sources are:

- ~ groundwater of larger aquifers: pumping stations at aquifers with granular porosity, springs/wells, groundwater pumping stations of aquifers with fissure porosity, karst/fissure porosity or mixed porosity,
- ~ springs of groundwater that do not include a surface water inflow: karst sources, sources at contacts of more permeable layers with less permeable or non-permeable layers, and springs with a gravitational water inflow,
- ~ springs of groundwater with surface water inflow: springs of groundwater into which surface water flows,
- ~ running waters: rivers, streams,
- ~ natural lakes,
- ~ artificial lakes: reservoirs, ponds, submerged gravel pits, puddles,
- ~ rainwater: rain water and other run-off rain water,
- ~ artificial recharge: drawing of groundwater that is artificially recharged with surface water (drainage river water, pools for recharge).

Groundwater is all water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

Running waters are natural watercourses such as streams, rivers and torrents, irrespective of whether they have permanent or periodic flow.

Standing waters are natural lakes (including intermittent lakes), artificial lakes, high and low marshes, fishponds, pools, wetlands, artificial reservoirs, smaller retarding basins and some other waters as a result of environmental interventions.

Catchment area is an area from which all inland waters run through streams, rivers or lakes into a river that flows into the sea.

River basin is an area from which all inland waters run through streams, rivers or lakes into the same river or lake.

Fresh water is water drawn from water resources in its natural state or water processed by the usual methods of coagulation, filtration, disinfection, etc.

Drinking water is water that must conform to regulations on the cleanliness of water in terms of microbiological, physical, chemical and radiological content, pesticides and military poisons. Such water is intended for supply as public drinking water or for the production of food intended for sale.

Technological water is water used for production and other purposes and does not meet the agreed standards for cleanliness of drinking water.

Used water includes fresh water, water in recirculation and reused water.

Consumed water is that quantity of water that is lost through vaporisation or water that becomes part of the product and is thus no longer available.

Unpolluted water is water that is suitable for all types of use with no processing whatsoever and is water the properties of which remain unchanged during use.

Waste (polluted) water is water that is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. Waste water is after use or as atmospheric precipitation discharged into public sewage or waters. Waste water is a mixture of domestic, industrial/process or drainage waste water.

Sewage consists of a network of feeders, channels, gutters and other equipment for draining waste water from buildings and drainage water from roofs and from paved or other covered area.

Mixed sewage system is a system for common collecting and draining of urban or/and industrial (technological) waste water with drainage waste water.

Treatment plant is a device for treatment of waste water which reduces or eliminates water pollution. Treatment plants are urban, industrial or independent treatment plants.

Primary treatment is treatment of (urban) waste water by a physical and/or chemical process involving settlement of suspended solids, or another process in which the BOD_5 of the incoming waste water is reduced by at least 20% before discharge and the total suspended solids of the incoming waste water are reduced by at least 50%.

Secondary treatment is treatment of (urban) waste water by a process generally involving biological treatment with a secondary settlement or other process, resulting in BOD removal of at least 70%, COD removal of at least 75% and the total suspended solids of the incoming waste water are reduced by at least 90%.

Tertiary treatment is treatment (additional to secondary treatment) of nitrogen and phosphorous and/or any other pollutant affecting the quality or a specific use of water. In addition to requirements for secondary treatment, this treatment includes nitrogen removal of at least 70%–80% and/or phosphorus removal of at least 80%. Tertiary treatment is additional treatment of substances that remain after secondary treatment. This improved treatment is necessary for sensitive areas of watercourses.

Population equivalent (PE) is a unit for water loading with the organic biodegradable stuff which corresponds to one inhabitant pollution per day. It is expressed in BOD_5 (a five-day biochemical oxygen demand). 1 PE is equal to 60 g (BOD_5) of oxygen per day.

Irrigation is artificial adding of water during the vegetation period when there is not enough water in the soil with the purpose to provide the optimum growth and development of cultivated plants. By irrigating land agricultural production is intensified, a more varied selection of plant varieties is achieved and output is better and more abundant. Irrigation comprises measures and equipment for providing, distributing and using water with the intent to provide plants with the optimum humidity in the ground.

Irrigation system is a system of man-made channels for supplying water to cultivated land to allow plants to grow.

Irrigation systems are divided into:

~ large irrigation systems, which are intended for a large number of users for shared use according to an irrigation schedule;

~ small irrigation systems, which are intended for one user or for several users who use the irrigation system independently one from the other

Environmental protection investment is divided into end-of-pipe investment and investment in integrated technologies.

Current expenditure for environmental protection is divided into internal current expenditure, which is earmarked for research and development, for the maintaining of the environmental protection facilities, for personnel costs and other internal current expenditure, and external current expenditure, which is earmarked for research and development, payments to third parties (public sector or specialised providers of waste collection and waste water treatment services), monitoring and other external current expenditure.

STATISTICAL SIGNS

- \- no occurrence of event
- … not available

ABBREVATIONS

ARSO	Republic of Slovenia, Slovenian Environment Agency
BOD	biochemical oxygen demand
BOD_5	a five-day biochemical oxygen demand
COD	chemical oxygen demand
GDP	gross domestic product
VAT	value added tax
EU	European Union
EUR	euro
MKO	Republic of Slovenia, Ministry for Agriculture and the Environment
PE	population equivalent
SURS	Statistical Office of the Republic of Slovenia

UNITS OF MEASUREMENT

ha	hectare
km	kilometre
km^2	square kilometre
l	litre
m	metre
m^3	cubic metre
m^3/s	cubic metre per second
mio.	million
1 PE	60 g (BOD_5) of oxygen per day
t	ton
%	per cent

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