

COMMUNICATION

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Environmental Statistics

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Protection against damaging water effects and rivers management

This communication presents selected statistics referring to flood control and river management, land drainage, land erosion control and torrent management. The tables contain preliminary data on areas and facilities flooded by surface and ground waters, areas and facilities protected against flood and those being drained, as of 31/12/2009.

The total area flooded by surface waters in 2009 is by far lesser than in the reference period 2008. It amounts to 4% of the areas flooded in 2008, of which 2% of arable land, compared to 2008.

Compared to 2008, the total area protected from flood in 2009 increased by 55%, of which 74% of arable land were protected.

When compared to 2008, the area of eroded land decreased by 25% in 2009.

The data relating to the Republic of Serbia and its subterritories. Starting from 1999, the Statistical Office of the Republic of Serbia does not have available certain data for AP Kosovo and Metohia, which are therefore not included in the data for the Republic of Serbia (total).

Protection against damaging water effects and rivers management¹⁾ As of 31/12/2009

	Republic of Serbia		
	Total	Central Serbia	AP Vojvodina
Areas and facilities flooded by surface water			
Total flooded area, thous. ha	15 755	7 755	8 000
Utilized agricultural area, ha	5 995	3 995	2 000
Settlements, number	32	25	7
Buildings, number	165	95	70
Industrial facilities, number	176	174	2
Other industrial facilities, number	2	2	-
Railway lines, km	12	9	3
Roads, km	56	50	6
Areas and facilities flooded by ground water			
Total flooded area, thous. ha	33 480	4 980	28 500
Utilized agricultural area, ha	16 780	4 780	12 000
Settlements, number	56	40	16
Buildings, number	109	29	80
Industrial facilities, number	137	137	-
Other industrial facilities, number	2	2	-
Railway lines, km	3	0	3
Roads, km	25	11	14

¹⁾ Preliminary data.

Protection against damaging water effects and rivers management¹⁾ (continued)

As of 31/12/2009

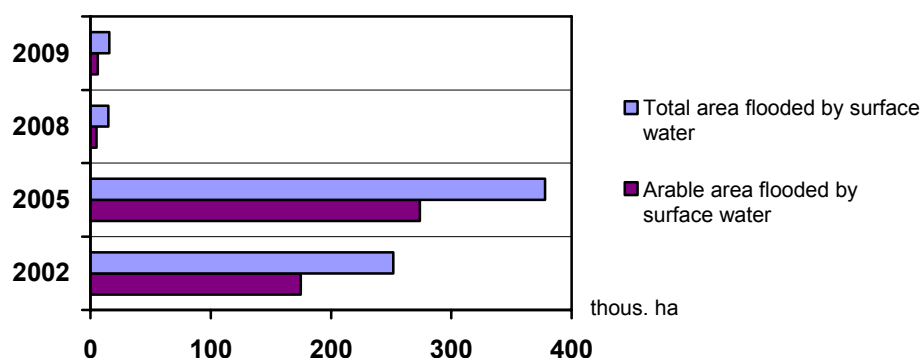
	Republic of Serbia		
	Total	Central Serbia	AP Vojvodina
Areas and facilities protected against floods			
Total flooded area, thous. ha	1 999	1 237	762
Utilized agricultural area, ha	1 869	1 245	624
Settlements, number	563	392	171
Industrial facilities, number	442	316	126
Other industrial facilities, number	1 312	1 024	288
Railway lines, km	983	705	278
Roads, km	2 558	1 807	751
Total length of embankments, km	3 032	1 895	1 137
Drainage			
Total area covered by drainage system, ha	2 243	596	1 647
Utilized agricultural area, ha	1 898	466	1 432
Total drained area, ha	1 916	440	1 476
Utilized agricultural area, ha	1 648	374	1 274
Pumping stations, number	226	74	152
Land erosion			
Eroded land, km²	3201	3201	-
Reclaimed land, km ²	505	505	-

¹⁾ Preliminary data.

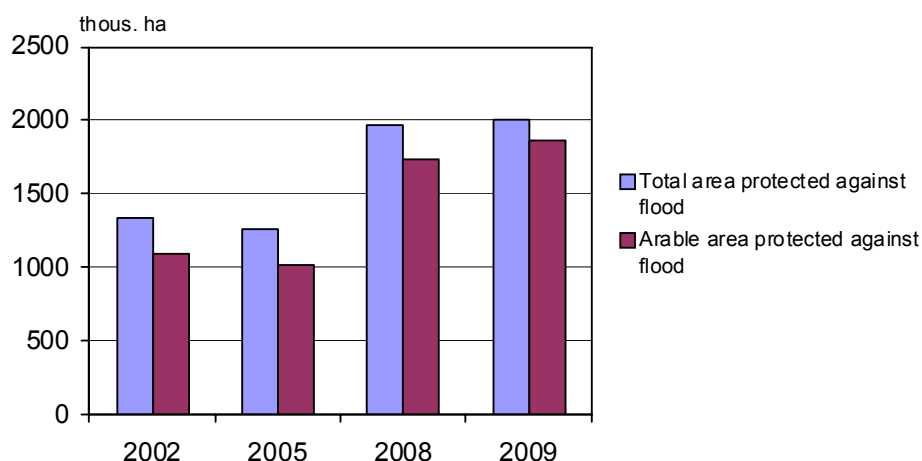
Floods and protection against water 2002, 2005, 2008

	Republic of Serbia								
	Total			Central Serbia			AP Vojvodina		
	2002	2005	2008	2002	2005	2008	2002	2005	2008
Areas and facilities flooded by surface water									
Total flooded area, thous. ha	252	378	15	244	261	7	8	117	8
Utilized agricultural area, thous. ha	175	274	5	173	185	3	2	88	2
Settlements, number	134	149	21	127	128	14	7	21	7
Industrial facilities, number	91	92	6	89	90	4	2	2	2
Railway lines, km	105	217	12	102	188	9	3	29	3
Roads, km	510	786	68	504	532	62	6	254	6
Areas and facilities protected against floods									
Length of embankments, km	3 223	4 713	3 307	1 892	1 967	2 015	1 331	2 746	1 292
Total protected area against floods, thous. ha	1 338	1 264	1 962	668	719	1 216	670	545	746
Utilized agricultural area, thous. ha	1 098	1 016	1 742	520	562	1 086	578	454	656
Settlements, number	563	713	574	385	545	399	178	168	175
Industrial facilities, number	491	495	438	356	367	298	135	128	140
Railway lines, km	1 216	1 080	989	739	760	705	477	320	284
Roads, km	3 110	4 268	2 856	1 885	3 151	1 807	1 225	1 117	1 049
Drainage									
Total drained area, thous. ha	2 068	2 033	2 067	475	736	368	1 593	1 297	1 699
Canals, km	23 380	24 887	90 639	6 353	6 988	86 471	17 027	18 019	4 168
Pumping station, number	482	453	220	119	128	66	363	325	154
Capacity, m ³ /sec	714	875	5 306	151	368	170	563	507	5 136
Power installed, kW	51 967	41 542	45 789	11 811	12 521	11 542	40 156	29 021	34 247
Land erosion									
Eroded land, km ²	284	1 635	1 221	284	1 629	1 221	-	6	-
Reclaimed land, km ²	199	-	36	199	-	36	-	-	-

Area flooded by surface waters



Protected areas against flood



Methodological explanations

Data on the protection against damaging effects of water and waterway management are compiled from regular reports of water management enterprises dealing with waterway management, flood control, land erosion control and torrent abatement. The Survey of Flood Control was conducted, from 1993 to 2008, every three years to provide relevant data. However, for reason of climate changes, unforeseeable periods of flood occurrence and users' requests, its frequency has been annual since 2009.

Geographically, the Survey covers enterprises performing their activities on the whole territory of the Republic of Serbia.

The reporting method is used for data collection, i.e. the reporting unit fills in the questionnaire VOD-3 based on available documentation. Should any corresponding documentation on certain information lack, a competent person, knowing the measures of flood control, makes an estimation on available equipment, and facilities condition. The reporting unit forwards the filled in questionnaire to the relevant statistical office located on its territory.

Flood by surface waters is meant to be a (temporary) unusual flooding of land (valleys with large rivers) caused by the overflow of water from natural and artificial waterbodies, over protective embankments and dams or by the break, i.e. destruction, of dams and other protective waterworks structures, including flood as a result of ice jams in waterways.

Under **protection against flood** presented are areas and structures being protected against damaging effects of surface waters.

Under **total protected area** presented are all categories of utilized land including sterile land.

River management (regulation) is the work on arranging natural rivers (in up and down river stream) to protect the areas against its damaging effect.

River flow cut-off is the shortening of the river flow by cutting off larger curves and meanders.

Flood by ground waters is the submersion of land (lowlands) due to an overflow of surface waters and high ground waters in period of abnormal water situation, and due to their slow drainage as well (lack of structures and insufficient capacity of the drainage network).

Under **protection against flood by ground waters** presented are data on total and arable areas covered by the drainage system, as well as data on the number, length and capacity of drainage facilities and devices.

Under **pumping stations** presented are only those that serve the drainage use. The total capacity of pumps implies the installed capacity of all pumps in pumping stations, which is expressed in m³/s.

The drained area is made of total areas drained in a year irrespective of the number of drainages performed.

Under **waters pump** presented are the quantities of water which have been abstracted from the drainage system and poured into a recipient.

Under **flooded areas and facilities** presented are all areas and facilities which have been flooded by mountain and torrent waters irrespective of the duration of floods and the height of water in the submerged area. If an area is flooded several times, it is counted only once.

Under **eroded land** presented is the land from which the fertile layer and vegetative cover have been detached or entirely transported by the devastating action of water or wind, thus its use in plant production has been significantly diminished or totally made impossible.

Reclaimed land is the land where there is no more nutrients washing off, landslide and transport of new alluviums.

Torrents are mountain streams which water level rises during periods of heavy rainfalls and abrupt snow melting. This large volume of water digs out beds, causes landslides and creates ravines, and the escaped water washes off the unstable land and deposited alluviums (stones, gravel, sand, soil, etc.), thus bringing damages to building facilities outside settlements and to agricultural land.