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WASTEWATER MANAGEMENT IN SOUTHERN BUG BASIN

The ecological condition of the Southern Bug river flowing in Khmelnytsky, Vinnytsia, Kirovohrad and Mykolayiv regions of Ukraine depends on the pattern of natural resource use and wastewater management. The quality of natural waters changes significantly as a result of river pollution by wastewater from industry and households, surface runoff from farmlands, villages, towns, roads, etc. The centralized water supply and sewerage availability in Southern Bug basin is shown in Table 1. Analysis of Table 1 shows that the majority of rural population do not have the access to sewerage and facilities for household wastewater treatment.

Table 1. Access to water supply and wastewater treatment facilities in Southern Bug basin

Region	Population, million people			Number of settlements		No access to water management facilities			
	total	urban	rural	towns	villages	Water supply		Wastewater treatment	
						towns	villages	towns	villages
Khmelnysky	1.255	0.721	0.534	37	1414	–	976	9	1402
Vinnytsia	1.545	0.799	0.746	37	1456	–	1097	10	1451
Kirovohrad	0.933	0.592	0.341	39	991	5	774	10	985
Mykolayiv	1.120	0.768	0.352	26	885	1	372	–	866
Total	4.853	2.880	1.973	149	4746	6	3219	29	4704

Household wastewater treatment facilities in regions under consideration were built in the 1960s and 1970s. Therefore, they are morally and physically outdated and do not fulfill water protection requirements. Even assuming that these facilities still provide normal wastewater treatment, more than 1 million people in rural areas of Southern Bug basin discharge household wastewater without any treatment. That significantly affects water pollution. Particular attention should be paid to the lack of modern stormwater sewers for collecting runoff from settlements and farmlands, which is mainly contaminated with heavy metals, fertilizer residues and pesticides. Landfills are another unsolved issue in terms of water pollution. Steady increase in solid waste accumulation at landfills in Southern Bug basin and lack of landfill leachate treatment are additional significant source of river pollution. The quality of water supply and wastewater treatment in Southern Bug basin is extremely important because it affects people health, conservation of biodiversity and ecosystems in river basin. The annual volume of wastewater discharged in Vinnytsia region located in Southern Bug basin is accounted for around 60 million m³. Only 47% of this amount is treated: in 2019, 28.1 million m³ of wastewater was processed at biological treatment facilities and 0.038 million m³ of wastewater was treated at physical-chemical treatment facilities. In the same time, some wastewater was reported as contaminated and uncategorized – 0.67 million m³ and 0.89 million m³, respectively. These constitute around 3% of total wastewater volume.

All the above mentioned factors of water pollution in Southern Bug basin indicate the necessity of additional measures: infrastructure inventory in the area of sanitary protection of water bodies; strengthening the control over environment protection in industry near water bodies; reconstruction of outdated and construction of new wastewater treatment facilities eliminating the discharge of untreated wastewater.