

VillageWaters

SOUND WASTEWATER TREATMENT FOR YOUR HOMES

Solutions for wastewater treatment in sparsely populated areas

4th of October, Warsaw, Poland

**Poland's situation in wastewater management
in sparsely populated areas**



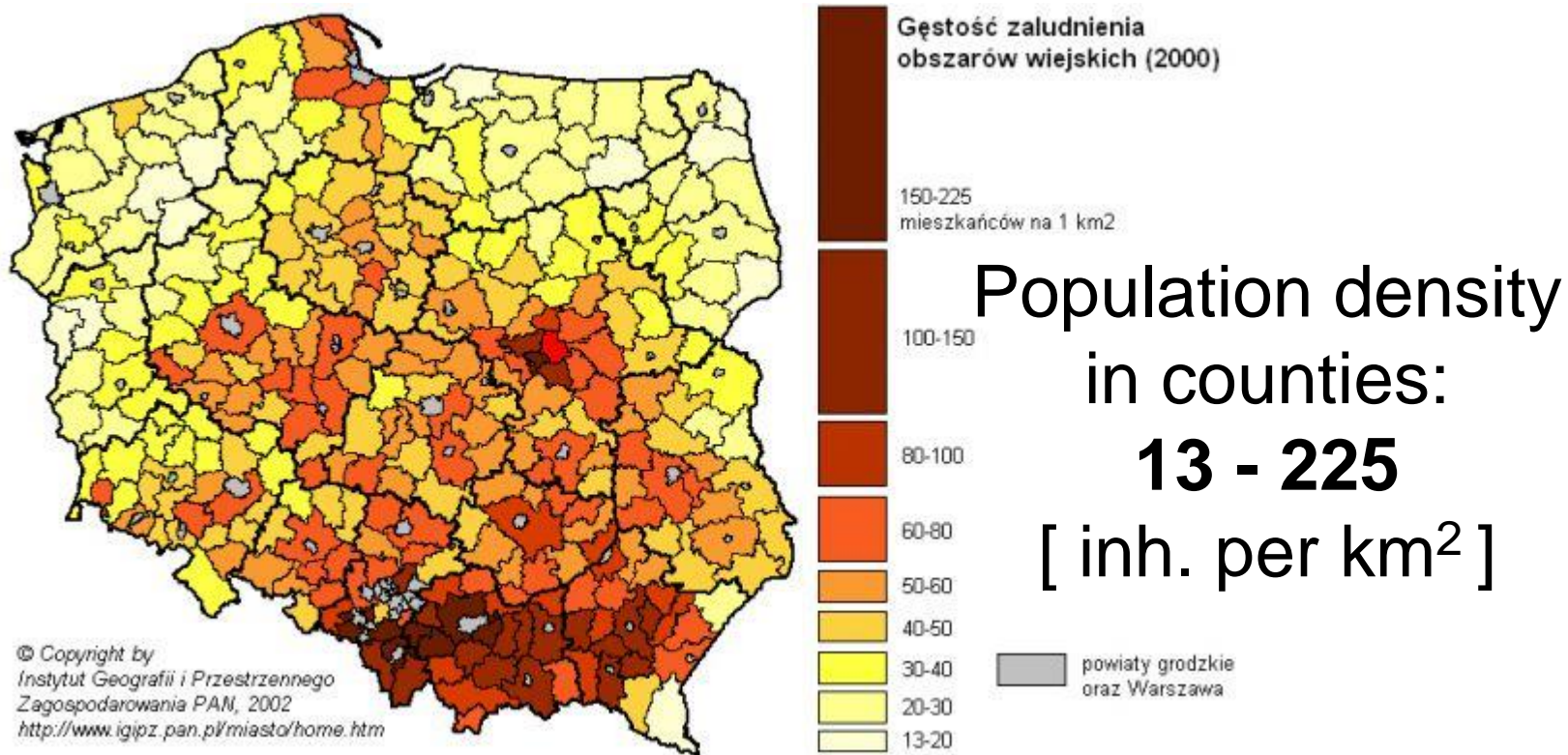
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Poznań University of Life Sciences, Poland

Outline

- Population in Polish rural areas
- % served by centralized sewerage
- Individual systems
- Emptying of holding tanks
- Treatment technologies
- Summary

Population in Polish rural areas

- 15 mln inhabitants
- On average 125-891 inhabitants in a village



Polish villages in statistics

Total number: **42,835 + 14 K** hamlets.

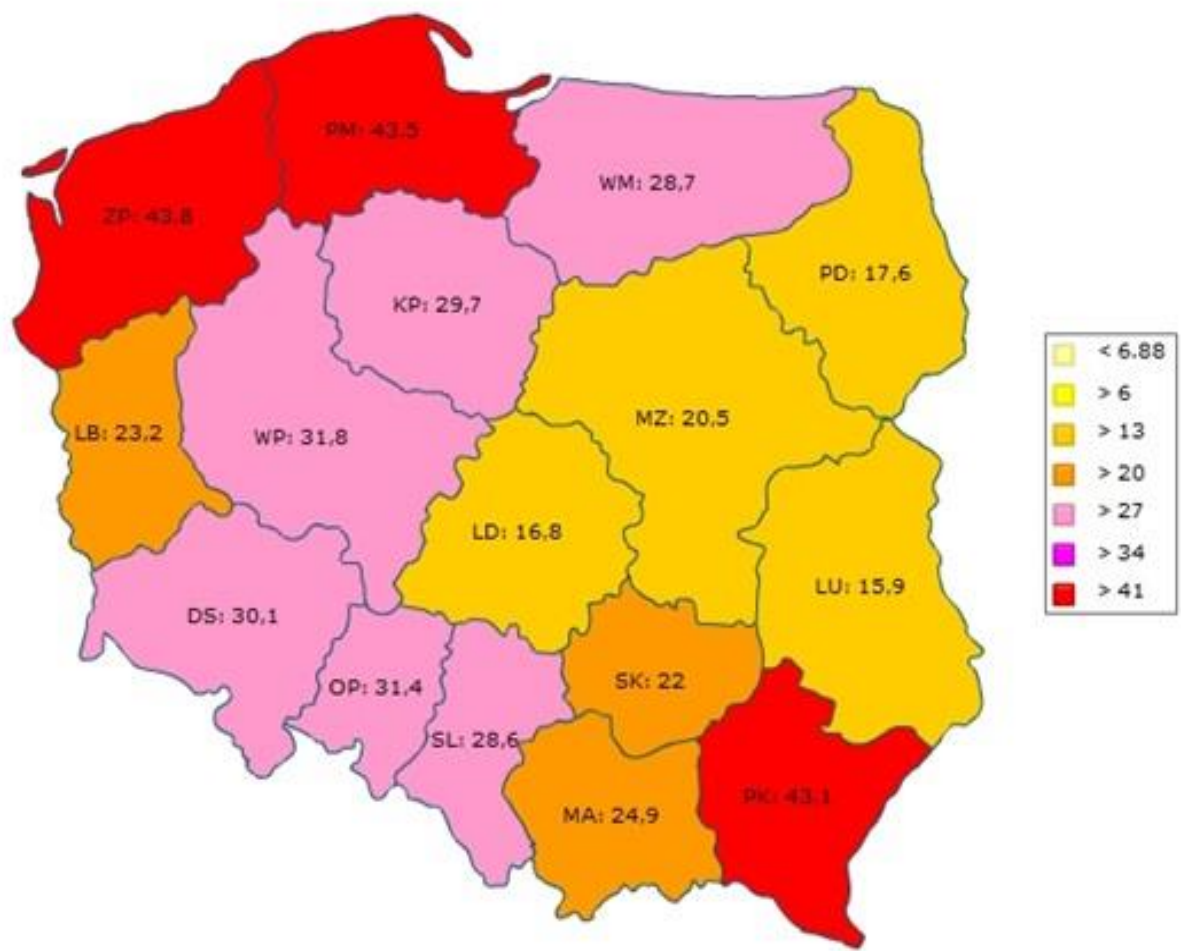
Division by sizes:

- **Small villages** < 300 p. (ca. 40% of the total number)
– mainly in central Poland;
- **Medium size villages**: 300 - 500 p. (ca. 40%);
- **Large villages** > 500 p. (20%) south of Poland.

25% of villages is sparsely populated (mean distance between homesteads > 100 m), but on-site systems are recommended already at population density < 25 p./ha.

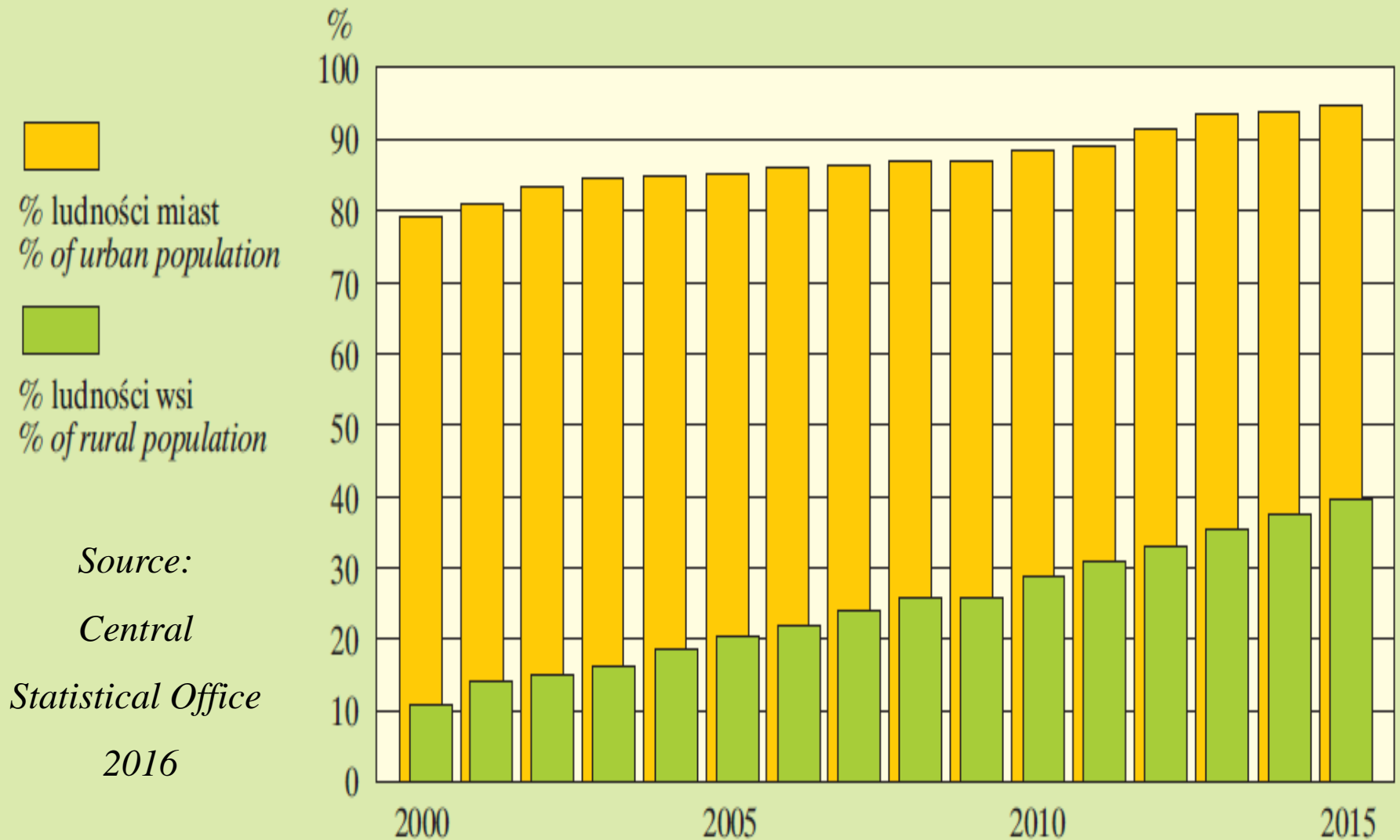
% of rural population served by centralized sewerage systems (on avg. **25%** in 2010 and **40%** in 2015)

(www.monitorui.bodkarpackie.pl 2011)



LUDNOŚĆ KORZYSTAJĄCA Z OCZYSZCZALNI ŚCIEKÓW W LATACH 2000–2015

POPULATION CONNECTED TO WASTEWATER TREATMENT PLANTS IN 2000–2015



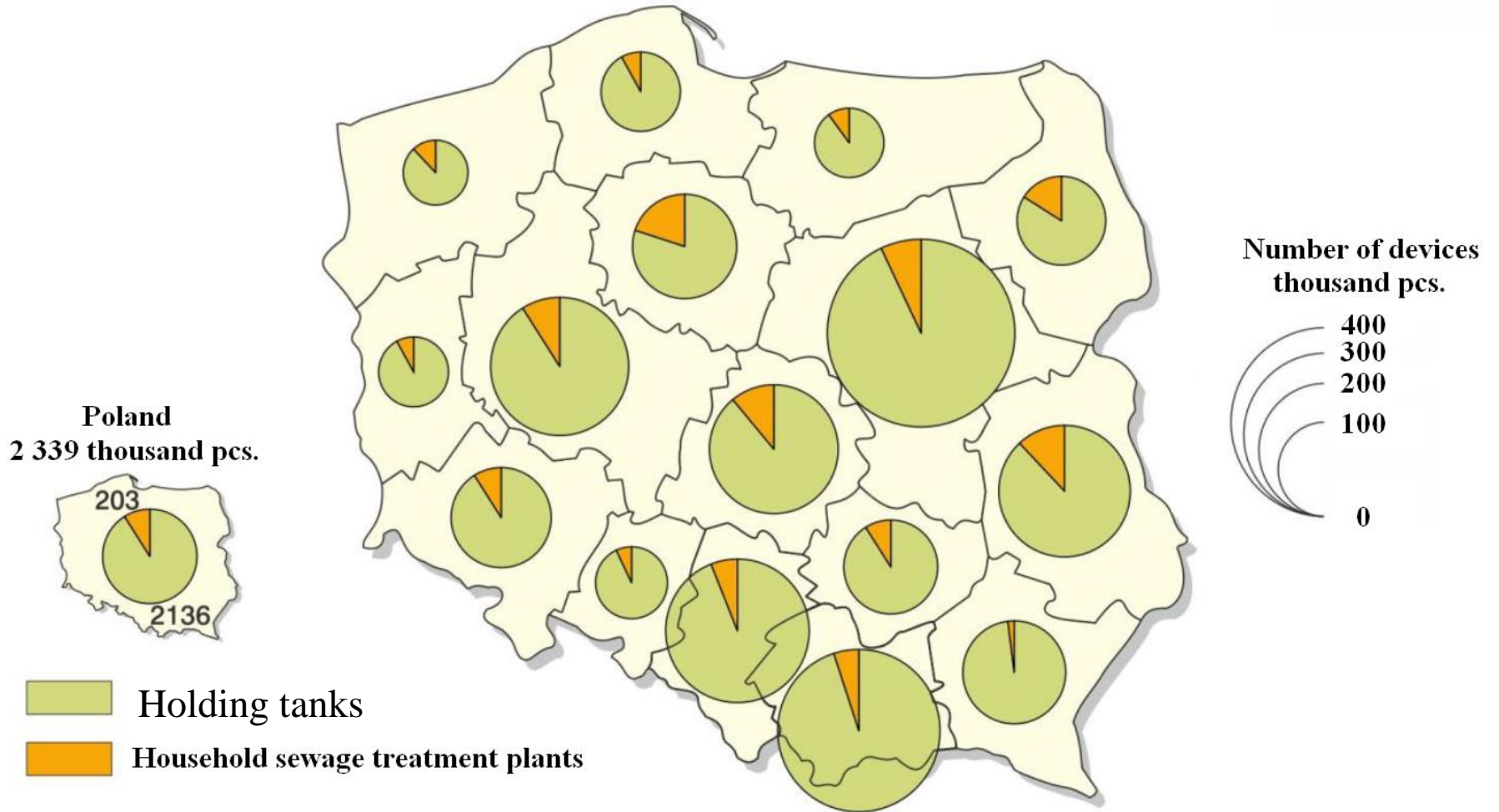
Source:

Central

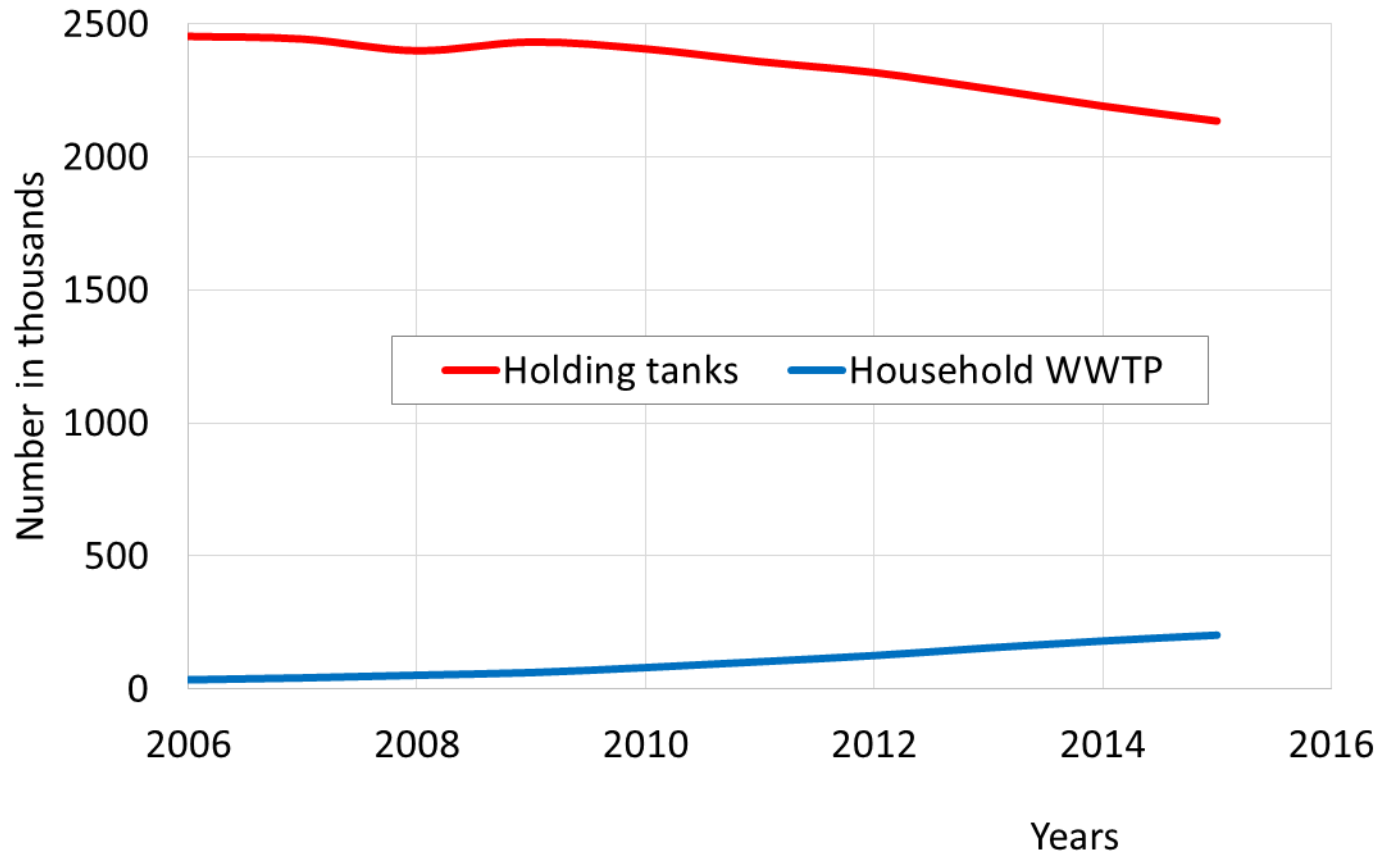
Statistical Office

2016

Household devices for liquid waste disposal in Poland in 2015



Number of holding tanks and household WWTPs in Poland



Emptying of holding tanks

- 23 mln m³ in the year 2015
- 8 mln p.*0.05 m³/p. day * 365 days/y-r =
= 146 mln m³/y-r

$$23/146 = 0.16 = 16\%$$

- Leaky holding tanks;
- Grey market?

Treated wastewater quality conditions

(according to Polish legislation for $Q_d < 5 \text{ m}^3/\text{d}$)

Parameter	Max. value mg/dm ³	ST + SAS
Biochemical oxygen demand (BOD ₅)	40	Reduction in ST ≥ 20%
Chemical oxygen demand (COD)	150	-
Total suspended solids	50	Reduction in ST ≥ 50%
Total nitrogen	30	-
Total phosphorous	5	-

Treatment technologies

- **Septic tank + soil adsorption system** (majority)
- Septic tank + Extended aeration AS
- **Extended aeration AS**
- AS + floating biomass carriers
- Trickling filters
- **Constructed wetlands (Vertical flow)**

Summary

- Emptying of holding tanks is not fully controlled and should be improved;
- Due to sparsely populated villages the market of the small WWTP can grow by ca. 400-600 tho. plants in the next 20 years;
- There is a need to point out the best and relatively cheap solutions (**our goal!**).



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Thanks for your attention.