

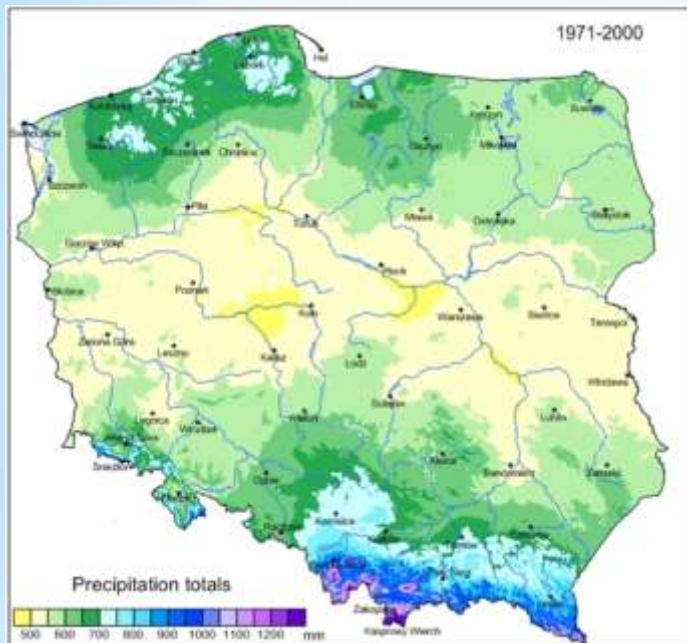
* Wastewater management in small communities in Poland

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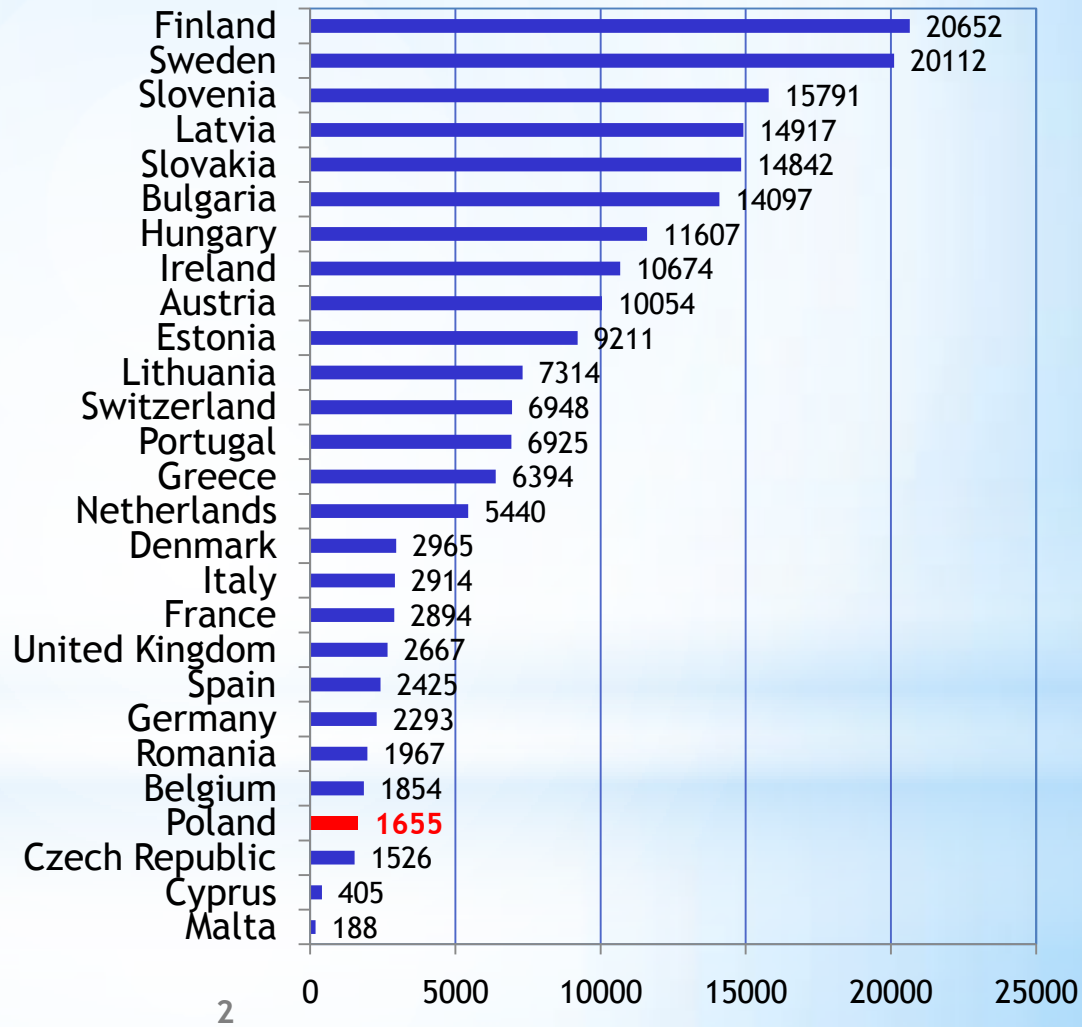
* Quantity of water resources



(Source: IMGW)

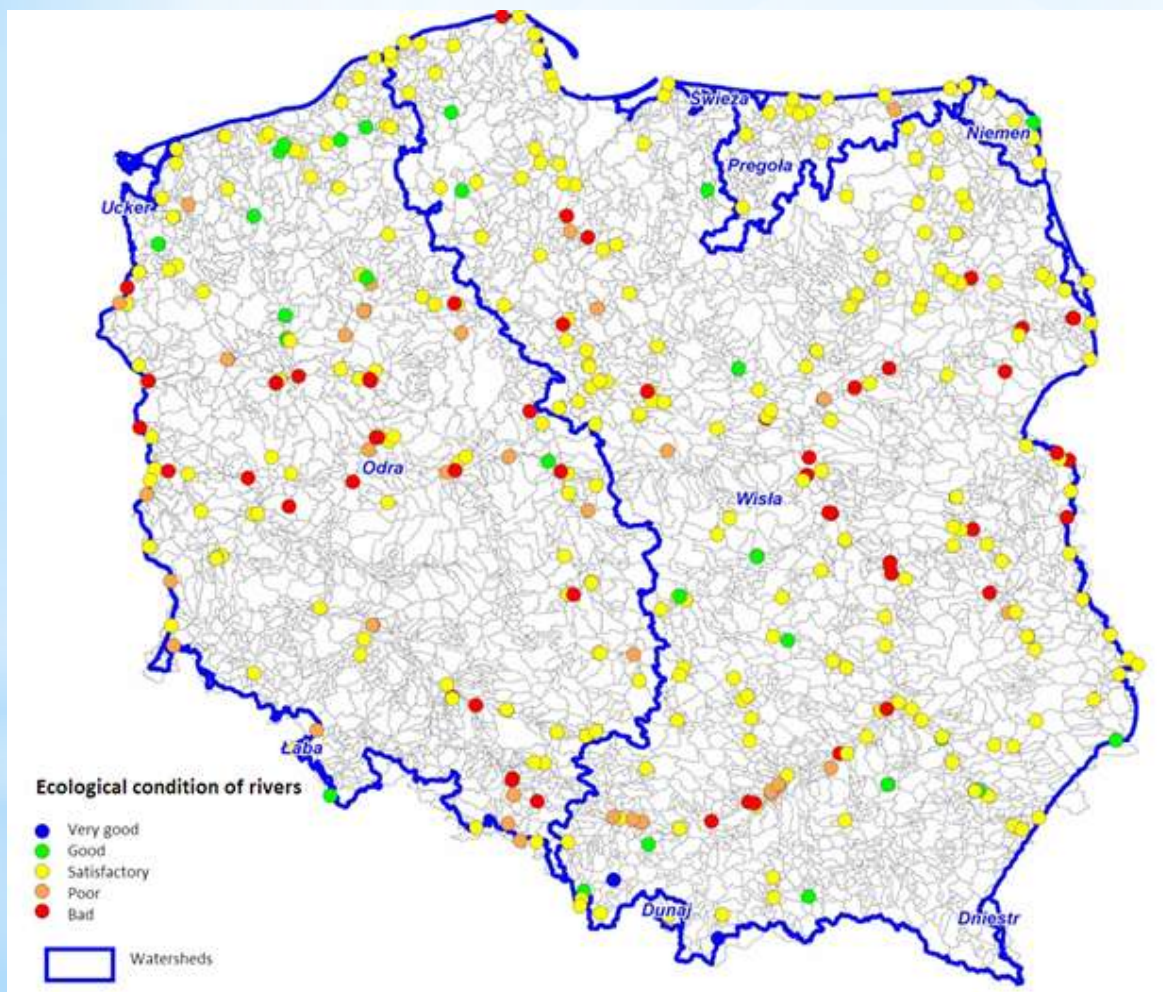
Average annual precipitation:
601 mm

Total fresh water resources per capita [m³]



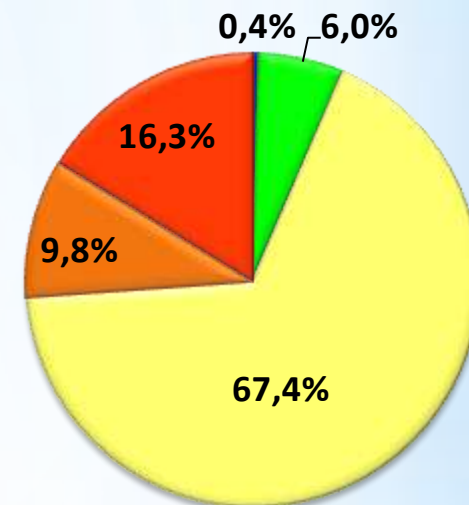
(Source: Eurostat)

* Surface water quality

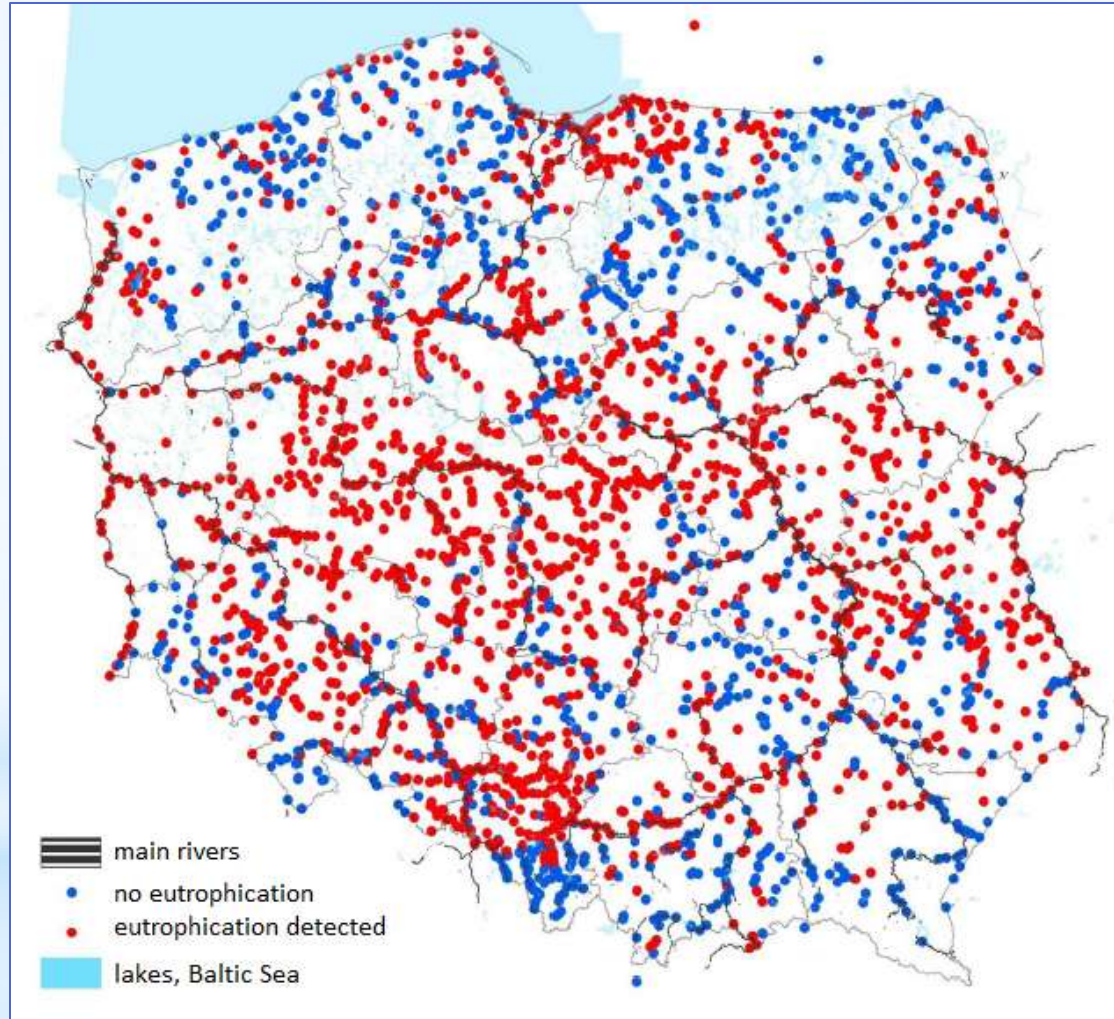


(Source: GIOŚ/PMŚ 2008)

% of river sections



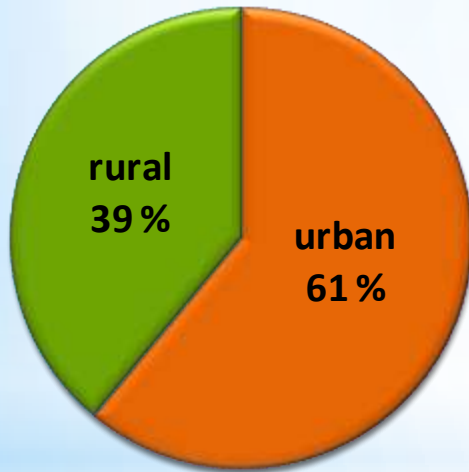
* Surface water quality - eutrophication



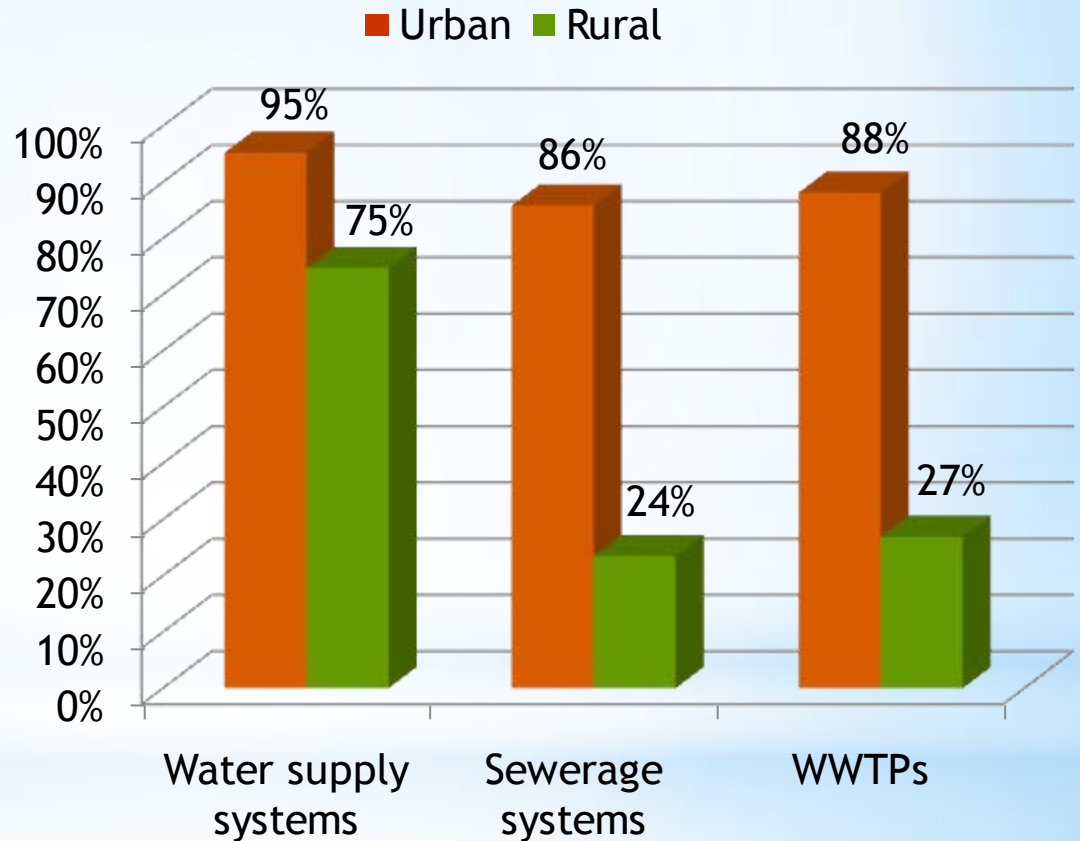
(Source: GIOŚ/PMŚ 2008)

* Urbanization

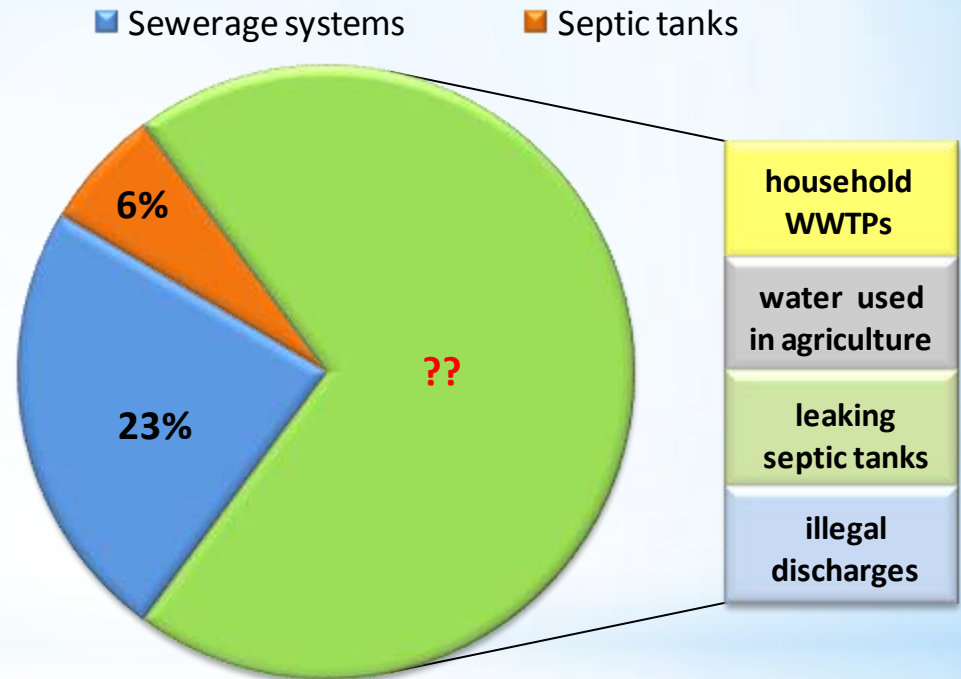
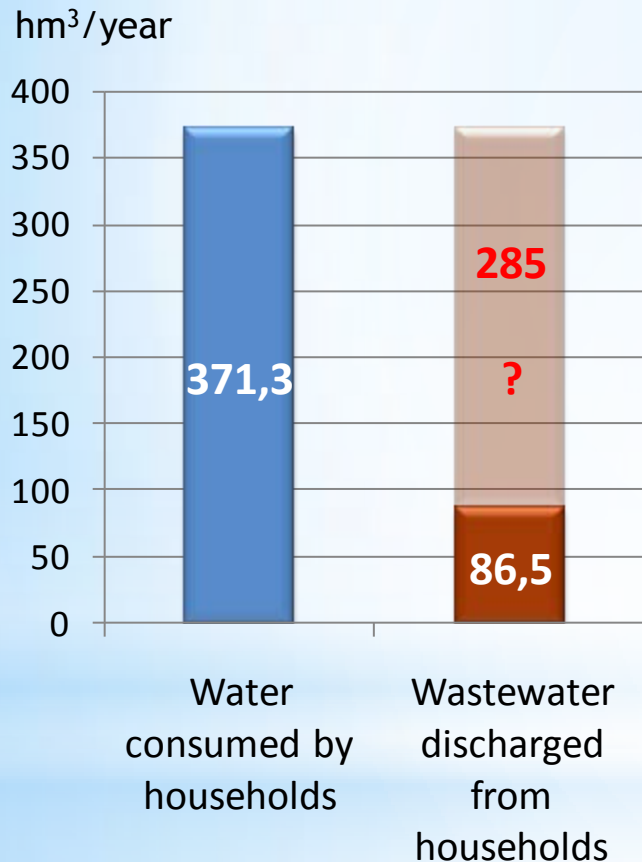
Population structure
(38,2 mln)



Percentage of population using:



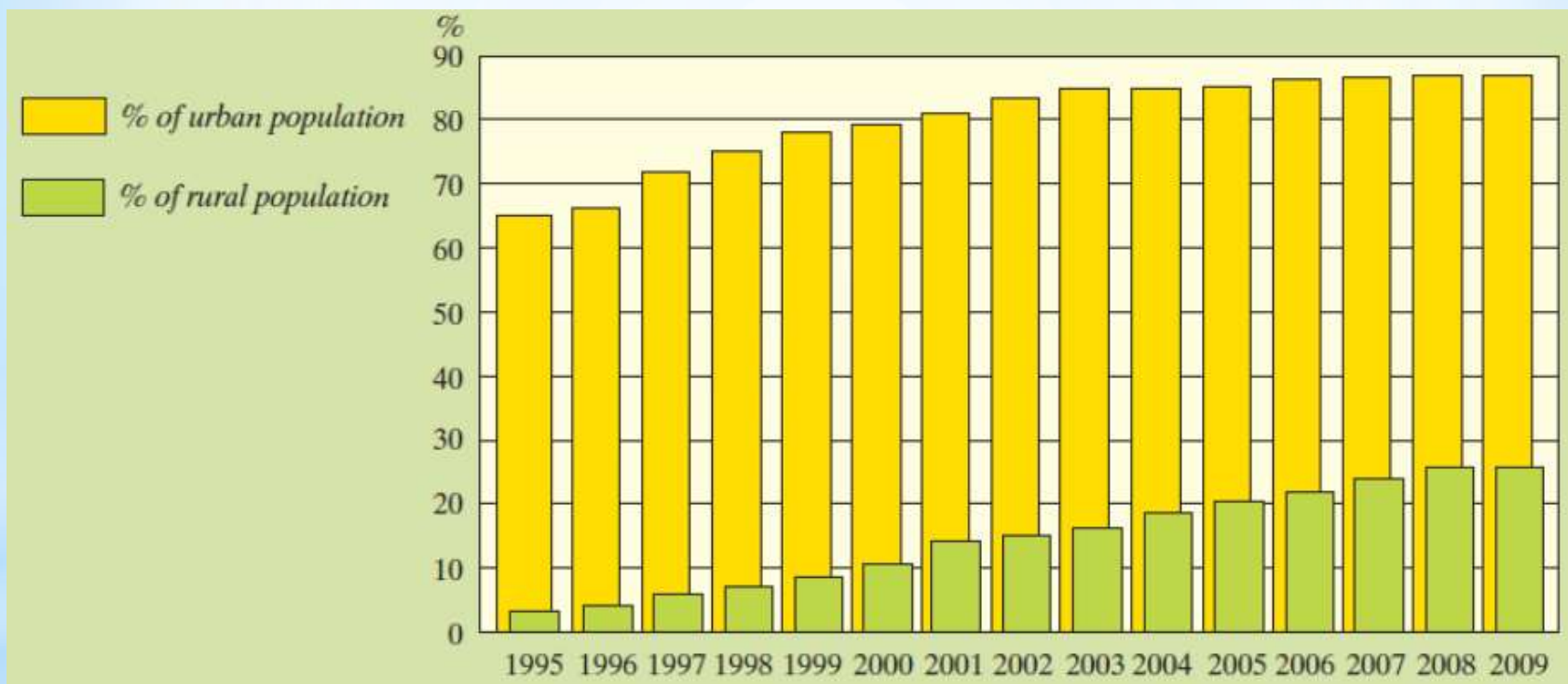
* Sanitation in rural areas



Wastewater disposal in rural areas (as a share of water volume)

* Sanitation in rural areas

Population using WWTPs in years 1995-2009



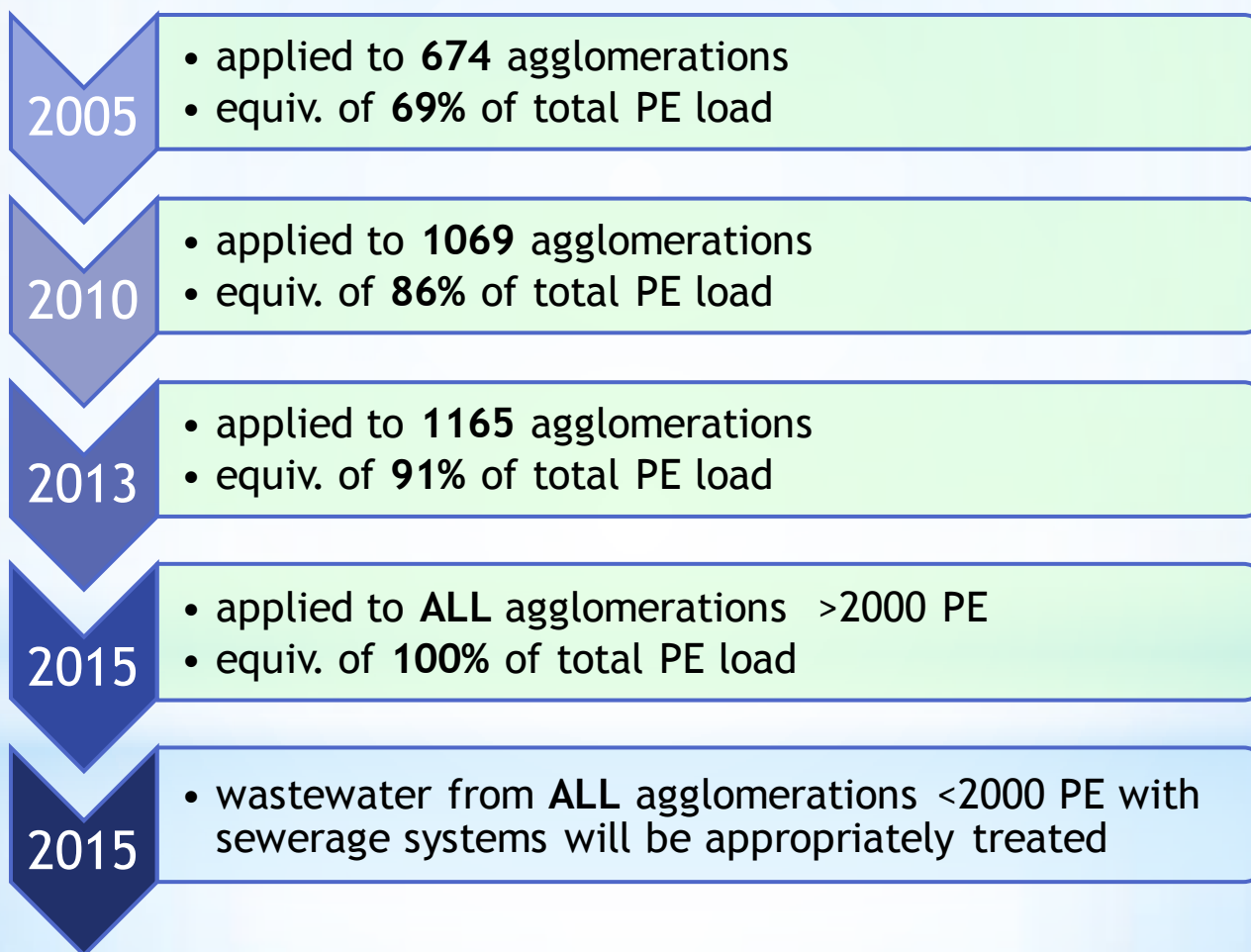
(Source: GUS, Environment 2010)

* Legal framework

- WFD (2000/60/EC) and the Directive concerning urban wastewater treatment (91/271/EEC) implemented into Polish law as:
 - * Water Law (2001)
 - * Environmental Protection Law (2001)
 - * Municipal water supply and sewage discharge law (2001)
 - * Order of Ministry of Environment on quality of effluents discharged to the environment (last revised 2009)
 - * other
- **Communes (2479)** - responsibility for water supply and sewage management in their areas
- **Minister of Environment** - coordination of water supply and sewage management actions and plans
- **National Board of Water Management** with 7 regional branches

* Implementation of 91/271/EEC

* Poland's EU accession treaty...



* Implementation of 91/271/EEC

* National Urban Wastewater Treatment Programme (2003)

- * Modernization, extension and construction of new WWTPs
 - * Priority list: 1313 WWTPs >2000 PE, 97% of total programme PE load
 - * Non-priority: 322 WWTPs, 3% of total programme PE load
- * Modernization or construction of 33 000 km of sewage lines
- * Expected results: ~100% of urban and ~60% of rural population served by sewerage systems and WWTPs in 2015

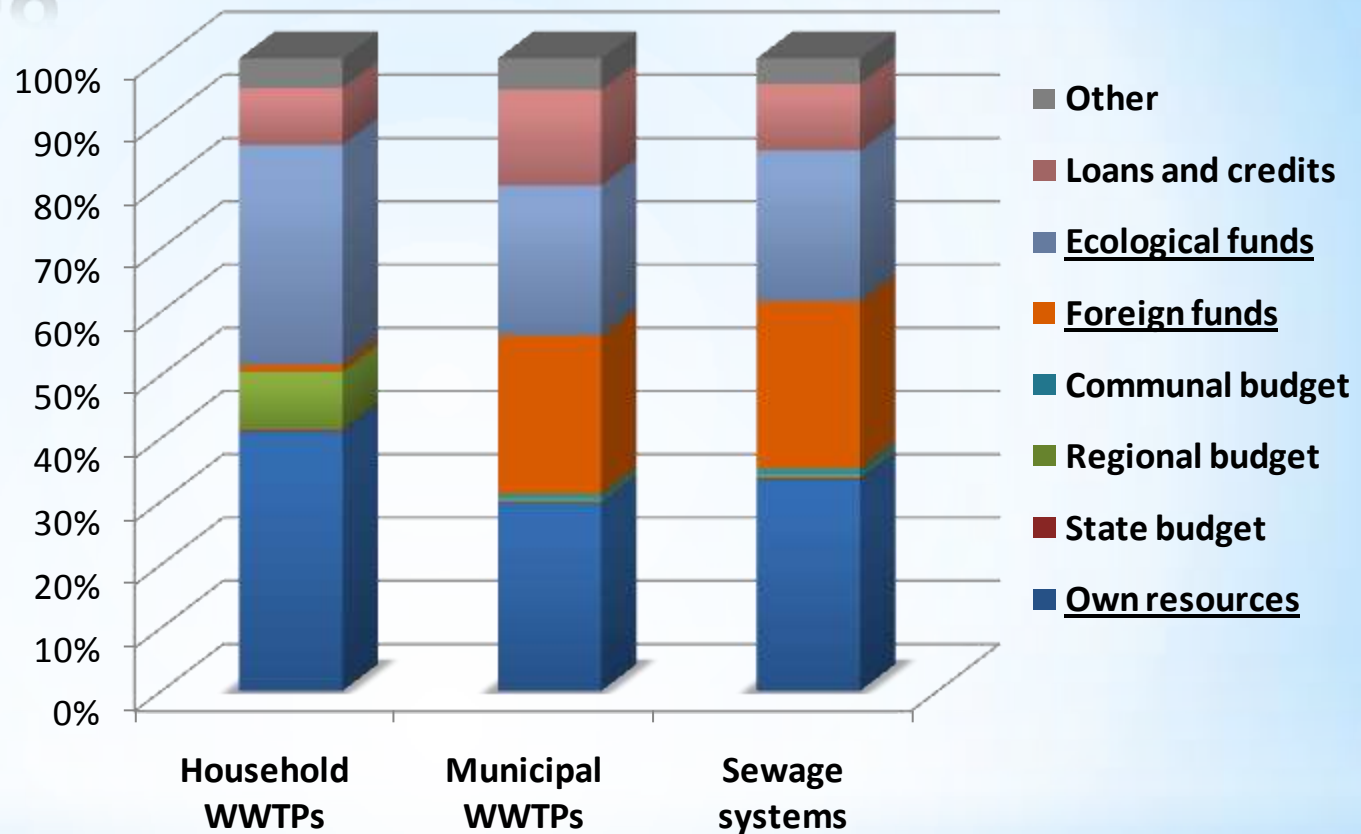


* Implementation of 91/271/EEC (article 7)

- * Programme of construction of WWTPs in agglomerations of PE < 2000 with sewerage systems
 - * started in 2007
 - * only 2% of budget and 1% of PE load
 - * applies to 379 agglomerations of 450 000 PE, including:
 - * 221 wwtps to be extended or modernized
 - * 29 new wwtps to be constructed
 - * planned construction of 1241 km of sewage network to ensure that 85% of population served by sewage networks



* Financing

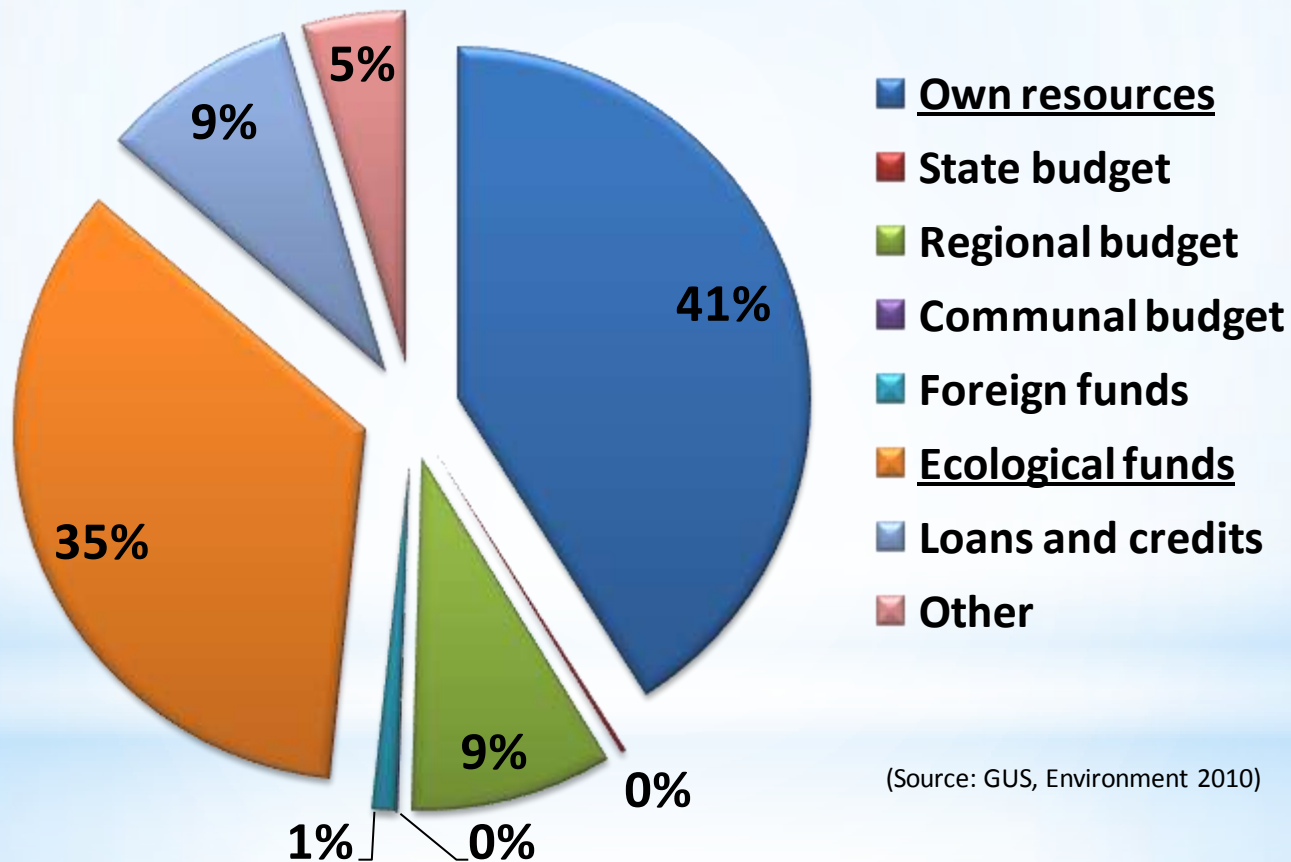


(Source: GUS, Environment 2010)

* Ecological funds and foreign funds:

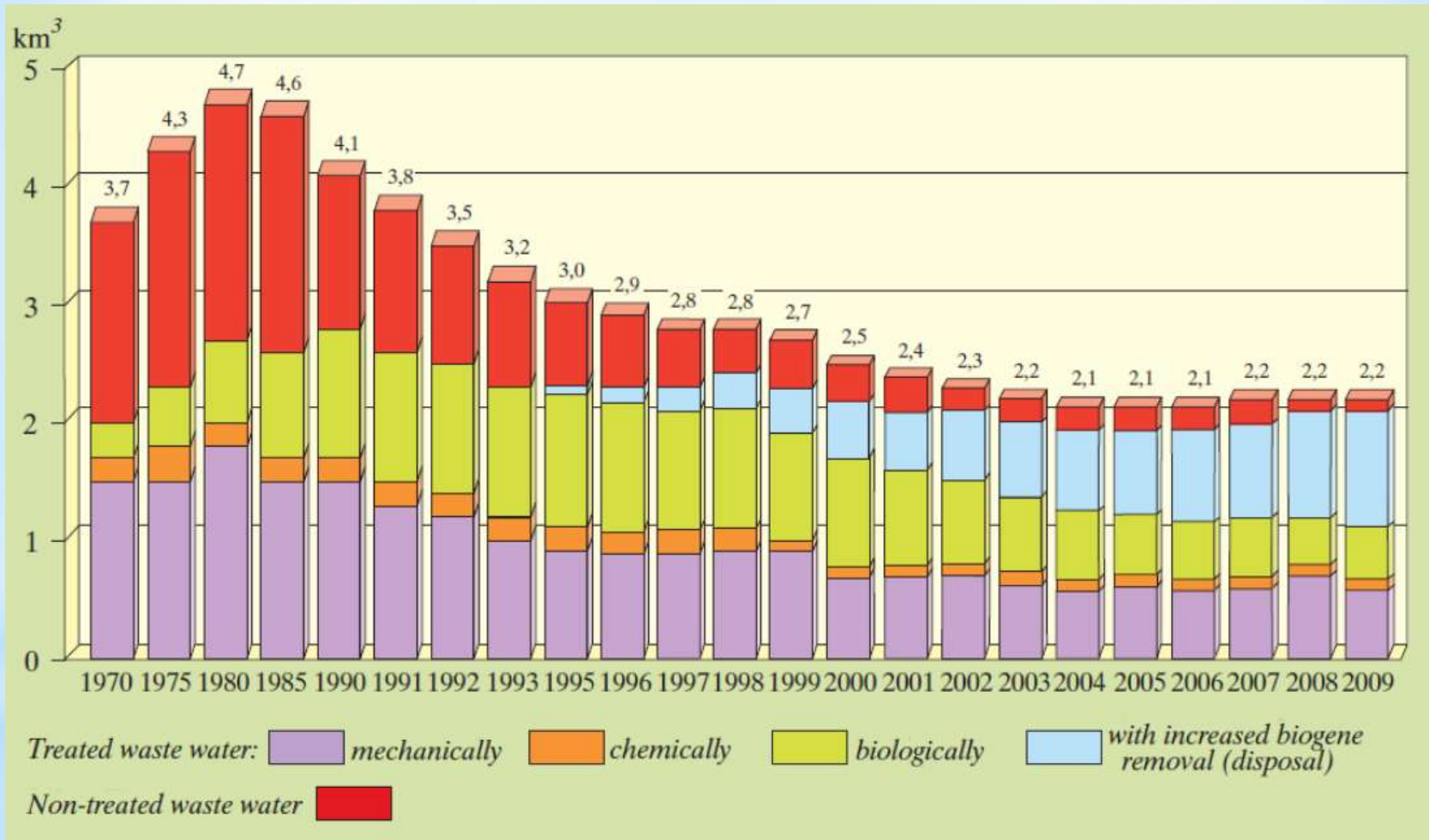
- National Fund for Environmental Protection and Water Management
- Programme of Development of Rural Areas
- EU Structural funds / Operational Programme „Infrastructure and Environment”
- Norwegian Financial Mechanism and EEA Grants for Poland

* Financing of small WWTPs



(Source: GUS, Environment 2010)

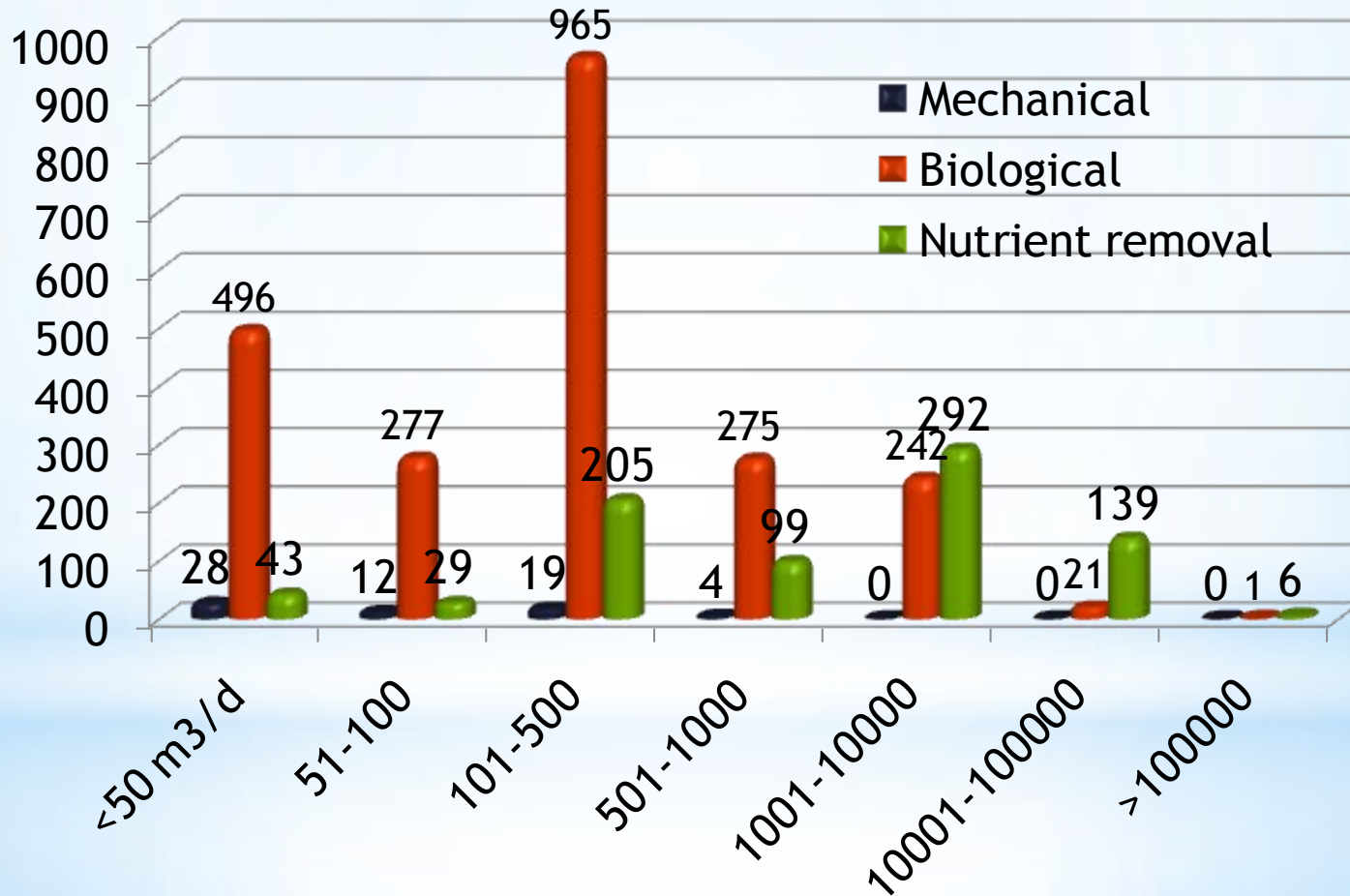
* Wastewater treatment technologies



INDUSTRIAL AND MUNICIPAL WASTE WATER REQUIRING TREATMENT DISCHARGED INTO WATERS OR INTO THE GROUND IN THE YEARS 1970-2009 (Source: GUS, Environment 2010)

* Small WWTPs (< 2000 PE)

Number of WWTPs by capacity and type of treatment



* Small WWTPs (< 2000 PE)

Requirements for discharges from urban WWTPs in Poland

#	Parameter	Unit	Max concentration or min % of reduction for PE:				
			< 2 000	2 000 - 9 999	10 000 - 14 999	15 000 - 99 999	> 100 000
1.	BOD₅	mg O ₂ /l	40	25	25	15	15
		<i>min. %</i>	-	70 - 90	70 - 90	90	90
2.	COD	mg O ₂ /l	150	125	125	125	125
		<i>min. %</i>	-	75	75	75	75
3.	TSS	mg/l	50	35	35	35	35
		<i>min. %</i>	-	90	90	90	90
4.	Total N	mg N/l	30^{*)}	15^{*)}	15^{*)}	15	10
		<i>min. %</i>	-	-	35 ^{*)}	80	85
5.	Total P	mg P/l	5^{*)}	2^{*)}	2^{*)}	2	1
		<i>min. %</i>	-	-	40 ^{*)}	85	90

*) when discharged to lakes or coastal waters

* Small WWTPs (< 2000 PE) Categories

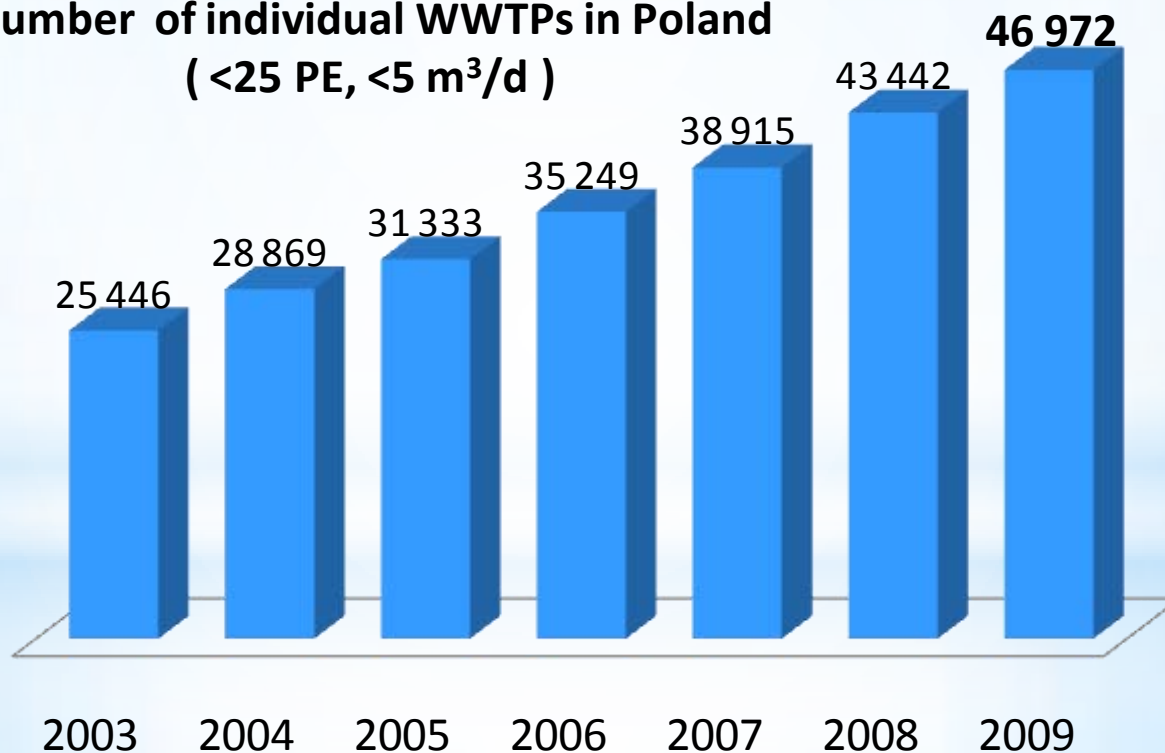
* Individual WWTP - only if municipal systems not economically feasible and no sewage system

	Household WWTPs	Small WWTPs
Capacity	$\leq 5 \text{ m}^3/\text{d}$	$\sim 5\text{-}150 \text{ m}^3/\text{d}$
Effluent discharged to...	water, soil	water
Water permit	no	yes
Construction permit	no	yes
Notification about installation	yes	no
Effluent quality control	no	yes

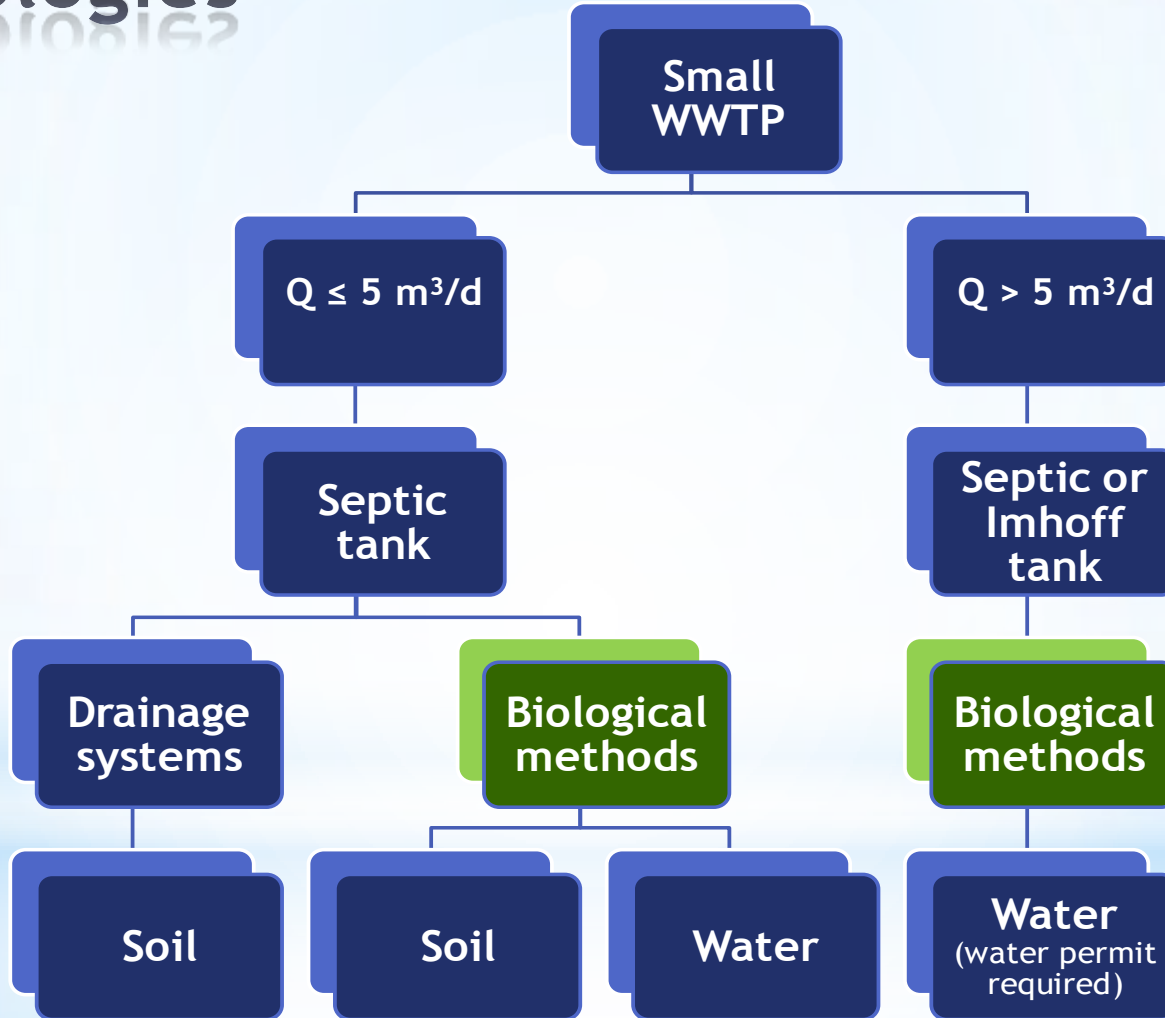
* Household WWTP

- No reliable data on number of WWTPs and technologies
- Many not reported
- Widely used in rural and suburban areas

**Number of individual WWTPs in Poland
(<25 PE, <5 m³/d)**



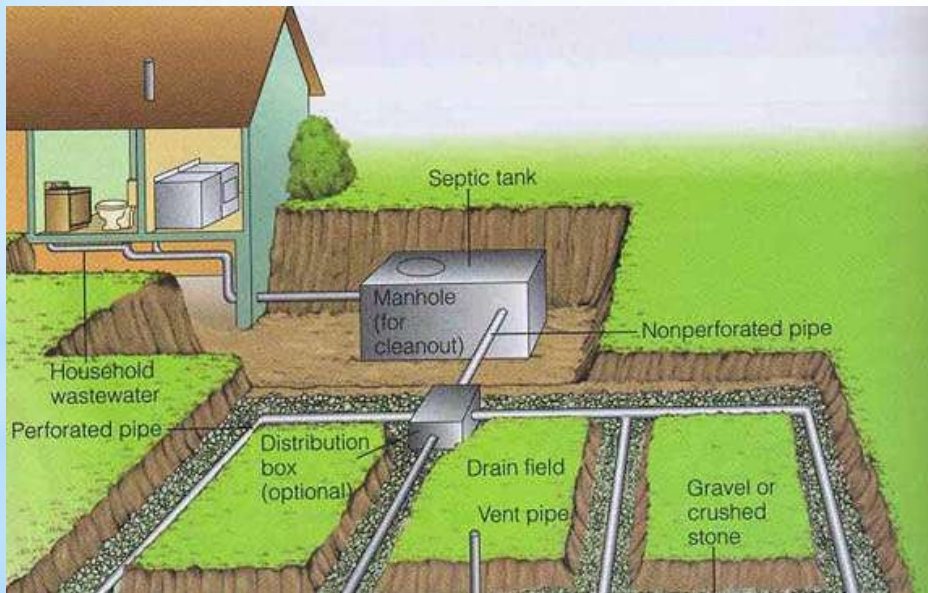
* Small WWTPs (< 2000 PE) Technologies



* Household WWTP: technologies

- Very popular - approx. 50% of the the small WWTPs in Poland
- Needed good soil conditions and space for drainage

Small compact WWTP (0,6-4 m³/d) with nitrification/denitrification

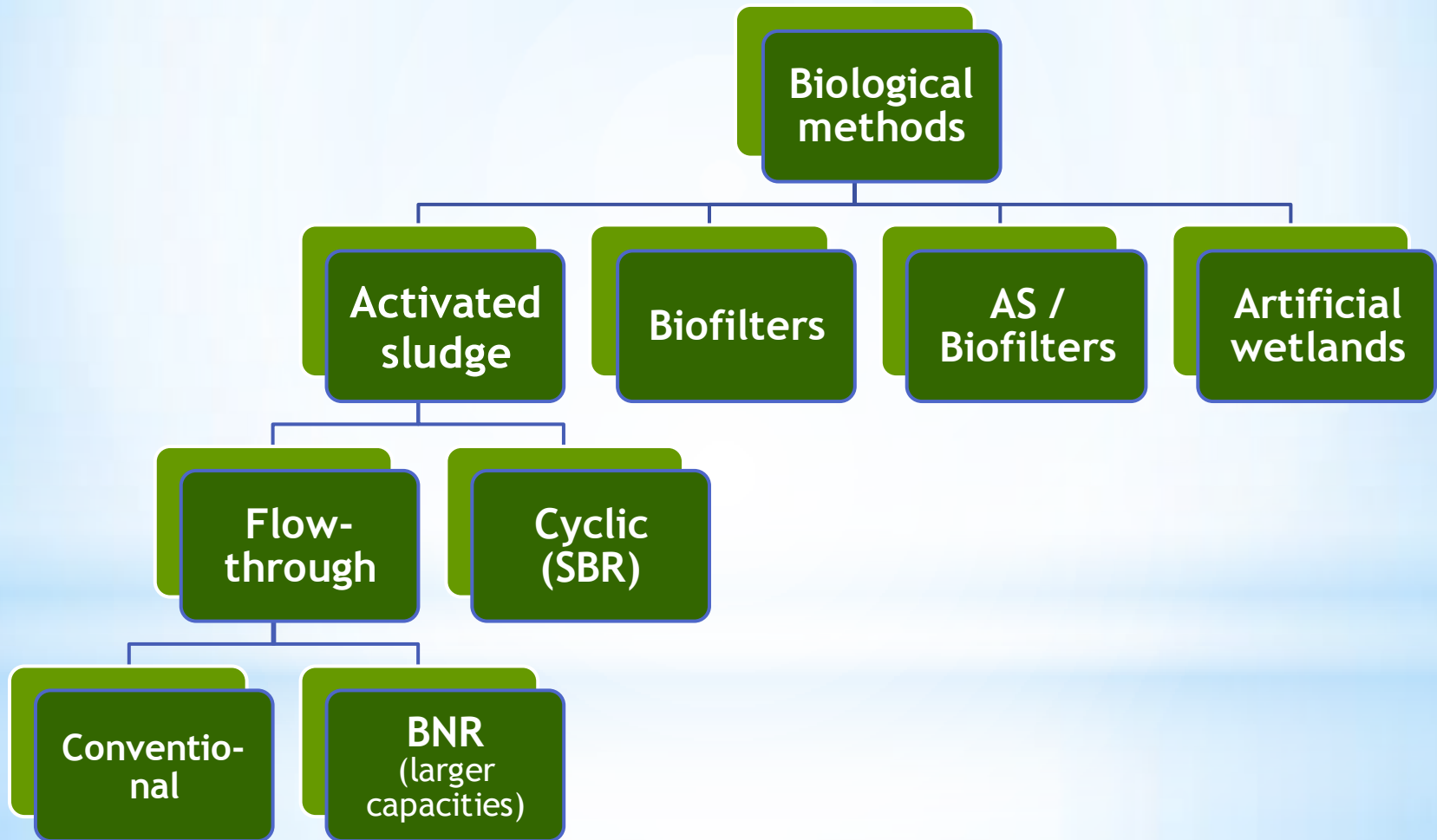


(Source: Kleiza Wastewater Solutions)



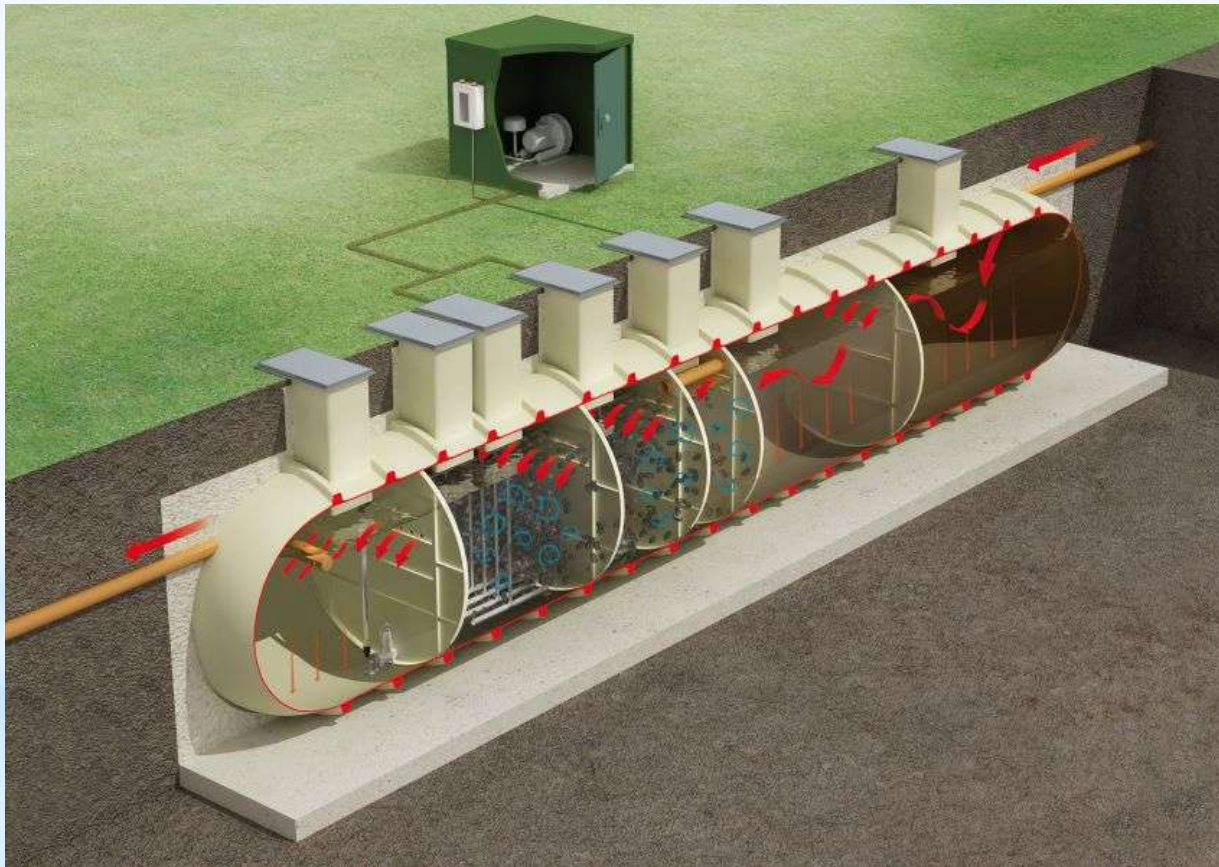
(Source: PROX Sp. z o.o)

* Small WWTP: Biological methods



* Small WWTP

- * Example small WWTP (15-60 m³/d) with activated sludge (nitrification/denitrification)



* Conclusions

1. Focus on massive reduction of pollution loads. Small communities have worse access to sanitation services.
2. Leaking septic tanks still a problem. The use of small WWTPs may be a solution.
3. Increasing number of new small WWTPs with advanced treatment technologies. Large potential for growth in this market.

Cracovia (1836)



* Thank you