PERIODICA POLYTECHNICA SER. CIVIL ENG. VOL. 35, NOS. 1-2, PP. 91-96 (1991)

WASTEWATER TREATMENT OF MEDIUM AND SMALL SETTLEMENTS

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Received: June 3, 1991

Abstract

The structure of the public supply in Hungary is quite deformed. In addition the distribution of the population in the settlements is also specific. This paper presents an overview of the problems of the current situation and indicates also the possible approaching methods.

Keywords: wastewater treatment, small settlements.

Introduction

The characteristic feature of the development of sewerage and wastewater treatment has been in Hungary its significant backwardness in comparison with water supply. According to the technical literature like (Studies, 1989) the share of population joined to water supply is 91%, share of sewerage makes 54% and only about 50% of settlements with sewerage have wastewater treatment.

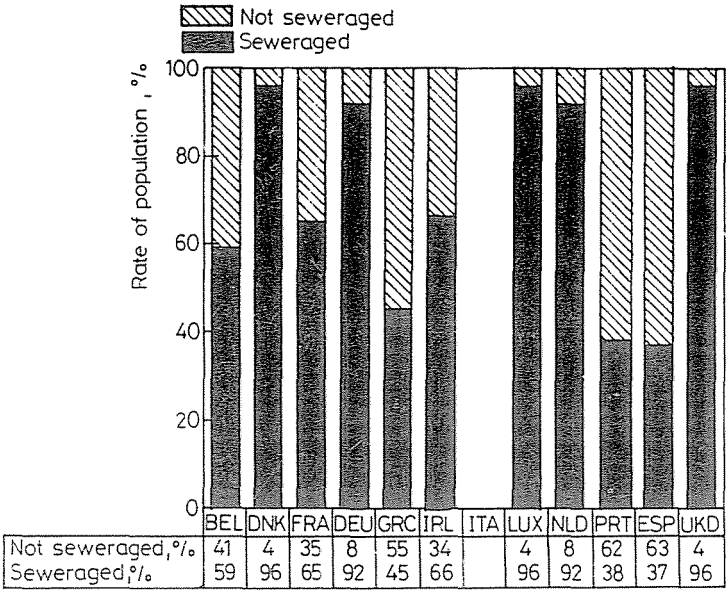
Examination

Examining the supply in the European countries, which is seen in Fig 1, we can draw the conclusion that one of the conditions of joining Europe is the considerable development of sewerage and wastewater treatment.

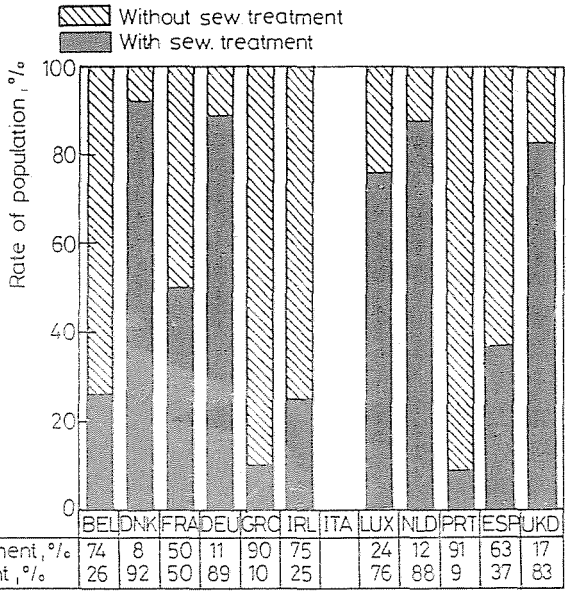
The starting point of every kind of development must be the accurate knowledge of the present situation.

In the first step we examined the supply with wastewater treatment of the settlements with less than 10000 inhabitants by number of supplied inhabitants and number of the wastewater treatment plants demonstrated in Fig 2.

Figures, reveal that in settlements with population between 2,000 and 10,000 the share of supply with wastewater treatment is 10.2 % . In settlements with population below 2,000 this amounts only to 2.9 % . At



	BEL	DNK	FRA	DEU	GRC	IRL	ITA	LUX	NLD	PRT	ESP	UKD
Not seweraged, %	41	4	35	8	55	34		4	8	62	63	4
Seweraged, %	59	96	65	92	45	66		96	92	38	37	96



	BEL	DNK	FRA	DEU	GRC	IRL	ITA	LUX	NLD	PRT	ESP	UKD
Without sew treatment, %	74	8	50	11	90	75		24	12	91	63	17
With sew. treatment, %	26	92	50	89	10	25		76	88	9	37	83

Fig. 1. Sewerage and sewage treatment in the EEC countries in percentage of the population

present in Hungary the amount of settlements with number of inhabitants between 2.000 and 10000 is 647 while below 2,000 it runs to 2,269. In

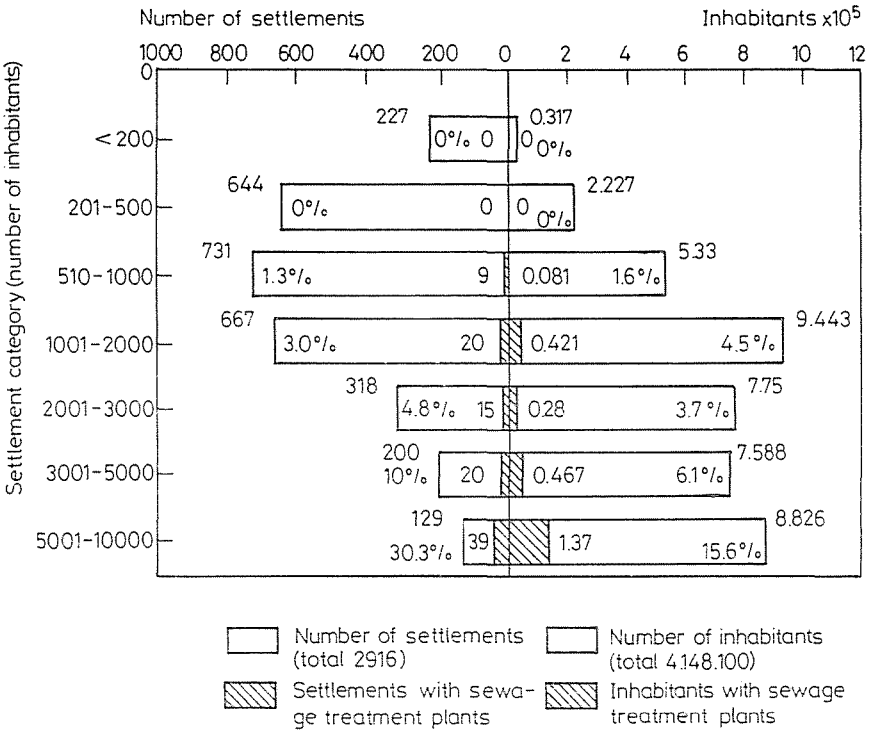


Fig. 2. The number of settlements and inhabitants with and without sewage treatment plants according to the size of settlements

the first settlement category live 2,965,400 people and in the second one 1,731,700. The total of the population living in settlements with number of inhabitants below 10,000 is 4,697,100. Probably the wastewater treatment of these settlements will be the most important task in the next years. The supply with sewerage and with wastewater treatment plants can be related not only to the number of inhabitants like settlements below 2,000. Also the water supply demands the sewerage and wastewater treatment. People living in small and medium size settlements have also the right to a better life-quality. The necessity of water quality protection does not allow differentiation between urban and rural areas.

The local conditions of small settlements considerably differ with the urban circumstances. Therefore what is effective for bigger settlements, is not certainly true for smaller ones. For example the Building Regulation concerning the protective areas of wastewater treatment plants must be revised.

The bearing capacity of financial burdens of the small settlements is in general lower than those of the bigger ones. Therefore water quality requirements should be carefully examined. Comparing the dischargeable contamination limits into recipients shown in Fig, 3 is in this respect quite instructive. Fig, 3 describes that the German and Austrian limits depend on the number of inhabitants, while the Hungarian regulation is not sensitive to that.

Number of inhabitants	COD g/m³			BOD_5 g/m³			NH_4-N g/m³			ΣP g/m³		
	GER	AUT	HUN	GER	AUT	HUN	GER	AUT	HUN	GER	AUT	HUN
1000	150	90	50-150	40	25	–	–	10	2-30	–	–	1.8-2.0
5000	110	75		25	20		–	5		–	1.5	
10000	90	75		20	20		10	5		–	1.0	
50000	90	75		20	15		10	5		2	1.0	
10000	75			15			10			1	(0.3)	

Fig. 3. Comparing the dischargeable contamination limits into recipients

It is worth to utilize the wastewater treatment methods applied in the European countries for getting detailed knowledge of the present situation of the sewerage and wastewater treatment in Hungary. The papers (RACAULT – VACHON, 1990), (ODEGAARD – STORHAUG, 1990), (BOLLER – DEPLAZES, 1990) quote examples for it. The treatment technologies applied in small and medium size wastewater treatment plants should be analyzed based on the European experience and trends. Fig. 4 sets an example for it. Before analyzing the possibilities of treatment technologies it must be examined which procedure is more appropriate:

- particular wastewater treatment and disposal or
- sewerage.

The paper (DULOVICS, 1987) contains more information about that. Choosing sewerage, determination of the adaptable system of sewerage is important. Also necessary to determine if municipal or regional wastewater treatment plant is more reasonable. In economic aspect the knowledge of

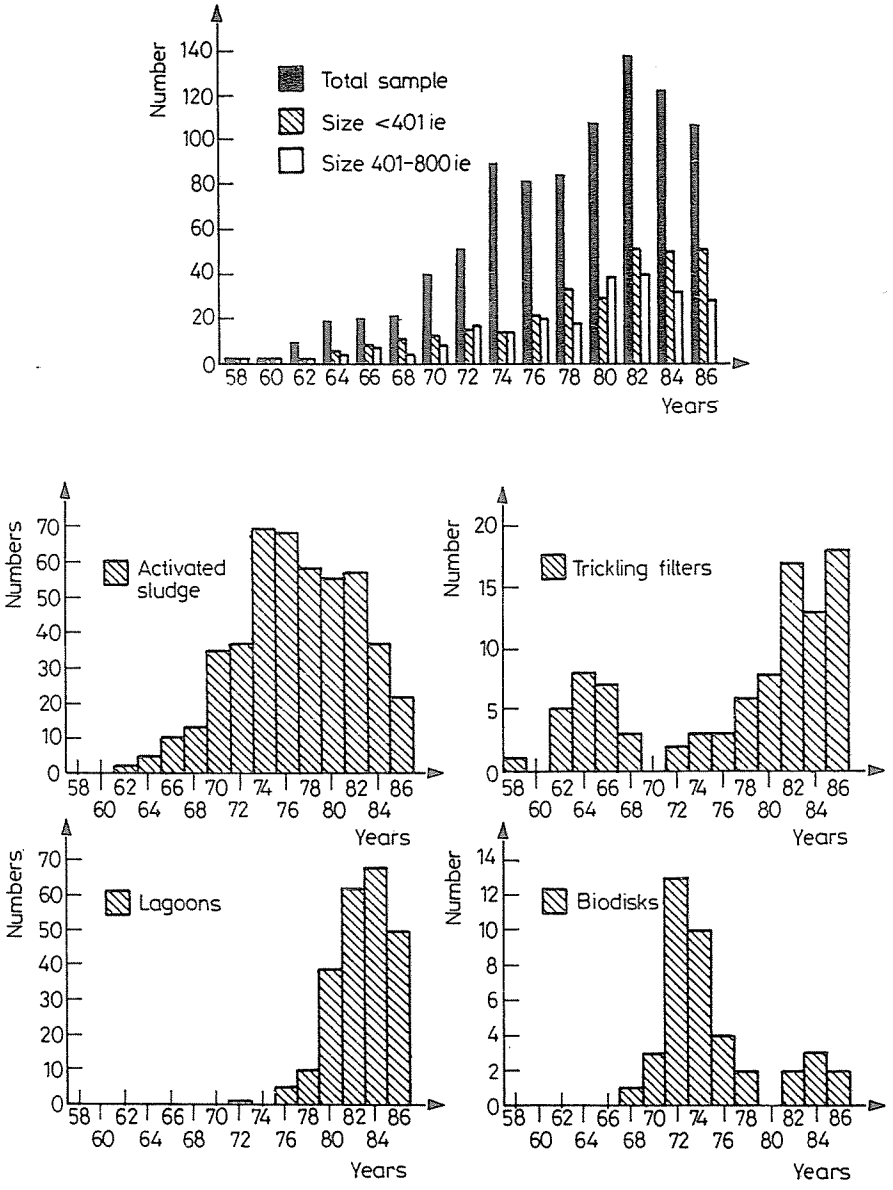


Fig. 4. Chronological list of plants according to size categories and processes Racault – achon, 1990)

the local circumstances and utilization are certainly significant. This its applies both to the position of the wastewater treatment plant and to the

selection of the treatment technology. The mentioned standpoints are in details discussed in another comprehensive study (BUCKSTEEG, 1990).

Summary

We find that in the future more attention should be paid to sewerage and wastewater treatment in consequence of our situation. In Hungary near the half of the population lives in small settlements. Therefore the development of wastewater treatment plants should be executed well-founded and cautiously in the case of the examined population categories.

The purpose of this paper was to direct attention to the necessity of the examinations before development and afterwards. Directions of the development can be determined based on these considerations.

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