

# Opportunities for wastewater treatment in rural areas in Eastern Europe A Bulgarian Example : “Developing a model for water and waste management in rural areas in Bulgaria “

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## Introduction

No treatment of wastewater in rural areas

The rural areas in Bulgaria and Eastern Europe with population less than 2000 inhabitants face the problem of not having regulation about an adequate management of their wastewater.

Since March 2005 in two villages in the region of Central South Bulgaria -Stara Zagora Spa and Sulitsa runs a pilot project on sustainable water and waste management. The villages belong to the Upper Tracian Valley in the Central part of Bulgaria. It is located along the Banska river in the southern foothills of Sarnena Gora, 451m above the sea level.

The project is financed by MATRA –Program for Eastern Europe of the Dutch Ministry of Foreign Affairs. Women in Europe for a Common Future NGO, Netherlands and Earth Forever Foundation, NGO, Bulgaria - are responsible for implementation of this pilot project . Both project villages are connected to a central drinking water supply. In the recreation village Stara Zagora Spa with 250 inhabitants and 150 visitors are the administrative buildings, hotels, one third of the households and the Spa connected to a sewer, which discharge its water untreated in the river nearby. It is a mixed sewer which collects black, grey and (partly) rainwater. The rest of the households and the households of the second village Sulitsa use soak-away and septic tanks, which wastewater infiltrates into the ground or overflows into the streets.



Fig. 1: River Banska, where the sewer from Stara Zagora Spa discharge its wastewaters.



Fig. 2: Illegal pipe connections of several houses, which wastewater is discharged into the park.

The sewer of Stara Zagora Spa is built in mid –60s to meet the demand of the large buildings, such as company recreational houses, hotels, kindergarten, and some households. The sewer is practically without management and no one pays any fee for the discharged amount of wastewater. Approximately 12 l/sec ( 4 l/sec comes from the Spa ) untreated wastewater flows into the Banska river or the municipal recreational park.

## Alternatives:

*Sustainable decentralised wastewater treatment:*

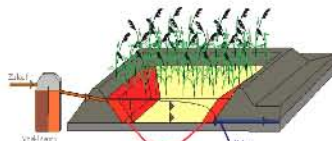


Fig. 3: Horizontal reed bed filter

Horizontal reed bed filters (constructed wetlands) are frequently and successfully used for the treatment of wastewater in rural areas of Western Europe and United Kingdom.

In horizontal filters the wastewater flows after pre-treatment (sedimentation) to the soil filter from one side to another i.e. flows horizontally. The treated wastewater can flow off e.g. in a river, infiltrate in the soil or reused as irrigation water. The purification of the wastewater is based on an aerobic microbiological treatment.

**References:** Lange, Jörg -Otterpohl, Ralf (2000) : Oekologie Aktuell Abwasser, Handbuch zu einer zukunftsfähigen Wasserwirtschaft. Constructed wetlands . Deutsche Bundesstiftung Umwelt.2000  
<http://www.bodes11111.de/waefel.htm>

## Comparison of Investment-Costs for Sanitation Systems - An Example

Municipality of 5000 inhabitants  
2000 Households

	Centralised	Decentralised
	Sewer System	Dry Sanitation
<b>Investment-Costs in Euro</b>		
Public Sewerage System	13.000.000	0
Storage Tanks for Urine and Faeces	0	6.000.000
Wastewater Treatment Plant	1.250.000	1.000.000
	Stabilization Pond or Constructed Wetland	Constructed Wetland for Greywater
<b>Sum</b>	<b>14.250.000</b>	<b>7.000.000</b>

Costs for Eastern German Wastewater Treatment [Halbach Institut 2000]  
Wastewater Management Franziska Meinzinger

Fig.4: Table with comparison of investment costs for Sanitation systems for a Municipality of 5000 inhabitants. (Ppt TUHH, Franziska Meinzinger)

## Results

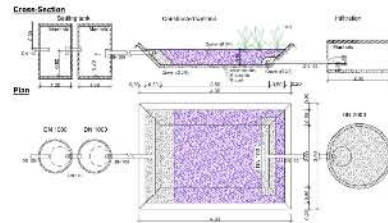


Fig. 5: Focussing on the local circumstances, a design for a horizontal constructed wetland was made by OtterWasser GmbH, Hamburg.

The construction of a constructed wetland (reed bed filter) will be carried out in the frame of the project and will treat the grey water of one of the administrative buildings in the village - the cultural club.

The black water will be separated by using special dry urine diverting toilets. The urine (yellow) and faeces (brown) will be diverted, treated and reused at the source. The toilet products will be sanitized by storage and composting processes.

This pilot project will serve as an example for decentralized sustainable and affordable wastewater treatment.



Fig. 6: Functioning constructed wetland,Bruck

## Conclusions

**Ecological wastewater treatment – ecological sanitation is an affordable, feasible and appropriate option for small rural agglomerations. in particular for villages with a lack of adequate wastewater treatment systems:**

- The method is cost efficient and environmental friendly
- Diverted wastewater streams can easily be treated and recycled
- There is no bad odor
- Low operation and maintenance costs
- Constructed wetlands have good landscape aesthetics
- Does not rely on chemicals to purify the wastewater
- It has shorter retention time and high removal efficiency
- It can be replicated in other rural areas of e.g. Eastern Europe