

# GROUNDWATER

MAKING THE INVISIBLE VISIBLE

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## Rationalisation of wastewater infrastructure in Kosovo

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# Introduction

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- In the Balkan countries, WWTPs are currently planned or under construction.
- Question is, if for a small location is it better to have its own WWTP or to transport the wastewater to a larger plant nearby?!
- This presentation addresses the developing and implementation of a decision-support system for such challenges.



# Impact of a decision-making tool

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- The discussion about centralization or de-centralization of wastewater infrastructure in Kosovo is actual
- Why do we need to execute such an approach?
- The answer:
  - Construction of wastewater infrastructure is expensive
  - Annual cost will be carried on for many years
  - Operational costs will be decisive for the total cost of ownership
  - A rational approach around wastewater infrastructure is necessary to keep the operational costs that low that the inhibitors can pay for

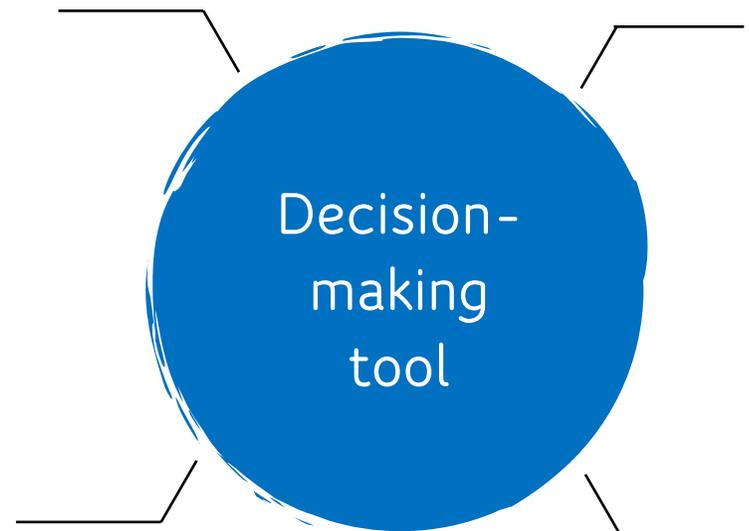


# Impact of a decision-making tool

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It can be well decided at which cities and villages wastewater treatment facilities has to be realized

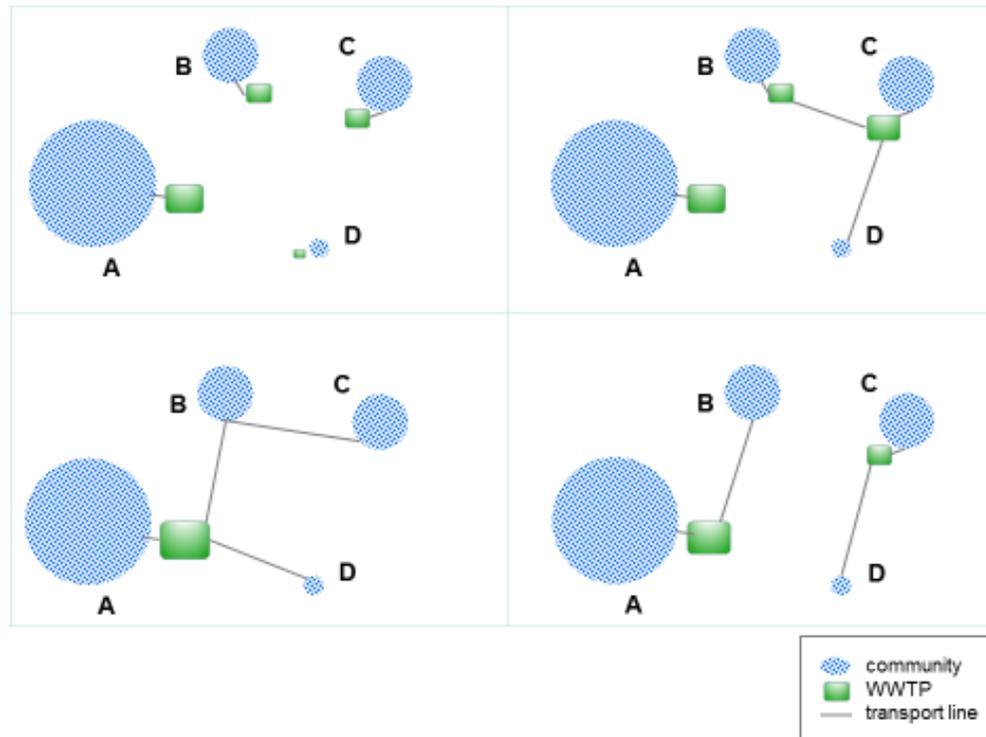
It is possible to become a clear idea about the amount, size and type of the treatment systems to be build



The knowledge about wastewater management in the region will increase

Making priorities at where and when it is most environmental- and cost-effective to realize wastewater treatment facilities

# Example of the scenarios



The following scenarios are possible

- All hotspots get their own WWTP
- Only cities A, B and C get a WWTP. The wastewater of city D is connected with city C. The wastewater of city B is pre-treated and then transported to city C.
- There are only two WWTP's. In city A also for the wastewater of city B. In city C also for the wastewater of city D.
- All wastewater is transported to one central WWTP.

# Project plan

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To design a wastewater decision tool, the next steps are relevant:

Given a number of locations that either could have a WWTP or could have a combined WWTP

Come up with a sensible formula for the costs of a WWTP as a function of the size of the plant, and, possibly, also for the effluent requirements

Consider the costs of transport of the wastewater from one location to another, as a function of flow rate, distance and any difficulty of the transport route

Calculate the joint costs of all WWTPs and transport lines for all combinations, and possibly all annual operating costs including capital costs

Select the most cost-effective combination

If necessary, attach a multi-criteria analysis to the selection procedure

# The model and starting points

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- The model will consist of a spreadsheet or web application
- 1,000 to 200,000 population equivalents
- The model will consist of a part in which the input data can be defined and a part that calculate the costs
- Waste water treatment systems to be taken into account must have low investments and annual, low costs energy use, and can be preferably constructed by local constructors
- Input data concerns among others: flows, pollution loads and configurations which can be aerobic treatment with primary sedimentation, with sludge digestion, for large plants and without primary treatment for smaller plants
- Costs calculations will be based on the dimensions of the several components of the treatment system and the transport of the waste water

# Phasing of the study

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- The project will start with the development of a prototype that will be tested at the waste water infrastructure of two different surveyable regions.
- The region Ferizaj, which will include the city of Ferizaj and still to chosen villages of the community Ferizaj. This area is under the management of the Region Water Company ( RWC) “Bifurkacioni”.
- The catchment area of the river Gračanica. The area consist of 4 villages with a inhabitants range of 2000-7500, 2 villages with a inhabitants range of 1000- 2000 and 3 villages with a inhabitants range of 500-1000 . The area is under the management of the RWC Pristina.

# Deliverables of the project

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- A comprehensible spreadsheet with explanation of most of the calculations and values (or ranges of values) in the spreadsheet itself.
- A manual explaining the set-up of the spreadsheet, how it works and what should be done to have reasonable outcomes, as well as technological considerations, with references to relevant literature, and cost calculations. A brief explanation of the functions used will also be included.
- An answer on the question, what are the lowest investment costs and what are the lowest running costs, when investing in wastewater infrastructure.
- Comprehensive discussions with the relevant water companies and other organizations.



# THANK YOU!

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