



Guidelines for the siting of sand dam



What is a sand dam?
An impermeable structure that traps water and sediment acting as an artificial aquifer for water storage and used during the dry season.

Background

Thousands of sand dams have been built, especially in Kenya. However their siting has not been based on scientific evidence. It is believed that **coarser grains** lead to greater yield while **finer grains** allow for greater filtration processes.

How should sand dams be sited to maximize coarse sediment captured while providing good water quality?

Objectives: Develop guidelines for the siting of sand dams for optimal storage and good water quality.

Impact of sediment type on water quality.

Factors contributing to retention of coarse grained sediment.

Column experiments



Assess *E. coli* removal over time.

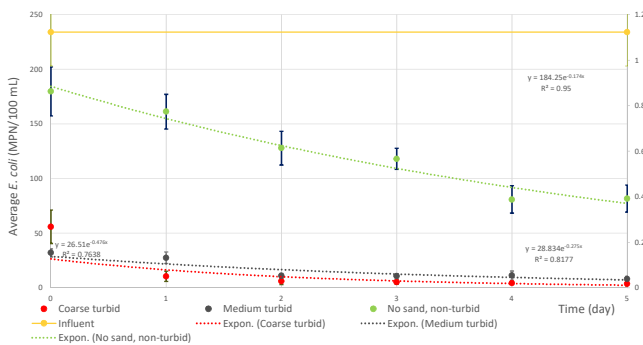
- 10 columns filled with mixtures of coarse (633 μm) and medium sand (300 μm).
- Infiltrated with *E. coli* solution (100 MPN/100 mL and 123 NTU) and sampled daily.

Study of 9 dams in Zimbabwe and Kenya

- Study of **sediment profile**.
- Review of **existing guidelines** to identify technical factors.
- Decide which of the **catchment parameters** have an **influence** on the sediment profile retained by the dam.



Results

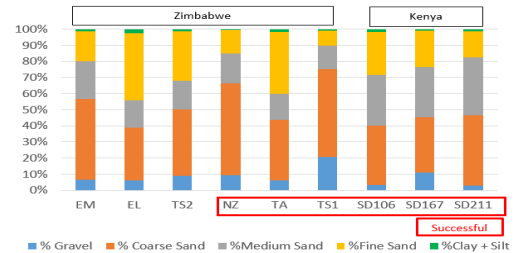


E. coli removal Vs. time in turbid water

- **Sandy environment is hostile to *E. coli***: greater decay rate in sand than in water.
- **Removal of *E. coli* increases with influent turbidity** in medium sand.

Results

Sediment type in dams



- **No strong correlations** between sediment trapped and catchment characteristics (size, geology, slope, land use around the dam, etc.). There may not be one golden factor that predicts sediments captured, or it could be something else not yet researched.
- **Potential correlation** between sediment trapped and vegetation levels around dam.
- **Sediment type captured** is less important than initially thought for maximising a dam's yield. Other factors need to be considered such as precipitation, water consumption etc.

Conclusion

Definitive guidelines based solely on sediment type were not found. Sediment profile is not the only indicator of a dam's performance. A larger sample of dams would be required to determine significant statistical correlation between sediment profile and catchment parameters. The dam's yield would be a better performance indicator to refer to in the future.

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