

# CEPT Wastewater Treatment

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## Problem Statement



- FURNAS hydroelectric power plant (1963)
- Current volume is 10% of the original
- 140 cities depend on the lake
- Great risks to human health and the environment
- CEPT as cost-effective solution for the region

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- Goal
  - Enhancing primary treatment efficiencies by adding chemicals to aid in settling
- Mechanism
  - Cationic metals or polymers to induce coagulation
  - Anionic polymers to induce flocculation
- Field work
  - Determine the appropriate chemical dosing
  - Show efficiency through lab analysis

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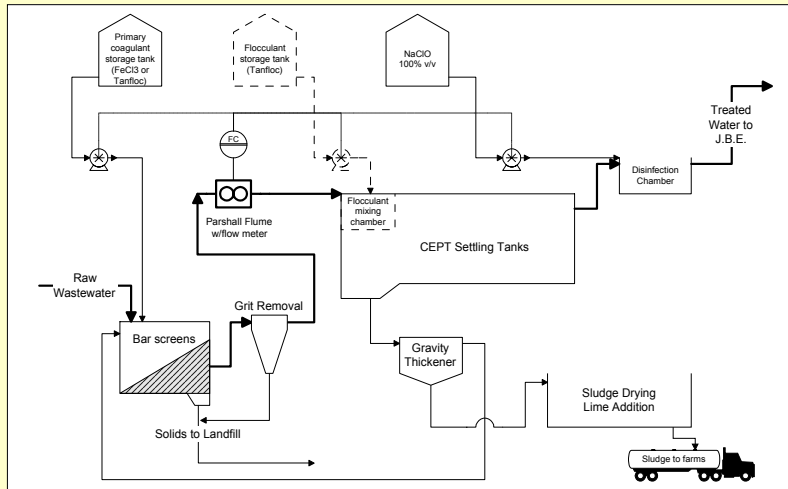
Indicator Parameter	Removal Efficiency
Turbidity	70%
TSS	65%
COD	60%
Phosphorus	90%



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# CEPT Treatment Diagram



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# Sludge Management

## Goals

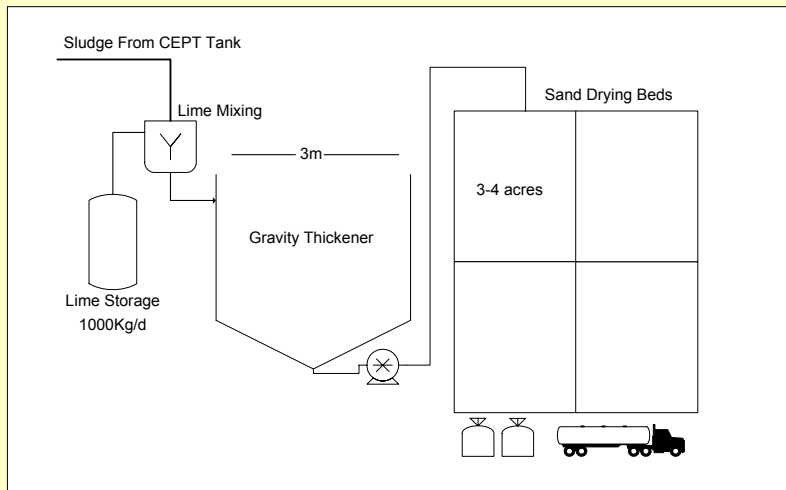
- Design sludge treatment system
- Develop reuse technology



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## Sludge Treatment Diagram



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## Sludge as Fertilizer

Sludge from CEPT plant can fertilize ~100 acres of coffee trees per year

### Advantages

- Sludge is an effective fertilizer
- Low-cost option for farmers
- Saves valuable landfill space



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## Lake Study - Goals

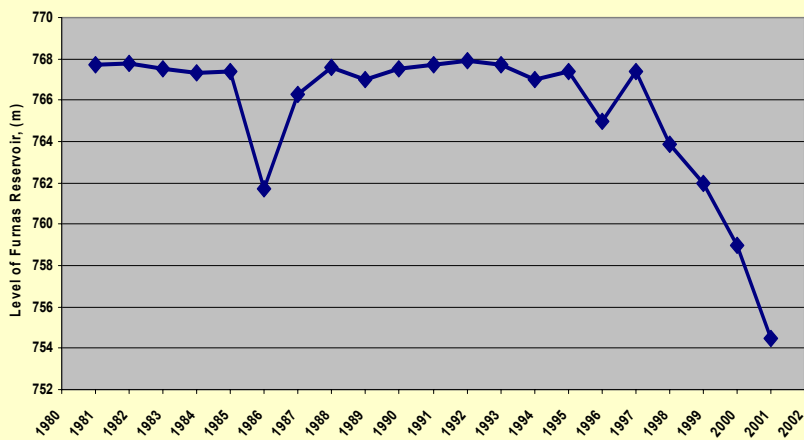
- Investigate level of improvement in Furnas Reservoir from implementation of CEPT
  - Locally
  - Regionally
- Use quantitative methods to investigate level of improvement
  - Characterize reservoir water quality
  - Correlate concentrations in reservoir with changing lake levels
  - Develop model to predict how water quality will improve in reservoir

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## Declining Reservoir Level Over Time



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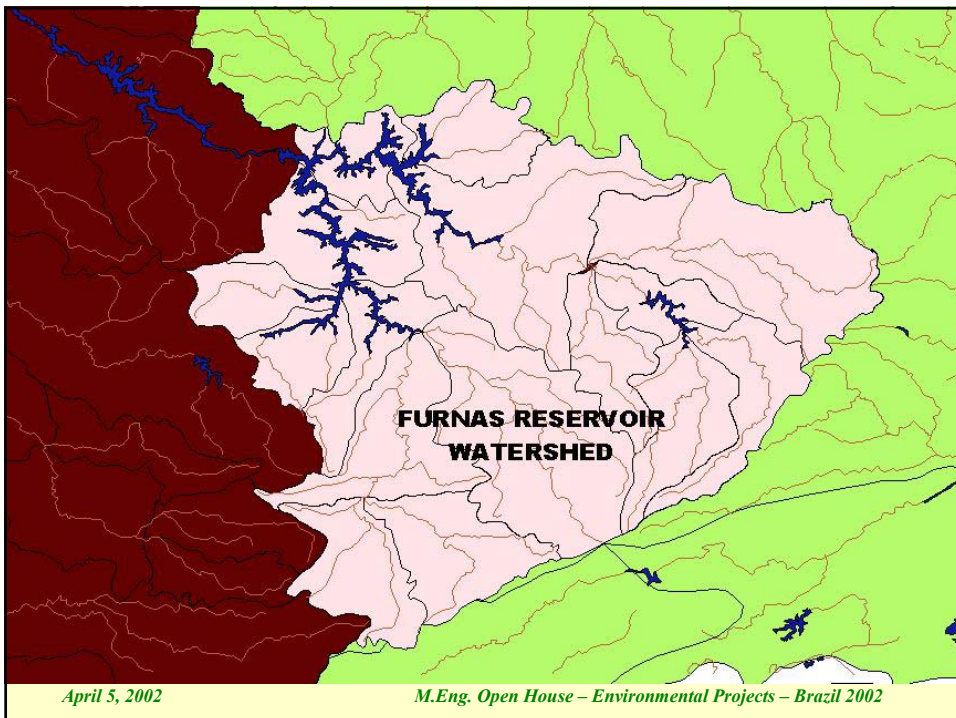
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- Well-mixed model
  - Small level of improvement
- Plug Flow model
  - No dispersion
  - Proportion inflow by drainage area

- % Difference 
$$\frac{C_{\text{NO CEPT}} - C_{\text{CEPT}}}{C_{\text{NO CEPT}}} \times 100\%$$

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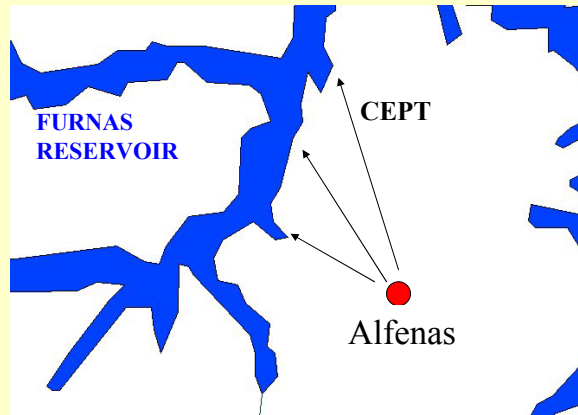
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## Local Model



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## Conclusion

- CEPT w/ Disinfection
- Improve water quality
- Sustain good water quality

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## Questions?

**Don't forget to visit our website at**

**<http://ceemeng.mit.edu/~Brazil>**

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