

Concept of appropriate water supply in the karst region Gunung Kidul, Southern Java, Indonesia

Kerstin Matthies, Ursula Obst

Karlsruhe Institute of Technology, Institute of Functional Interfaces, Department of Microbiology of Natural and Technical Surfaces, Germany

Introduction

- karst region
- tropical climate
- ➔ water shortages during dry season
- no water treatment, no regular water quality monitoring
- dilapidated water distribution system
- water highly contaminated with fecal bacteria
- ➔ consumers boil water to avoid illness ➔ barely sustainable



map: <http://www.iwrm-indonesien.de/>

Aims

- development and implementation of a water quality monitoring system



Sampling at a reservoir

- serves as a base for development of appropriate and sustainable **water supply concept**

Analytical methods

- physiochemical analysis
 - temperature, pH, O₂, conductivity, turbidity
- microbiological analysis
 - ColiLert-System (quantitative detection of total coliform bacteria and *E.coli*)
- molecular biological analysis
 - PCR and population analysis



ColiLert- Analysis

Results and Discussion

- fecal bacteria (coliforms) in each sampling site
- dry season: increase of bacterial count within distribution system (see figure 1)
 - ➔ results from dilapidated and heated pipelines
- wet season: coliform contamination much higher
 - ➔ results from high input of bacteria and poor filtration capacity of karst underground

thorough water treatment is essential to prevent illness

sustainable and appropriate water treatment concept:

1. central filtration - turbidity removal before distribution system
2. hygienisation after the distribution system - central but close to the customer
3. household disinfection (e.g. ceramic filtration)

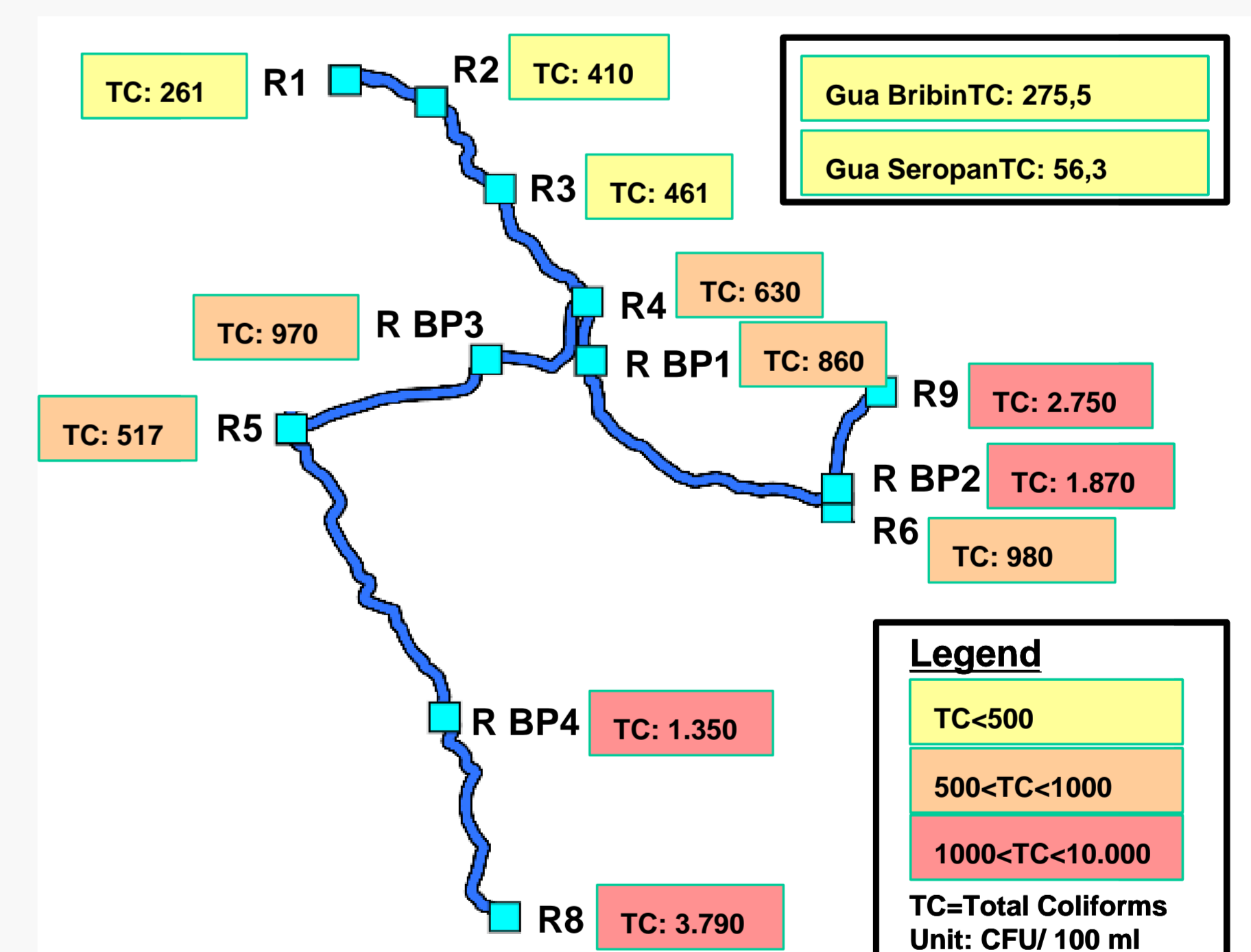


Figure 1: Distribution of total coliform data in July 2010
R1-R9 = reservoirs, R BP1-4 = pump stations

Conclusion and Outlook

water highly contaminated with fecal bacteria during dry and wet season



- **pipelines** have to be renovated
- **monitoring** has to be established
- appropriate **water treatment** has to be implemented



Dilapidated pipeline

Contact: Dipl.-Ing. Kerstin Matthies

Email: kerstin.matthies@kit.edu