

Impact of Technical Assistance on Drinking Water Supply Safety & Sustainability ~ El Salvador ~



Georgia Kayser

William Moomaw, Jeff Griffiths, Julie Schaffner, Beatrice Rogers
The Fletcher School of Law and Diplomacy, Tufts University

Unsafe Drinking Water: Large Scale Social and Economic Impacts



- 3.6 million die each year from water-related diseases
 - 1.8 million of these are children under 5
- Millions of school days lost each year to water-related disease
- Millions of hours lost walking to water and caring for sick family members
- 1/2 of the world's hospital beds are occupied by patients with a water-related disease

(WHO, 2008)

Reducing Water-Related Diseases

- Access to safe drinking water reduces water-related diseases
- Piped drinking water to the household is thought to be the best, the gold standard



Failures in Piped Systems

- Quality of water
- Intermittent service
- Aging water systems
- Disinfection not monitored/enforced
- Seasonal Impacts: Too much and too little
- Lack of O&M support/knowledge



Research: Does Post-Construction Support Minimize These Problems?
Case: El Salvador

Post-Construction Support: The Circuit Rider Model

1. Technical Assistance

- Operator training, on-call assistance, monthly visit by technician

2. Financial Training

- Accounting, budgeting, transparency

3. Operational Management

- Village Water Committee responsibilities
importance of disinfection

4. Environmental Sustainability

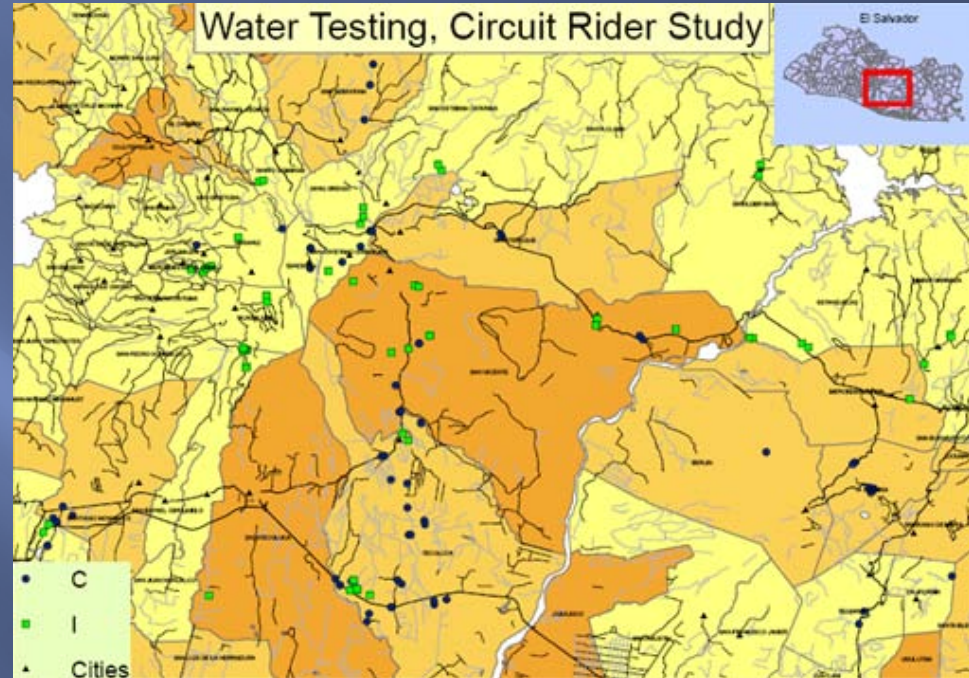
- Protection of water source, encourage metering



Field Research in El Salvador

Methodology

- Selection of Communities: 32 Control (No Post-Construction Support) and 28 Intervention (Post-Construction Support)
- 120 Interviews in 60 Communities
- 126 water samples
- GPS point at sample site
- Key Informant Interviews



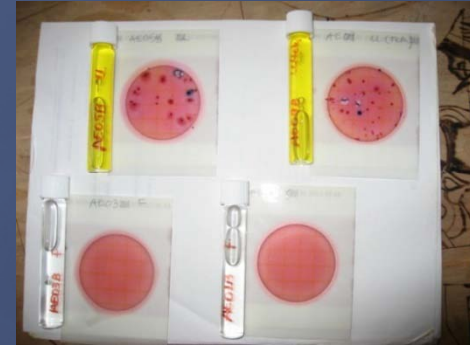
Collaborating Organizations

1. ASSA - Asociacion Salvadoreña de Servicios de Agua
2. IRWA - International Rural Water Association

Measured Outcomes

1. Water System Performance (Water Samples)

- Microbiological Quality testing 3m & Colilert
- Disinfection (residual chlorine testing)



2. System Sustainability (Interviews)

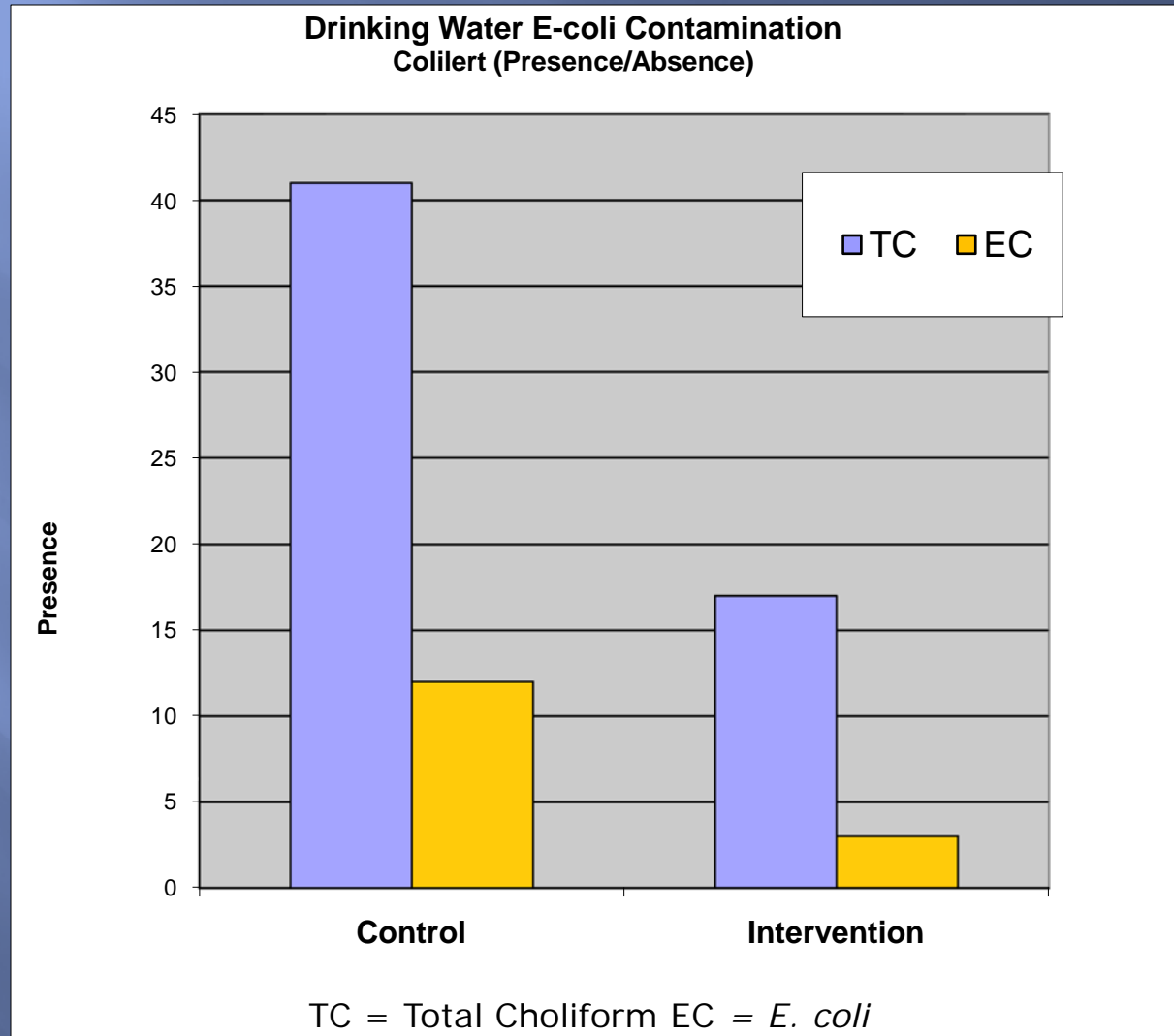
- Financial Training
- Technical Capacity
- Operational Management
- Environmental Sustainability



Results: Description of Communities

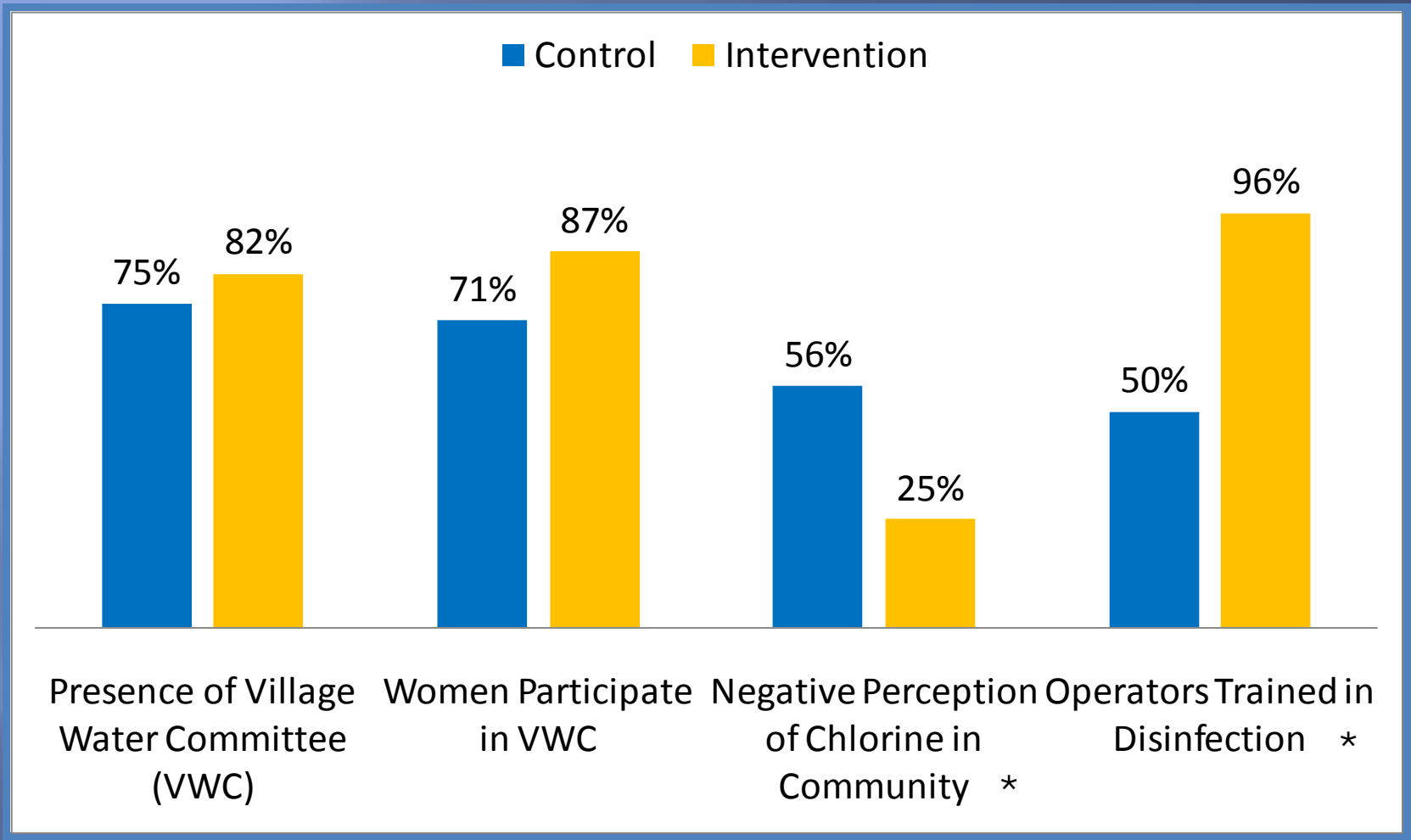
Variable	Control	Circuit Rider
Private HH connection	91%	89%
Source water = ground water	56%	57%
Source water = spring	38%	32%
Pump used to access/distribute water	78%	82%
Average # HHs served	300	272
NGO constructed system	65%	75%
Average age of system	13 years	12 years

Results: Water Contamination is More Common in Control Communities



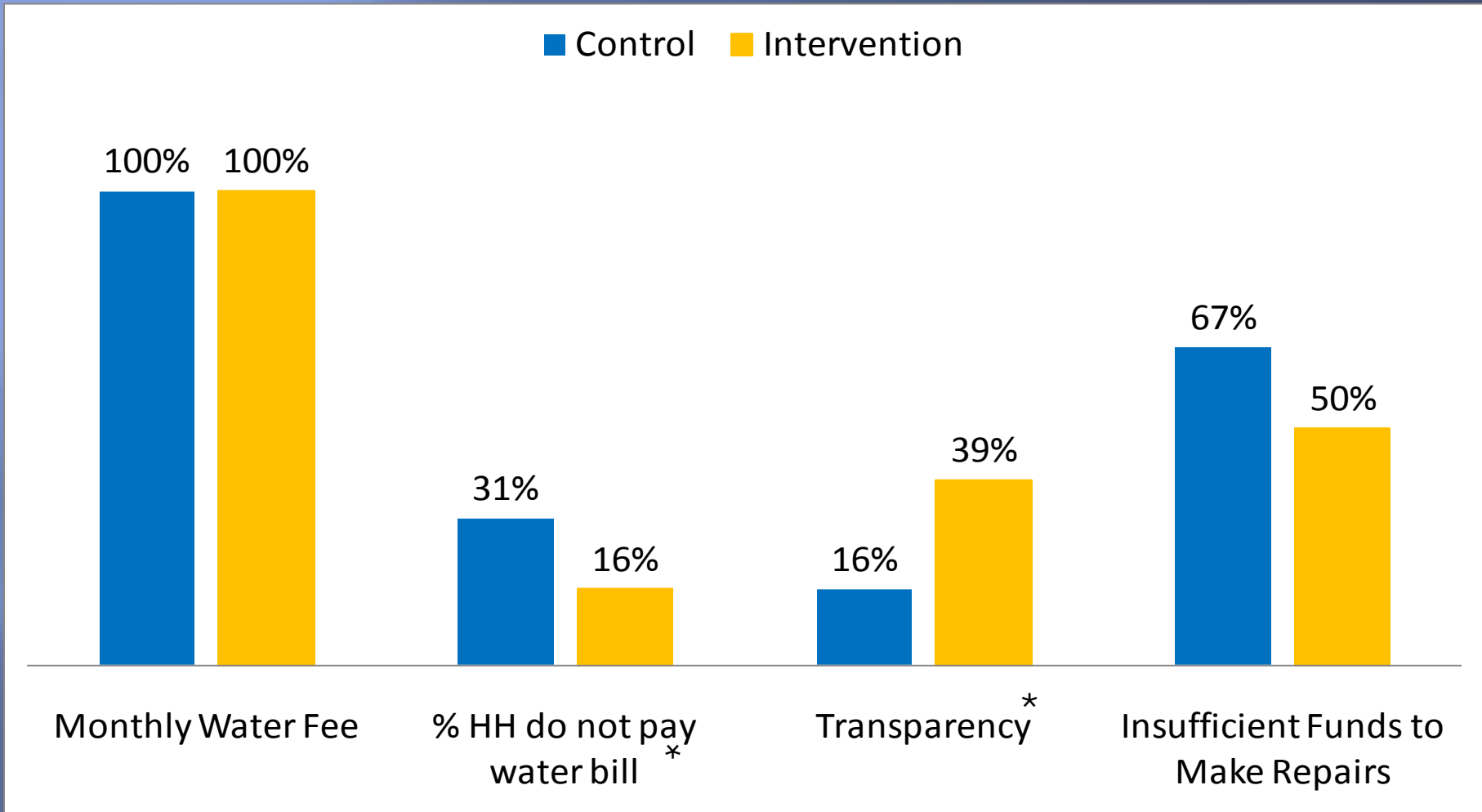
Statistically significant results, $p > .05$

Results: Circuit Rider Communities Are More Likely to be Trained in Disinfection



* = statistically significant $p < .05$

Results: Circuit Rider Households Are More Likely to Pay Water Fees



* = statistically significant $p < .05$

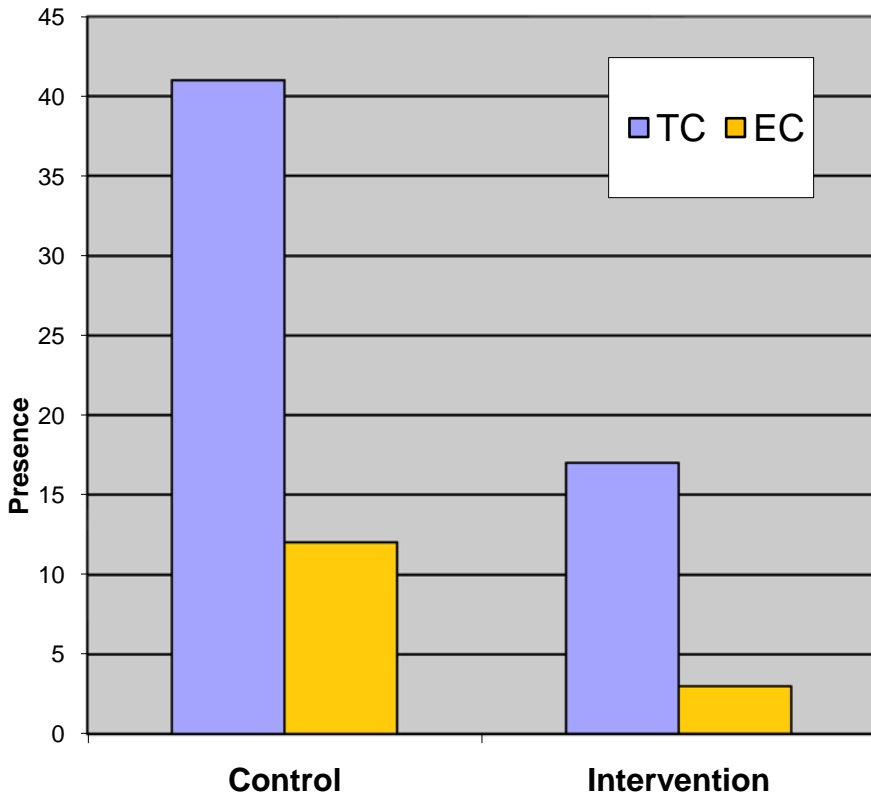
Results: Circuit Rider Communities Are More Likely to Have Meters



* = statistically significant, $p < .05$

Summary of Results

Drinking Water E-coli Contamination
Colilert (Presence/Absence)



TC = Total Coliform EC = *E. coli*

With Post-Construction Support (Circuit Rider Model)

- Lower rates of contamination (less *E. coli*)
- Higher operator training in disinfection
- Lower negative community perception of chlorine
- Higher rates of water fee payment
- Greater financial transparency
- Higher rates of metering

Conclusions

- The circuit rider model improves system performance and contributes to the long-term delivery of safe drinking water in rural El Salvador.
- The circuit rider model is an example for those interested in safe drinking water and Sustainable Development.

Thank You

Research made possible by:

- National Institute of Health,
- United Nations Forum on Forests,
- Tufts Ticsch College of Citizenship and Public Service,
- The Fletcher School Ph.D. Program,
- Water System Science and Society Program, Tufts University,
- International Rural Water Association,
- Asociación Salvadoreña de Servicios de Agua, and
- Participating communities in El Salvador



Contact: georgia.kayser@tufts.edu

