Title: Cost Effective Household-scale Greywater Treatment Solutions Applicable to Dhaka Region

Research Methodology

The research will consist of the following phases:

Phase 1: Prototype Development

1. Component integration
    a. Pre-tank filtration: Grease trap and coarse mesh screen to remove oil, hair, lint, and large debris.
    b. MABR unit: Simplified Membrane Aerated Biofilm Reactor for biological treatment.
    c. Secondary filtration & disinfection: Fine membrane filtration followed by chlorine tablet dosing.
2. Storage and distribution: Treated water stored in a small tank; low-power pump supplies water to toilets and cleaning taps.

Phase 2: Laboratory Performance Evaluation

1. Sampling: Collection of influent (untreated) and effluent (treated) greywater.
2. Water quality testing: Analysis of turbidity, BOD, total coliforms, pH, and chlorine residuals to assess compliance with non-potable reuse standards.

Phase 3: Durability and Economic Analysis

1. Stress testing: Continuous operation (~30 days) to identify issues like clogging or pump overheating.
2. Cost-benefit analysis: Estimation of capital and operating costs; comparison with Dhaka WASA tariffs to determine payback period.

Phase 4: Final Reporting

1. Manual development: Simple user guide covering installation, maintenance, and troubleshooting.
2. Research compilation: Integration of experimental and economic findings into a final report.