

Researcher Example (Grant/Funding Concept Paper)

Title: Development of a Low-Cost Water Filtration System Using Locally Sourced Agricultural Waste for Rural Communities

Background and Rationale

An estimated 2 billion people globally lack access to safely managed drinking water, with rural sub-Saharan communities disproportionately affected. Conventional filtration systems (activated carbon, reverse osmosis) are often cost-prohibitive for low-income rural households. Agricultural waste materials such as rice husk ash and coconut shell char have demonstrated adsorptive properties in lab settings but remain underexplored for scalable, community-level deployment.

Problem Statement

Existing low-cost filtration solutions in the target region (e.g., ceramic pot filters) have adoption barriers due to fragility and limited contaminant removal (particularly for heavy metals). There is a gap for a durable, affordable filter using regionally abundant waste materials that addresses both microbial and chemical contamination.

Research Objectives

1. Formulate and test a composite filter media from rice husk ash and coconut shell activated carbon.
2. Evaluate filtration efficiency against E. coli, turbidity, and heavy metal (lead, arsenic) benchmarks set by WHO guidelines.
3. Pilot the filter design with 30 households in [target region] and assess usability and durability over 6 months.

Significance/Innovation

This research is novel in combining two waste streams into a single composite filter, potentially achieving higher contaminant removal than either material alone, at an estimated production cost of under \$5 per unit — significantly below commercial alternatives.

Preliminary Work

Bench-scale testing (unfunded, conducted in [Lab Name]) has shown 89% turbidity reduction using a 60:40 rice husk ash-to-charcoal ratio, supporting feasibility for scaled testing.

Proposed Methodology

- Phase 1 (Months 1–3): Material characterization and lab-scale filter optimization
- Phase 2 (Months 4–6): Contaminant removal efficacy testing (microbial, chemical)
- Phase 3 (Months 7–12): Field pilot with household deployment and usability tracking

Expected Outcomes and Impact

A validated, low-cost filter design with a technical specification package suitable for local manufacturing, plus peer-reviewed publication of removal efficacy data.

Budget Estimate (Summary)

Category	Estimated Cost
Materials & lab testing	\$8,000
Field pilot (30 households)	\$6,500
Personnel (research assistants)	\$10,000
Analysis & dissemination	\$3,000
Total	\$27,500