



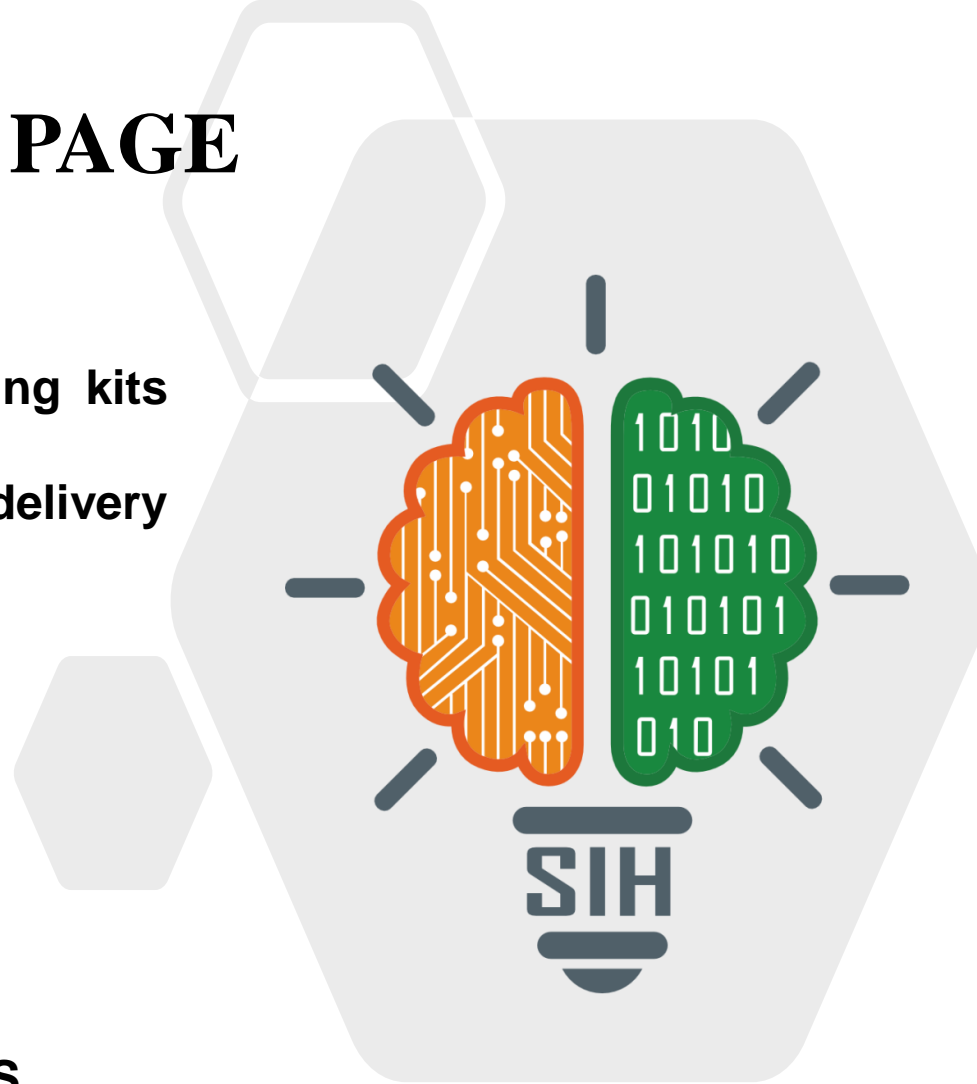
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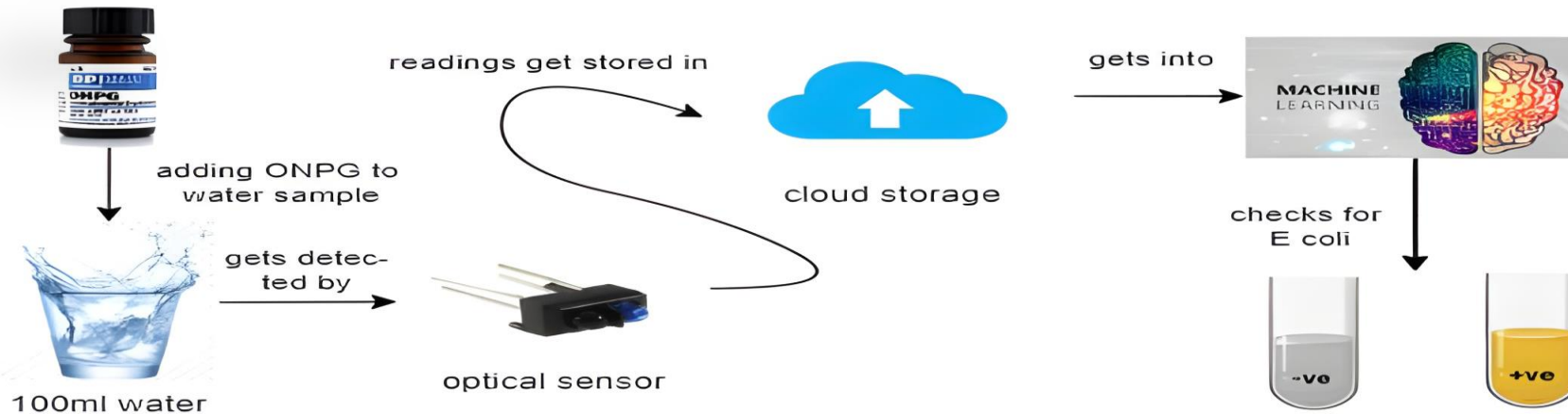
TITLE PAGE

- Problem Statement ID – 1770
- Problem Statement Title- Personalized testing kits for testing Bacteriological contamination at delivery points
- Theme- Smart Automation
- PS Category- Hardware
- Team ID- 14627
- Team Name (Registered on portal)- QUASARS





Personalized Water Testing Kit



Prototype Completion Briefing

Project overview-

- The project aims to develop a compact, autonomous prototype using an Arduino Uno to detect E. coli and Total Coli in drinking water'
- Incorporating sensors for turbidity, gas, TDS, and temperature, with output shown on a laptop.

Pending Tasks for Completion

- Optimize the prototype for compactness by reducing component sizes and improving circuit .
- Integrate the necessary voltage regulator for the LED display.
- Transition the Arduino Uno to a reliable battery-powered system for enhanced portability.

Next Steps-

- Complete the integration of the LED power supply, replace the laptop with a portable cell-based power source.
- conduct real-world testing to validate system reliability and accuracy
- ensure the output is displayed on an attached screen for user convenience.

Prototype Completion Criteria-

- The prototype must be compact and portable for rural use
- Operate independently on a battery, reliably display contaminant output on the LED screen
- Ensure seamless integration of all sensors, algorithms, and displays as a complete system.

PROPOSED SOLUTION

1)Detailed Explanation-

- Our multi-sensor system accurately detects low levels of E. coli and T. coli
- Reduces the risk of waterborne diseases

2)How it addresses the problem-

- It integrates optical, TDS, GAS sensor to accurately
- Delivers instant, accurate results for continuous water safety assurance

3)Uniqueness of the problem-

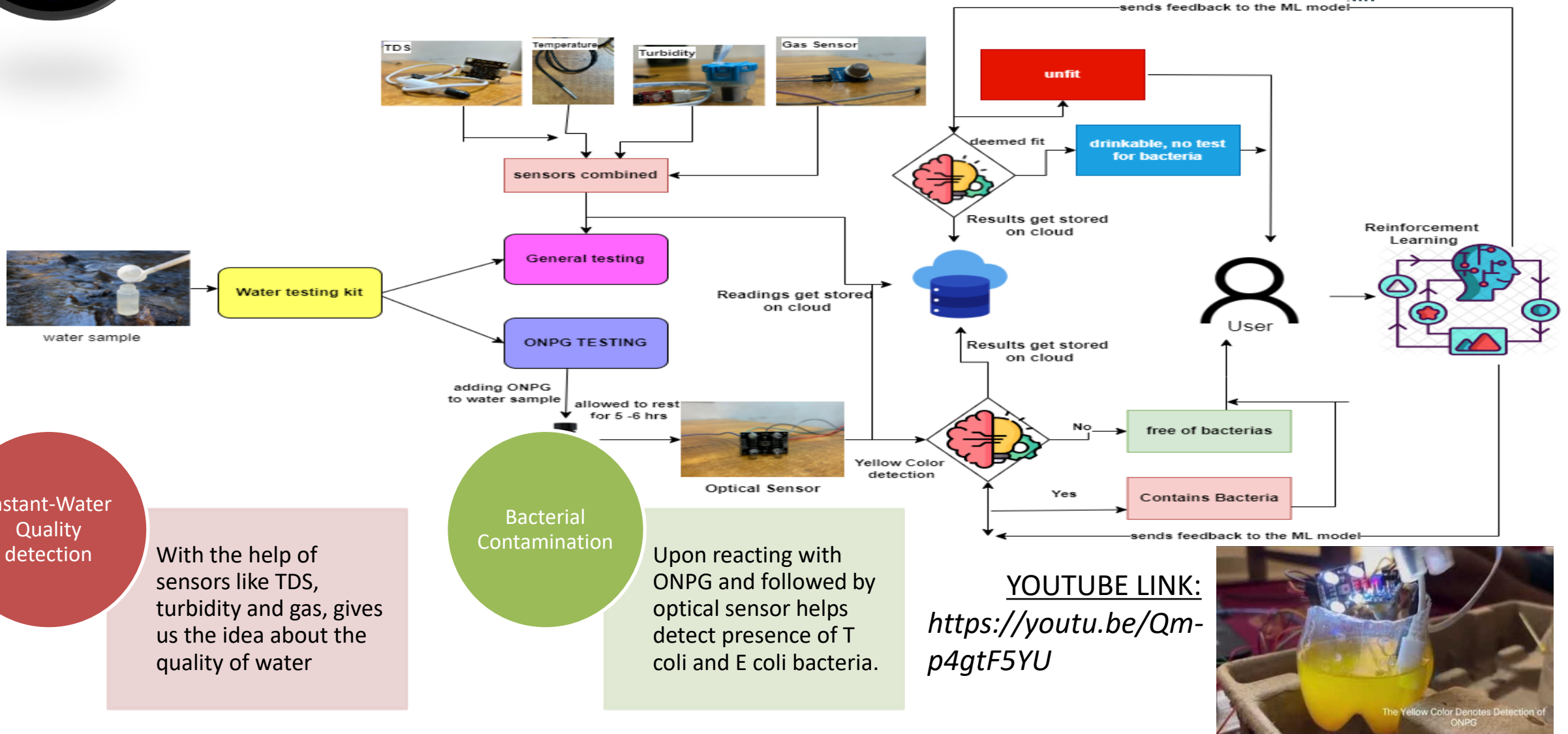
- Combines multiple sensors for precise water quality analysis.
- Portable, durable, and easy to use and long lasting.



TECHNICAL APPROACH

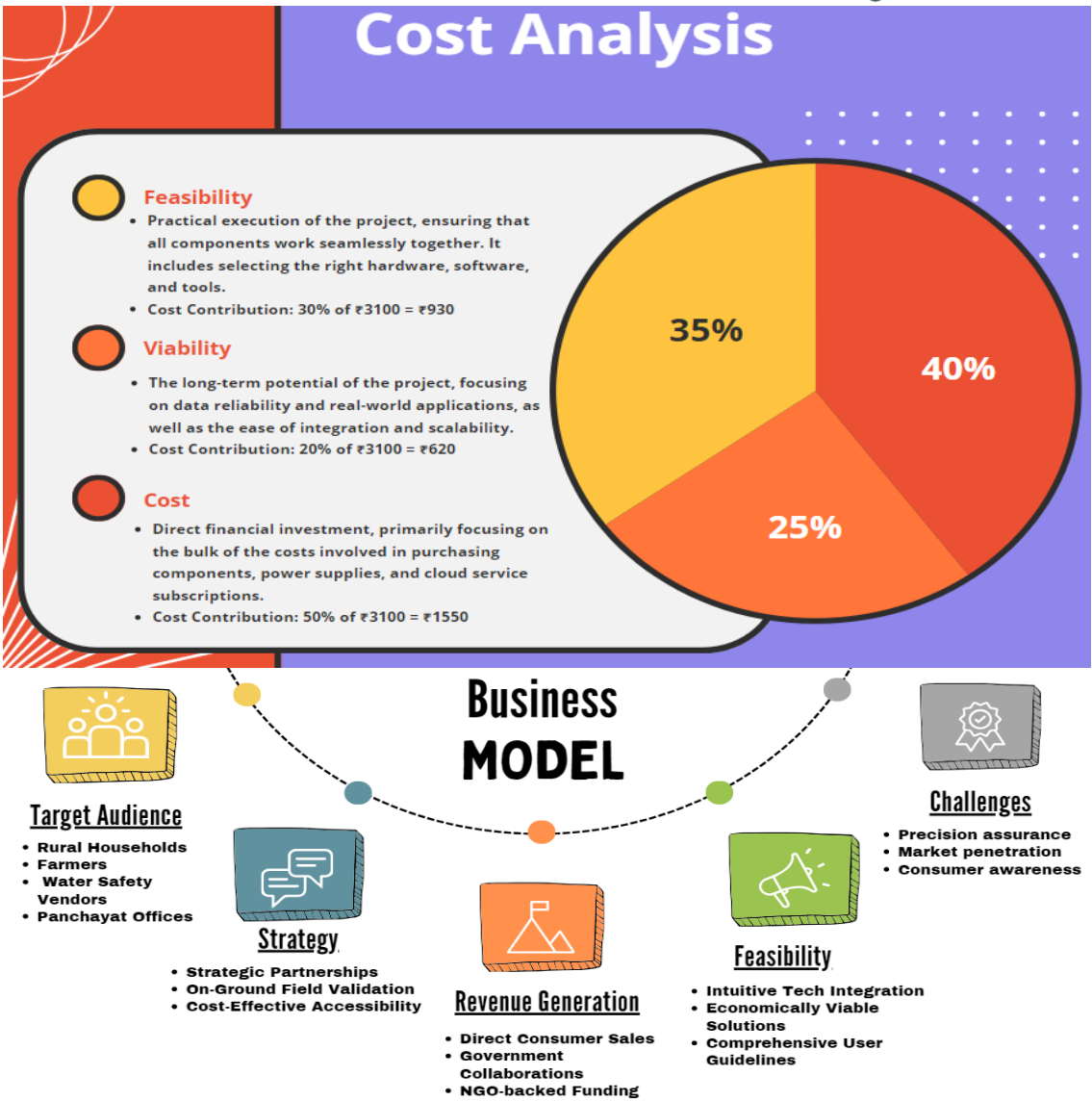
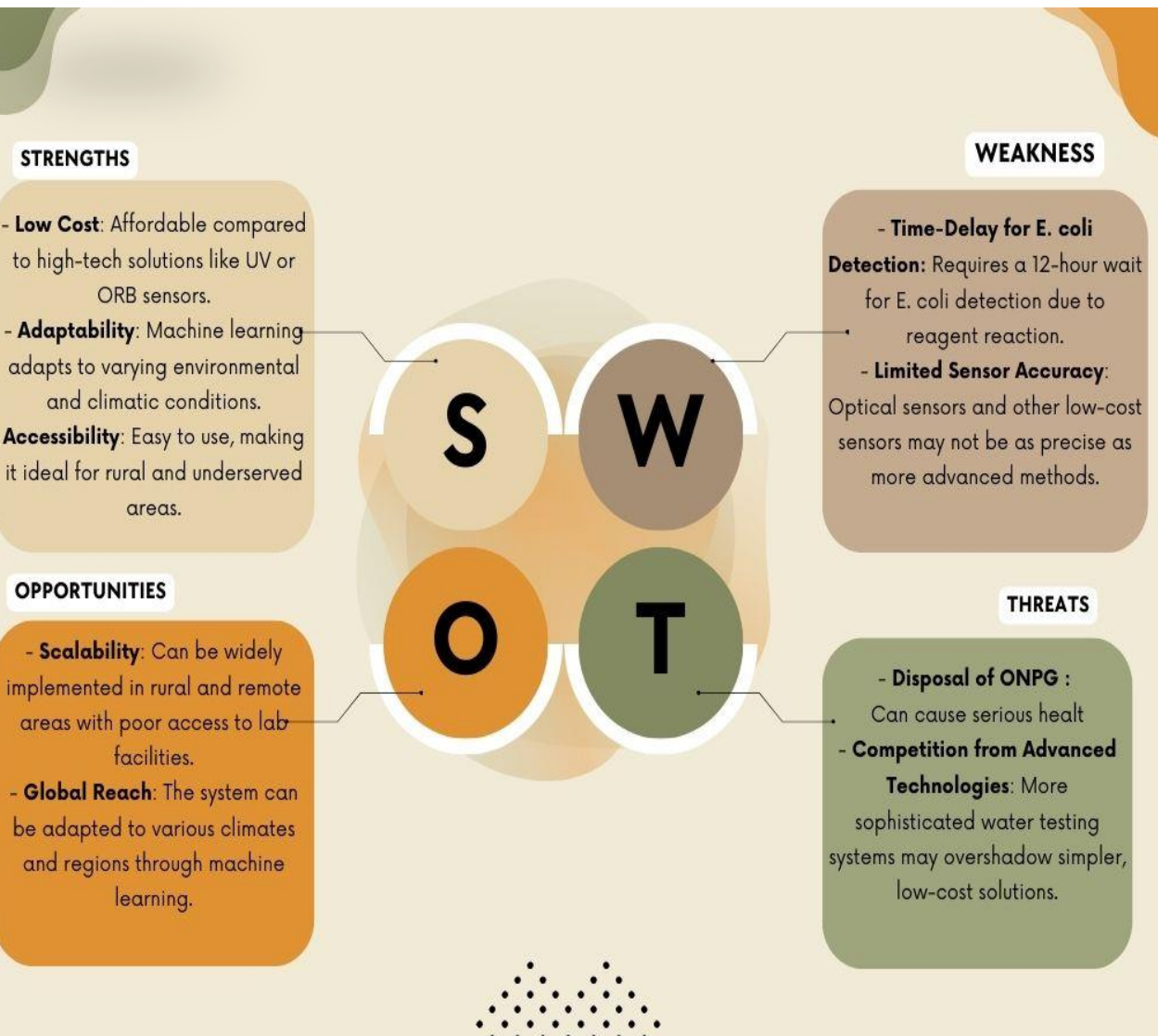


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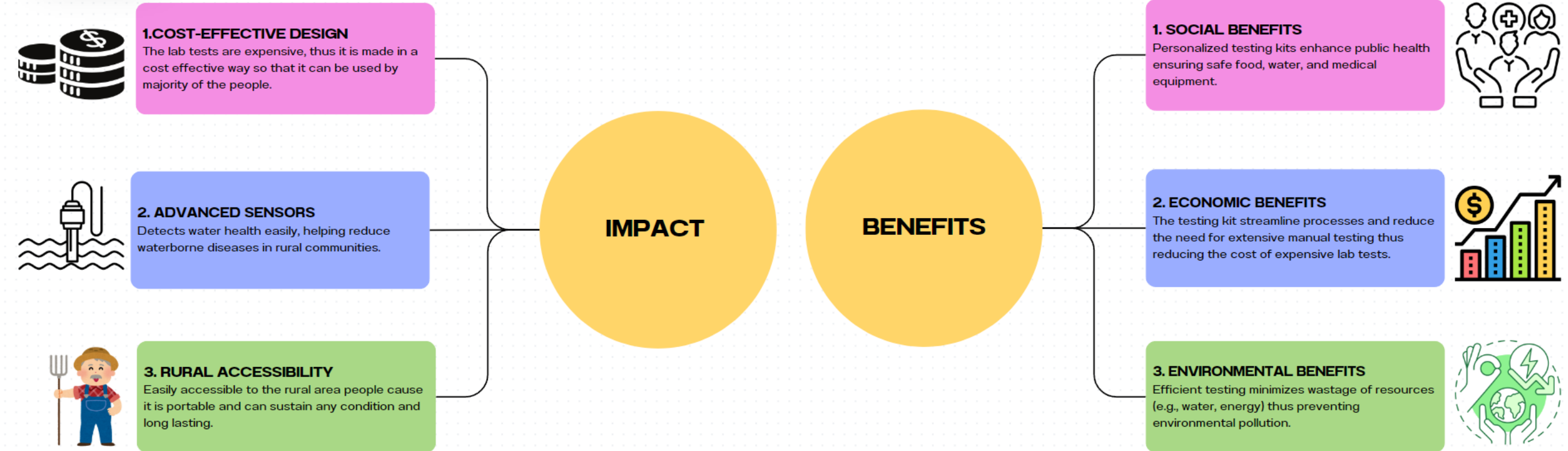
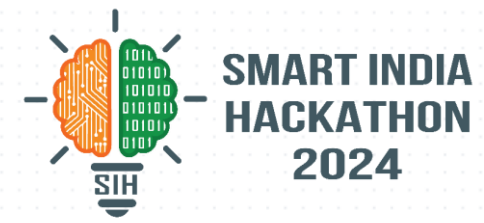


FEASIBILITY AND VIABILITY



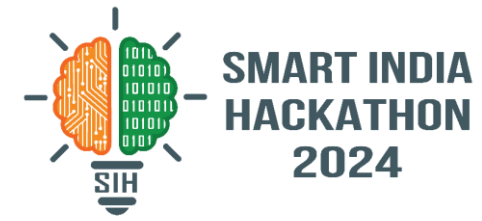


IMPACT AND BENEFITS





RESEARCH AND REFERENCES



- Traditional lab methods for E. coli are accurate but slow and inaccessible in rural areas.
- Optical sensors with reagents detect E. coli via colour change (yellow) after 12 hours.
- Multiple sensors (turbidity, gas, TDS, temperature) enable instant water checks.
- Machine learning enhances accuracy by adapting to different climates.
- Offers a cost-effective alternative to advanced tech like UV or ORB sensors.

Progress in methods for the detection of viable *Escherichia coli*

•E. coli Detection Using Colorimetric Sensors:

- Nguyen, T., Kim, Y., & Song, S. (2020). Development of a colorimetric sensor using gold nanoparticles to detect *Escherichia coli* rapidly. *Journal of Nanoscience and Nanotechnology*, 20(12), 7617-7622.
- DOI: 10.1166/jnn.2020.18589
- Link : <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5587108/>

Molecular testing devices for on-site detection of *E. coli* in water samples

- Carlos Manzanar, Elise Morrison, Young S. Kim, Morteza Alipanah, George Adedokun, Shouguang Jin, Todd Z. Osborne & Z. Hugh Fan
- Link: <https://www.nature.com/articles/s41598-023-31208-4>