HydroWatch: Water Quality Monitoring System

HydroWatch is an innovative solution for water management. It monitors water quality, automates motor control, and ensures clean water supply. The system addresses water contamination issues in India, promoting environmental sustainability and public health.

Project Overview

Problem	Solution
Delayed Detection of Contaminant	Real-time monitoring and immediate alerts
Inconsistent and Infrequent Testing	Continuous, automation
High Labor and Operational Costs	Reduced need for manual testing
Water Wastage	Timely alerts
Inability to Track Contamination Source	Location-specific monitoring

System Features and Specifications

1 Real-Time Monitoring

Continuous checks of water purity using turbidity sensors.

2 Automatic Source Detection

Detects and alerts about municipal water availability.

3 Motor Automation

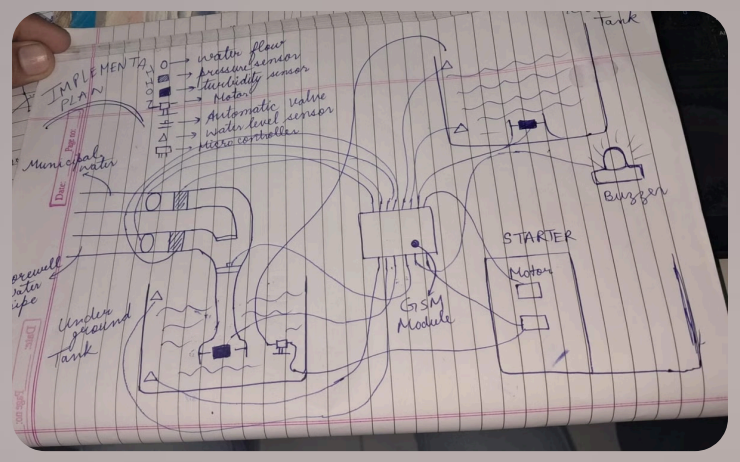
Operates motor based on tank levels and water purity.

4 Manual and Auto Valve control

when impure water comes then turn off the valve automatically and send alert to user. if the user wants then he/she can control valve manually.

5 Mobile App Notifications

Sends real-time alerts about water quality and motor status.



System Design and Implementation Plan

1

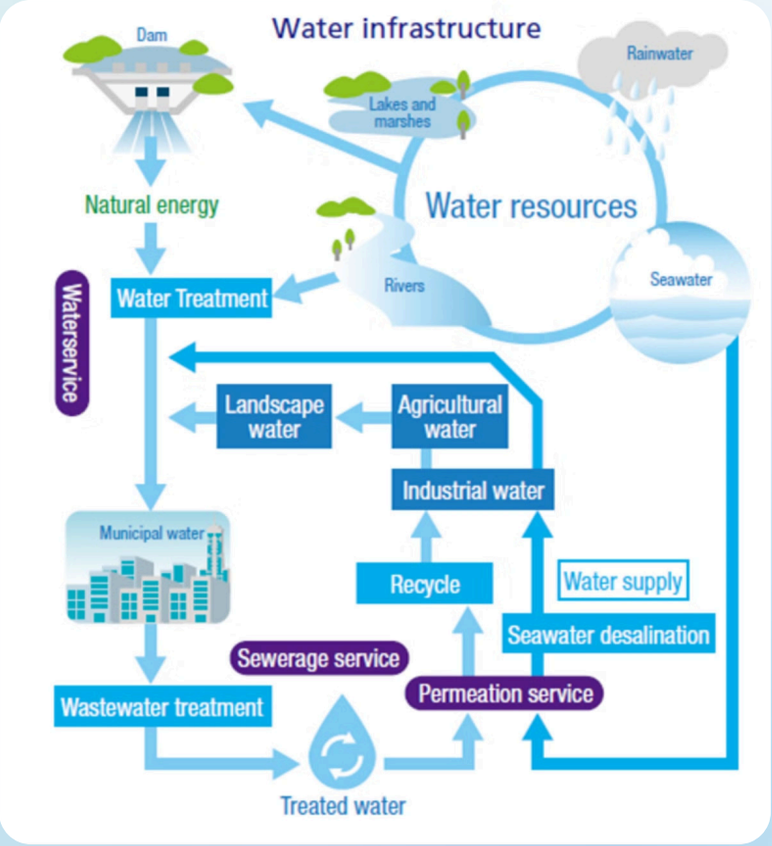
System Workflow

- **Sensor Monitoring:** Turbidity and flow sensors track the purity and availability of water from both borewell and municipal sources.
- **Motor Control:** The motor activates automatically to pump water from the lower tank to the upper tank if the water quality is deemed safe.
- **User Notifications:** The app sends notifications when impurities are detected or when municipal water is available.
- **Manual Control Alerts:** Alerts prompt the user to manually adjust the valve if poor water quality is identified.

2

Implementation Steps:

- **Sensor Installation**: Install turbidity sensors at the inlets of both borewell and municipal water, and place flow sensors in their respective pipes.
- **Hardware Setup:** Connect all sensors, including the water level sensor, to the Node MCU microcontroller, and configure it to communicate with the HydroWatch app.
- **App Integration and Notification System:** Develop the HydroWatch mobile app to receive real-time data from the Node MCU and set up notifications and sound alerts for user updates.
- **Testing and Calibration:** Conduct tests with controlled water samples to ensure sensor accuracy and set up turbidity levels for safe water quality detection.



Requirements and Budget

Component	Quantity	Cost (INR)
Turbidity Sensors	2	1,000
Node MCU	1	350
Water Flow Sensors	2	140
Pressure Sensor	1	₹70
Solenoid Valve	1	800
Buzzer/Alert System	1	₹100
Connecting Wires and Connectors	various	₹200
Total		2660

Feasibility and Challenges

Feasibility & future enhancement

These are also used in many corporate and non corporate industries also ,in case of future enhancement it will be enhance with ai.

Predictive Water Usage Patterns: Integrate AI models to analyse household water usage over time, identifying trends and predicting high-demand periods.

Challenges

Sensor calibration, app connectivity, and sensor longevity are key challenges.

Expected Impact and Benefits

Health and Safety

Reduces exposure to contaminated water, promoting safer household water usage.

Efficiency

Improves water management by automating motor operations based on quality and availability.

Convenience

Provides notifications and audio alerts for easy water source management.

Budget Analysis

Total Cost

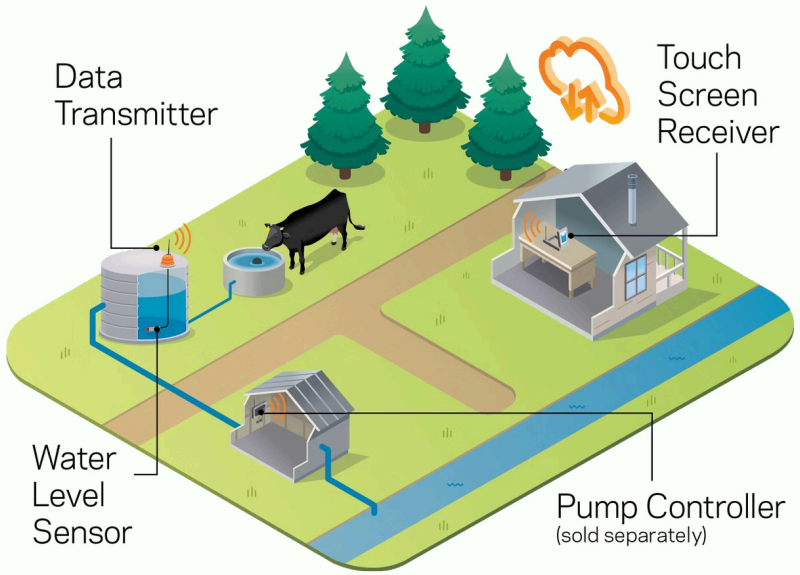
The estimated total cost for HydroWatch components is ₹2660.

Key Components

Major costs include turbidity sensors (₹1,000) and solenoid valve (₹800).

Affordability

HydroWatch is designed to be cost-effective for residential use.



Research References

1 Water Quality Monitoring

ResearchGate provides information on sensor accuracy for water quality monitoring.

2 Node MCU Integration

Node MCU documentation offers guidance on integrating the microcontroller with sensors

Thank You

Affordable

Cost-effective solution for water quality monitoring.

Safe

Ensures access to clean drinking water.

Alert

Real-time notifications for water management.