

SMART WATER MANAGEMENT SYSTEM

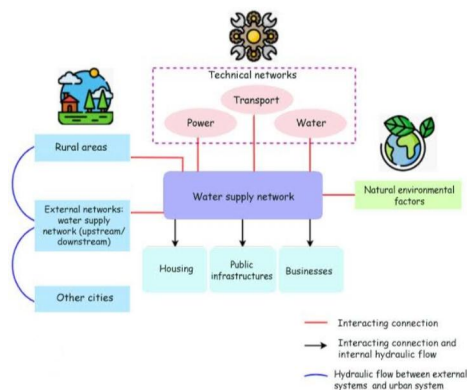
Abstract:

1. Water is one of the fundamental resources that aid life and there are speculations that estimate at 2025 almost half of the urban population will live under short supply and water stress.
2. With the usage of new technological advancements in IoT (Internet of Things) powered smart devices for water management, it can become a worthy implementation towards avoiding the predicted water depletion.
3. In the past years up until recently, water monitoring and management were manually carried out with intensive power requirements and high capital expense with low efficiency recorded.

Introduction:

Smart Water Management is the activity of planning, developing, distributing and managing the use of water resources using an array of IoT technologies which are designed to increase transparency, and make more reasonable and sustainable usage of these water resources.

Block Diagram:



shows the strategy of the water supply network. During functional analysis, the activities of a system are represented by

Two types of functions:

1. **Main and Technical.** The essential aim of a system's behavior is communicated by its functions, and the system's response to stressors imposed by the external environment is modeled using technical functions.
2. Using functional block diagrams (FBDs), the system and its surrounding environment are represented in functional analysis.

3. An external functional analysis aims to identify the system under consideration, its boundaries, and the external contexts with which it interacts.
4. The urban system is defined by its physical and administrative limits when applied to Saudi Arabia.
5. Using this FBD, people can see how the urban system interacts with its surroundings, including other cities and rural areas, as well as external technical networks (such as those for power and water, telecommunications, and transportation), as well as environmental factors.

Innovative ideas of Water Management:

- Digital Water Management.
- Wastewater Processing.
- Advanced Filtration.
- Flood Prevention.
- Water-saving Technology.
- Decentralized Infrastructure.
- Innovative Materials.
- Desalination.

Modern Technology of Water Management:

Advanced technologies such as SCADA (Supervisory Control and Data Acquisition) systems, smart meters, and automation enable efficient monitoring and control of water supply networks. These technologies help reduce leaks, optimize water distribution, and ensure equitable access to water resources.

Technology is used in Water Management system:

Smart Water Monitoring and Management Systems, based on the combination of sensors, big data and AI technologies, can provide to water utility operators, farmers and companies the ability to measure, monitor and control their water distribution networks as well as the quality of the water distributed.

Obtainable Functions of Water Management:



- presents an outline of functionalities obtainable with IoT based water management system.
- It, by and large, indicate tank state sensing capability using sensors [9, 10], the ability of smart meters useful in measuring usage over time, real-time analysis is also a notable function obtainable in smart water management, spillage or hardware damage can also be detected as well as remotely controlling the pumping motto through a web interface or automated switching of the motor based on water level [18, 19, 20, 21, 22, 23, 24, 25].
- Smart valves for schedule irrigation is another exciting functionality possible with automated water management.

Advantages:

- It lowers your water-related costs.
- Prioritizing water management helps you eliminate water waste and keep your water infrastructure operating in peak condition. Using water efficiently decreases your water bill, and there are several other ways it drives down water-related costs.

Disadvantages:

- The rainfall is unpredictable. Precipitation is extremely difficult to predict and sometimes no rainfall is supplied meaning the system can't harvest water.
- The costs of such system can sometimes take anywhere from 10 to 15 years to see any profit.