

Smart Water Management

SENSOR:

- pH Sensors.
- Turbidity Sensors.
- Dissolved Oxygen Sensors.
- Conductivity Sensors.
- Electromagnetic Flow Sensors.
- Ultrasonic Flow Sensors.
- Pressure Transducers.
- Ultrasonic Level sensor.
- Smart Water Meters.
- Soil Moisture Sensors.

DATASET:

- **Water Quality and Pollution Data:** This dataset contains information on water quality parameters and pollution levels in various bodies of water.
- **Water Consumption and Usage Data:** This dataset provides data on water consumption patterns in residential, industrial, and agricultural sectors.
- **Water Infrastructure Data:** This dataset includes details on water distribution networks, pipelines, reservoirs, and treatment plants.
- **Drought and Precipitation Data:** This dataset offers data on drought conditions and historical precipitation patterns.
- **Wastewater Treatment Data:** This dataset contains data on the treatment and disposal of wastewater.
- **River and Streamflow Data:** This dataset provides information on water flow rates in rivers and streams.
- **Groundwater Monitoring Data:** This dataset includes groundwater levels, quality, and monitoring information.
- **Flood Prediction and Monitoring Data:** This dataset offers data on flood risks and real-time flood monitoring.
- **Water Quality Sensors Data:** These datasets come from water quality sensors deployed in various locations.
- **Reservoir and Lake Level Data:** This dataset includes water levels in reservoirs, lakes, and dams.
- **Water Conservation Data:** This dataset contains data related to water conservation efforts and policies.
- **Hydrological Modeling Data:** This dataset provides data used for hydrological modeling and forecasting.
- **Climate and Weather Data:** This dataset includes climate and weather information relevant to water resource management.

Usage:

- | 90.1% of the 'in use' water bodies are fulfilling the requirements of up to 100 people.
- | 1.7% of water bodies are fulfilling the requirements of more than 50,000 people.

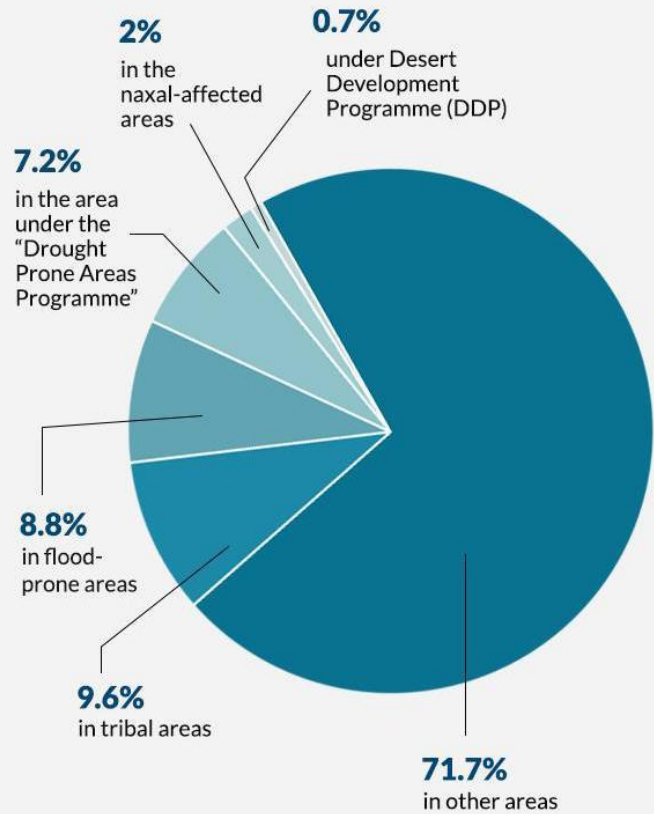
Benefits to cities/towns:

- | 88.6% of water bodies benefit one city/ town/ village.
- | 10.6% benefit 2-5 cities/towns/village.
- | 0.8% are benefitting more than 5 cities/towns/villages.

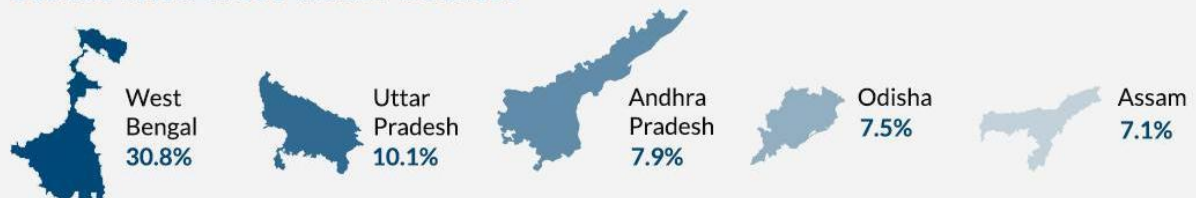
State wise:

- | West Bengal has the highest number of ponds & reservoirs.
- | Andhra Pradesh has the highest number of tanks.
- | Tamil Nadu has the highest number of lakes.
- | Maharashtra is the leading state for water conservation schemes.

Locations:



States with most water bodies:



Model results:

Water Quality Predictions: These models predict water quality parameters such as pH, turbidity, and contaminant levels, ensuring compliance with water quality standards.

Water Usage Forecasts: Models forecast water consumption patterns, facilitating resource allocation and demand management.

Leak Detection: Models identify and locate leaks in water distribution systems, reducing water loss.

Flood Risk Assessment: Models predict flood risks, enabling timely warnings and preventive measures.

Water Availability Projections: Models estimate the availability of water resources in various regions, assisting in resource planning.

Efficiency Improvements: Models suggest operational enhancements in water treatment and distribution systems, resulting in cost savings and resource conservation.

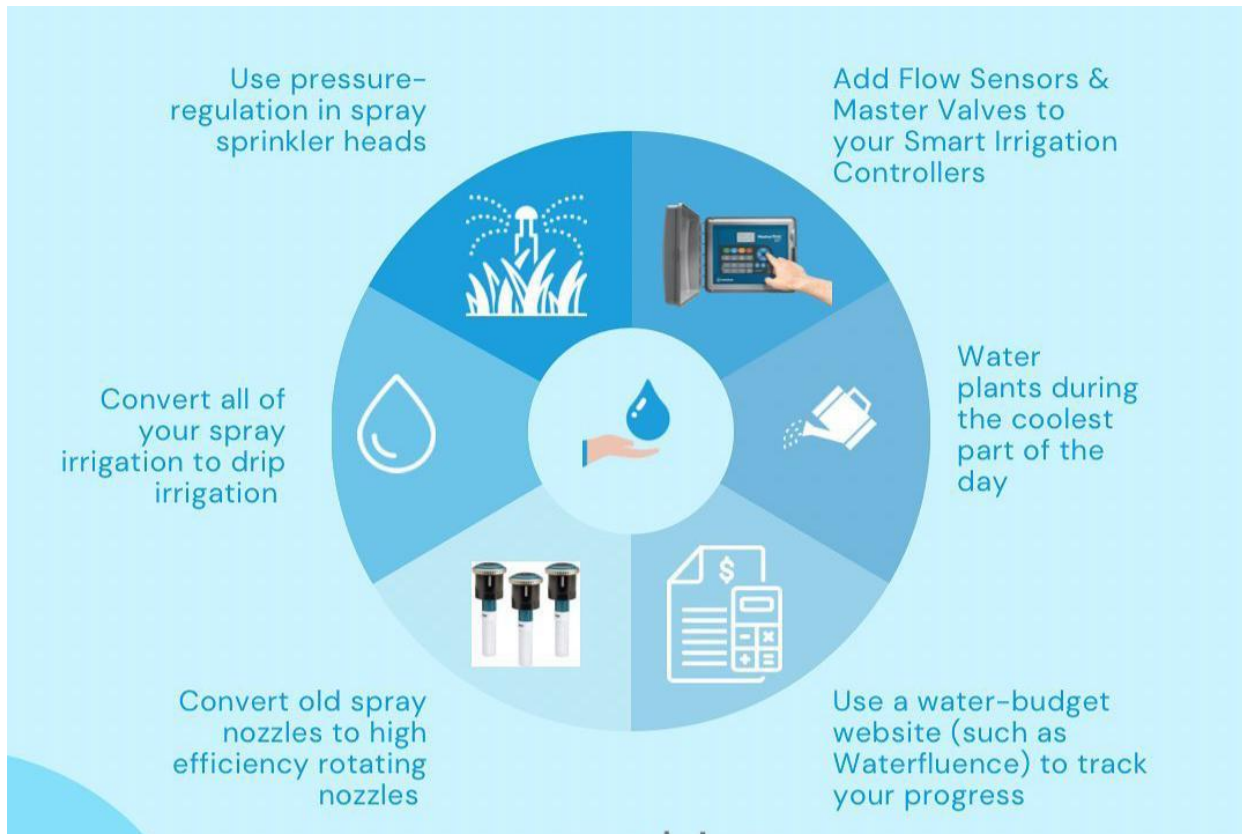
Environmental Impact Assessments: Models assess the environmental impact of water management decisions and policies.

Optimization of Irrigation: Models help optimize irrigation schedules for agriculture, conserving water and enhancing crop yields.

Water Resource Management Strategies: Models provide insights into effective strategies for managing water resources in regions facing water scarcity.

Real-time Monitoring and Alerts: Models trigger real-time alerts for issues like water quality deviations, unusual consumption, and infrastructure problems.

Example for smart water management:



Smart Irrigation System for Agriculture:

Problem:

Agriculture consumes a significant amount of water, and water scarcity is a growing concern. Conventional irrigation methods are often inefficient and can lead to overuse of water resources.

Solution:

Implement a smart irrigation system that combines data from various sensors, weather forecasts, and soil moisture level

Components:

1. **Soil Moisture Sensors:** These sensors monitor soil moisture levels in real time.
2. **Weather Forecast Data:** Access to local weather forecasts provides information about upcoming rain, temperature, and humidity.
3. **IoT (Internet of Things) Connectivity:** Sensors are connected to a central control system via the internet.
4. **Central Control System:** A smart controller processes data from the sensors and weather forecasts.
5. **Automated Valves:** These valves control the flow of water to irrigation zones.
6. **Mobile App or Web Interface:** Farmers can remotely monitor and control the irrigation system via a user-friendly app or web interface.

How It Works:

- Soil moisture sensors continuously monitor the moisture level in the soil.
- The central control system collects data from the sensors and combines it with local weather forecasts.

- Using this data, the system calculates the optimal irrigation schedule for each zone in the field.
- Automated valves open and close according to the schedule, ensuring that crops receive the right amount of water.
- If rain is expected, the system can delay or skip irrigation to avoid water wastage.
- Farmers can monitor and adjust the system remotely through a mobile app or web interface.

Benefits:

- **Water Efficiency:** Smart irrigation reduces water wastage by only irrigating when needed, conserving valuable resources.
- **Cost Savings:** Efficient water usage leads to reduced water and energy costs.
- **Improved Crop Yield:** Consistent and optimized irrigation promotes healthier crop growth and higher yields.
- **Environmental Impact:** Reduced water consumption has a positive environmental impact by conserving water resources.