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MODULE
20B

Water Conservation Domestic Water Management

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Water conservation is a crucial practice that involves the strategic management and utilization of water resources to minimize waste and ensure sustainable access to this vital resource. As global populations continue to rise and climate change exacerbates water scarcity, the importance of effective water conservation practices cannot be overstated.

Learning Objectives +

- Benchmarking with Performance Metrics
- Water Conservation
- Commissioning in Sustainable Construction
- Energy and Materials Use and Management
- Summary and Resources
- HBDP Practice Test V.4.1_Test Your Knowledge!



DOMESTIC WATER MANAGEMENT OVERVIEW

- Involves water supply sources, distribution systems, water use categories, and wastewater treatment.
- Municipal water supplies are centralized systems managed by local governments or private entities.
- Private wells tap into underground water sources for non-potable uses.
- Rainwater harvesting collects and stores rainwater for non-potable uses.
- Distribution systems involve pipes, pumps, and storage tanks, with pressure management and leak detection issues.
- Water usage can be categorized into potable uses, non-potable uses, and wastewater management.
- Water conservation strategies include fixing leaks, shorter showers, using dishwashers and laundry machines only with full loads, installing water-efficient fixtures, and minimizing water use in outdoor environments.
- Smart water management technologies enable smart home devices to monitor and optimize water use.
- Governments can facilitate water conservation through incentives, regulations, and public education campaigns.



DOMESTIC WATER MANAGEMENT

THE IMPACT OF FIXTURE SELECTION ON DOMESTIC WATER MANAGEMENT

Understanding Domestic Water Fixtures

- Fixtures like faucets, showerheads, toilets, and appliances facilitate water delivery and usage in residential environments.
- Each fixture type has specific characteristics, including flow rates, design, and efficiency.

Importance of Flow Rates

- Flow rates are a critical metric in assessing the efficiency of water fixtures.
- Traditional showerheads can deliver flow rates of 2.5 GPM or more, while modern, water-efficient models may reduce this to 1.8 GPM or less.



THE IMPACT OF FIXTURE SELECTION ON DOMESTIC WATER MANAGEMENT +

Role of Fixtures in Water Conservation

- The integration of water-efficient fixtures is crucial for effective water management strategies.
- Adoption of such fixtures can lead to reduced demand on municipal water supplies, lower utility bills for consumers, and decreased energy use associated with water heating.

Impact on Infrastructure and Resource Management

- The selection of water fixtures has implications for water infrastructure and resource management.
- When households utilize water-efficient fixtures, the overall demand on municipal water systems decreases, alleviating pressure on treatment facilities, distribution networks, and natural water sources.

Behavioral Factors and Education

- Fixture selection is influenced by consumer behavior and education.
- Educational campaigns that inform homeowners about the benefits of low-flow fixtures often result in higher adoption rates.



DETERMINING IRRIGATION REDUCTIONS FOR WATER CONSERVATION

Understanding Irrigation Needs

- **Crop Water Requirements:** The water needs of crops vary based on species, growth stage, soil type, and climate conditions.
- **Soil Water Holding Capacity:** The soil's ability to retain water is crucial in determining irrigation needs.

Determining Reduction Strategies

- **Scheduling Irrigation:** Optimizing the timing of water application involves monitoring soil moisture levels and adjusting irrigation practices accordingly.
- **Implementing Deficit Irrigation:** Water application is intentionally reduced to below the full crop water requirement, but still sufficient to maintain acceptable yield levels.
- **Utilizing Advanced Irrigation Technologies:** Modern irrigation systems like drip irrigation or sprinkler systems allow for more efficient water application compared to traditional flood irrigation.



DETERMINING IRRIGATION REDUCTIONS FOR WATER CONSERVATION +

Evaluating Impact of Reductions

- **Monitoring Crop Response:** Ensuring that irrigation reductions do not adversely affect crop health is essential.
- **Economic Considerations:** Cost-benefit analyses can help determine the feasibility of implementing new technologies or practices.
- **Future Research:** Focus on developing more refined models that integrate climate variability, crop responses, and economic factors to further enhance water conservation efforts in agriculture.



STRATEGIES TO REDUCE POTABLE WATER CONSUMPTION

Reclaimed Water Use

- Reclaimed water is treated wastewater reused for beneficial purposes.
- It is used for landscape irrigation, industrial processes, and toilet flushing.
- Reclaimed water reduces reliance on potable water sources and reduces demand on wastewater treatment facilities.

Non-Potable Water Harvesting

- Non-potable water harvesting involves collecting and using water from sources other than the municipal water supply.
- Techniques include rainwater harvesting, greywater systems, and stormwater management.
- Examples include rainwater tanks in Queensland, Australia, which capture and store rainwater for various applications.





STRATEGIES TO REDUCE POTABLE WATER CONSUMPTION +

Irrigation Optimization

- Efficient irrigation techniques ensure water is delivered directly to plant roots while minimizing waste.
- Techniques include drip irrigation, soil moisture sensors, and scheduling and timing.
- The use of smart irrigation controllers can reduce irrigation during rainy periods, conserving water.



Types of Vegetation and Planting

- Native and drought-resistant plants require less water and can thrive in local conditions.
- Strategies include native plant landscaping, drought-tolerant species, and planting techniques like group planting and mulching.
- Examples include the use of native grasses and shrubs in Xeriscaping, drought-tolerant plants in landscaping designs, and mulching in Phoenix, Arizona.



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