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- **Water Conservation – Why It Matters**
-  **What is Water Conservation?**
- **Water conservation** means using water carefully and not wasting it. Even though our planet is covered with water, **only a small amount** (about 1%) is fresh water that we can drink, cook with, and use in daily life. So, it's important to **save water** wherever we can.

Save the water

1 Use watering can



2



3 Use half flush reservoir of the toilet



4



5

Use a glass of water to brushing teeth



Use fillet sink



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SAVE THE WATER



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WATER SCARCITY

Aenean commodo ligula eget dolor. Aenean massa
Cum sociis natoque penatibus et magnis dis parturient

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SAVE WATER

Aenean commodo ligula eget dolor. Aenean massa
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- **1. Limited Freshwater Supply**
- Only **3%** of the world's water is fresh, and less than 1% is easily accessible for human use. The rest is trapped in glaciers or underground. That means we have a **very limited amount** of usable water. Conserving it ensures there's enough for everyone.



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- **2. Growing Population = Growing Demand**

As the global population increases, so does the demand for clean water—for drinking, farming, sanitation, and industry. Without conservation, we could face serious water shortages.

- **3. Supports Agriculture and Food Supply**

Water is essential to grow crops and raise animals. If we waste water, it affects food production, leading to **higher prices** and **food insecurity**.



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4. Protects Ecosystems

Lakes, rivers, and wetlands are homes for many species. Overuse of water can dry up these habitats, harming fish, birds, and plants. Conservation helps **keep nature in balance**.

5. Saves Energy

It takes a lot of energy to pump, treat, and heat water. By using less, we also **reduce energy consumption** and **cut down greenhouse gas emissions**, which helps fight climate change.



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6. Prepares for Droughts

- In times of drought, water becomes even more precious. Conserving water now helps ensure we have enough during dry periods and **avoids crisis situations**.

7. Ensures Future Generations Have Water

- By saving water today, we protect it for tomorrow. It's our responsibility to leave a **sustainable future** for our children and grandchildren



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- **Save water, save our planet**
- Our water comes from rivers, lakes and reservoirs.
- **Climate breakdown** is one of the biggest drivers of water shortages and is expected to heap even more pressure on our depleting supplies. People in England are facing shortages by 2050 unless we save water fast – according to the UK Environment Agency.
- What's more, pollutants like sewage and farm run-off are causing havoc in rivers and lakes, like Lake Windermere in Cumbria (pictured). In 2023 alone, 440,000 hours of sewage was released along England's coastline.



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- Elementary water conservation involves using water wisely and preventing waste through simple actions like turning off the tap while brushing teeth, taking shorter showers, and fixing leaks.
- Here's a breakdown of elementary water conservation tips:
- In the House:
- **Turn off the tap:** Don't let water run unnecessarily while brushing teeth, shaving, or washing hands.
- **Take shorter showers:** Aim for 5-minute showers instead of longer baths.
- **Fix leaks:** Repair any dripping faucets or leaky pipes promptly.
- **Run full loads:** Only run the dishwasher and washing machine when they are completely full.
- **Collect rainwater:** Use a water butt to collect rainwater for watering plants.
- **Use a bucket to catch water:** Catch the water while waiting for the shower or sink to warm up and use it for plants or cleaning.
- **Wash fruits and vegetables in a bowl:** Instead of running water from the tap, wash fruits and vegetables in a bowl of water.
- **Drop tissues in the trash:** Instead of flushing them, save water every time.
- **Keep a pitcher of drinking water:** Keep a pitcher of drinking water in the refrigerator instead of running the tap.



1. Turn off the taps

Don't let your water **consumption** run out of control. Save 6 litres of water a minute by turning off your tap while you brush your teeth. **Fix leaky taps** too – and stop what could be 60 litres of water going straight down the drain every week.



2. Shower with less

Every minute you spend in a power shower uses **up to 17 litres of water**. Set a timer on your phone to keep your showers short, sweet and water-saving.

Switching to an efficient shower head will allow you to lather up in less water, which means you'll save water and cut your bills.



3. Save up your dirty clothes

Washing a full machine load of clothes uses **less water and energy than 2 half-loads**. This means lower bills as well as saving water.



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4. Call for a new law

We can each do our small bit to save water at home, but we need to be able to hold polluters accountable for damaging our rivers, lakes and seas. In 2023, sewage was poured into the UK's waterways 1,000 times a day.

Friends of the Earth is calling for a new law that would force polluters to clean up their act: the Right to a Healthy Environment.

Demand a healthy environment

5. Time your gardening

Water outdoor plants in the early morning or at the end of the day to stop water immediately evaporating in sunlight and heat. Water the soil so that the liquid goes straight to the roots, where it's needed.

In a heatwave, animals need water too. Instead of watering your lawn, leave out a water-filled container, like a casserole dish, for birds to drink from and wash. Thirsty bees and other insects will need a saucer or bowl with water and stones in it.





6. Catch rainwater

Installing water butts **saves up to 5,000 litres of water a year**². And your plants will thank you for rainwater rather than treated tap water.

You can also cut water use by 33% by watering plants manually instead of using automatic sprinklers.



7. Get a low-flush toilet

The average UK household uses about **30% of all water used to flush the toilet**². Modern dual-flush systems save huge amounts of water. They use just 6 litres – or 4 with a reduced flush – much less than the 13 litres for each old-style single flush.

If you can't invest in a new loo, get a **water-saving bag for your old-style toilet**².



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8. No more washing up

Got a dishwasher? Fill it up completely each time you run it and you'll use less water than you would doing the dishes by hand. Yes, even if you're using a washing-up bowl. What better excuse to go and have a nice sit down?

Find out more about the **most water- and energy-efficient ways to run your appliances** from the Energy Saving Trust.



9. Reduce food waste

It takes a lot of water to produce our cereal, fruit and other food.

More than half of the 7 million tonnes of food and drink UK households bin every year could be eaten. Wasting less food could not only save water, but also save you **£540 a year**.

Get some handy advice from **Love Food Hate Waste**, or get inspired by **high-tech solutions to food waste** from around the world.



10. Boil what you need

Save water, money and energy by only boiling as many cups of water as you need.



11. Steam your veggies

Steam your food to cut water usage and retain more of the natural nutrients.

If you do boil, try using the leftover water as a **tasty stock for soups**. Or let it cool and use it to water plants.



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12. Be plumbing prepared

Regularly check your kitchen pipes and the dishwasher hose for slow leaks.

Find out where your household stop valve is and make sure that you can turn it on and off. You'll thank us if you ever have a burst pipe, because you'll be able to cut off the flow before it floods the house.



13. Quality and seasonal eating

Rearing animals for meat and dairy and harvesting crops like avocado at a large and unsustainable scale is incredibly water-intensive. By **cutting down on meat and dairy** and eating seasonal vegetables you'll be helping to save water.

You'll also be helping to protect the climate. The **meat** and dairy industries are big contributors to global warming.



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- Water conservation is essential for the sustainability of agriculture and the preservation of vital water resources. Adopting effective conservation strategies can help farmers minimize water usage, mitigate water scarcity, and promote ecological balance.
- In today's world, with a growing population and increasing water stress, the agricultural sector must prioritize water conservation.
- Safe Zone™ is effective in implementing efficient irrigation methods like drip irrigation or precision sprinklers that can reduce water loss and ensure water is delivered directly to plant roots. Read on to learn more about various water conservation techniques



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- **Mitigating Water Scarcity**
- Water scarcity is becoming a growing concern in many regions, exacerbated by population growth, climate change, and competing water demands. Efficient water conservation practices in agriculture help reduce the pressure on limited water supplies and mitigate the impacts of water scarcity on both agricultural production and ecosystems.
- **Enhancing Agricultural Productivity**
- Water is an essential component for crop growth and livestock production. Adopting water conservation techniques can help farmers optimize water usage and ensure crops receive adequate moisture while reducing wastage. Optimizing water usage enhances agricultural productivity, leading to increased yields and improving food security.



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- **Different Techniques Used for Water Conservation**
- **Efficient Water Use in Agriculture**
- Efficient water use in agriculture refers to practices and techniques that aim to maximize the productivity of crops while minimizing water consumption. It involves employing methods such as capturing and storing water and drip irrigation to deliver water directly to the plant roots, reducing losses due to evaporation or runoff. Learn more about these techniques below.



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- **Drip Irrigation on Farms**
- Drip irrigation is a highly efficient water conservation technique widely used in agriculture. It delivers water directly to the plant roots, minimizing water loss through evaporation and runoff. Farmers rely on a network of tubes or pipes with small emitters that release water at a steady, controlled pace. This method not only reduces water wastage but also promotes healthier crops by providing water exactly where it's needed on the farm.
- Additionally, drip irrigation helps farmers conserve water by minimizing weed growth and reducing disease incidence, as the plant foliage stays dry. These systems can be customized to suit different crops, soil types, and farm landscapes, making them a versatile and sustainable water conservation solution for agriculture.



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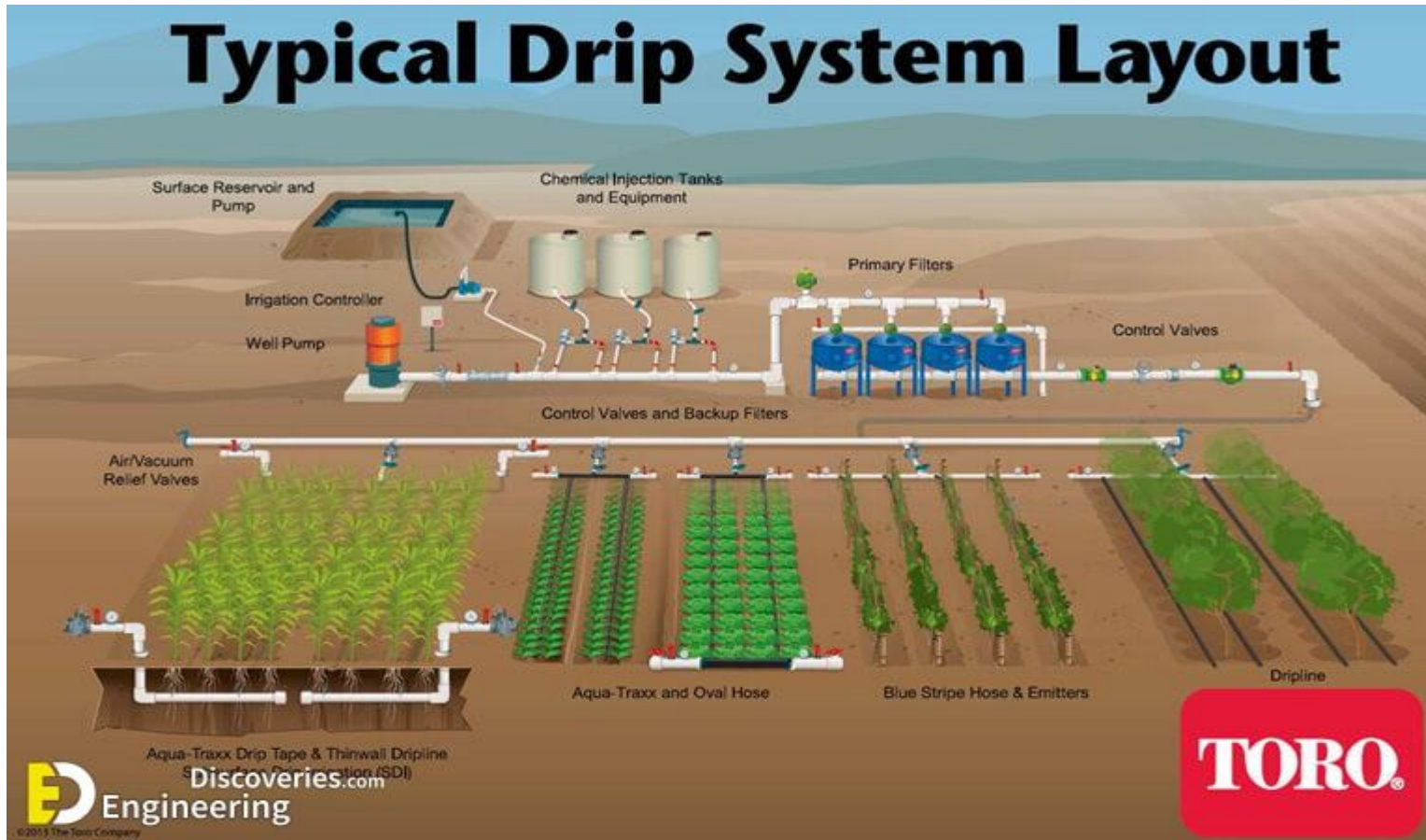
- **Benefits:**
- **Water Efficiency:** Drip irrigation delivers water precisely to the root zone, reducing water loss through evaporation and runoff compared to traditional irrigation methods like sprinklers.
- **Nutrient Delivery:** It can also be used to deliver fertilizers and other nutrients directly to the plants, ensuring they receive the right amounts at the right time.
- **Improved Crop Yields and Quality:** By providing plants with consistent and optimal moisture levels, drip irrigation can lead to higher yields and improved crop quality.
- **Reduced Weed Growth:** Since water is delivered directly to the roots, drip irrigation minimizes wetting the soil surface, which reduces weed growth.
- **Soil Health:** Drip irrigation can help to prevent nutrient leaching and improve soil health.



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Typical Drip System Layout





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- Capturing and Storing Water
- Capturing and storing water is a crucial strategy for sustainable water use in agriculture. This water conservation technique involves collecting and storing rainwater, surface runoff, and even treated wastewater for later use in irrigation.
- Farmers can use various methods to capture water, such as constructing ponds, reservoirs, or tanks to store the collected water. During droughts or dry periods when water availability is limited, these stored water sources can provide plants with moisture when needed.
- Implementing such systems conserves water and provides farmers with a reliable water supply, reducing their dependence on scarce freshwater resources



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Rainwater Harvesting for Irrigation



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- Irrigation Scheduling
- Efficient water use in agriculture also involves proper irrigation scheduling, which entails determining the optimal timing and frequency of irrigation to meet crop water requirements while minimizing water wastage.
- This water conservation technique accounts for crop type, growth stage, soil moisture levels, and weather conditions. Farmers can use advanced agricultural technologies like soil moisture sensors and weather forecasts to precisely monitor the moisture content of the soil and make informed decisions about when to irrigate.
- Water irrigation scheduling ensures crops receive adequate water without overwatering, leading to improved water-use efficiency and optimized yields for farmers.



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- **Factors Considered:**
- Irrigation scheduling takes into account several factors, including:
- **Crop Water Requirements:** Different crops have varying water needs throughout their growth cycle.
- **Soil Properties:** Soil type and its water-holding capacity significantly influence irrigation timing and depth.
- **Climate Conditions:** Rainfall patterns, temperature, and evapotranspiration rates (the amount of water lost from the soil and plants) play a crucial role.
- **Irrigation System Characteristics:** The type of irrigation system (e.g., drip, sprinkler, flood) and its efficiency affect how water is applied



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- **Benefits of Proper Irrigation Scheduling:**
- **Increased Crop Yields:** Providing the right amount of water at the right time can lead to higher yields.
- **Improved Water Use Efficiency:** Optimizing irrigation practices reduces water waste and conserves water resources.
- **Reduced Costs:** Efficient irrigation can lower water and labor costs, as well as fertilizer requirements.
- **Enhanced Environmental Sustainability:** Minimizing water waste and runoff helps protect water resources and the environment



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- Enhancing Soil Health for Water Conservation

Enhancing soil health for water conservation involves implementing practices that improve the soil's structure, fertility, and moisture-holding capacity, promoting efficient water use and conservation. This includes strategies like:

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- Compost, Mulch, and Water Conservation

Compost and mulch are essential tools for water conservation in agriculture, helping farmers improve soil health and reduce water loss through evaporation. Compost, made from decomposed organic matter, enhances soil structure, boosts its water-holding capacity, and increases nutrient content. By making the soil more porous, compost helps farms retain moisture and reduces the need for frequent irrigation.

Mulching, which involves covering the soil with organic materials like straw or wood chips, acts as a protective layer that prevents water evaporation and suppresses weeds. The combined use of compost and mulch promotes better water infiltration, conserves moisture, and reduces water requirements on the farm.



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Compost mulch



Straw mulch



Bark mulch



Newspaper mulch



Wood chips mulch



Sawdust mulch



Plastic mulch film



Black plastic mulch



LDPE plastic



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Compost and Soil Health:

- Improved Water Retention:
- Compost, which is made from decomposed organic matter, enhances soil structure, increasing its ability to hold water.
- Enhanced Drainage:
- Compost also improves soil drainage, preventing waterlogging and ensuring that plants can access the water they need.
- Increased Porosity:
- Compost creates more pore space in the soil, allowing for better aeration and water infiltration.
- Nutrient Cycling:
- Compost provides essential nutrients to plants, reducing the need for chemical fertilizers and promoting healthy plant growth.



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- Benefits of Compost for Soil Health:
- Improved Soil Structure:
 - Compost adds organic matter, which helps to form stable soil aggregates, improving aeration, drainage, and water infiltration.
- Enhanced Nutrient Availability:
 - Compost acts as a slow-release fertilizer, providing essential nutrients like nitrogen, phosphorus, and potassium, as well as trace elements, to plants.
- Increased Water Retention:
 - The organic matter in compost improves the soil's ability to hold water, making plants more resilient to drought and reducing the need for frequent irrigation.
- Support for Beneficial Microorganisms:
 - Compost provides a food source and habitat for beneficial soil microorganisms, which play a crucial role in nutrient cycling, disease suppression, and overall soil health.
- Reduced Erosion:
 - Healthy soil structure, promoted by compost, helps to prevent soil erosion, protecting valuable topsoil and maintaining water quality.
- Improved Crop Yields and Quality:
 - By enhancing soil health, compost contributes to increased crop yields and improved crop quality, leading to more sustainable and productive agricultural systems.
- Reduced Reliance on Synthetic Inputs:
 - Using compost reduces the need for synthetic fertilizers and pesticides, promoting environmentally friendly and sustainable practices.
- Long-Term Soil Improvement:
 - The benefits of compost application can persist for several years, leading to long-term improvements in soil health and productivity.



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- Mulch and Water Conservation:
- **Reduced Evaporation:**
- Mulch, which is a layer of organic material placed on the soil surface, helps to prevent water from evaporating from the soil, thus conserving moisture.
- **Weed Suppression:**
- Mulch inhibits weed growth, reducing competition for water and nutrients between plants and weeds.
- **Soil Temperature Regulation:**
- Mulch helps to maintain a cooler soil temperature, which can reduce stress on plants, especially during hot weather.
- **Reduced Runoff:**
- Mulch helps to prevent soil erosion and runoff, ensuring that rainwater infiltrates the soil and is available for plant use.
- **Types of Mulch:**
- Common types of mulch include straw, wood chips, compost, and leaf litter.



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- Dry Farming
- Dry farming is a technique that relies on natural rainfall and moisture stored in the soil without irrigation. It is particularly suitable for regions with limited water resources. Dry farming employs specific practices like strategic planting, soil preparation, and crop selection to encourage root growth and maximize water absorption from rainfall.
- This farming technique emphasizes the importance of conserving soil moisture through reduced tilling, soil mulching, and the use of drought-tolerant crop varieties.



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- Cover Crops in Water Conservation for Sustainable Farming

Cover crops are non-commercial crops grown primarily to protect and enhance the soil between main crop seasons. These crops, such as legumes, grasses, or clovers, are planted to prevent erosion, improve soil structure, and increase organic matter content.

Cover crops are vital to water conservation. They play an essential role by reducing surface runoff, increasing water infiltration, and minimizing soil evaporation. Their extensive root systems enhance soil water-holding capacity and nutrient retention. Incorporating cover crops into crop rotation systems can significantly improve soil health, conserve water, and mitigate the impacts of drought and heavy rainfall events.



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- Conservation Tillage

Conservation tillage practices involve minimizing soil disturbance during planting and cultivating crops. Reducing or eliminating traditional plowing or intensive tillage, coupled with the use of Aqua-Pam™ can be very helpful in preserving soil structure, organic matter, and beneficial soil organisms.

This practice enhances water conservation by improving soil infiltration and reducing erosion. The undisturbed soil becomes a natural barrier, preventing water runoff and promoting water retention in the root zone. Conservation tillage reduces water and contributes to improved soil health and nutrient cycling.



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- Optimizing Crop Performance through Water-Smart Practices

Optimizing crop performance through water-smart practices involves implementing strategies that enhance water use efficiency and maximize the productivity of crops. This includes employing techniques such as:

Crop Rotation: Boosting Water Conservation and Soil Health

- Crop rotation is a practice that involves growing different crops in a specific sequence on the same piece of land over time. This technique offers several benefits for optimizing crop performance and water use efficiency.
- For example, alternating between water-demanding crops and more drought-tolerant crops allows the soil to replenish moisture levels during periods of lower water demand. Crop rotation also helps break pest and disease cycles, reducing the need for chemical interventions and further enhancing crop health.



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- Water-Conserving Plants: Increased Water Efficiency
- Another approach to optimizing crop performance and water efficiency is by planting water-conserving plants. Water-efficient crops are specially selected or bred for their ability to thrive in water-limited conditions. They have evolved mechanisms such as deep root systems, reduced transpiration rates, or efficient water uptake to withstand droughts and periods of limited water availability.
- Incorporating water-conserving plants into agricultural practices optimizes water usage and offers several other advantages. By diversifying crop selection and utilizing water-efficient varieties, farmers can mitigate the impacts of climate change, including increased water variability and unpredictable weather patterns.



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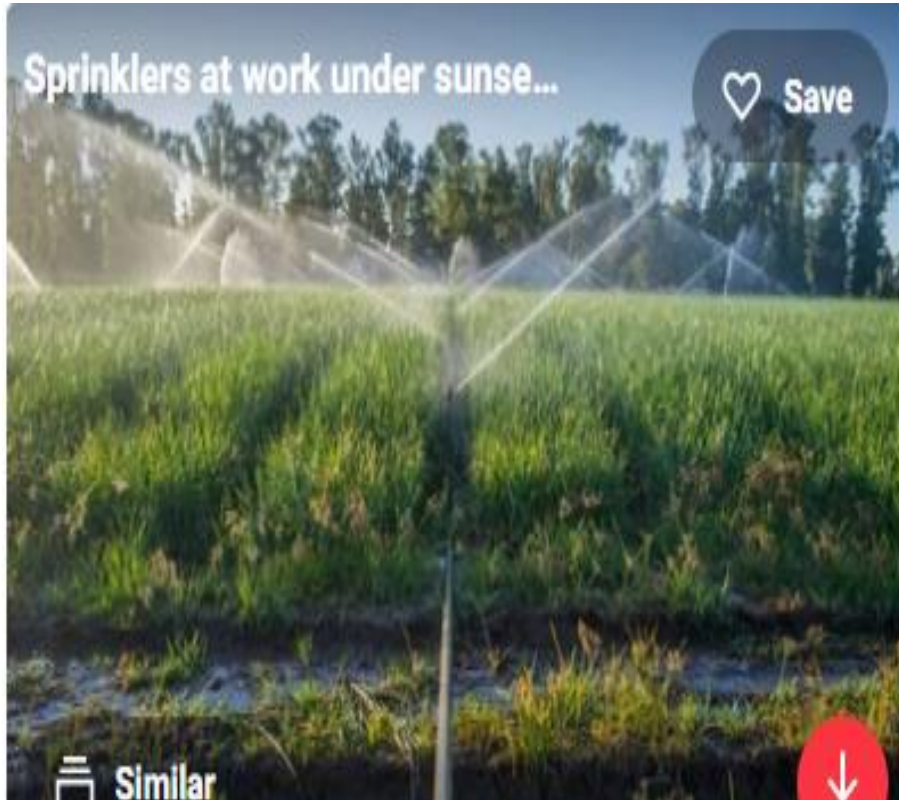


- Rotational Grazing for Enhanced Water Efficiency
- Rotational grazing is a sustainable livestock management practice that involves systematically moving livestock between different grazing areas. This technique improves soil health and contributes to water conservation by allowing pastures to rest and recover, promoting robust plant growth and deep root development. Increased vegetation cover from rotational grazing helps reduce soil erosion and water runoff, allowing more water to infiltrate and be retained in the soil for future use.
- Moreover, rotational grazing effectively manages livestock impact by preventing overgrazing in any single area. This practice maintains consistent ground cover, reducing the risk of soil compaction and enhancing water absorption. By supporting healthier soil and improving water-holding capacity, rotational grazing helps create a more resilient farming system, better equipped to handle water scarcity and sustain long-term agricultural productivity.



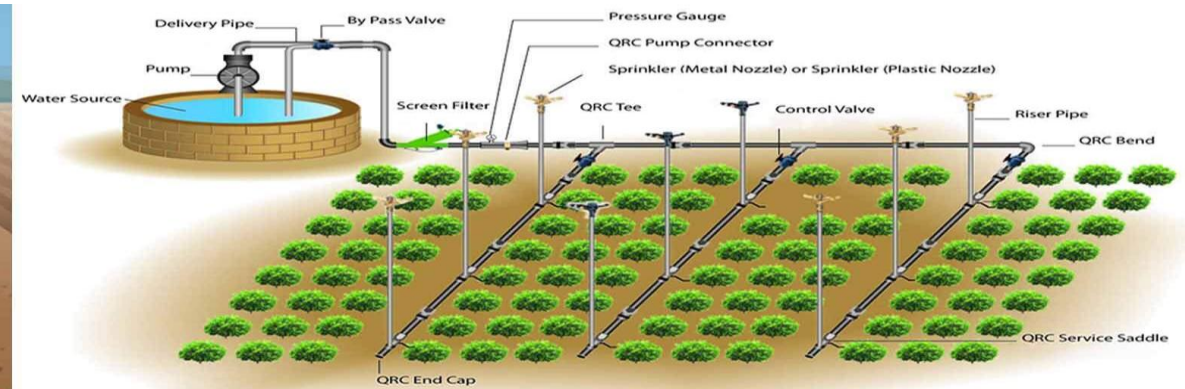
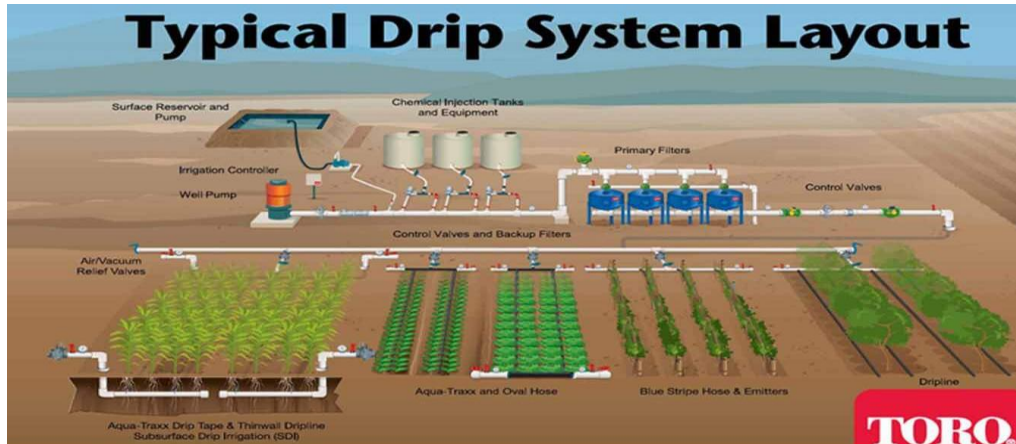
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Layout of Sprinkler Irrigation System





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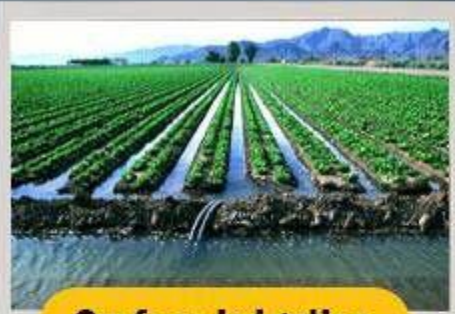


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Surface Irrigation



Drip Irrigation



Sprinkler Irrigation



Subsurface Irrigation

Modern Irrigation



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- The Purpose of Water in Industry
- Large supplies of water are needed by industries for fabricating, processing, washing, diluting, cooling or transporting a product.
- The amount of water used in the production phase is referred to as water intensity and can differ greatly depending on the product produced. For example, a pound of paper requires approximately 3,000 gallons of water compared to 65,000 gallons needed when producing a car.



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You already know that water is essential to humans. But did you know that it's critical to most industries, too?

Following agriculture, industry is the second largest user of the world's water consumption. From industries that produce metals and wood products to manufacturers of gasoline and chemicals, water is involved in some way during most production processes



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- **How to save Water in Industries?**

- 1) **Educate your employees**

- Build understanding in your employees why water is important and let them innovate ways to water conservation. You can announce awards in your company for identifying and innovative solutions to reduce water consumption.





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- 2) What is current water Consumption
- You need to know your current water consumption to set target for next cycle. It can be month or quarter or year. It will help you to identify peaks times, locations which are using more water, leaks and equipments.

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- **3) Routine Checks**
- Installation on Monitoring, water pressure meter and water flow meter will help to identify leakage in pipes, joints or valves.





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- 4) Minimal use in Cleaning
- To avoid high water consumption we can shift to electric brooms, vacuum cleaner or other cleaning devices (like squeegees etc.) in initial process. Wash equipments as and when required than regularly. Reduce the uses of water sprinkler.



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- **5) Equipment modification**
- Ensure that sprayer angle is perfect on product. Also use triggers to stop water flow, reduce water flow and pressure wherever possible without affecting performance to conserve water in Industry

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- **6) Install Water saving Equipments**
- There are plenty of water Conservation equipments are available. Consider using them. Such as toilet systems, tap aerators, also replace tap from high volume to high pressure and low volume.





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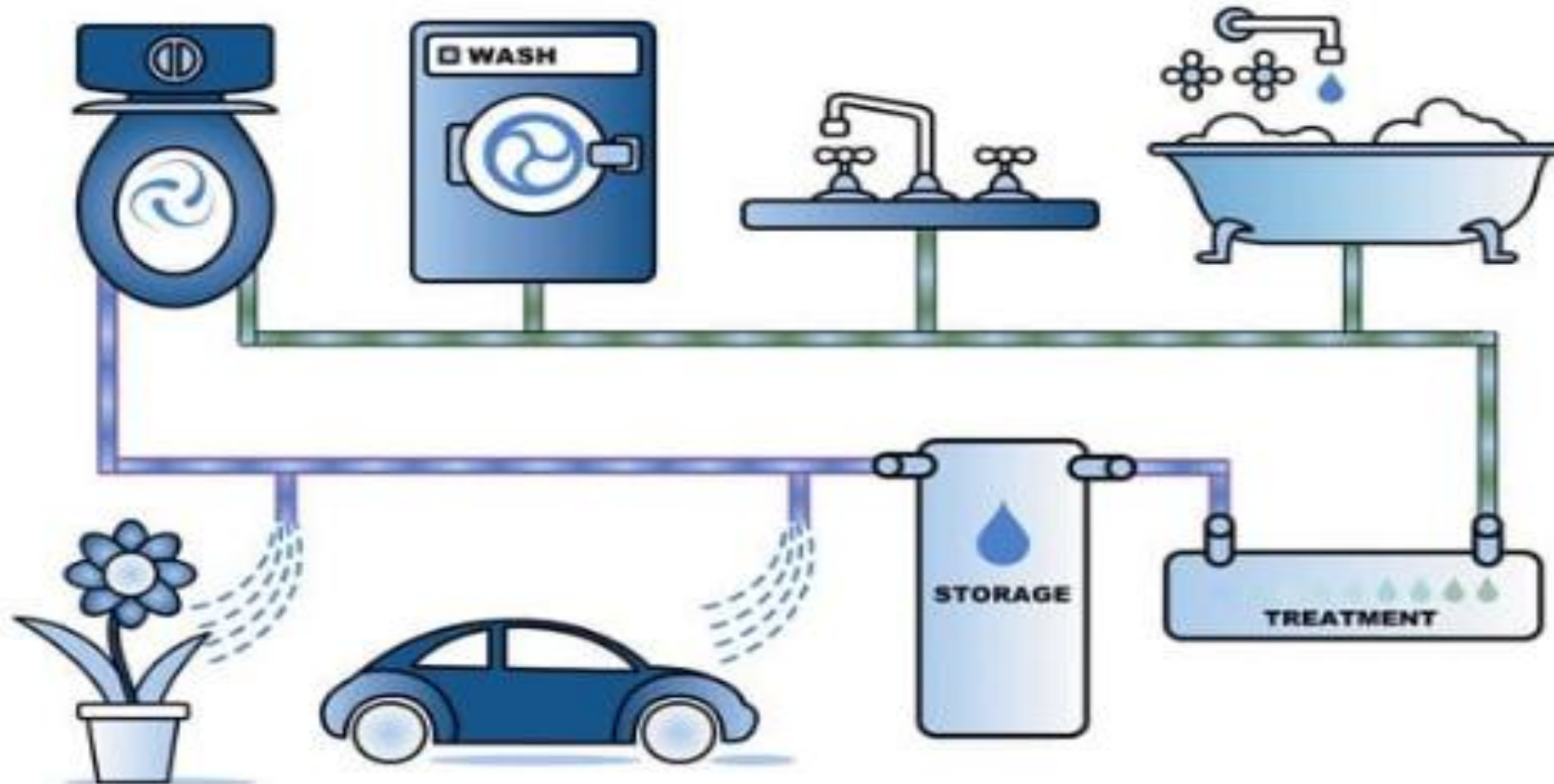
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- **Water Recycling**
- It is wrong assumption that all processes require pure drinking water (potable water) in business. We can reuse water (Non-Potable) in plant wherever possible. Let's say for fire protection, pH adjustment we can use non-potable water. Installation of cooling tower to recycle water with efficient refrigeration loop can save upto 25% of total water consumption.



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- **8) Ways to reuse Water**
- We can save water in Industries by Reuse Uhle-box seal water, Reuse of Centrifugal pump seal water, Reuse vacuum pump seal water, use condenser water for steam makeup.
- **9) Reverse Osmosis**
- Consider installing reverse osmosis unit to treat water. Although energy consumed by this plant is much higher but it worth it.



- **10) Effluent and sewage water treatment plant**
- Installing and maintaining ETP (effluent treatment plant) and STP (sewage treatment plant) in industry area to treat waste water, so that it can be recycled for flush in toilet and floor cleaning.
- Do you know any other ways to save water in industries, then please mention in comment.
- Perfect Pollucon Services offers Cess return assessment and has experts with technical information to help you identify ways to save water in industries by reducing its consumption and wastes.



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- **Water Conservation in Construction Industry**
- Water conservation in the construction industry is of paramount importance due to the substantial water demands associated with construction activities. The construction industry consumes vast amounts of water for activities like site preparation, concrete mixing, dust control, and equipment cleaning.
- Implementing water conservation measures can significantly reduce the environmental impact of construction projects, conserve water resources, and mitigate the strain on local water supplies. Techniques such as rainwater harvesting, efficient irrigation systems, water-efficient fixtures, and wastewater recycling can be employed to minimize water consumption during construction.
- Additionally, promoting awareness and providing training to construction workers and contractors on the importance of water conservation can foster a culture of sustainable water use within the industry. By prioritizing water conservation practices, the construction sector can play a vital role in preserving water resources and promoting sustainable development.



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- **Water Conservation in Service Industry**
- Water conservation in the service industry is essential to reduce water usage and minimize the environmental impact of operations. The service industry encompasses a wide range of sectors, including hospitality, restaurants, entertainment, and healthcare, all of which rely on water for various purposes such as cleaning, sanitation, and customer services.
- Implementing water-efficient practices such as installing low-flow faucets and toilets, fixing leaks promptly, and optimizing water-intensive processes can significantly reduce water consumption. Additionally, raising awareness among employees and customers about the importance of water conservation can foster a culture of responsible water use within the service industry.
- By prioritizing water conservation efforts, the service industry can contribute to the overall sustainability goals and help conserve this valuable resource for future generations.



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- Digital tools to enable water system optimisation
- Follow-up and optimisation of water consumption and of treatment processes is essential for successful results. AFRY offers several products to support optimisation of water systems in the process industry:
- Effluent Treatment Optimisation Tool: A digitalized tool to ensure continuous compliance of your effluent treatment discharge
- AFRY Walk Trough Audit: Brief but efficient audit to identify the key improvement opportunities.
- AFRY On-line Process Optimisation: Long-term consultancy support and advisory in the optimisation of mill processes
- Water Use Monitoring: A digitalised tool to enable control of water use, target setting and follow-up of targets.



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- Key aspects of industrial water policy:
- Resource Allocation:
 - Water resources are allocated to industries in a way that supports economic growth and meets the needs of the sector, while also considering environmental sustainability.
- Water Conservation:
 - Policies encourage the adoption of technologies and practices that reduce water consumption during industrial processes, such as water-smart management techniques and zero water withdrawal.
- Water Reuse and Treatment:
 - Policies promote the reuse of treated wastewater for non-potable industrial uses and incentivize water treatment to generate tradable credits.
- Water Quality Management:
 - Policies ensure that industrial water meets specific quality standards, depending on the application, and that wastewater is treated and discharged in compliance with regulations.
- Water Demand and Supply Trading:
 - Policies may establish frameworks for water demand and supply trading, where industries can trade water allocations or credits for water conservation efforts.
- Benchmarking and Monitoring:
 - Policies may include benchmarking studies to assess water use efficiency in different industrial sectors and to identify opportunities for improvement.



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- **Policy Interventions:**
- Policies can include financial incentives, regulatory frameworks, and technological support to encourage water conservation and efficient water use within industries.
- Examples of policies and initiatives:
- **State Water Policy 2022 (Karnataka):**
- This policy outlines how water resources will be allocated to different sectors, including industry, and how water savings can be transferred to industry to promote economic growth.
- **Benchmarking Industrial Water Use Efficiency in India (TERI):**
- This study assesses water use efficiency in various industrial sectors and recommends policy interventions to improve water use.
- **National Water Resources Policy (India):**
- This policy recognizes the importance of providing adequate water supply for industry and states that industrial water needs should be included in water resources development plans.
- **Circular Economy:**
- Policies promoting circular economy principles encourage the reduction of resource use, including water, and the reuse, recycling, and recovery of water and waste.
- By implementing these policies, governments can promote sustainable water use in industries, contribute to economic growth, and protect water resources for future generations.



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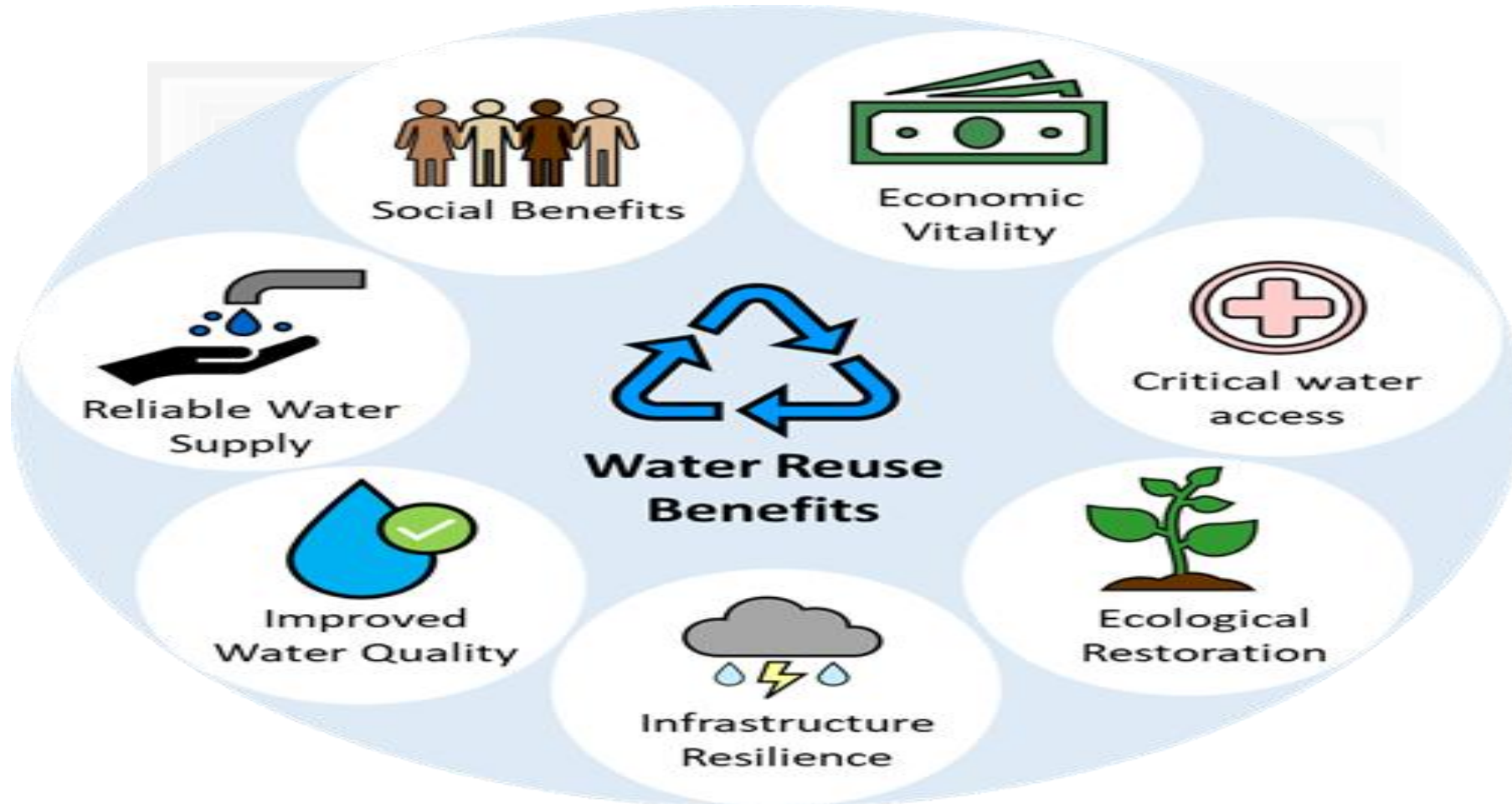


- Water Reuse and Recycling: A Deeper Dive
- Water reuse and recycling involve treating wastewater and then using it for beneficial purposes like irrigation, industry, or even potable water. This practice reduces reliance on freshwater sources, enhances water security, and promotes sustainability. Water recycling, also known as water reclamation, specifically focuses on reusing treated wastewater within the same system for the same or similar purpose.



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Potable Water Reuse (drinkable)





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- Benefits:
- Water Conservation: Reduces the demand for freshwater, which is increasingly scarce in many regions.
- Environmental Protection: Reduces the discharge of wastewater into rivers and lakes, protecting aquatic ecosystems.
- Economic Savings: Can reduce energy consumption and costs associated with water treatment and supply.
- Sustainability: Promotes sustainable water management practices and helps to meet water demand in the face of climate change.



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- Challenges:
- Public Acceptance: Concerns about the quality of reclaimed water and its potential health impacts can hinder public acceptance and implementation.
- Regulatory Frameworks: Need for clear regulations and standards to ensure the safety and effectiveness of reclaimed water use.
- Infrastructure Costs: Requires investment in treatment facilities and infrastructure to support water reuse and recycling



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Water Recycling vs. Water Reuse

- While both terms are often used interchangeably, there's a subtle difference:
- Water recycling:
- Typically involves using treated wastewater within the same system for the same purpose, like cooling water in a power plant.
- Water reuse:
- More broadly encompasses using treated wastewater for any beneficial purpose, which may include different sectors or applications.

Key Differences Between Recycling and Water Reuse



Feature	Recycling	Water Reuse
Resource Type	Solid materials (plastic, metal, paper, etc.)	Water (liquid waste)
Primary Goal	Create new products and reduce solid waste	Conserve water and reduce dependence on freshwater
Processing Complexity	Varies by material; can be energy-intensive	Requires advanced treatment for safety and reuse
End Uses	Consumer goods, construction materials, packaging	Irrigation, industrial use, potable (drinking) water
Environmental Impact	Reduces landfill space, energy usage	Reduces water stress, pollution, and over-extraction
Circular Economy Role	Enables material circularity	Enables sustainable water cycles



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- **What are the Environmental Benefits of Water Recycling?**
- In addition to providing a dependable, locally-controlled water supply, water recycling provides tremendous environmental benefits. By providing an additional source of water, water recycling can help us find ways to decrease the diversion of water from sensitive ecosystems. Other benefits include decreasing wastewater discharges and reducing and preventing pollution. Recycled water can also be used to create or enhance wetlands and riparian habitats.



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- **Water Recycling Can Decrease Diversion of Freshwater from Sensitive Ecosystems**
- Plants, wildlife, and fish depend on sufficient water flows to their habitats to live and reproduce. The lack of adequate flow, as a result of diversion for agricultural, urban, and industrial purposes, can cause deterioration of water quality and ecosystem health. People who reuse water can supplement their demands by using a reliable source of recycled water, which can free considerable amounts of water for the environment and increase flows to vital ecosystems.



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- **Water Recycling Decreases Discharge to Sensitive Water Bodies**
- In some cases, the impetus for water recycling comes not from a water supply need, but from a need to eliminate or decrease wastewater discharge to the ocean, an estuary, or a stream. For example, high volumes of treated wastewater discharged from the San Jose/Santa Clara Water Pollution Control Plant into the south San Francisco Bay threatened the area's natural salt water marsh. In response, a \$140 million recycling project was completed in 1997. The South Bay Water Recycling Program has the capacity to provide 21 million gallons per day of recycled water for use in irrigation and industry. By avoiding the conversion of salt water marsh to brackish marsh, the habitat for two endangered species can be protected.



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- **recycled Water May Be Used to Create or Enhance Wetlands and Riparian (Stream) Habitats.**
- Wetlands provide many benefits, which include wildlife and wildfowl habitat, water quality improvement, flood diminishment, and fisheries breeding grounds. For streams that have been impaired or dried from water diversion, water flow can be augmented with recycled water to sustain and improve the aquatic and wildlife habitat.



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- **Water Recycling Can Reduce and Prevent Pollution**
- When pollutant discharges to oceans, rivers, and other water bodies are curtailed, the pollutant loadings to these bodies are decreased. Moreover, in some cases, substances that can be pollutants when discharged to a body of water can be beneficially reused for irrigation. For example, recycled water may contain higher levels of nutrients, such as nitrogen, than potable water. Application of recycled water for agricultural and landscape irrigation can provide an additional source of nutrients and lessen the need to apply synthetic fertilizers.



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- What is Water Pollution?
- Water Pollution is the contamination of water bodies such as lakes, rivers, streams, or marine environments caused by toxic substances discharged directly or indirectly into them without adequate treatment to remove harmful compounds.
- This spells disaster for aquatic ecosystems, and the pollutants also seep through and reach the groundwater, which might end up in our households as water used in daily activities.
- The contaminating substances that cause water pollution are called Water Pollutants.
- These substances can come from various sources, such as effluent discharge, solid waste, etc.
- Water Pollution is one of the prominent types of Environmental Pollution.

Point Sources

Pollution flowing from a single and identifiable source is termed as point source.

For example, discharge pipe from a factory, roadway or leaking underground storage tank.





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- Non Point Sources
- Non-point sources of pollution are often termed 'diffuse' pollution, which refers to inputs and impacts that occur over a wide area and are not easily attributed to a single source.
- They are often associated with particular land uses instead of individual point source discharges.
- For example, run-off from agri fields, urban landscapes, mining fields, construction sites, etc.
- Non-point source pollution is often more difficult to control than point source pollution.



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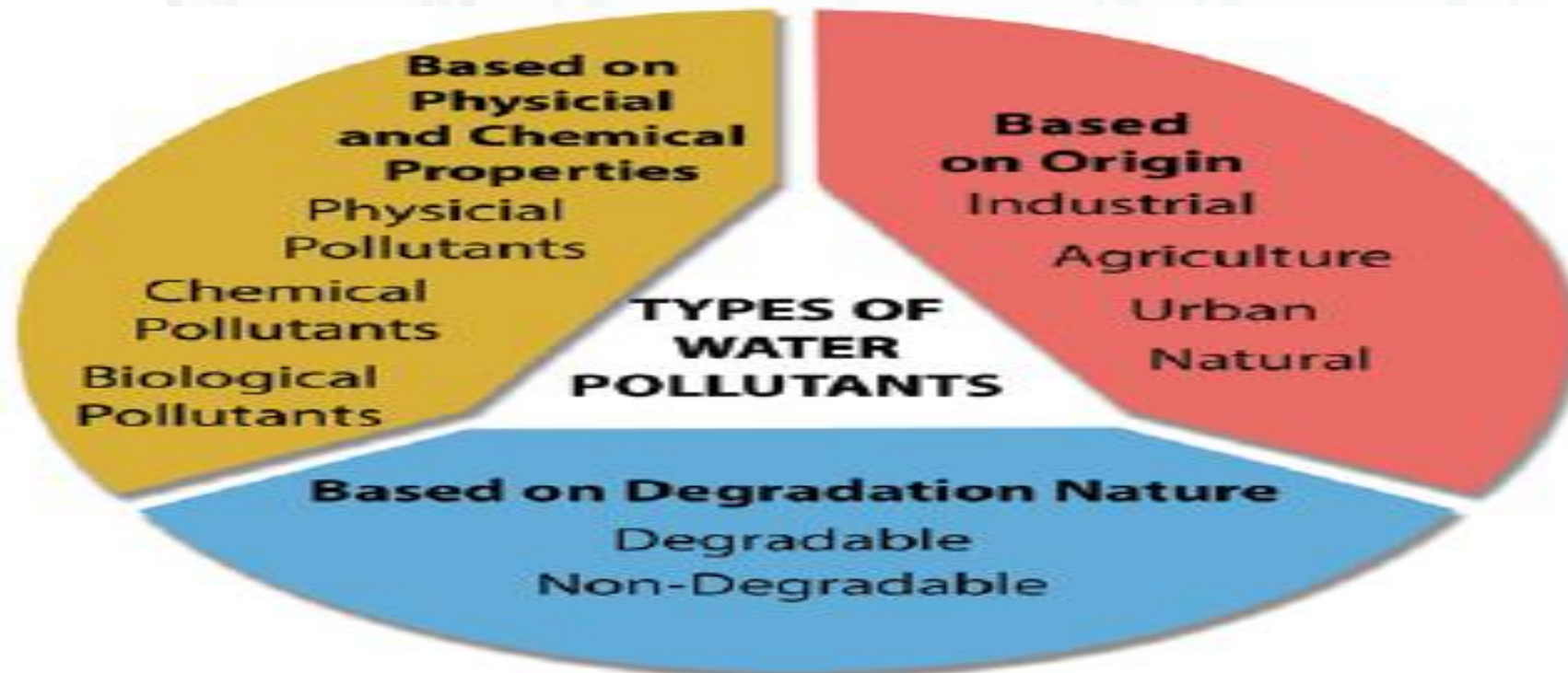
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- The various non-point sources of water pollution are:
 - **Agriculture:** In farming areas, non-point sources of pollution include pesticides, fertilisers, animal manure, and soil washed into streams during rainfall run-off, where stock is given access to stream banks. They may foul the water and accelerate erosion.
 - **Forestry Land Use:** It may contribute to non-point source pollution of streams by increasing soil erosion and sediment run-off.
 - **Urban Land Use:** Rainfall-runoff as stormwater drains is one of the major nonpoint sources of pollution in urban areas, impacting the water quality of our waterways and bays.
 - **Mining:** Abandoned mine drainage is a form of water pollution.
 - **Highway and Bridges:** Runoff from roads, highways, and bridges reach surface waters.

Types of Water Pollution

Based on different parameters, water pollutants can be classified into different categories, as described below





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- **Based on Origin**
- **Industrial Pollutants:** Different industrial pollutants include carbonates, nitrites, and nitrates of heavy metals such as mercury, lead, zinc, arsenic, etc.
- **Agricultural Pollutants:** These are chemical fertilisers, pesticides, insecticides, herbicides, synthetic chemical compounds, weeds, and plant remains.
- **Urban Pollutants:** These contain chemicals from vehicular exhaust, lime, household sewage, chemical fertilisers used in the lawns and gardens within the city, etc.
- **Natural Pollutants:** The natural pollutants include volcanic dust, sediments due to weathering and erosion, debris caused by landslides, decayed and decomposed organic matter, etc



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- **Based on Physical and Chemical Characteristics**
- **Physical Pollutants:** These pollutants can change physical characteristics such as taste, turbidity, colour, sedimentation content, dissolved and suspended solids, etc.
- **Chemical Pollutants:** Carbonates, chlorides, sulphites, sulphates, sulphides, nitrates of heavy metals like mercury, lead, cadmium, etc., pesticides, herbicides, insecticides and other chemical compounds.
- **Biological Pollutants:** Any contaminant of biological origin that causes water pollution is called a biological pollutant, such as infective bacteria, viruses, protozoa, and parasitic worms.



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- **Based on Nature of Degradation**
- **Degradable Pollutants:** Pollutants that can be broken down by biological agents such as decomposers or microorganisms.
 - These are also known as **organic pollutants**, e.g. sewage, garbage, plants and animals.
- **Non-Degradable Pollutants:** These pollutants cannot be degraded quickly by biological agents or sunlight.
 - These are also known as **inorganic pollutants**, e.g. plastic pollutants, solid toxic substances and chemical pollutants.



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- **Causes of Water Pollution**
- Water pollution is caused by various human activities that introduce harmful substances into water bodies.
- Major causes of water pollution include industrial waste discharge, agricultural runoff containing pesticides and fertilisers, untreated sewage, oil spills, and the dumping of plastic and other non-biodegradable waste.
- Additionally, mining activities, deforestation, and the improper disposal of hazardous chemicals contribute to water contamination as well as water pollution.
- This water pollution disrupts aquatic ecosystems, harms wildlife, and poses serious health risks to humans.
- Natural causes, such as volcanic eruptions and soil erosion, can also lead to water pollution, but human activities are the primary contributors.



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- **Effects of Water Pollution**
- The effects of water pollution are as follows:
- **Health Effects**
 - Contaminated water is a major source of waterborne diseases such as cholera, typhoid, hepatitis A, and dysentery.
 - Exposure to toxic chemicals in polluted water can lead to serious health conditions, including cancers, neurological disorders, and reproductive issues.
- **Environmental Effects**
 - Water pollution can disrupt reproductive processes, cause fish kills, and alter aquatic habitats.
 - All these lead to the loss of biodiversity.
 - Excess nutrients from agricultural runoff can cause eutrophication, leading to algal blooms that deplete oxygen levels in water.
 - This process can result in “dead zones” where aquatic life cannot survive.
- **Economic Effects**
 - Water pollution can have significant economic costs, including increased healthcare expenses, loss of tourism revenue, and reduced agricultural productivity.
 - Water pollution affects fish populations, reducing catches and economic losses for the fishing industry.
 - Cleaning up polluted water bodies and restoring affected ecosystems can cause substantial costs.
- **Other Effects**
 - Water Pollution can render freshwater sources unusable, reducing the availability of clean water for drinking, irrigation, and industrial use.
 - This can exacerbate water scarcity issues




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Chemicals	Health Impacts
Mercury	Minamata Disease—Mercury is converted into Methyl Mercury by bacterial action, which causes numbness of limbs, lips, and tongue, deafness, blurring of vision, and mental derangement.
Cadmium	Itai-itai disease (ouch-ouch disease) – a painful disease of bones and joints.Cancer of the liver and lung
Nitrate	Methaemoglobinemia or Blue-baby Syndrome – Nitrate reacts with haemoglobin and forms non-functional methaemoglobin that impairs Oxygen transport.
Fluoride	Skeletal fluorosis – hardened bones and stiff and painful joints.Teeth deformity
Arsenic	Black-Foot DiseaseDiarrhoeaPeripheral NeuritisHyperkeratosisLung and skin cancers
Lead	Symptoms of Lead exposure: persistent fatigue, irritability, loss of appetite, constipation, insomnia.Effects in Children: damage to brain and nervous system, behavioural problems, anaemia, liver and kidney damage, hearing loss, dev delays.Effects in Adults: poor muscle coordination, nerve damage, high BP, hearing and vision impairment, reproductive problems, and low fetal development.



#WaterWisdom



Top 10 Things You Can Do to Reduce Water Pollution

<p>Recycle motor oil and other vehicle fluids.</p> 	 <p>Compost leaves and yard clippings.</p>	<p>Throw litter in its place.</p> 	<p>Wash your vehicle on your lawn rather than on pavement.</p> 
<p>Tell a friend or neighbor about how to prevent stormwater pollution, and get involved in your community's programs.</p> 	<p>Only allow storm water down a storm drain or into a drainage ditch.</p> 	<p>Reduce household hazardous wastes.</p> 	 <p>Use fertilizer and pesticide sparingly.</p>
<p>Clean up after your pet.</p> 		 <p>Check your vehicles for leaks and repair them.</p>	



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Home Waste

(Garbage thrown into the river)



Festivals

(Goddesses into rivers)



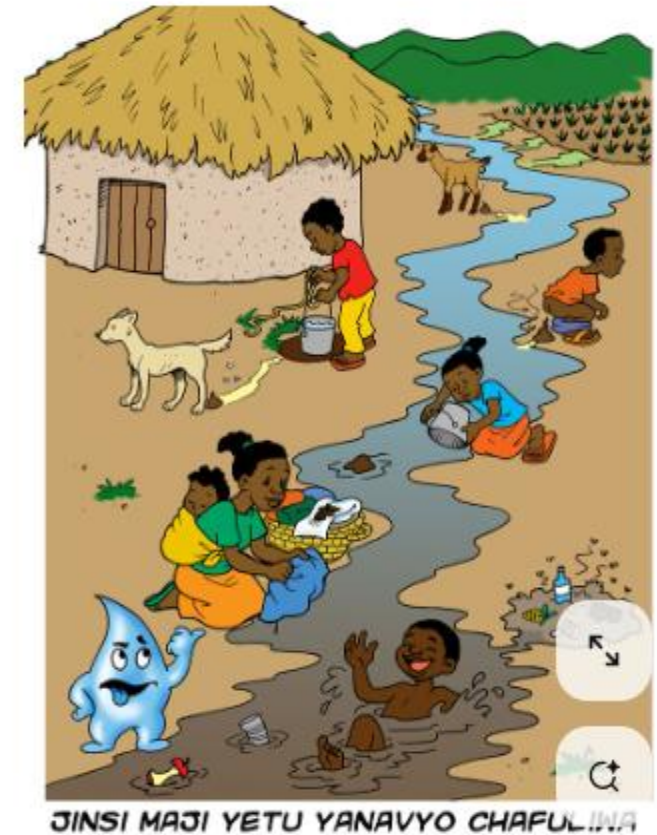
Industries

(Toxic chemicals as waste)



Farmers

(Fertilizers washed down and flow into river)



JINSI MAJI YETU YANAVYO CHAFULIWA



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BEAUMONT
TEXAS

5 HOUSEHOLD HABITS TO PREVENT STORMWATER POLLUTION

Stormwater is the water that flows into our drains. Any chemicals, debris, or pollutants it picks up along the way can get into the water we use to swim, fish, and produce fresh drinking water.

LAWN MAINTENANCE

Use pesticides and fertilizers sparingly and sweep up yard debris so it doesn't get blown down the drain

HOME IMPROVEMENT

Protect storm drains before starting any home improvement projects, and clean up all debris immediately

GARAGE WASTE

Clean spills with an absorbent material like kitty litter or sand, and recycle vehicle oils at a participating service station

VEHICLE WASTE

Clean any spills from vehicle maintenance, and wash your vehicle on grass to prevent runoff into drain

GARDEN MAINTENANCE

Plant native plants in your yard since they require less water, fertilizers, and pesticides

REMEMBER: ALL STORM DRAINS CONNECT TO OUR WATERWAYS