WATER QUALITY MONITORING IN PUBLIC POOLS

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Content

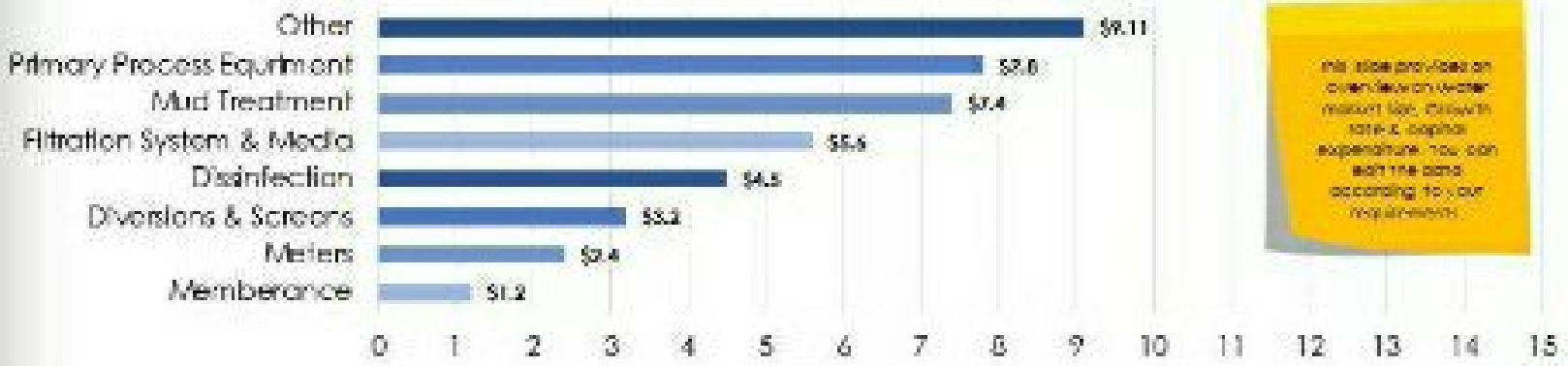
Introduction

- Water market overview
- Global water treatment market by industry
- Global water treatment market by geography
- Water industry key statistics in U.S.
- Key global water industry statistics
- Water industry trends
- Water industry growth drivers

Water Market Overview

	US Market $ Bn.	US 5 Year Growth %	Global Market $ Bn.	Global Growth %
Overall Water Market	$211.0	1 - 3%	$26.48	3 - 5%
Water Treatment Equipment	$10.00	4 - 2%	$12.40	2 - 5%
Transport (pipes, pumps & valves)	$6.14	3 - 1%	$43.11	1 - 6%
Chemicals	$4.25	3 - 4%	$32.10	4 - 2%
Instruments & Testing	$2.54	4 - 2%	$20.26	2 - 7%
Residential Water Treatment	$8.61	6 - 2%	$14.82	2 - 8%
Engineering & Construction	$2.14	2 - 6%	$28.41	6 - 10%
Drinking & WW Utilities	$3.12	3 - 2%	$61.10	2 - 5%

Annual Global Capital Expenditure in Water Equipment ($ Bln)



Global Water Treatment Market by Industry

Global Water Treatment Market by Geography

This slide is 100% editable. Adapt it to your needs and capture your audience's attention.

Water Industry Key Statistics in U.S.

Where do Office Buildings use Water?

- Drinking/Kitchen
- Cooling/Heating
- Landscaping
- Restrooms

Common Type of Water Filters

- Membrane
- Reverse Osmosis
- Activated Carbon
- Distillers
- Ion Exchange
- Ultraviolet (UV)

key statistics play a vital role in analyzing the market. You can organize the data with your own

$134 Billion

Total size of the US Water Market

9%

Of the total water use in commercial & institutional facilities come from office buildings

Top5

Uses of water

- Drinking/Households
- Agriculture
- Industry/Commerce
- Energy
- Recreation

Key Global Water Industry Statistics

Realizing a circular economy could globaly divert up to 340 million tons of waste from landfill each year

Industry is the second largest user of water, behind agriculture

Global water demand for Manufacturing is anticipated to increase by 400% by 2050

Global demand for water will exceed viable resources by 40% by 2030 if we continue business as usual

This slide provides forecast about the water industry based on the current scenario globally

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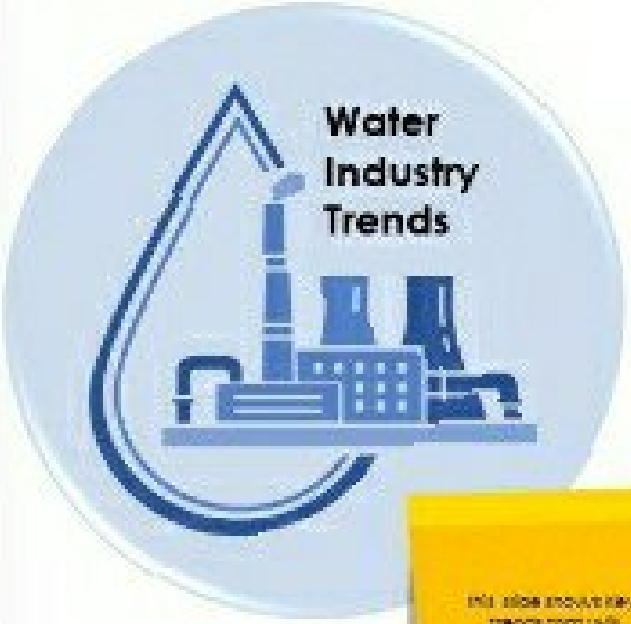
Trends Influencing Water Industry



01. Increasing Regulation

02. Failing Infrastructure

03. Enhanced Monitoring & Measurement

04. Water Scarcity

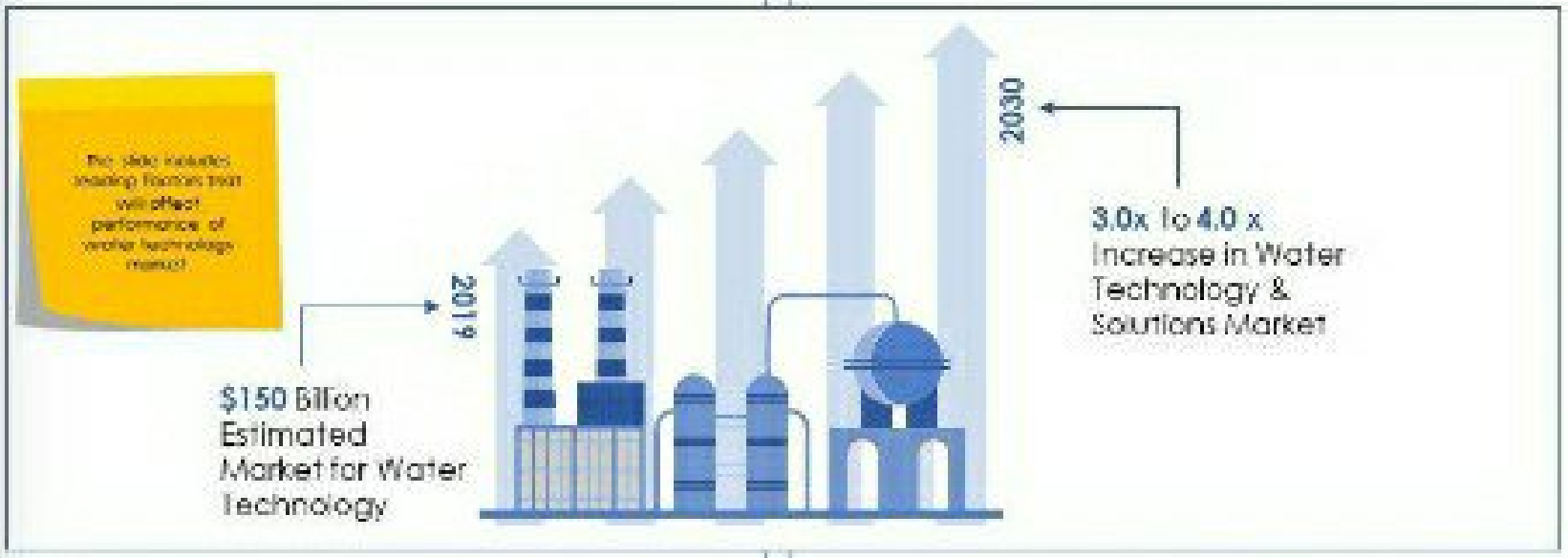
05. Greater Conservation & Efficiency

06. Growth in Desalination

Water Industry Growth Drivers

1. " 2.5x Increase In Demand (3.0% CAGR)

2. Stronger Environmental Compliance Required



$150 Billion Estimated Market for Water Technology

3.0x to 4.0 x Increase in Water Technology & Soutions Market

4. Gradual Migration towards "Market" pricing for Water Delivery & Treatment

3. Grater Efficiency Required (Energy & O&M Costs)

Water Quality

- Sources of water pollution
- Natural processes effecting water quality
- Human processes effecting water quality
- Brief overview on optimization of deterioration in water quality
- Pollutants that deteriorate water quality on global scale

Sources of Water Pollution

Sources of Water Pollution

When we talk about Water Quality, first thing that comes in to picture is the sources of pollution which have been categorised in this slide. You can edit this based on your requirement.

Natural Causes

Same in Rural & Urban Areas

- ✓ Geology of Rocks
- ✓ Climate Change
- ✓ Atmospheric
- ✓ Text Here
- ✓ Text Here

Anthropogenic Causes

Rural Areas

- ✓ Agricultural Activities
- ✓ Run off from Croplands
- ✓ Mining Operation
- ✓ Text Here
- ✓ Text Here
- ✓ Text Here

Urban Areas

- ✓ Industrial Discharge
- ✓ Channelization
- ✓ Municipal Discharges
- ✓ Text Here
- ✓ Text Here

Natural Processes Effecting Water Quality

Process Type	Major Process within Water Body	Water Body
Hydrological	Dilution	All water bodies
	Evaporation	Surface waters
	Percolation & leaching	Groundwaters
	Suspension & setting	Surface waters
Physical	Gas exchange with atmosphere	Mostly rivers and lakes
	Volatilisation	Mostly rivers and lakes
	Adsorption/desorption	All water bodies
	Heating and cooling	Mostly rivers and lakes
	Diffusion	
Chemical	Photodegradation	
	Acid base reactions	All water bodies
	Redox base reactions	All water bodies
	Dissolution of particles	All water bodies
	Precipitation of minerals	All water bodies
	Ionic exchange[1]	Groundwaters
Biological	Primary production	Surface waters
	Microbial die-off and growth	All water bodies
	Decomposition of organic matter	Mostly rivers and lakes
	Bioaccumulation[2]	Mostly rivers and lakes
	Biomagnification[3]	Mostly rivers and lakes

Here we have provided four different process types affecting water quality along with their sub-categories. Choose the one that suits your requirement.

Human Processes Effecting Water Quality

Sources Type	Major Sources of Water Pollution	Water Body
Direct Sources	Dumping	All water bodies
	Industrial Runoff	All water bodies
	Agricultural Runoff	Surface waters
	Chemical Runoffs	All water bodies
	Plastics	All water bodies
	Batteries	Groundwaters
Indirect Sources	Domestic City Sewage	Rivers and lakes
	Septic Systems	All water bodies
	Excess Nutrients in Supply Water	Surface waters
	Leaks & Spills	Surface waters
	Fossil Fuels	All water bodies
	Mining	Surface Waters

Here we have provided two different human source types affecting water quality along with their sub-categories. Choose the one that suits your requirement.

Brief Overview on Optimization of Deterioration in Water Quality

A three-point strategy to resolve conflict between water use and quality deterioration.

Determining the quality of water and aquatic environment and adopting water-use procedures that prevent deterioration

In order to control pollution, wastes are treated before discharging into a water resource

Polluted water is treated before use in order to meet the optimum water quality

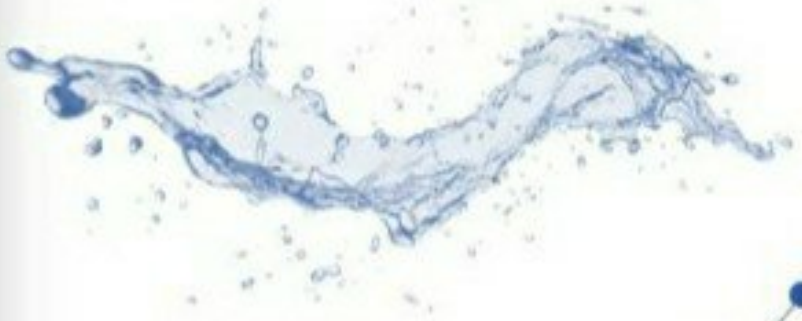
Pollutants that deteriorate Water Quality on Global Scale

Here in this slide we have provided some of the common chemical and biological pollutants that deteriorate water quality.

	Rivers	Lakes	Reservoirs	Groundwaters
Pathogens	●●●	●	●	●
Suspended Solids	●●	○○	●	○○
Decomposable organic matter	●●●	●	●●	●
Eutrophication	●	●●	●●●	○○
Nitrate as a pollutant	●	○	○	●●●
Salinisation	●	○	○	●●●
Heavy metals	●●	●●	●●	●●
Organic micro-pollutants	●●	●	●●	●●●
Acidification	●	●●	●	○
Changes to hydrological regimes	●●	●●	●●	●

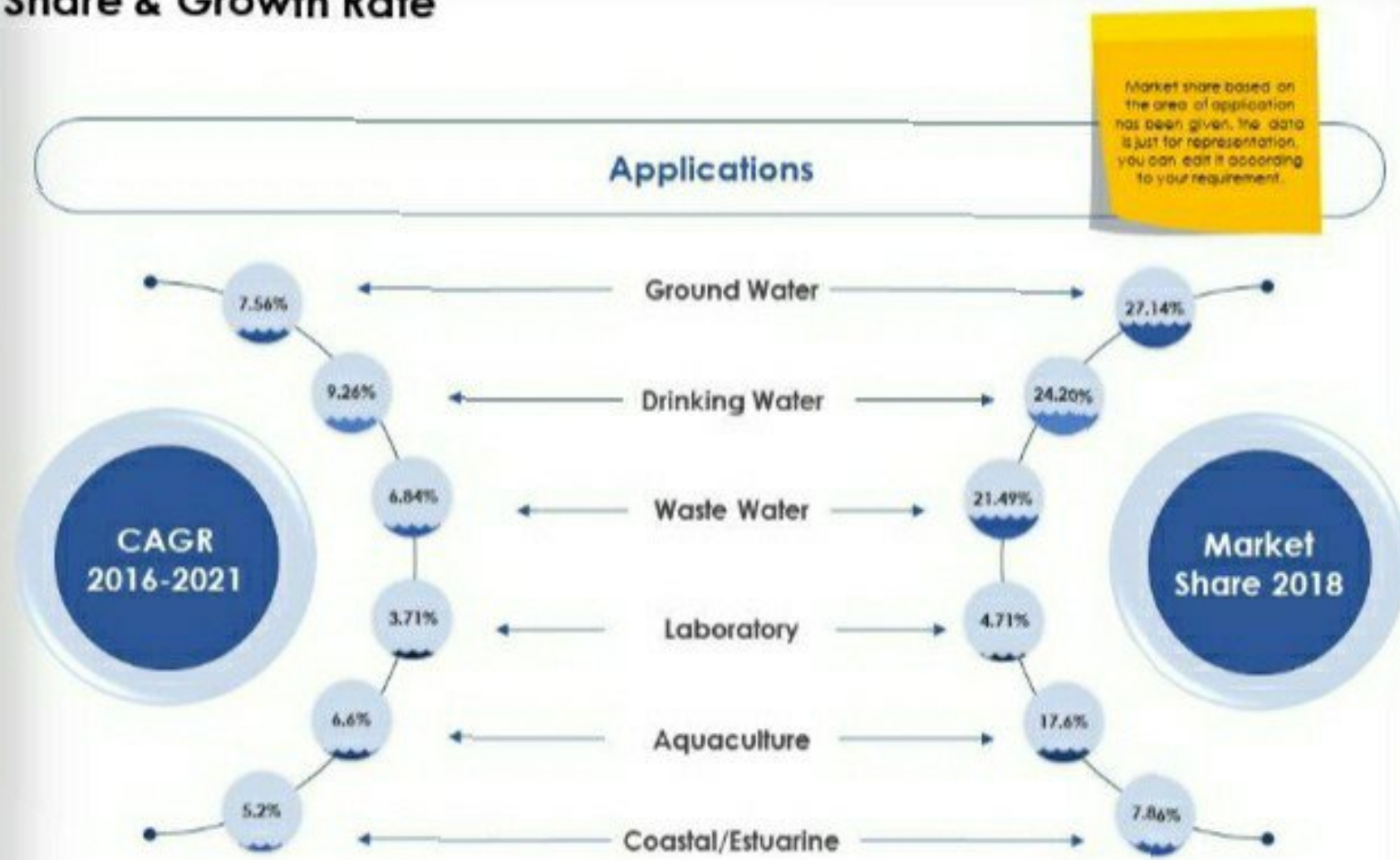
●●●	●●	●	○	○○
Globally Occurring or Locally Severe Deterioration	***Important* Deterioration**	**Occasional or Regional Deterioration**	**Rare Deterioration**	**Not Relevant**

Designing a Monitoring Program



- Global water quality monitoring equipment by application- market share & growth rate
- Water quality monitoring types
- Preliminary surveys for determining water quality
- Description of the monitoring area
- Types of monitoring sites and programme objectives
- Considerations while selecting sampling site
- Location map of the sampling sites
- Variables used in water quality monitoring programme
- Frequency and timing of sampling

Global Water Quality Monitoring Equipment by Application- Market Share & Growth Rate



Water Quality Monitoring Types

Objectives for each type of monitoring have been listed here. You can choose the one that matches your requirement.

Monitoring Type	Objectives
Surveillance Monitoring	✓ Identification of baseline conditions in the water-course system ✓ Detection of any signs of deterioration in water quality ✓ Identification of any water bodies in the water-course system that do not meet the desired water quality standards ✓ Identification of any contaminated areas
Operational Monitoring	✓ Development of water quality guidelines and/or standards for specific water uses ✓ Development of regulations covering the quantity and quality of waste discharges ✓ Development of a water pollution control programme
Investigative Monitoring	✓ Determination of the extent and effects of specific waste discharges ✓ Estimation of the pollution load carried by a water-course system or subsystem ✓ Evaluation of the effectiveness of a water quality management intervention

Preliminary Surveys for Determining Water Quality

this is a sample survey data. You can replace the data with your own findings.

Collection Site	E.coli	pH	Ammonia	Nitrate	Phosphorus	Dissolved O2	Chloride	Nitrite
Site 01	156.5	8.1	<0.05	<1	0.202	7.8	6	<0.05
Site 02	248.1	8.1	<0.05	<1	0.027	7.8	<5	<0.05
Site 03	178.2	8	<0.05	<1	0.15	7.7	8	<0.05
Site 04	201.4	8	<0.05	<1	0.069	7.6	8	<0.05
Site 05	121.1	8	<0.05	<1	0.043	7.8	6	<0.05
Site 06	461.1	8	<0.05	<1	0.02	7.6	6	<0.05
Site 07	160.7	8	<0.05	<1	0.036	7.8	6	<0.05
Site 08	285.1	8.1	<0.05	<1	0.02	7.6	<5	<0.05
Site 19	1119.9	8.1	<0.05	<1	0.038	7.8	7	<0.05
Site 10	816.4	8.1	<0.05	<1	0.074	7.7	6	<0.05
Site 11	727	8.1	<0.05	<1	0	7.7	5	<0.05
Site 12	579.4	8.1	<0.05	<1	0.049	7.8	5	<0.05

Description of the Monitoring Area

Parameters	Comments
Environmental Conditions and Processes	✓ Your text here ✓ Your text here
Meteorological and Hydrological Information	✓ Your text here ✓ Your text here
Description of Water Bodies	✓ Your text here ✓ Your text here
Summary of Actual and Potential uses of Water	✓ Your text here ✓ Your text here

Types of Monitoring Sites and Programme Objectives

Type of Site	Locations	Objectives
Baseline Site	Location 01	To establish natural water quality conditions to provide a basis for comparison impact (as represented by trend & global flux station) To test for the influence of long-range transport of contaminants & the effects of climatic change
Trend Site	Location 02	To test for long-term changes in water quality to provide a basis for statistical identification of the possible causes of measured conditions or identified trends
Global River Flux Site	Location 03	To determine fluxes of critical pollutants from river basin to ocean or regional sea Some trend stations on rivers also serve as global flux stations

Here we have included three types of monitoring sites. You can choose the one that matches your project requirement.

Considerations while Selecting Sampling Site

We have provided certain factors that need to be considered before selecting a sampling site.

Considerations	Comments
Objective	Your text here
Proximity to Inhabited Area	Your text here
Ease of Monitoring	Your text here
Weather Conditions	Your text here
Government Regulations	Your text here
Add text here	Your text here

Location Map of the Sampling Sites

Variables Used in Water Quality Monitoring Programme

Measured Variable	Streams: Baseline & Trend	Headwater Lakes: Baseline & Trend	Groundwaters: Trend Only	Global River Flux Stations
Water discharge or level	X	X	X	X
Total suspended solids	X	-	-	X
Transparency	-	X	-	-
Temperature	X	X	X	X
pH	X	X	X	X
Electrical conductivity	X	X	X	X
Dissolved oxygen	X	X	X	X
Calcium	X	X	X	X
Magnesium	X	X	X	X
Sodium	X	X	X	X
Potassium	X	X	X	X
Chloride	X	X	X	X
Sulphate	X	X	X	X
Alkalinity	X	X	X	X
Nitrate	X	X	X	X
Nitrate	X	X	X	X
Ammonia	X	X	X	X
Total phosphorus (unfiltered)	X	X	-	X
Phosphorus, dissolved	X	X	-	X
Silica /reactive	X	X	-	X
Chlorophyll a	X	X	-	X
Fluoride	-	-	X	-
Faecal coliforms (trend stations only)	X	X	X	-

Here we have provided various variables used in water quality monitoring. Cross indicates that the variable is not used in monitoring of a particular type of water body.

Frequency and Timing of Sampling

Water Body	Sampling Frequency
Baseline Stations	
Streams	**Minimum:** 4 per year, including high – & low – water stages **Optimum:** 24 per year(every second week); weekly for total suspended solids
Headwater Lakes	**Minimum:** 1 per year at turnover; sampling at lake outlet **Optimum:** 1 per year at turnover, plus 1 vertical profile at end of stratification season
Trend Stations	
Rivers	**Minimum:** 12 per year for large drainage areas, approximately 100,000km² **Maximum:** 24 per year for small drainage areas, approximately 10,000km²
Lakes/Reservoirs	**For issues other than eutrophication:** **Minimum:** 1 per year at turnover **Maximum:** 2 per year at turnover, 1 at maximum thermal stratification **For eutrophication:** 12 per year, including twice monthly during summer
Groundwaters	**Minimum:** 1 per year for large, stable aquifers **Maximum:** 4 per yea for small, alluvial aquifers **Karst:** same as rivers **Aquifers:** your text here

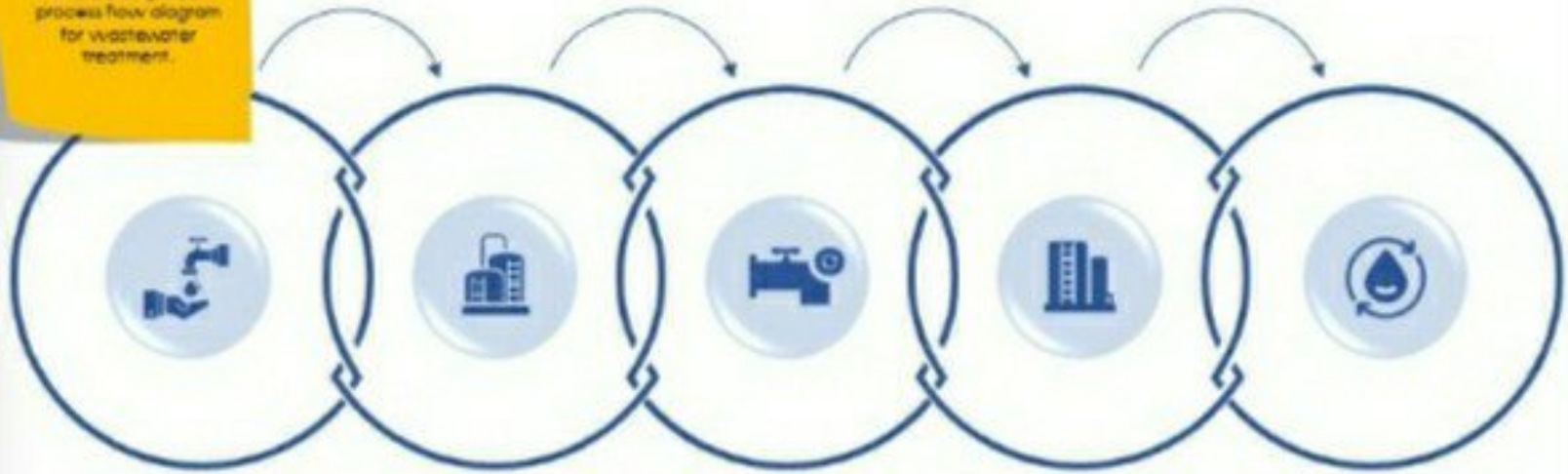
This slide shows the number of times samples need to be analysed for different types of water bodies. You can edit it according to your requirement.

Waste Water Treatment & Reuse

- Waste water treatment process-simplified
- Waste water treatment process-detailed
- Waste water reuse regulatory framework
- Global wastewater reuse by sector
- Types of wastewater reuse
- Treated wastewater quality parameters
- Technical details of wastewater treatment
- Possible usage of treated wastewater
- Constituents to be rechecked in treated water
- Problems associated with wastewater reuse
- Wastewater reuse constraints

Waste Water Treatment Process-Simplified

This is a simplified process flow diagram for wastewater treatment.



Wastewater Source
- ✓ Text Here
- ✓ Text Here

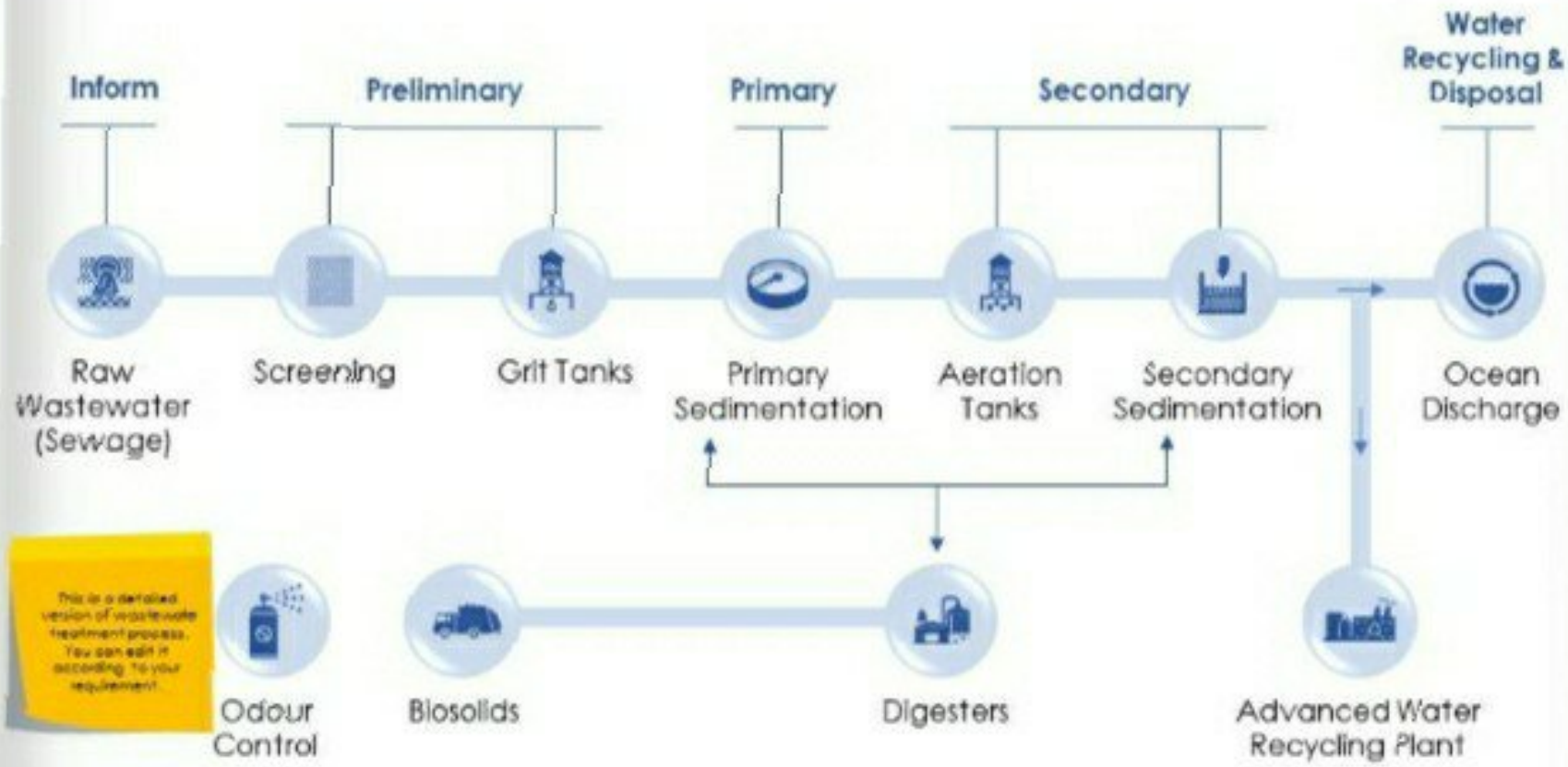
Pump Station
- ✓ Text Here
- ✓ Text Here

Conventional Treatment
- ✓ Clarification
- ✓ Biological

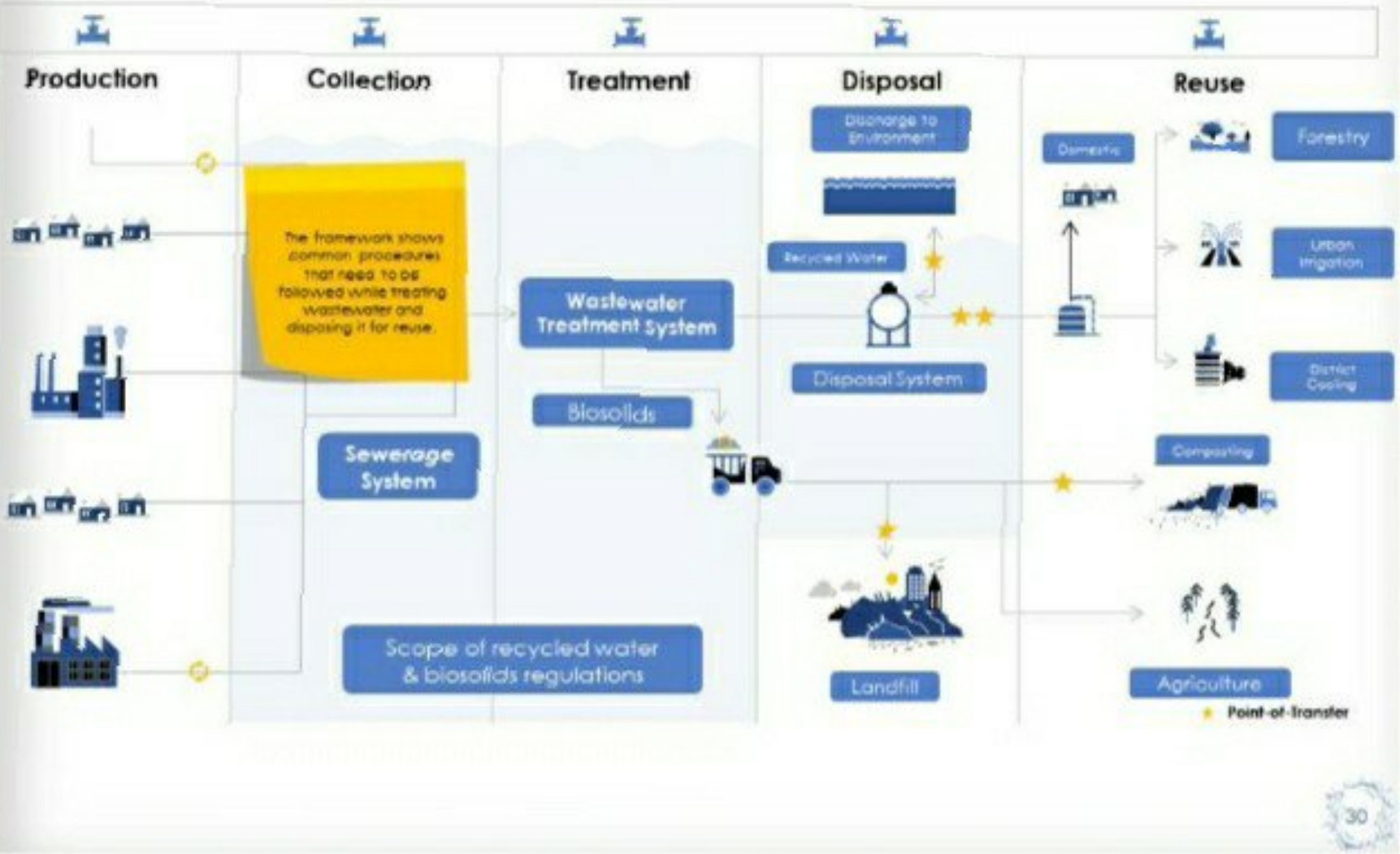
Advanced Treatment
- ✓ Filtration
- ✓ Disinfection

Water for Reuse
- ✓ Text Here
- ✓ Text Here

Waste Water Treatment Process-Detailed

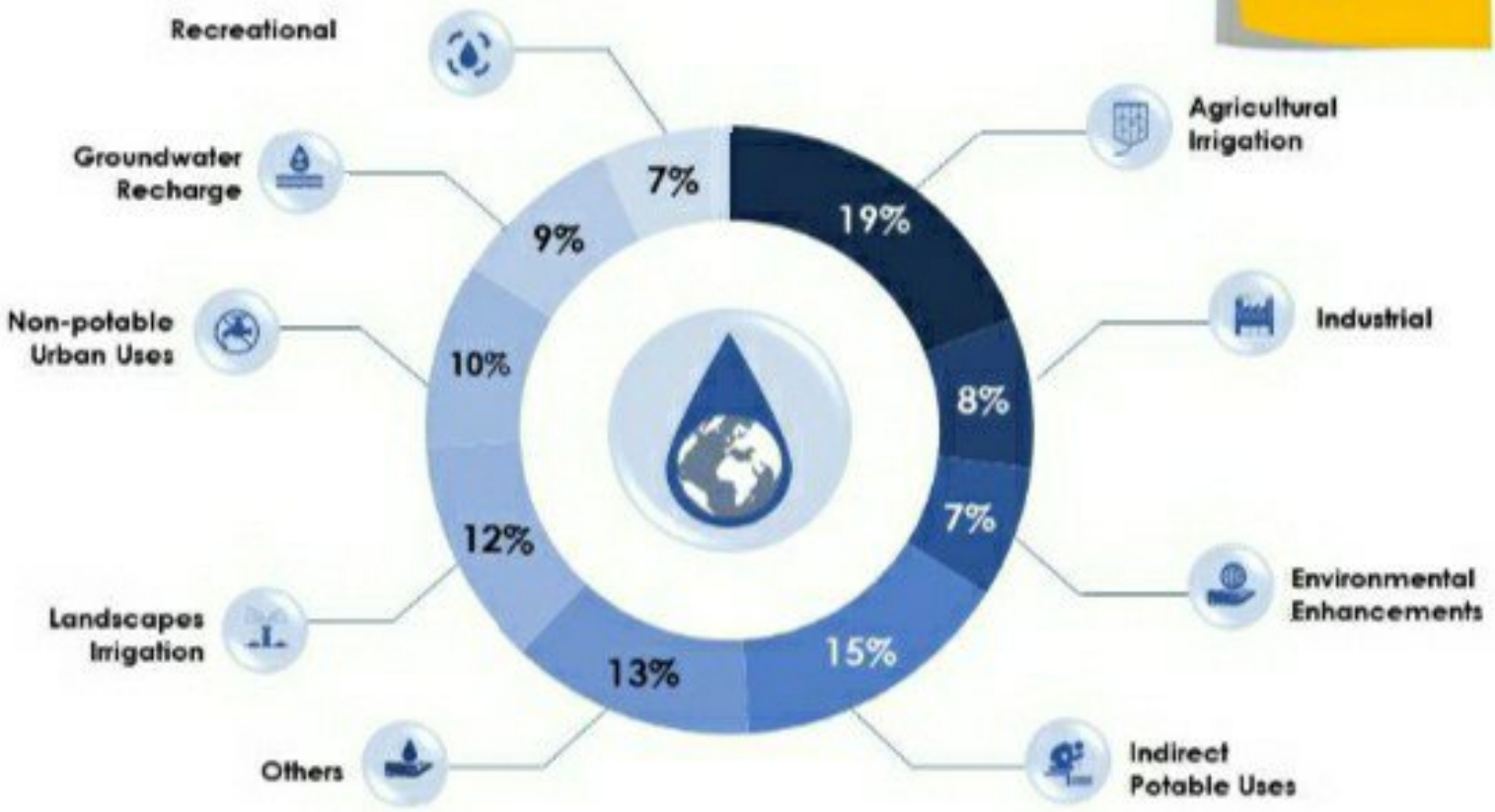


Wastewater Reuse Framework



Global Wastewater Reuse by Sector

The pie chart shows major sectors where wastewater is reused after treatment. You can edit it according to your requirements.



this graph/chart is linked to excel, and changes automatically based on data. Just left click on it and select "Edit Data".

Types of Wastewater Reuse

Common uses of wastewater have been provided. You can choose the use category that matches your requirement.

Categories of Use	Uses
Urban	Sporting facilities; gardens; roadsides; dust control; vehicle washing
Agricultural	Seed crops; greenhouse; commercially processed; hydroponic; fodder
Industrial	Wash down water; soil compaction; cooling water; dust control; marking concrete
Recreational	Recreational impoundments with/without public access; snowmaking; golf course irrigation; aesthetic impoundments without public access
Environmental	Stream augmentation; silviculture; aquifer recharge; wetlands; stream augmentation
Potable	Augmentation of surface drinking water supplies; aquifer recharge for drinking water use; treatment until drinking water quality.

Treated Wastewater Quality Parameters

Certain standards need to be maintained in treated water quality. Here we have provided them according to the type of reuse.

Type of Reuse	Treatment	Reclaimed Water Quality	Reclaimed Water Monitoring
Urban Reuse Landscape irrigation, vehicle washing, toilet flushing, fire protection, commercial air conditioners,& other uses with similar access or exposure to the water	Secondary Filtration Disinfection	**pH = 6 – 9** **< 10 mg/l** biochemical oxygen demand **(BOD) < 2** turbidity units **(NTU) 5** No detectable faecal **coliform/100 ml 4** **1 mg/l** chlorine **(C12)** residual (min.)	**pH** – weekly **BOD** – weekly Turbidity – continuous Coliform – daily **C12** residual – continuous
Agricultural Reuse for Non-food Crops Pasture for milking animals; fodder, fiber & seed crops	Secondary Disinfection	**pH= 6 – 9** **<30 mg/l** BOD **<30 mg/l** total suspended solids **(TSS)** <200 faecal **coliform/100 ml5** **1 mg/l C12** residual **(min.)**	**pH** – weekly **BOD** – weekly **TSS** – daily coliform daily **C12** residual continuous
Indirect Potable Reuse Groundwater recharge by spreading into portable aquifers	Site specific secondary & disinfection. May also need filtration &/or advanced waste water treatment	Site specific meet drinking water standards after percolation through vadose zone	**pH** – daily Turbidity – continuous Coliform – daily **C12** residual – continuous Drinking water standards – quarterly Other – depends on constituent

Technical Details of Wastewater Treatment

This is a sample data. You can replace the data with your own findings.

Parameter	Refinery Wastewater				Treated Water Standard
	LTDS		HTDS		
	Normal	Maximum	Normal	Maximum	
pH	6 – 9	12	6 – 9	12	6 – 8
TDS (mg/l)	200 – 500	2,000	1,000 – 2,000	10,000	-
TSS (mg/l)	50 – 100	500	50 – 100	500	< 5
COD (mg/l)	330 – 750	750	550 – 750	1,100	< 50
BOD_5 (mg/l)	140 – 300	300	200 – 300	440	< 15
NH_3 – N (mg/l)	5 – 20	50	5 – 30	50	< 5
PO_4 (mg/l)	–	–	–	–	< 5
Oil & grease (mg/l)	300 – 10,000	10,000	300 – 20,000	10,000	< 5
Sulphide (mg/l)	5 – 10	30	5 – 30	30	< 0.5
Phenols (mg/l)	10 – 40	60	10 – 40	60	< 1
Cyanides as Cn (mg/l)	2 – 4	6	2 – 4	6	< 0.2
Bio – assay (%)	–	–	–	–	90 *

Possible Usage of Treated Wastewater

Treated wastewater can be used for different purposes. Here we have provided few such categories. You can use whichever suits your requirement.

Agricultural Irrigation

- ✓ Crop irrigation
- ✓ Commercial nurseries

Groundwater Recharge

- ✓ Groundwater replenishment
- ✓ Saltwater intrusion control
- ✓ Subsidence Control

Landscape Irrigation

- ✓ Parks
- ✓ Schools Yards
- ✓ Highway Medians
- ✓ Golf Courses
- ✓ Cemeteries
- ✓ Residential

Recreational / Environmental

- ✓ Lakes & Ponds
- ✓ Marsh enhancement
- ✓ Stream-flow augmentation
- ✓ Fisheries
- ✓ Text here
- ✓ Text here

Industrial Recycling & Reuse

- ✓ Cooling water
- ✓ Boiler feed
- ✓ Process water
- ✓ Heavy construction

Non-Potable Urban Uses

- ✓ Fire Protection
- ✓ Air Conditioning
- ✓ Toilet flushing
- ✓ Text here

Potable Reuse

- ✓ Blending in water supply reservoirs
- ✓ Pipe-to-pipe water supply

Your Text Here

- ✓ Text here
- ✓ Text here

Constituents to be Rechecked in Treated Water

In this slide a comparison of standard and measured data is done to check the quality of water.

What we tested for	Standard	Measured	Notes
Dissolved oxygen	Minimum of **6 parts** per million (PPM)	**8.1**	The presence of oxygen in water is essential for fish & amphibians
Fecal coliform bacteria	Maximum of **200** colony forming units per **100 milliliters** of water	**2**	Your text here
Carbonaceous biological oxygen demand (CBOD)	Maximum Summer:**4 PPM** Winter: **8 PPM**	**< 2** (entire year)	Your text here
Phosphorus	Maximum of **10,188 pounds** per year	**7,816 pounds**	Your text here
Nitrogen	Maximum of **409,448 pounds** per year	**157,196 pounds**	Your text here
Ammonia	Summer: max. **1 PPM** winter: max. **2 ppm**	**< 0.1** **0.132**	Your text here
Suspended solids	Maximum of **30 PPM**	**<2.5**	Your text here

Problems Associated with Wastewater Reuse

Problems	Area of Impact	Impacts
Heavy elements	Public health	Nervous system disorder Bioaccumulation Surface water pollution
	Environmental impact	Acute and chronic toxicity for plants and animals life
Nutrients (N&P)	Public health	Blue baby syndrome Infiltration into potable water supplies
	Environmental impact	Eutrophication Surface water pollution Irrigation practices
Dissolved Solids (salinity)	Environmental impact	Accumulation in soil Clogging dip irrigation system
Emerging Pollutants	Public health	Acute and chronic health effects
Ground Water Contamination	Environmental impact	Nitrate contamination on private drinking wells
Antibiotics	Public health	Lower effectiveness of antibiotics if irrigation of fodder is involved
Odor	Public health	Public health of neighboring communities. Aesthetic concern
Concerns with Industrial Processes	Environmental impact	Scaling Corrosion Biological growth & fouling

This slide shows the impact of wastewater reuse on public health as well as environment

Wastewater Reuse Constraints

Reuse Category	Major Constraints
Irrigation	Surface or groundwater contamination
Landscape Irrigation	ublic health concerns related to pathogens
Industrial Recycle & Reuse	Desires treated water quality
Groundwater Recharge	TDS, Nitrates & pathogens emerging contaminants
Non potable urban use (Toilet flushing, fire protection, AC)	Public health concerns related to pathogens desired treated water quality
Potable Reuse	Produced water quality trace organics

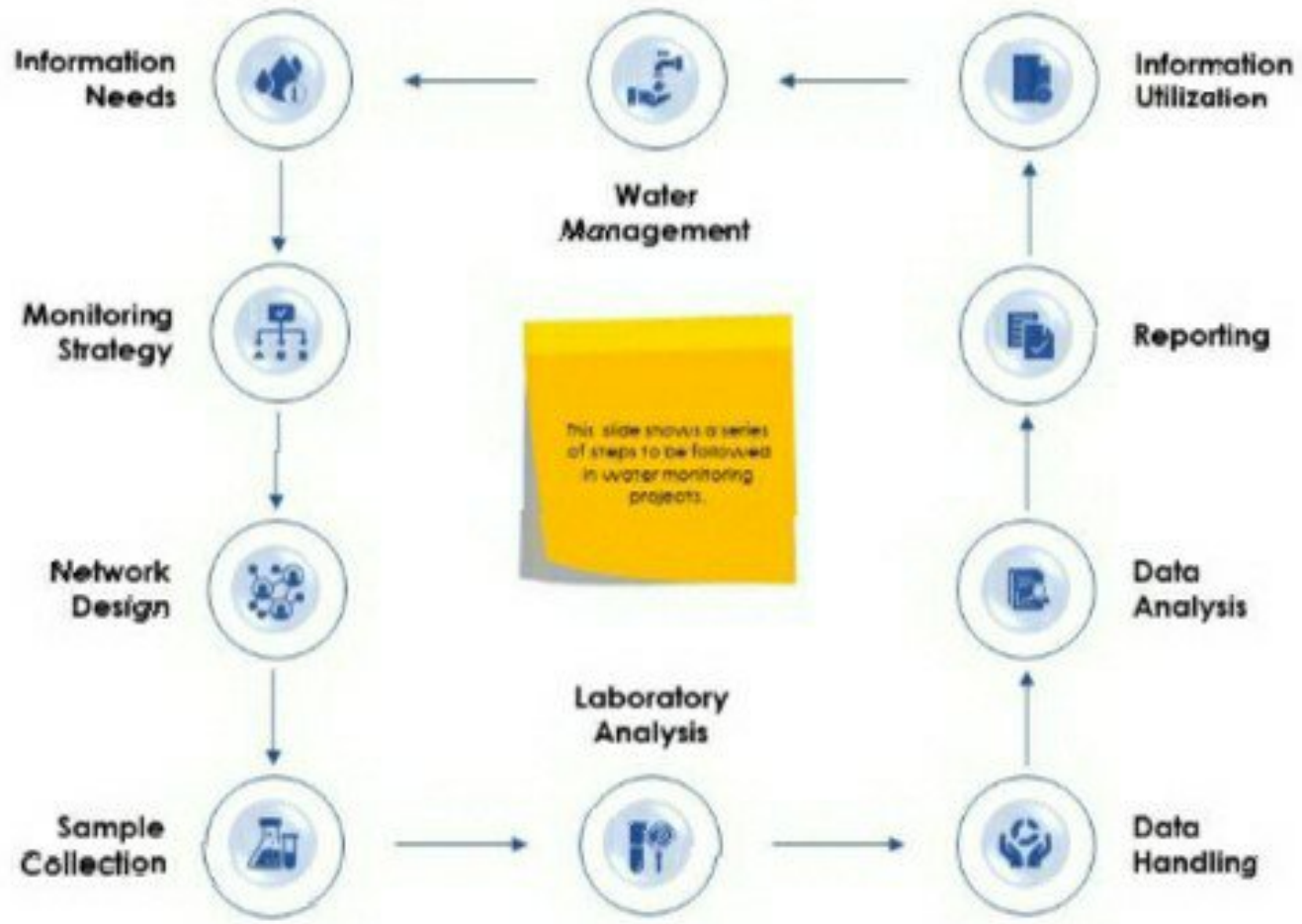
Here we have included major challenges faced in wastewater reuse for each category.

Monitoring and Assessment

- Major water quality monitoring systems
- Water management monitoring cycle
- Water quality monitoring trend

Major Water Quality Monitoring Systems

Water Management Monitoring Cycle



Water Quality Monitoring Trend

This slide shows how many times quality monitoring needs to be done for different water resources. You can edit it according to your requirement.

	Streams and Rivers	Large Rivers	Lakes	Groundwaters
Water	< 24 per year	< 12 per year	1 per year at overturn or at each overturn	1 to 4 per year
Particulate Matter	1 per year	1 per year	1 per year	Not relevant
Biological Monitoring	1 per year	1 per year biotic indices	8 – 12 per year 0.2 per year	–

Characteristics of Surface Waters

Water streamflow and water quality characteristics are described here.

01 Varying Composition	02 Low Mineralization	03 High Turbidity
04 Colour	05 Microorganisms Present	06 Dissolved Oxygen
07 Low Hardness	08 Tastes and Odours	09 Possible Chemical Toxicity

Common Water Uses

	Consuming	Contaminating
Domestic use	Yes	Yes
Livestock watering	Yes	Yes
Irrigation	Yes	Yes
Aquaculture	Yes	Yes
Commercial fisheries	Yes	Yes
Forestry & logging	NO	Yes
Food processing	Yes	Yes
Textile industry	Yes	Yes
Pulp & paper industry	Yes	Yes
Mining	Yes	Yes
Water transportation	NO	Yes
Hydroelectric power generation	NO	NO
Nuclear power generation	Yes	Yes
Recreation	NO	Yes

Purpose of Water Quality Monitoring

01 Determine water quality and quantity

02 Impacts on water quality

03 Control and regulation of water quality

04 Past trends and present status of water quality

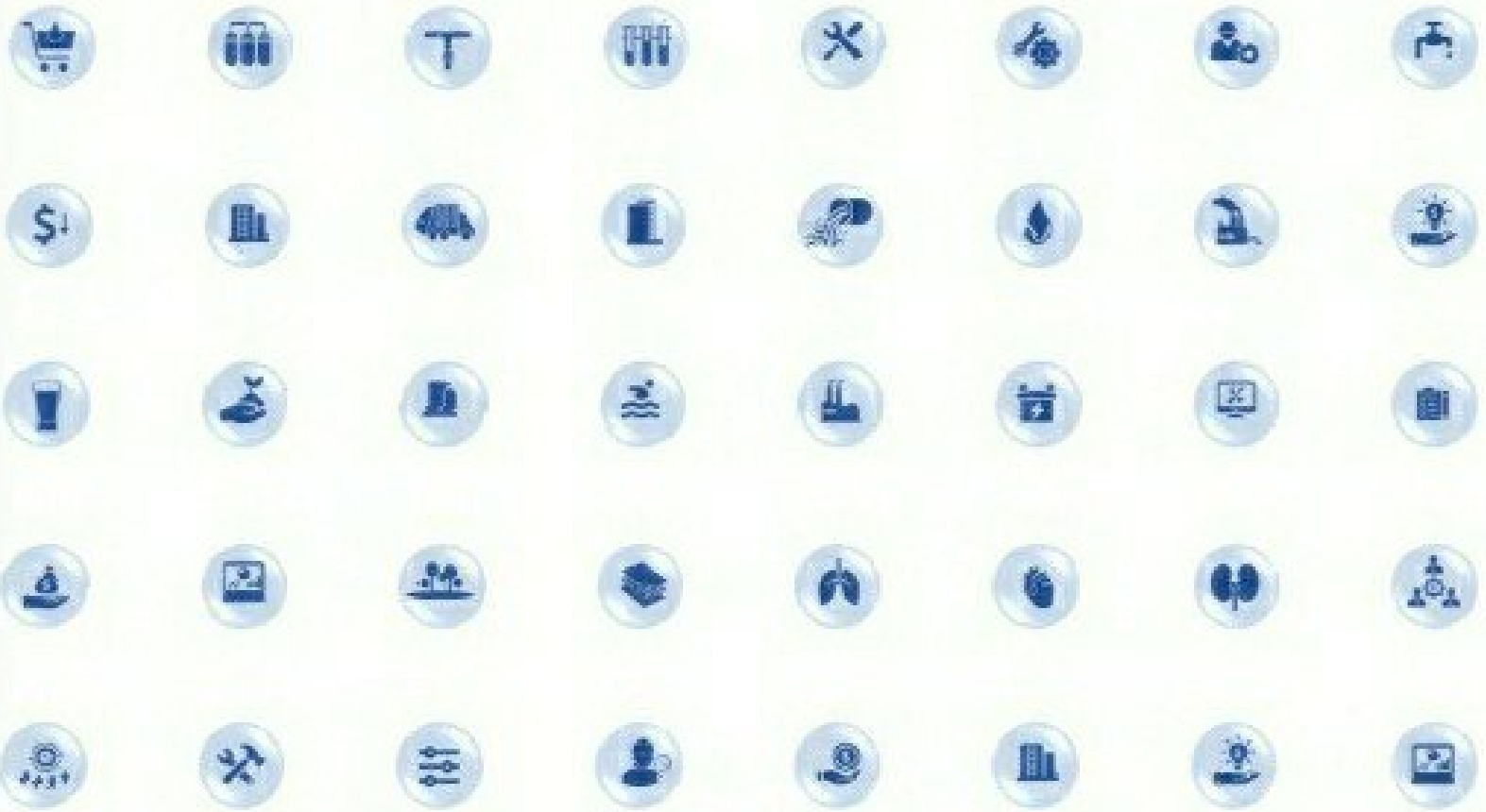
05 Insights into future trends

06 Influence of water quality on environment

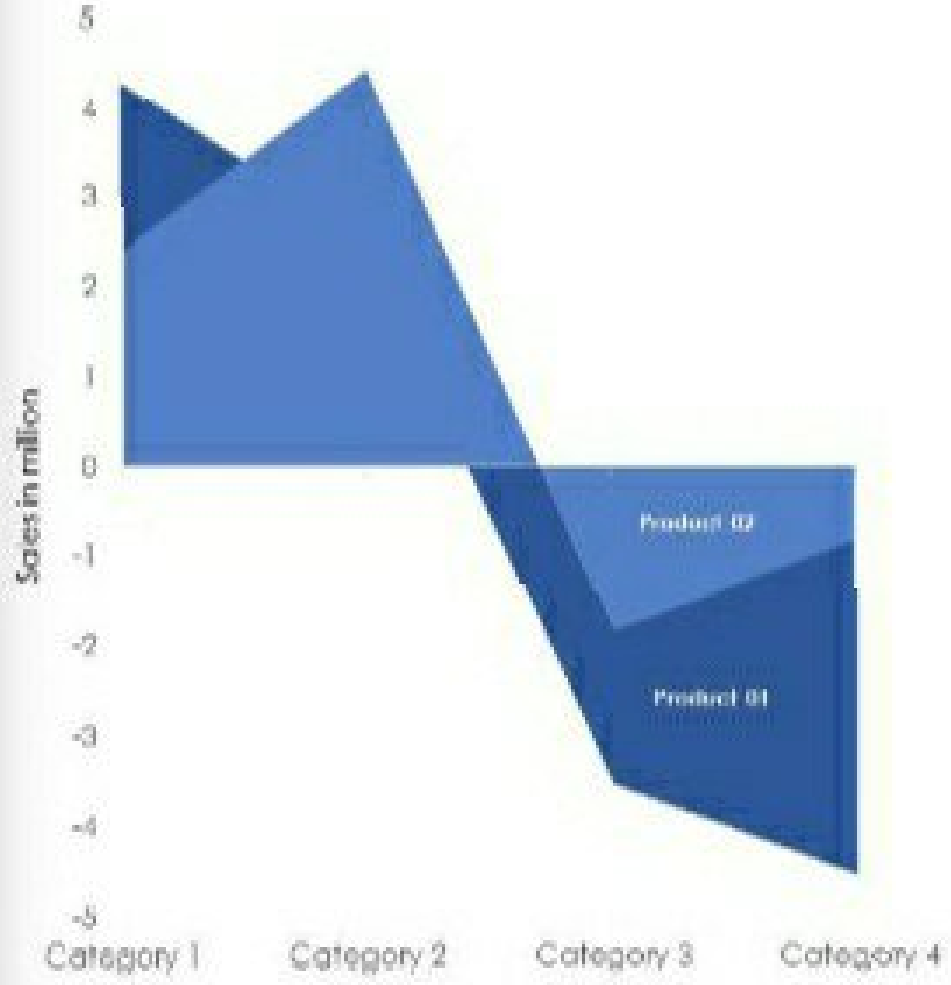
Characteristics of Media used in Water Quality Monitoring Programme

Characteristics	Water	Particulate matter		Living Organisms			
		Suspended	Deposited	Tissue analyses	Biotests	Ecological surveys	Physiological Responses
Type of Analysis or Observation	⇐ Physical ⇒						
	⇐ Chemical ⇒						
						⇐ Biological ⇒	
Applicability to Water Bodies	Rivers, lakes, groundwaters	Mostly rivers	Large rivers	Rivers, lakes	Rivers, lakes	Rivers, lakes	Rivers, lakes
Intercomparability	⇐ Global ⇒				Depends on standard procedures	Global	Local to regional
Specificity to given Pollutant	⇐ Specific ⇒					⇐ Integrative ⇒	
Classification	⇐ Complete ⇒ quantification of classes & scale		Concentrations only	Quantitative	Semi-quantitative	⇐ Relative ⇒	
Sensitivity to Low levels of Pollution	Low	High			Variable	Medium	Variable
Sample Contamination Risk	High	Medium	⇐ Low ⇒		Medium	⇐ Low ⇒	
Temporal Span of Information Obtained	Instant	Short	Long to very long (continuous records)	Medium (1 month) to long (1 year)	Instant to continuous	⇐ Medium to long ⇒	
Levels of Field Operators	Untrained to highly trained	Trained	Untrained to trained	Trained	⇐ Medium ⇒ To highly trained		
Permissible Sample Storage Duration	Low	High	High	High	Very low	High	No
Maximum Duration of Determination	Instant, (in any container) to days	Days	Days to weeks	Days	Days to months	Weeks to months	Days to weeks

Water Quality Monitoring Management Icons Slide



Area Chart



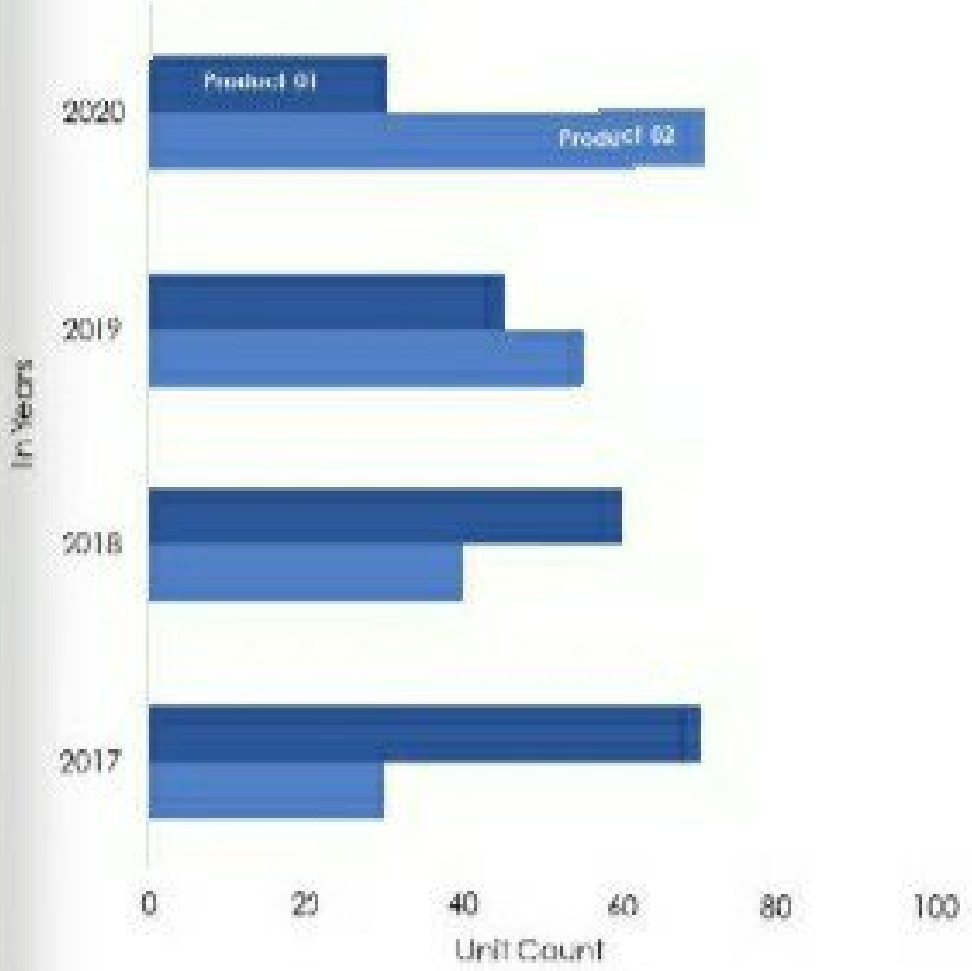
01 **Product**

This graph/chart is linked to excel, and changes automatically based on data. Just left click on it and select "Edit Data".

02 **Product**

This graph/chart is linked to excel, and changes automatically based on data. Just left click on it and select "Edit Data".

Bar Chart



01 Product

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02 Product

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THANK
YOU