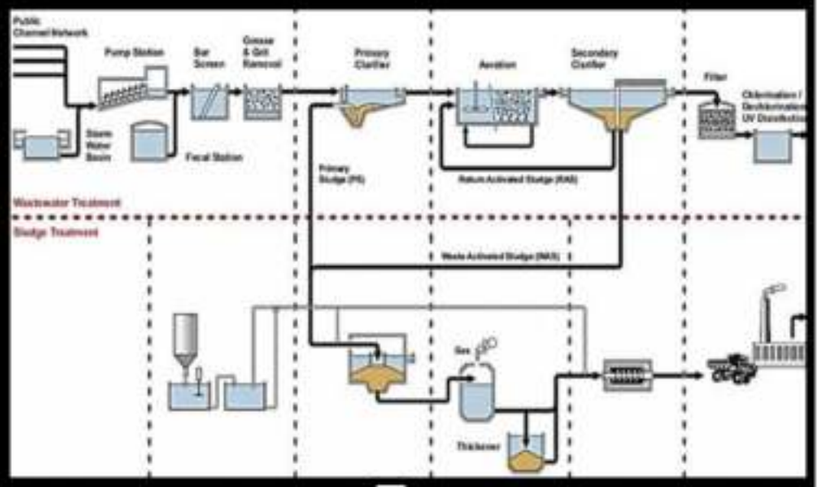
Technology Paradigm Shift



COST Comparisons

PARTICULARS	NAME OF TECHNOLOGY					
	ASP	MBBR	SBR	UASB+EA	MBR	IWT
Area Req . Sqmt/MLD	1000	550	550	1100	450	1200-1500
Capital Cost (Rs. In Lakhs)	118	95	123	95	178	100
Civil Cost (% Of Capital Cost)	60	40	30	65	20	75
Plantation, acclimatization and biomedia application	-	-	-	-	-	23
O&M Work (%Of Total Capital Cost)	40	60	70	35	80	7

PARTICULARS	NAME OF TECHNOLOGY					
OPERATION& MAINTAINENCE COST						
	ASP	MBBR	SBR	UASB+EA	MBR	IWT
YEARLY POWER COST (LACS/MLD)	4.07	4.9	3.37	2.75	6.65	0
ANNUAL REPAIR COST (LACS/MLD)	2.38	1.94	1.84	2.48		0.7
CHEMICAL COST LACS/MLD	5.3	5.3	3.3	6.3		0
MANPOWER COST LACS/P.A.	12	12	12	12	12	2.8
O& M COST PER YEAR (Rs. In Lacs)	23.75	24.14	20.51	23.53	18.65	3.5

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Green STP—Treating Water the Nature's Way

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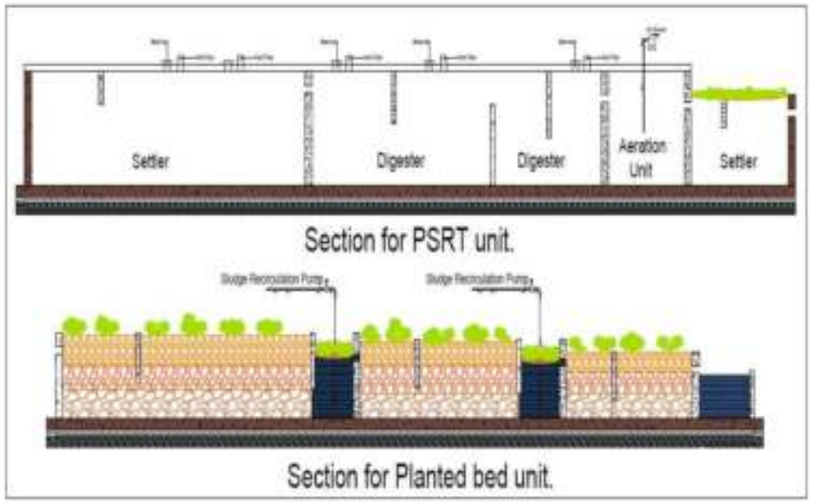
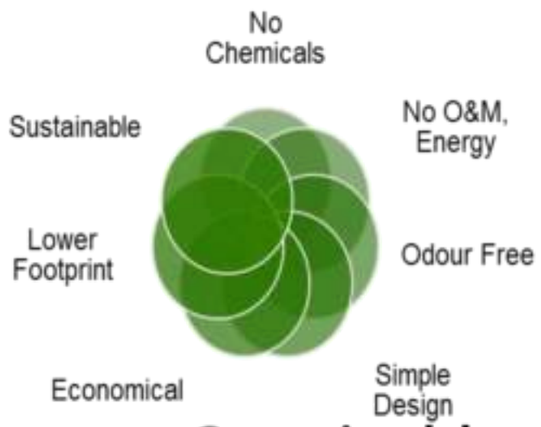
Natural Wastewater Treatment System



IWT are typical natural engineered treatment systems, designed and constructed to utilize the natural processes involving wetland vegetation, soils and their associated microbial assemblages to assist in treating the wastewater.

They have been gaining increasing international interest and are assumed to be highly applicable in developing countries, due to their characteristic properties like utilization of natural processes, simple construction, simple operation and maintenance (O/M), process stability, and above all its cost effectiveness.



Component

Treatment Parameters

Water Parameter	Pre-Treatment(mg/l)	Post-Treatment(mg/l)
pH	5-8	7-8
TSS	240-475	20-35
BOD	220-450	10-30
COD	310-525	30-70
Nitrogen	10-40	1-2
Phosphorus	3-7	1-3

Constituents	Subsurface flow
Biodegradable organics	Facultative and Anaerobic bacteria act
Suspended solids	Filtration, Sedimentation,
Nitrogen	Nitrification/Denitrification, Plant uptake, Volatilization
Phosphorous	Filtration, Sedimentation, Plant uptake
Heavy Metals	Adsorption, Sedimentation
Trace organics	Adsorption, Biodegradation
Pathogens	Natural decay, Predation, Sedimentation

Comparison with Other Technologies

Performance Characteristics

Sr.	Items	Conventional Activated Sludge	UASB	Extended Aeration	Facultative Aerated Lagoons	IWT
1	Performance BOD Removal %	85-92	75-78	95-98	75-85	87-92
2.	Sludge	First digest then dry on beds or use mechanical devices	Directly dry on beds or use mechanical devices	No digestion dry on sand beds or use mechanical devices	Mech. Desludging once in 5-10 years	Negligible
3.	Sludge Handling	Needs to be removed periodically	Removed and processed before management	Removal and Processing needs to be performed	Desludge and processed before reuse	Reuse as compost after mixing with bulking material
4.	Equipment Requirement (excluding screening and grit removal common to all processes)	Aerators, recycle pumps, scrappers, thickeners, digesters, dryers gas equipment	Nil except gas collection and flaring gas conversion to elect is optional	Aerations, recycle pumps sludge, scrappers for large settlers	Aerators only	None, gravity flow
5.	Operation & Maintenance	Expert operator	Highly Skilled Operator	Medium Skilled Operator	Medium, unskilled	Unskilled
6.	Special features	Considerable equipment and skilled operation required	Minimal to negligible power reqd. makes it economical	High power reqd., favored for small and medium plants	Power reqd. similar to ASP operation simpler	No power requirement, minimal maintenance

Unique Features

- **Passive Disinfection**
- **Modular Design**
- **Methane Capture**
- **Real Time Monitoring**

Wastewater Treatment Specifications		
Flow (m^3/day)	Area (m^2)	Cost (INR,lakhs)*
100	75-100	20
200	140-180	34
500	350-450	65
750	525-675	82.5
1000	780-950	100

*T&C Apply

Sustainable and Economic Solution for Wastewater Treatment

Complete Solution of Wastewater Treatment Across Horizons