GOVERNMENT OF TAMIL NADU
DIRECTORATE OF MUNICIPAL ADMINISTRATION

SEGMENT 2 | STATE EXPERIENCE SHARING



Tamil Nadu
Treated Usedwater Reuse Model

Towards a Circular Water Economy
for a Water-Stressed State

Presented by **Shri P. Madhusudhan Reddy**
Director of Municipal Administration, Government of Tamil Nadu

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Tamil Nadu Treated Used Water Reuse Policy

Circular water economy || Treated water as an additional resource



POLICY 2019

Launched December 2019

VISION

Sustainable water management through reuse maximise collection and treatment of sewage, and use treated water to cut freshwater dependence and stop pollution of water bodies.

100%

Sewage / septage collected is treated

in every ULB, to the quality needed for reuse

90%

Coverage & collection

UGD and/or septage schemes in all ULBs & CMWSSB within 10 years

25%

Freshwater replaced

or full STP output reused in 3 years where STP already exists

Who it Covers

- ✓ Industry: Power Plants, SIPCOT, SEZs & SIDCO (within 50 km of an STP)
- ✓ Agriculture: Irrigation with treated wastewater
- ✓ Aquifer Recharge: Lake & river augmentation
- ✓ Municipal Uses: Cooling, toilet flushing, parks, firefighting & construction
- ✓ STPs shall be designated as Water Reclamation Plants (WRPs).

How the 2019 Policy Makes Reuse Happen

Mandates, grids, pricing and delivery || Treated Used Water Reuse Policy for Tamil Nadu





TTUF polishing || lake / grid discharge

Industry -50 km grid

Power plants, SIPCOT, SEZs, SIDCO within ~50 km of an STP take treated water for non-potable and process use. New units >100 KLD must apply. Units >1,000 KLD need ZLD; grid supplies only make-up water. Fresh surface / groundwater is restricted once the grid is available.

Agriculture & recharge

Surplus after industry goes to farms (CPHEEO 2013 quality) and to over-exploited / saline firkas for aquifer recharge. Sludge can be given to farmers as compost after testing. Lakes and rivers may be augmented; drinking-source water bodies need potable quality.

Cities & buildings

Mandatory municipal uses: parks, fire-fighting, horticulture. Cooling, toilets, car wash and construction where a grid exists. New institutions / commercial buildings >100 KLD must use treated water. Private STPs reuse on-site (TNCDBR 2019).

Price, PPP & oversight

Treated water is an economic commodity, priced below freshwater. BOT / DBFOT or SPVs allowed. Water bunks (+10% spare) for scattered users. Online water-exchange portal, smart meters; Empowered Committee reviews targets every year.

Technology Options for Industrial Reuse

Choose treatment intensity by the water quality the end use actually needs

01

Secondary + Filtration + UV

- Basic non-potable quality

Best when the user already has on-site storage and polishing (including RO) and can blend treated sewage with fresh water or use it to dilute treated effluent before land irrigation.

EXAMPLES

- ✓ Pulp & paper mills;
- ✓ confined land irrigation;
- ✓ supply augmentation

02

Tertiary + Ultrafiltration (TTUF)

- Low turbidity & suspended solids
- TDS not critical

Use when the demand is for clear, low-solids water but dissolved salts do not have to be reduced.

EXAMPLES

- ✓ Aquifer recharge
- ✓ Railways
- ✓ Toilet flushing in public and commercial buildings

03

Tertiary + UF + Reverse Osmosis (TTRO)

- High quality
- TDS < 300 mg/L
- Total hardness < 50 mg/L

Required where process or boiler water needs tight control of salts and hardness, or where one plant serves a whole industrial cluster.

EXAMPLES

- ✓ Boiler feed
- ✓ Process water
- ✓ SIPCOT / TIDCO / SIDCO cluster supply

Water Quality Standards for Industrial Use

Tolerance limits by manufactured product (mg/L unless stated)

Parameters	Manufactured products						
	Tannery	Paper & Pulp	Rayon	Textile	Boiler water	Enamel industry	Cooling Tower
pH	6.5-8.0		6.0-8.5	6.0-8.5	9.5-10.5		
Turbidity (TU)	25	10	1	2			<50
Colour	25	5	5	20			
Total Hardness ($CaCO_3$)	300	100	5	2	Nil	39	<250
Total Alkalinity ($CaCO_3$)	150		75	150	15		<200
Iron	0.5	0.25	0.05	0.1		0.3	5
Manganese	0.5	0.05	0.03	0.1		0.005	2
Total Dissolved Solids		**300**	**200**	**200**	**50**	**147**	**500**
Silica			10		1		75
Aluminium				0.1			
Sulphate				100		25	
Chloride	500			100	2	13	

Source: BIS quality tolerances

Status of the STPs

Sewage generation vs. Treatment capacity

Facility Type	No. of Facilities	Total Capacity (MLD)	Utilization Capacity (MLD)
STPs	121	2,419.20	1,445.94
FSTPs	47	1.219	0.931
Filter Beds in Drains / Individual Soak Pits (ISP)/ Community Soak Pits (CSP)	2,090,179	1,429.241	1,436.959
Grand Total	**2,090,347**	**3,849.66**	**2,883.83**

Source: Jal Hi AMRIT, 2025 and SBM 2.0, 2024



Estimated sewage generation (80% of total supply)

4,731.66 MLD



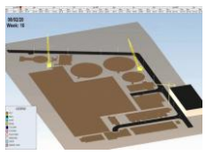
STPs installed capacity

3,849.66 MLD



STPs operational capacity in GCC and DMA

2,883.83MLD



STPs / FSTPs under execution in DMA and DTP (STP 360 & FSTP 40)

400 MLD



Work order issued for STPs execution in DMA and DTP

380 MLD

Industrial Water Demand for Used Water

Sector-wise demand that treated used water can serve



Power Plant (16,416 MW)

738 MLD*

Estimated daily consumption



SIPCOT

Existing - 111 MLD
Proposed - 85 MLD

Total 196 MLD



TIDCO

Proposed - 65 MLD
(Perambalur SEZ, Nanguneri City)

Total 138 MLD



TANSIDCO

3.0 MLD

Total Water Demand	
Existing	1,082 MLD
Proposed	150 MLD
Total Industrial Demand	1,232 MLD
Other Activities	82 MLD
Total	1,314 MLD



The Southern India Mills' Association

10 MLD



CETP (Tannery & Textile)

16 MLD

ZLD already established - water needed for top-up



Paper & Pulp

131 MLD

Power Plant Water Demand Estimation

- Estimated daily water demand of thermal power plants.
- Calculated using Specific Water Consumption (SWC): 2.5 m^3/MWh.
- Based on 75% Plant Load Factor (PLF).
- As per MoEF&CC Notification No. S.O. 3305 (E), dated 07 December 2015.

Water Demand for Other Activities (Chennai)

Non-potable urban uses that treated water can replace



Parks

- GCC has implemented and maintains about 902 parks in Chennai Corporation premises; total park area is about 21,72,478 sq.m.
- CGWA proposed norms of 3-5 litres/sq.m for green-belt development; 5 litres/sq.m has been considered for gardening.

11 MLD



Construction in Chennai

- In 2024, approximately 19,220 residential units were sold in Chennai, with an average unit size of 1,445 sq.ft a total area of 25,80,186 sq.m.
- Estimated water consumption for construction in Chennai: 9.6 KL/m^2.

69 MLD



Southern Railway

- The water requirement for non-domestic purposes at three stations Egmore, Central and Basin Bridge is about 1.8 MLD.

2 MLD

Total Demand for Other Activities: 82 MLD

Current Status, Proposed Solution & Policy Impact

4,731.66 MLD
Sewage generation

3849.66 MLD
STP installed capacity

2,883.83 MLD
STP Utilisation Capacity

283 MLD
Proposed potential
27 reuse grids

Current Status - 2025

- Existing reuse:
  - 8 grids | 175 MLD installed / 81 MLD actual supply
- Under construction:
  - 11 grids | 153 MLD
- Treatment gap:
  - 1,335 MLD operational vs 5,877 MLD generated (23% treated)

Proposed Solution

- 27 water reuse grids identified
  - ✓ Priority I: 16
  - ✓ Priority II: 8
  - ✓ Priority III: 3
- Proposed WRP capacity: 283 MLD
- Industrial demand: 326 MLD
- Major sectors:
  - ✓ SIPCOT, power plants, textiles, paper, TIDCO / SIDCO
- Technologies:
  - ✓ Filtration
  - ✓ TTUF
  - ✓ TTRO (UF + RO)

Water Reuse Policy & Impact

- ✓ 2019 Policy to be enforced as Rules
- ✓ Mandatory recycled water for all govt construction & private builders
- ✓ Minimum 30% reuse for 17 red-category industries
- ✓ Supply treated effluent to thermal power plants
- ✓ Additional urban demand (Chennai example): 82 MLD (parks + construction)
- ✓ Saline intrusion barriers
- ✓ Land subsidence mitigation & adaptation strategy

Existing Reuse Grids - Under Operation

10 grids || 175 MLD installed || 81 MLD actual supply

Sl. No	Name of Grid	STP	Technology	Installed capacity (MLD)	Operation capacity / actual supply (MLD)	Remarks
1	**Koyambedu - Oragadam Grid**	Koyambedu	**TTRO**	45	**20**	**Under Operation**
2	**Kodungaiyur - Manali - Minjur - Ennore + Gummidipoondi + Thervoykandigai Grid**	Kodungaiyur	**TTRO**	45	**20**	**Under Operation**
3	**Langs Garden - Egmore Railway Station**	Langs Garden	**TTUF**	10	**6.5**	**Under Operation**
4	**Madras Fertilizers Limited**	Kodungaiyur	Secondary treated sewage	12	**7**	**Under Operation**
5	**Manali Petrochemicals Limited**	Kodungaiyur		3	**1**	**Under Operation**
6	**Chennai Petroleum Corporation**	Kodungaiyur		13	**5**	**Under Operation**
7	**Nesapakkam - Porur**	Nesapakkam	**TTUF**	10	**10**	**Under Operation**
8	**Perungudi**	Perungudi	**TTUF**	10	**5**	**Under Operation**
9	**Villivakkam**	Villivakkam	**TTUF**	5	**5**	**Under Operation**
10	**Coimbatore - Vellalore compost yard - Ukkadam**	Ukkadam	Secondary treated sewage	22	**1.5**	**Under Operation**
			Total	**175**	**81.0**	

Source - Tamilnadu Water Investment Company (TWIC) 2025

Reuse Grids - Under Construction

11 grids || 153 MLD under construction / DPR stage

Sl. No	Name of Grid	STP	Technology	Installed capacity (MLD)	Remarks
1	**Coimbatore - Nanjundapuram**	Nanjundapuram	Secondary treated sewage	**0.5**	**Under construction**
2	**Coimbatore - Ondiputhur - Agriculture farm**	Ondiputhur	Secondary treated sewage	**17**	**Under construction**
3	**Tiruchirappalli, Panjapur**	Tiruchirappalli	**TTUF**	**10**	**Under construction**
4	**Hosur - SIPCOT**	Hosur	**TTRO**	**20**	**Under construction**
5	**Salem Corporation - Kumaragiri lake**	Salem Corporation	**TTUF**	**1**	**Under construction**
6	**Chengalpattu - TWAD**	Chengalpattu	**TTUF**	**5.5**	**Under construction**
7	**Tirunelveli - Gangaikondan Park**	Tirunelveli	**TTRO**	**10**	**Under DPR stage**
8	**Trichy - Manapparai Park**	Tiruchirappalli	**TTRO**	**5**	**Under DPR stage**
9	**Cuddalore Park**	Cuddalore	**TTRO**	**8**	**Under DPR stage**
10	**Buckingham Canal**	Chennai	**TTUF**	**51**	**DPR completed**
11	**Coimbatore - Ukkadam**	Ukkadam	**TTUF**	**25**	**Under DPR stage**
			Total	**153**	

TTRO Plants Supplying Industrial Clusters



Koyambedu

45 MLD | **TTRO** | **Commissioned 2019**

- ✓ Supply Network: Delivers RO permeate through a 65 km dedicated pipeline.
- ✓ Beneficiaries: Industries in Oragadam, Irungattukottai, Sriperumbudur, and surrounding industrial clusters.
- ✓ Tariff: ₹65 per kL of RO permeate.



Kodungaiyur

45 MLD | **TTRO** | **Commissioned 2019**

- ✓ Supply Network: Provides RO permeate through a 28 km dedicated pipeline.
- ✓ Beneficiaries: Industries in the Manali-Ennore-Minjur industrial corridor of North Chennai.
- ✓ Tariff: ₹65 per kL of RO permeate.

TTUF for Groundwater Recharge & Railways



Villivakkam

5 MLD | **TTUF** | **Commissioned 2025**

- ✓ UF permeate is discharged into Villivakkam lake to recharge groundwater.



Langs Garden

10 MLD | **MBBR + UF** | **CMWSSB**

- ✓ CMWSSB has implemented a 10 MLD modular Sewage Treatment Plant based on Moving Bed Bio Reactor (MBBR) technology followed by ultrafiltration.
- ✓ Treated water will be supplied to Southern Railway for non-domestic purposes.

TTUF for Construction & Lake Discharge



Perungudi

10 MLD | TTUF | Commissioned

✓ Currently, 10 MLD TTUF has been commissioned. TTUF water can be used for construction, and the balance water would be discharged into Perungudi Lake.

Construction use

Perungudi Lake discharge

CASE STUDIES - 4

Nesapakkam TTUF - 10 MLD



Process tanks and piping



UF membrane skid



Screening / inlet works



Treated-water channel

PLANT AT A GLANCE

Capacity	10 MLD
Technology	SBR + TTUF
Commissioned	2022
Process chain	SBR → UF → Lake
Discharge	Porur Lake
Reuse type	Indirect potable

Key point

✓ Ultrafiltration permeate is discharged into Porur Lake for indirect potable reuse. Porur Lake supplies drinking water to Chennai.

IIT-Approved Process Schematic

Nesapakkam 10 MLD || SBR secondary + TTUF polishing || Discharge to Porur Lake

A. SECONDARY TREATMENT

Raw sewage inlet → **Screening & grit** wet well / degritter → **SBR feed tank** → **SBR reactors** biological treatment → **SBR treated-water tank**

B. TERTIARY (TTUF)

Filter feed tank from SBR treated water → **Multi-grade filter** TSS reduction → **Ultrafiltration** TTUF core step → **Activated carbon** organics / odour → **Ozonation / UV** disinfection

C. RESIDUALS

Sludge pit SBR waste sludge → **Filter-press feed** → **Filter press** dewatering → **Dewatered cake** disposal / reuse → **Porur Lake → city drinking-water supply**

What the Plant is Designed to Deliver

The TTUF plant is designed to produce high-quality reclaimed water through advanced tertiary treatment for safe environmental reuse and lake discharge.

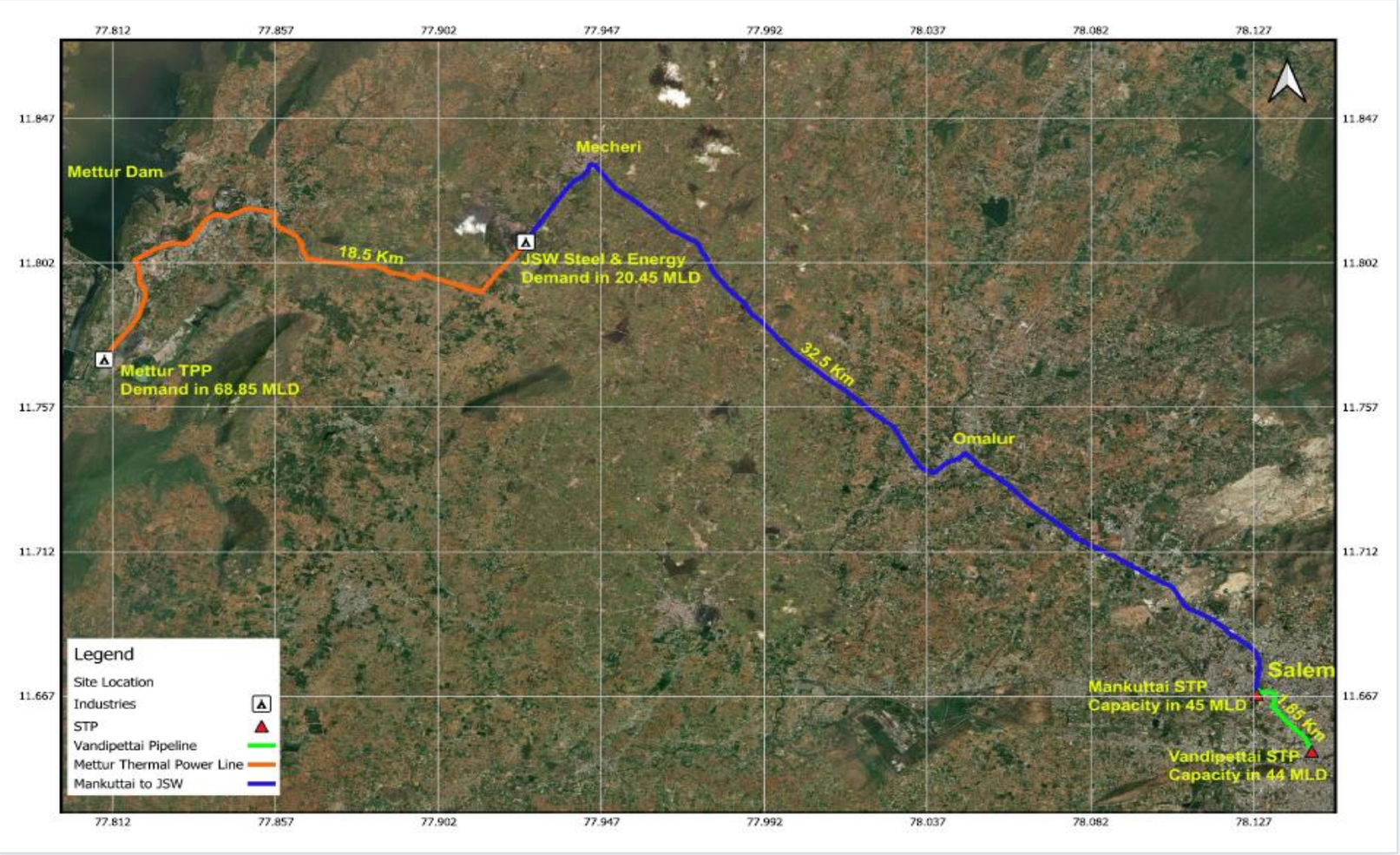
- ✓ Secondary SBR: Reduces organic load (BOD/COD).
- ✓ Multi-Grade Filter + Ultrafiltration: Removes turbidity and suspended solids.
- ✓ Activated Carbon: Eliminates residual organic compounds and odour.
- ✓ Ozonation / UV Disinfection: Inactivates pathogens and ensures microbiological safety.
- ✓ Final Output: Reclaimed water suitable for lake discharge and non-potable environmental applications.

Note: TTUF is designed for turbidity and suspended solids removal; TDS reduction is not the design objective (unlike TTRO).

Source: IIT Madras approved TTUF process flow diagram || DBO 10 MLD Water Reclamation Plant, Nesapakkam || CMWSSB & BGR Energy Systems.

Reuse Grid - Salem

Mankuttai & Vandipettai STPs → JSW Steel → Mettur Thermal Power Plant



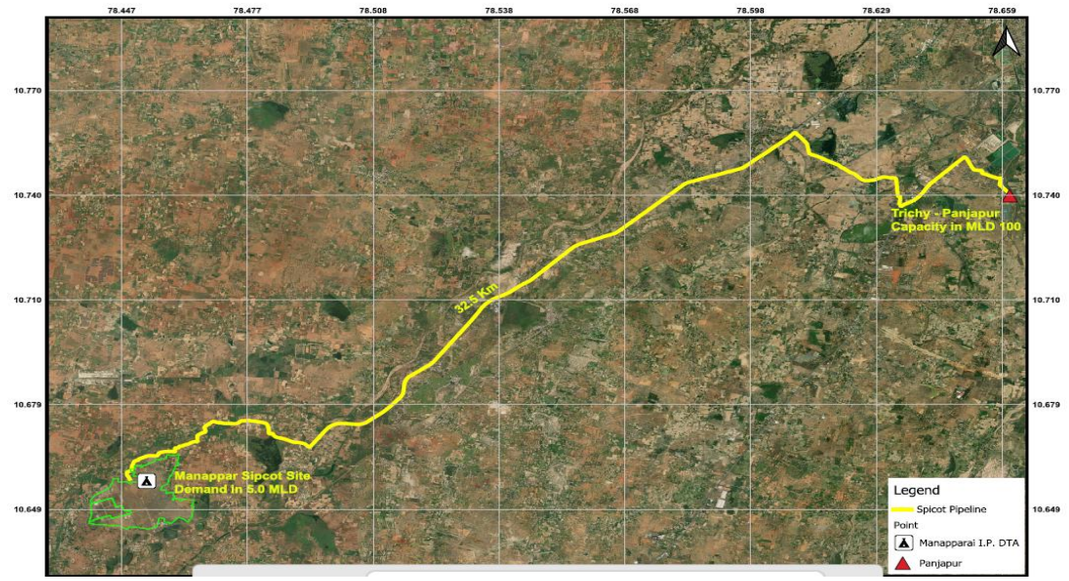
GRID AT A GLANCE

Mankuttai STP	45 MLD
Vandipettai STP	44 MLD
JSW Steel demand	20.45 MLD
Mettur TPP demand	68.85 MLD
Mankuttai → JSW	32.5 km
JSW → Mettur TPP	18.5 km
Vandipettai link	1.85 km

Reuse Grids - Trichy & Ariyalur

STP-to-industry conveyance || SIPCOT Manapparai || TANCEM & Ramco Cements

Trichy - Panjappur STP → SIPCOT Manapparai



100 MLD	5.0 MLD	32.5 km
Panjappur STP capacity	SIPCOT Manapparai demand	Conveyance

Ariyalur - Keelapalur STP → TANCEM & Ramco



4.16 MLD	1.5 MLD	2.7 MLD
Keelapalur STP capacity	TANCEM demand	Ramco Cements demand

Source - Tamilnadu Water Investment Company (TWIC) 2025

Industrial Water Supply Tariff of Various Agencies

Industrial tariffs of freshwater and treated-water (TTRO) suppliers

Sl. No	Name of Agency	Source of Water	Tariff
1	**New Tirupur Area Development Corporation Limited (NTADCL) — capacity 185 MLD**	River water; transmission system 100 km	₹82/KL
2	**Tamil Nadu Water Supply and Drainage Board (TWAD)**	Multiple sources	1. ₹150/KL for industries that have NOT paid the proportionate cost of the scheme 2. ₹45/KL for organisations that have paid the proportionate cost of the scheme
3	**Chennai Metro Water Supply & Sewerage Board (CMWSSB)**	Multiple sources (including desal, TTRO)	1. Industry up to 500 KL: ₹81/KL 2. Industry >500 KL: ₹160/KL for entire quantity
4	**TTRO**	Secondary treated sewage; transmission system 86 km	**1. Supply to SIPCOT Industrial Complex: ₹65/KL** **2. SIPCOT selling price: ₹80/KL**
5	**SIPCOT Industrial Park - Proposed TTROs**	Secondary treated sewage	**₹75 - 95/KL (STEW purchase cost ₹10.0)**

Highlighted rows: supply based on secondary treated sewage (TTRO).

Thank You

Towards a Circular Water Economy
for a Water-Stressed State



TREAT | REUSE | RECYCLE | RESTORE