

# RAJASTHAN STATE POLLUTION CONTROL BOARD



## ENVIS HUB RSPCB

## NEWSLETTER VOL. - 3

### MESSAGE FROM CHAIRPERSON



Textile industries in Rajasthan are one of the oldest sectors of industries, representing an amalgamation of generations of experimentation with fabric. These industries are a leading contributor in the economy as well as in providing employment.

Sanganer (Jaipur), Pali, Jodhpur and Balotra (Barmer) are well known centres for traditional printing and processing of cotton cloth which are sent to various parts of the world. Bhilwara is also prominently known as a centre for medium to large scale textile units, which are currently involved in the processing of suiting, shirting and denims.

In processing of textiles, the industry uses a wide range of dyes, auxiliary chemicals, sizing materials and huge quantity of water every day. As a result, contaminated wastewater is generated which can cause degradation of land as well as water bodies unless treated and disposed of adequately.

RSPCB is a statutory body engaged in regulating and monitoring these industries of the state under the provisions of the Water Act, 1974 and Air Act, 1981. Looking at the current scenario of degrading water bodies, the State Board has mandated that the waste water from textile industries shall be treated and recycled water shall be used in the processes of units. ETPs are also encouraged to recycle treated water for industrial purposes and for adopting ZLD status.

This newsletter gives a glimpse of the status of the textile sector in Rajasthan and various steps taken by the State Board in regulating this sector.

**Sudhansh Pant**  
(Chairperson)



**TEXTILE  
INDUSTRIES  
IN  
RAJASTHAN**





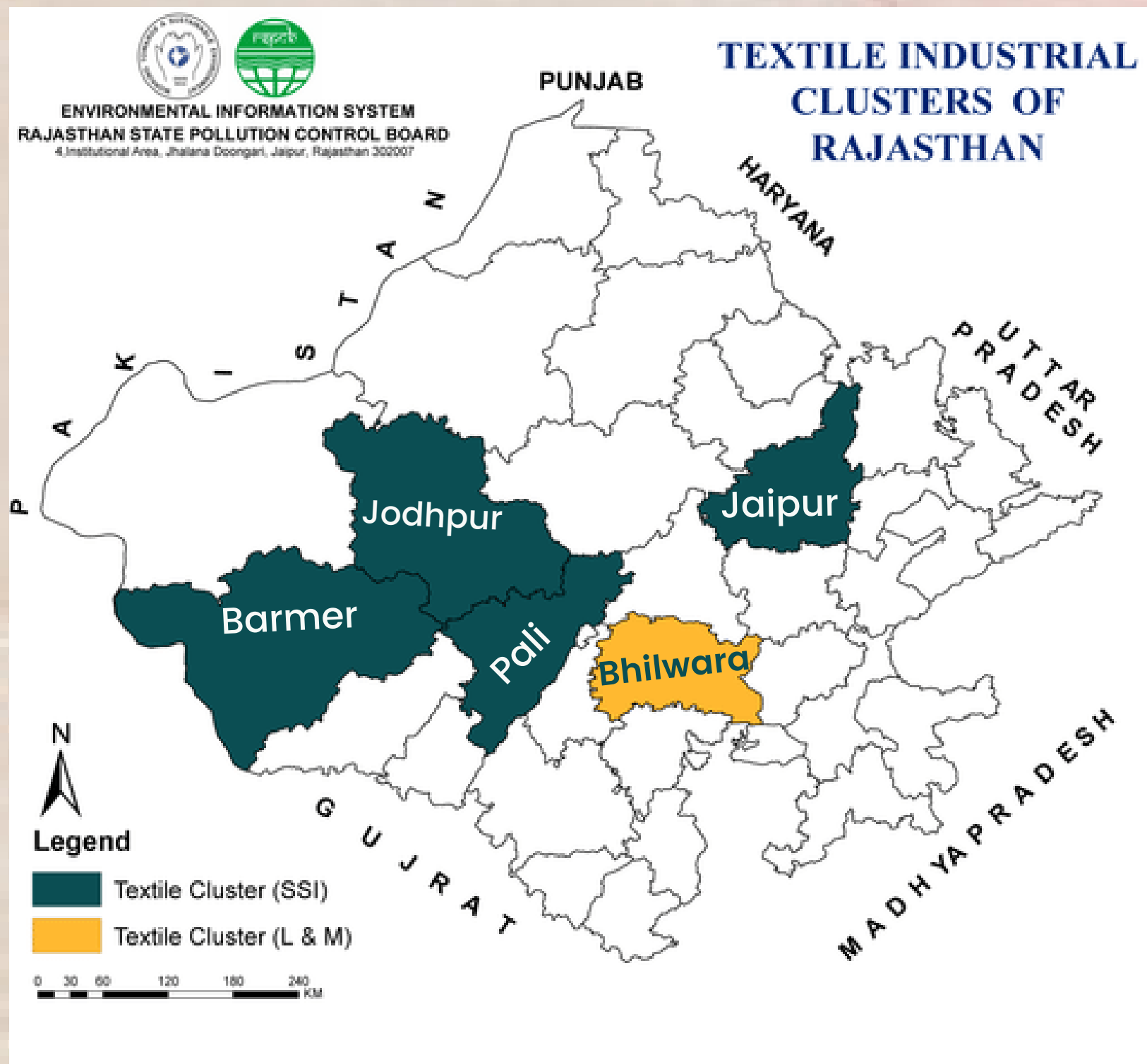
# • Status of textile industry in Rajasthan

Clothing is among the basic needs of human being, which derives from two sources, ancient handicrafts and modern scientific invention. In India, textile sector is one of the oldest manufacturing sectors of Indian economy, dating back to several centuries and famous for its product across the world.

The textile industry is one of the key contributors to the economy of Rajasthan. After agriculture, this sector provides highest employment opportunities. The textile industry also has potential to provide large scale employment in the state, it has high percentage of entrepreneurs along with skilled, semi-skilled, and unskilled workers.

With a strong base of textile industry in Rajasthan, there is a vast potential for its development in the state. Rajasthan's textile industry comprises wide range of units from small-scale units of spinning, weaving, block printing, screen printing, dye houses, apparel-making enterprises to large scale processing units. Abundant availability of raw material, trained labour and a network of backward and forward linkages make Rajasthan an attractive hub for this sector.

Rajasthan has a leading position in spinning of polyester, viscose yarn & synthetic suiting and processing. Textile cluster of Rajasthan are mainly present in five districts i.e., Jaipur, Bhilwara, Pali, Jodhpur and Barmer, around 2500 industries are presently operating in these clusters. Jaipur is a well-known centre for garment manufacturing, Sanganer town of district Jaipur is famous worldwide for its dyeing and printing industries. Bhilwara has specially emerged as a leading center for processing of synthetic fabric, specially suiting of mixed fiber. Pali has evolved as one of the most important production centers in the textile dyeing and finishing sector, it is also



known for production and export of cotton, rubia and polyester. Jodhpur textile cluster houses the biggest block of textile dyeing and printing industries.

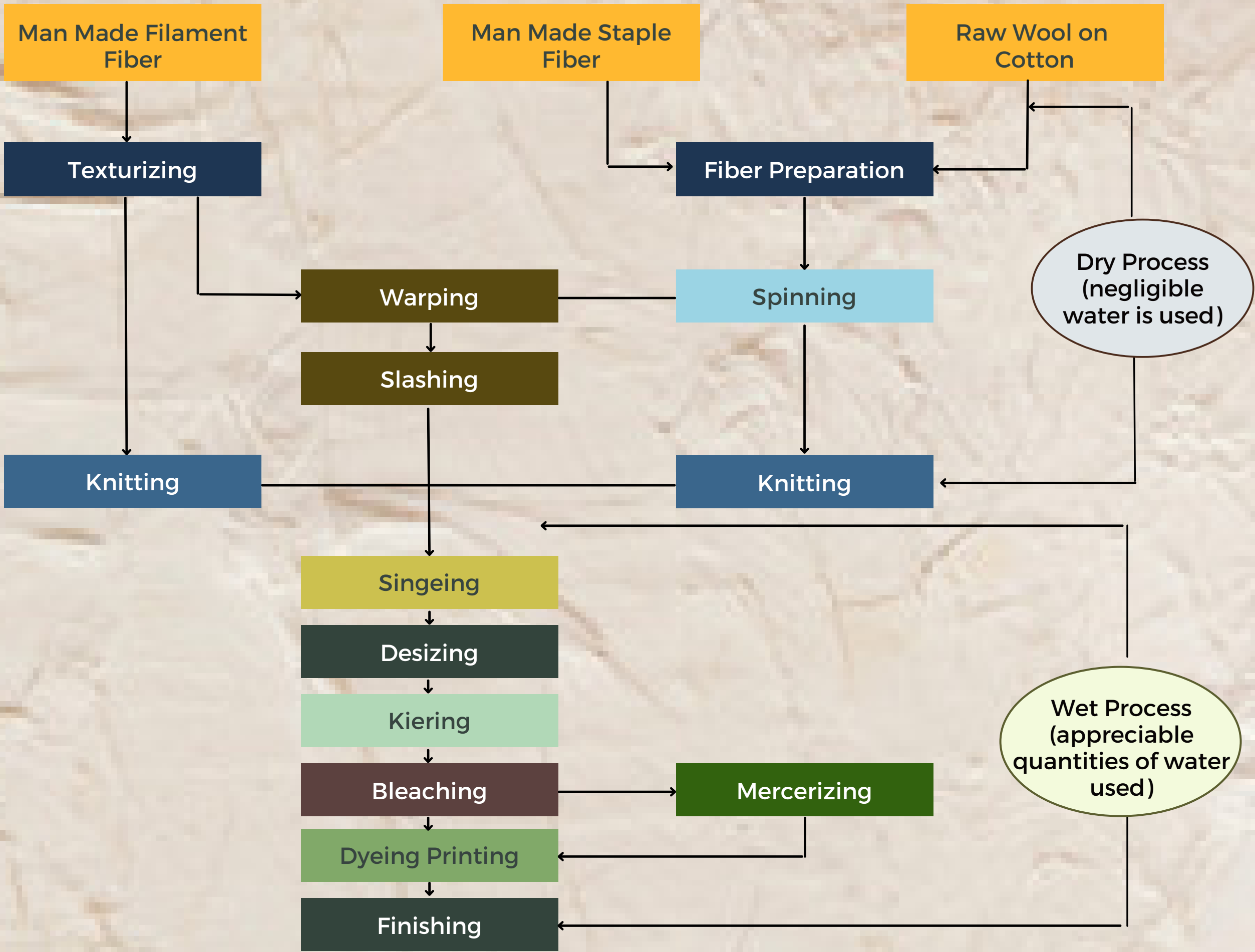
Rajasthan is also famous for printing & dyeing of low cost, low weight fabric. Jodhpur, Pali, Sanganer, Balotra, Jasol and Bituja are the major clusters of small scale industries engaged in printing and dyeing of low cost fabric.

## • Textile manufacturing processes

Textile manufacturing industries have a complex procedure, as it undergoes range of stages from converting fibre into yarn, yarn into fabric and so on ending up with clothing as a concluding product.

In textile industries various chemicals such as dyes, acids, alkalis, salt etc. are being used and at the same time considerable amount of water is also being used in different processes.

General processes involved in textile industry are divided into two processes i.e., Dry Process and Wet Process. These two processes are elaborated in the given figure.





**SINGEING****01**

It is a pre-treatment process in which loose fibers are burnt, which are not firmly bound into the yarn or fabric structure. This involves use of starch or other non-biodegradable sizing agents, so waste water from this process mostly consists of starch and softeners.

It is the wet processing or pre-dyeing process done after the singeing step. This is done in order to remove the size from warp yarn of the woven fabric for uniform dyeing & finishing in further processing.

**DESIZING****02****DYEING****06**

It is a process in which color is applied to fiber stock, yarn or fabric using dyes. The nature of wastewater coming from this unit depends upon the type of dye used.

**MERCERIZING****05**

It is a process for increasing the tensile strength, luster, sheen, dye affinity, and abrasion resistance of cotton and cotton/polyester goods by impregnating the fabric with sodium hydroxide solution.

**BLEACHING****04**

It is process to whiten the fibers by treatment in solution containing hydrogen peroxide, chlorine dioxide, hypochloride, sodium perborate, etc. This operation contributes about 10-20% of the total pollution load.

**KIERING****03**

This process consists of boiling the cloth to remove grease, waxes, natural fats and other impurities by an alkaline solution containing 1 to 3 percent of caustic soda, soda ash, sodium silicate, sodium peroxide and other chemicals for several hours with the aid of steam.

**07****PRINTING**

It is a process of decorating fabrics by application of dyes, or other related materials in the form of patterns. Textile printing is related to dyeing but in dyeing properly the whole fabric is uniformly covered with one colour, whereas in printing one or more colours are applied.

In this process, finishing is given to a fiber, yarn, fabric either before or after fabrication to improve its physical appearance. The wastewater may contains fixing agents like gum, soap & minerals and this process can also release formaldehyde into the air.

**08****FINISHING**

## • Pollution Potential in textile industry

It has been studied that in almost all production stages of the textile industry, there is a form of chemical contamination that is released into the environment; from the moment, the base materials were planted and produced, to spinning, weaving, dyeing, and finally transporting the finished products, each of these stages leaves a potentially devastating ecological footprint in our environment.

Textile effluent/emission varies from day to day and even hour to hour due to the batchwise nature of the textile process. Textile industries generate all four kinds of waste i.e., Liquid effluent, air emissions, solid wastes and hazardous wastes.

### 1 Water Pollution

Effluents generated from the sector are of utmost concern because of its high volume and pollution potential. The composition, quantity and nature of waste generated is determined by the processes involved, fiber type and chemicals used, operating practices etc. The strong color of textile wastes is the hardest component to treat. The important pollutants present in effluent are colour, biochemical oxygen demand (BOD), chemical oxygen demand (COD), toxic heavy metals, residual chlorine, formaldehyde (HCHO), PBDEs, phthalates, organochlorines, dissolved solids and non-biodegradable organics.

Table 1 : - Characteristics of effluents released from different processes.

<b>1 Sizing</b>	Starch, waxes, carboxymethyl cellulose (CMC), polyvinyl alcohol (PVA), wetting agents	High in BOD, COD
<b>2 Desizing</b>	Starch, CMC, PVA, fats, waxes, pectin	High in BOD, COD, SS, DS
<b>3 Bleaching</b>	Sodium hypochlorite, Cl <sub>2</sub> , NaOH, H <sub>2</sub> O <sub>2</sub> , acids, surfactant, NaSiO <sub>3</sub> , sodium phosphate, cotton fiber	High alkalinity, high SS (suspended solid)
<b>4 Printing</b>	Pastes, urea, starches, gums, oils, binders, acids, thickeners, cross-linkers, reducing agents, alkali	High pH, low BOD, high DS strong colored, high BOD, high DS, low SS, low heavy metals
<b>5 Mercerizing Dyeing</b>	Sodium hydroxide, cotton wax Dyestuffs urea, reducing agents, oxidizing agents, acetic acid, detergents, wetting agents	Highly colored, high BOD, oily appearance, High Suspended Solid, slightly alkaline, low BOD



## 2 Hazardous Waste

Sludge generated during treatment of effluent from textile industries is categorized as Hazardous waste as per Schedule - I Category - 35.3 of HWM Rules, 2016. The waste generated can be utilized as energy resource in Thermic Fluid Heater/Boiler as per standard operating procedure issued by CPCB regarding utilization of ETP sludge from textile industries to use as a supplementary fuel along with Coal in Thermic Fluid Heater (TFH)/Boiler in September, 2020. The waste can also be used in co-processing in cement kilns. When waste generated is not utilized as resource then it gets disposed in authorized TSDFs (Treatment, Storage & Disposal Facilities) in accordance with authorization conditions.

Other sources of hazardous waste source in textile industry are used oil, empty containers of dyes and other harmful chemicals.

Table 2: - Typical Characteristics of Textile Industries ETP Sludge.

S.No.	Properties / Parameters	Unit	Typical Characteristics
1	pH	----	7.36
2	Moisture	%	17.1
3	Gross Calorific Value (GCV)	Kcal/Kg	4442
4	Sulphur	%	0.66
5	Halogenated Aromatic Compounds	mg/kg	Absent
6	Total Halogens (Cl+Br+I)	mg/kg	98.2
7	Heavy Metals	mg/kg	BDL

## 3 Noise Pollution

Noise pollution is one of the major issues apart from air and water pollution due to textile units. Prolonged exposure to high noise causes psychological effects and physical damage includes loss in concentration which finally affects the workers and people living nearby. There are different processes in the textile chain that can produce noise pollution. The dry processes produce more noise than the wet processes. Though machinery manufacturers are taking continuous efforts to reduce the noise level but the measures are not adequate.

## 4 Solid Waste

The solid waste generated by textiles industry is further classified in three types of wastes: *Pre-consumer textiles waste*: It includes scraps, damaged or defective material samples, fabric selvages and leftover fabric from the cutting process. *Post-consumer textile waste*: These are household articles or garments that the owner does not require any more and discards. *Industrial textile waste*: It is generated from industrial applications and includes conveyor belts, filters, geo-textiles and wiping rags.

## 5 Air Pollution

Air pollution caused by the textile industry is also a major cause of concern. Boilers, thermic fluid heaters, and diesel generators are the main sources of air pollution in textile units. The pollutants generated include dust and lint, solvent mists, odour and boiler exhausts containing Suspended Particulate Matter (SPM), sulphur dioxide gas, oxides of nitrogen, etc.

## • Pollution Control Arrangements in the Textile Industry

The waste water generated from the textile industry is required to be treated by a suitable mechanism to remove harmful pollutants present in textile effluent. Typically the conventional wastewater treatment system in textile processing industries includes screen chamber, oil & grease trap, equalization, coagulation and flocculation, followed by settling in primary treatment systems and biological treatment followed by clarifiers in secondary treatment system. Although COD/BOD reductions are achieved through this conventional treatment system but objectionable colour, high TDS levels of effluents remain and effluents are not fit to be discharged into surface water or on land. Hence, tertiary treatment systems are becoming necessary for achieving prescribed standards for disposal. Pressure Sand Filter (PSF) and Activated Carbon Filter (ACF) are typically used for polishing.

Membrane based processes such as Reverse Osmosis (R.O), ultra filtration and nanofiltration are being widely used as end of the treatment for removal of organics and dissolved salts. Ozonation is also one of the tertiary treatment options which is mainly used for the oxidation of organic and inorganic, deodorization, and decolorization in textile industries. Typically evaporation process is used for evaporation of high concentrated rejects of R.O, ultra-filtration, nano filtration etc, where TDS concentration is high. Similarly, Multiple Effect Evaporators, Mechanical Vapor Recompression, Direct Contact Evaporation are various methods used for evaporation of effluents or rejects generated from the membrane processes.

## → PRESENT STATUS

- For benefits of Small Scale Textile units located in textile clusters of State, CETPs have been installed for treating their waste water excluding Bhilwara textile clusters. Whereas individual units located in isolated areas need to install their own effluent treatment arrangements.
- State Board is allowing units to have their own ETP only when the proposed treatment is ZLD based to achieve zero liquid discharge and to use 100% recycle treated waste water generated for industrial purposes. Also, they shall not discharge the effluent neither inside nor outside their premises.
- CETPs are also adopting zero liquid discharge status which will benefit both the industries and the environment as the water requirement of the units can be met with the recycled water.



## Effluent Treatment Process

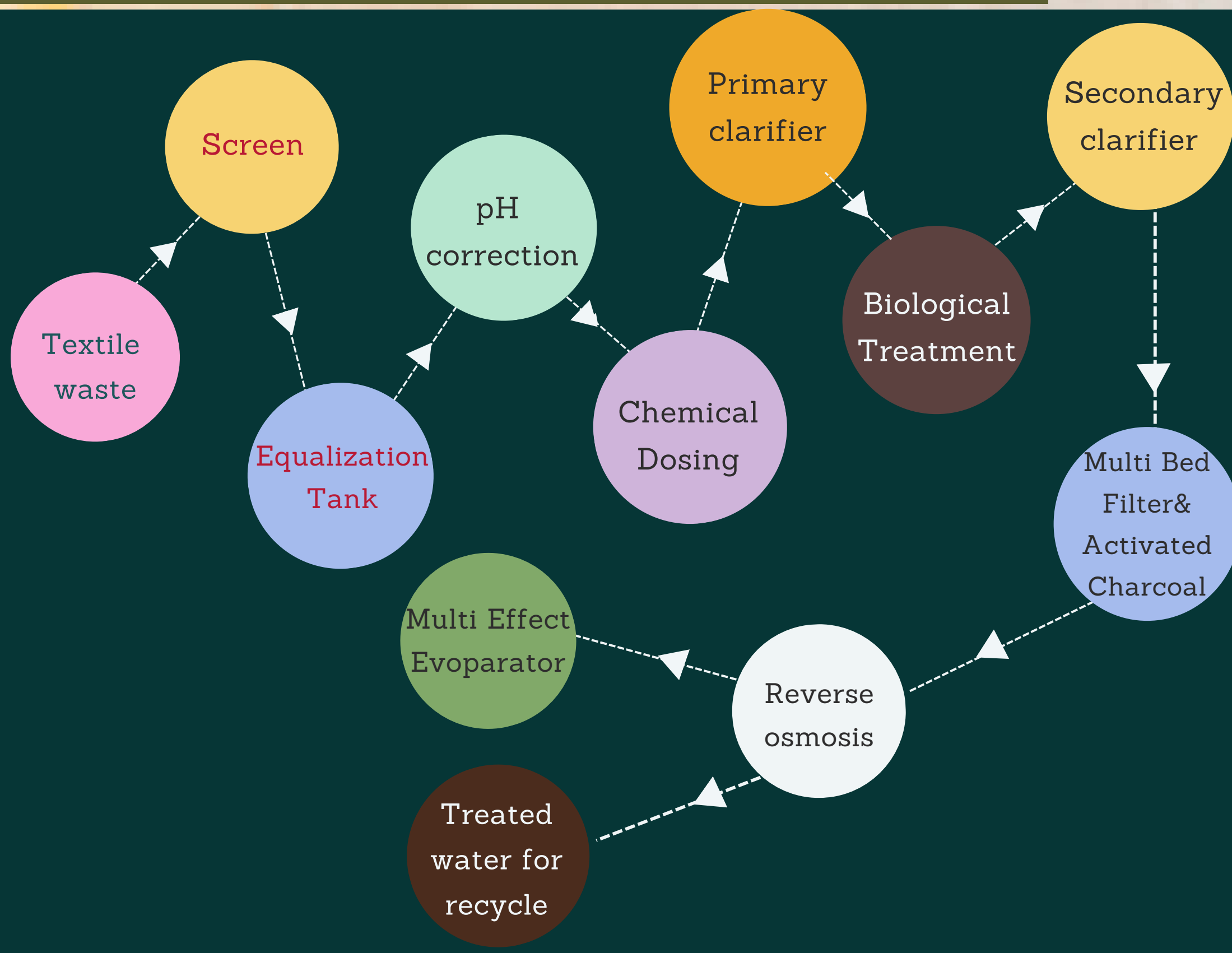


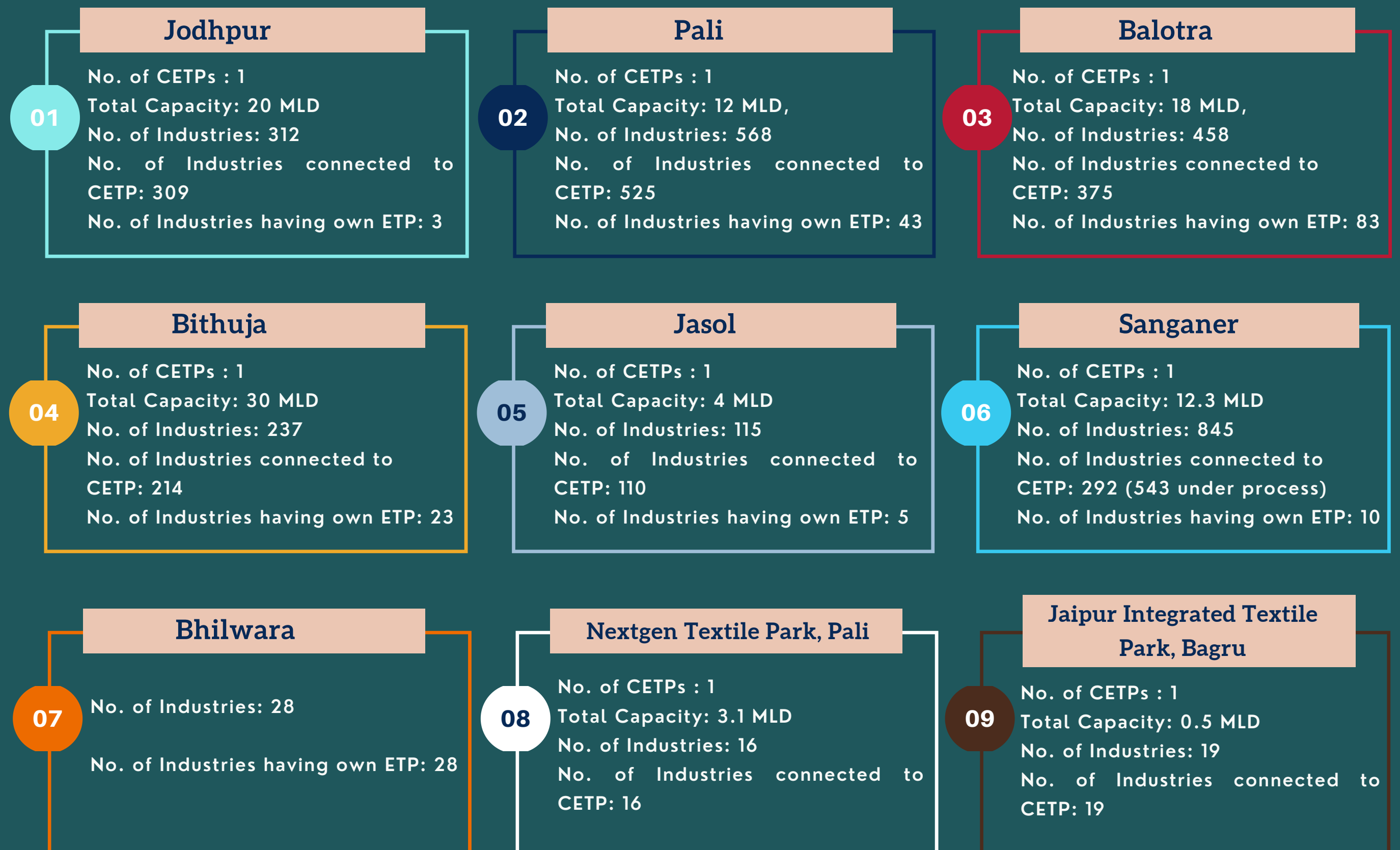
Table 3:- Properties of effluent from Textile Chemical Processing

Property	Standard	Cotton	Synthetic	Wool
pH	5.5-9.0	8-12	7-9	3-10
BOD, mg/l, 5 days	30-350	150-750	150-200	5000-8000
COD, mg/l, day	250	200-2400	400-650	10000-20000
TDS, mg/l	2100	2100-7700	1060-1080	10000-13000

### • CETPs in Rajasthan

Under the provisions of the Water (Prevention and Control of Pollution) Act, 1974, every industry has to provide adequate treatment of its effluents before disposal. The Small Scale Industries (SSIs) which are a major contributor to the total pollution, find it uneconomical to install dedicated pollution control equipment due to their limited size and scale of operations and therefore the concept of Common Effluent Treatment Plants (CETPs) is suitable for them. CETPs help in achieving end-of-pipe treatment of combined wastewater of the SSIs at lower unit cost and also facilitate better monitoring by the State Pollution Control Board (SPCB). Number of initiatives have been taken by State Govt. and Central Govt. to provide financial assistance to SSIs to establish and upgrade the existing CETPs.

#### CETPs in Rajasthan, capacities and industries connected to it



## Financial support by State Govt. for establishing CETPS

- The Department of Industries, Govt of Rajasthan notified the Scheme for Establishment of Integrated CETPs and Up-gradation of Existing CETPs vide Notification dated 27.02.2020. Scheme was formulated whereby a corpus fund of Rs 200 crore has been created, which has equal contribution from RIICO & RSPCB. Under the scheme one time grant is given for establishment of new CETP or up-gradation / expansion of existing CETP.

## Statutory Clearance Process

- All the industries which are covered under the provisions of Water (Prevention & control of Pollution) Act, 1974 and Air (Prevention & control of Pollution) Act, 1981 are required to obtain 'consent to establish' for establishment of any new unit or before carrying out expansion/modernization of any existing unit.
- Units after establishment are required to obtain 'consent to operate' before commencing commercial production. Consent to operate is also required for all the existing units which are covered under the provisions of Water (Prevention & control of Pollution) Act, 1974 and Air (Prevention & control of Pollution) Act, 1981. Consent to establish is one time and required only at the time of establishment of new unit or before carrying out expansion /modernization in the existing unit whereas consent to operate is granted for a specific period and needs to be renewed every time after expiry.
- Industries which are covered under the provisions of Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008 are also required to obtain authorization under the provisions of the rules.
- All the industries are required to comply with the prescribed standards for emission or discharge of environmental pollutants from textile industries and ambient air and noise quality standards as notified under E (P) Act, 1986 shall be monitored at the boundary of the industry for compliance.

## In case of non-compliance of Statutory Requirement

- If any non-compliance is observed during the operations, notice U/s 31(A) of the Air Act, 1981 and U/s 33 (A) of the Water Act, 1974 can be issued and proponent may be directed to rectify the non-compliance within specified period. If non compliances are found to be continuing even after show cause notice, the consent may be revoked/ refused and directions for closure and disconnection of electricity supply will be issued forthwith. The owner will also be liable for criminal prosecution and the State Board may cease the unit.

## • Categorization of textile industries by RSPCB

State Board has categorized the industries under Red, Orange and green categories depending on their pollution potential. Accordingly, the textile industries have been categorized as under:

### Red

- Handloom/carpet weaving (with dyeing and bleaching operation)
- Synthetic fibers including rayon, tyre cord, polyester filament yarn.
- Yarn/Textile processing involving any effluent/emission-generating process, bleaching, dyeing, printing and scouring.

### Orange

- Cotton ginning and processing (Large and medium scale units)
- Handloom/carpet weaving (Dry process-Large & medium scale)
- Spinning and weaving and yarn doubling- Large & medium scale.

### Green

- Cotton ginning and processing (Small scale units)
- Garment manufacturing (washing without detergent)
- Handloom/carpet weaving (Dry process-SSI)

## Advanced tools to monitor industries

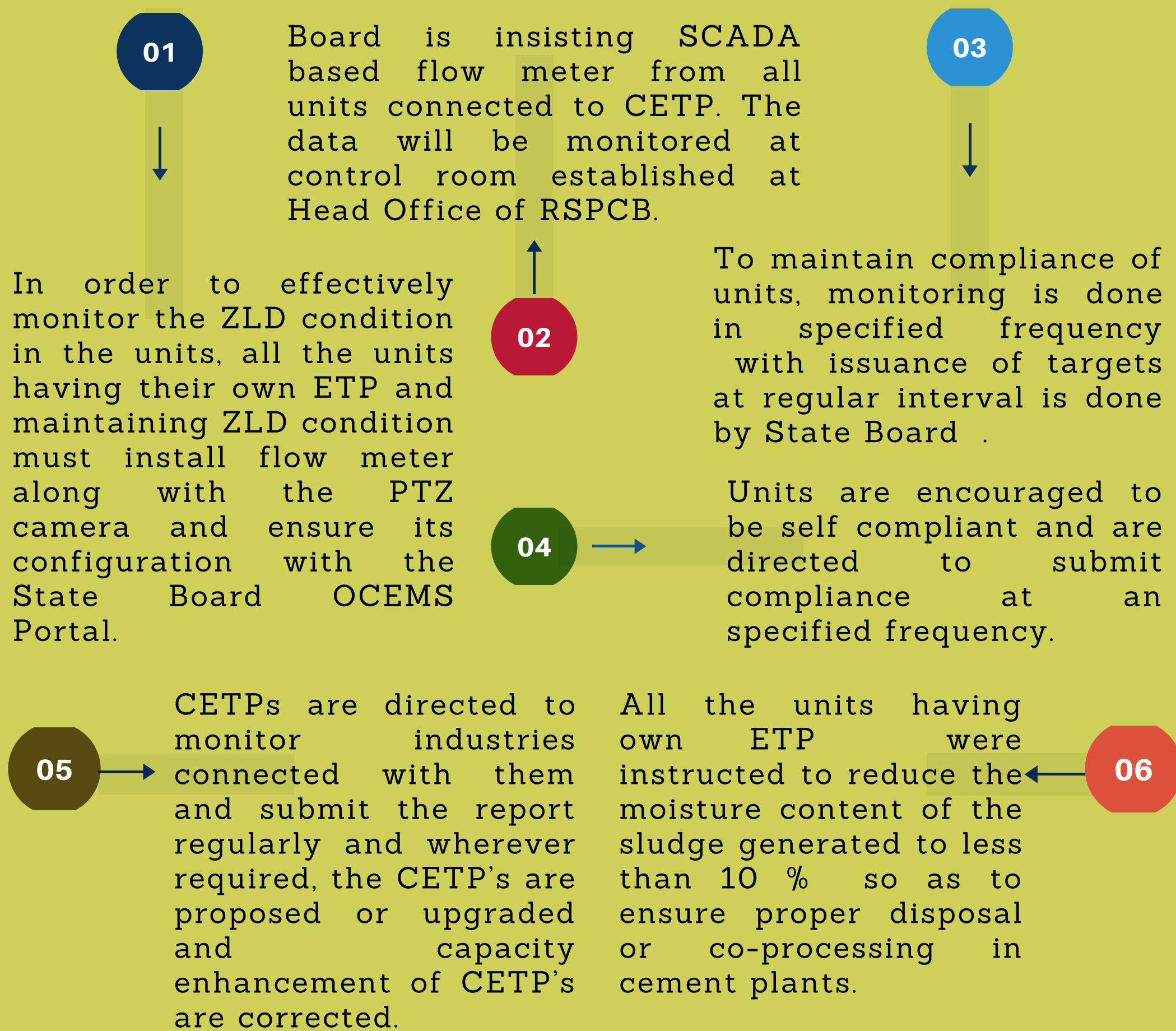
**OCEMS** (Online Continuous Emission/Effluent Monitoring System) is an advanced technical system consisting of the total equipment necessary to determine the concentration, emission and effluent rate using analytical measurements and a computer program to provide results in units of the applicable emission limit/effluent limits or standard. Whenever discharge levels are breached by industry, an SMS alert is sent out to officials who can then trigger action.

**SCADA** (Supervisory Control And Data Acquisition)- It is a system for remote monitoring and control that operates with coded signals over communication channels for industries generating trade effluent, as a mitigation measures towards leakage of effluent carrying pipelines and also controls over the quantity of trade effluent discharged by a individual industry by providing automatic gates/valves.



## • Action Plan for monitoring of textile sector

RSPCB is taking appropriate actions for controlling pollution from textile sector. Some of the salient features to effectively monitor and reduce the environmental damage is as under-



## Office order related to textile cell

01

As per office order no. F.14 (5)/Admin/RSPCB/Project/2785-2836 dated 12/1/22. All units desirous of having own ETP shall install ETP in their individual units own plots. The State Board may allow treatment of waste water into another unit only if the units are situated on adjoining plots and laying of pipeline for carrying waste water for treatment do not involve road cutting and passing through public hand. It was further directed that multiple units presently operative with one ETP shall install individual ETPs within a period of one year from the date of issue of the order.

02

Issued office order no. F(5)/Gen-67/RSPCB/Textile/3671-3727 dated 15.03.2022 regarding frequency of compliance monitoring of textile industries is revised in supersession of earlier orders. Now the following schedule of inspection and monitoring shall be followed for textile industries.

a) For Own ETP Units: once in 04 months  
b) For CETP connected units:

- Units having effluent generation more than 50KLD: once in 04 months.

Units having effluent generation less than 50KLD: once in 04 months

03

In order to efficiently monitor the ZLD condition in the units, all the units under MSME Grant scheme having their own ETP and maintaining ZLD condition must install flow meter along with the PTZ camera the ETP within three months, as the PTZ camera alone cannot ensure the ZLD condition and ensure its configuration within the State Board OCEMS Portal as per Office Order no. F.11(495)/RSPCB/LAB/2313 dated 10/9/21.

04

The State Board dated 22.02.2021 has issued order regarding issuance of permission for transferring KLD from one industrial unit to other industrial units (which are connected with CETP). In this regard, it was further clarified that this office order is for transferring KLD from one industrial unit to only one unit and not applicable for transfer of KLD from one unit to multiple units vide office order F.14 (5)/Admin/RSPCB/Project/2732 dated 11.01.2022.

05

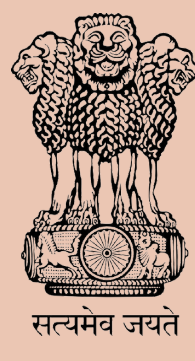
As per office order no. F(5)/Gen-67/RSPCB/Textile/3671-3727 dated 15.03.2022 the units shall:

a) Install online effluent monitoring system including flow meters, PTZ cameras and SCADA and share the same with the State Board:

- All units which are connected to CETP shall install flow meters and SCADA system.
- The credentials of SCADA to be shared with R.S.P.C.B.
- All own E.T.P. units shall install flow meters and PTZ cameras.

b) Maintain log-book in prescribed format for CETP connected units and for Own ETP units.

- Record Trade Effluent generated, recycled and disposed (In case of own ETP units).
- Record sludge and M.E.E Salt (In case of own ETP units).
- Record of trade effluent transferred to CETP (in case of CETP connected units)



*Message from  
Member Secretary*

The textile industry uses varieties of chemicals in manufacturing processes, most of the chemicals used are toxic and persist in the environment. They include heavy-metal-rich dyes and fixing agents, bleaches, solvents, and detergents which lead to pollution of natural resources. As per a report published by the World Bank, around 20% of water pollution globally is caused by textile processing industries.

The State Board has endeavoured to curb pollution in textile industries by encouraging textile units to adopt Zero Liquid Discharge (ZLD) status and effectively monitor this in these units. The State Board is also regularly monitoring industries as per prescribed rules for effective implementation.

Upgradation of technology for effective treatment of effluent, use of less toxic reagents in processing, self compliance by units and better enforcement by State Board are most important steps required to abate pollutants released from textile industries.

*Uday Shankar  
(Member Secretary)*

FOLLOW US AT



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