

The concept note

For

**Challenges against implementation of ZLD in textile processing
Industries and clusters in India**



Prepared by

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Acknowledgement

I am thankful to SGTPA-Surat for entrusting CEE-Ahmedabad to examine the facts about implementation of ZLD system in the textile industries and its clusters in response to the draft notification issued by the Ministry of Environment, Forest and Climate Change (MoEF &CC), the government of India.

I am also thankful to my subordinates **Shri Nandankumar Project Officer and Shri Parth Patel Project Officer in CEE –Ahmedabad** for assisting me during preparation of this note.

The concept note is prepared as per the discussion with the members of the SGTPA on 14th March, 2016 and their requirements. The note includes the important issues like SWOT analysis, the global scenario of ZLD, challenges against ZLD, its alternatives and some suggestions as to where and why ZLD shall be implemented. The note further includes the data/feedback pertaining to field visits, photographs related to the visits, environmental issues of the textile sector and the need and viability of ZLD.

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1. Background

The Ministry of Environment Forest & Climate Change (MOEF&CC) has prepared a draft for circulation to the textile industries to achieve Zero Liquid Discharge (ZLD) if their waste water discharge is more than 25KLD and also to the clusters of the textile sector regardless of their effluent discharge quantity. The ministry has invited comments/suggestions in this regard from concerned stake holders. The comments/suggestions are to be sent to the MS and DD CPCB New Delhi.

CEE -Ahmedabad is entrusted with the task of preparation of the concept note in this regard by SGTPA-Surat and accordingly this note is prepared.

The history of textiles

The history of textile is almost as old as that of human civilization and as the time moved on, the history of textile has further enriched itself. In the 6th and 7th century BC, the oldest recorded indication of using fiber comes with the invention of flax and wool fabric at the excavation of Swiss lake inhabitants. In India the culture of silk was introduced in 400AD, while spinning of cotton traces back to 3000 BC.

In China, the discovery and consequent development of sericulture and spin silk methods got initiated at 2640 BC while in Egypt the art of spinning linen and weaving developed in 3400 BC. The discovery of machines and their widespread application in processing natural fibers was a direct outcome of the industrial revolution of the 18th and 19th centuries. The discoveries of various synthetic fibers like nylon created a wider market for textile products and gradually led to the invention of new and improved sources of natural fiber. The development of transportation and communication facilities facilitated the path of transaction of localized skills and textile art among various countries.

The textile industry is one of the oldest and largest industrial sectors in India and our country is the second largest producer of textile and garment next to China. The textile units are scattered all over India. (Figure-1) The textile industry in India constitutes one of the country's major export sectors. India makes a major contribution to world trade in cotton yarn, accounting for some 25% of the total. Indian Textiles Industry has an overwhelming presence in the economic life of the country. Apart from providing one of the basic necessities of life, the textile industry also plays a pivotal role through its contribution to industrial output, employment generation and export earnings of the country.

This sector contributes about 14% to India's industrial production, 4% to country's Gross Domestic Product (GDP), 27% to the country's foreign exchange inflows and 13% to the country's export earnings. The textile sector, the second largest provider of employment after agriculture; provides direct employment to over 45 million people.

Indian textile industry can be divided in to several segments some of which are as under:

- **Cotton:** second largest cotton and cellulosic fibers producing country in the world.
- **Silk:** INDIA is the second largest producer of silk and contributes world's 18% raw silk production.
- **Wool:** INDIA has 3rd largest sheep population in the world, having 6.15 crores sheep, producing 45 million kg of raw wool, and accounting for 3.1% of the total world wool production, INDIA'S rank 6th amongst clean wool producer countries and 9th amongst greasy wool producers.
- **Man-made fibers:** the fourth largest in synthetic fibers/yarn globally.
- **Jute:** INDIA is the largest producer and second largest exporter of the jute goods.

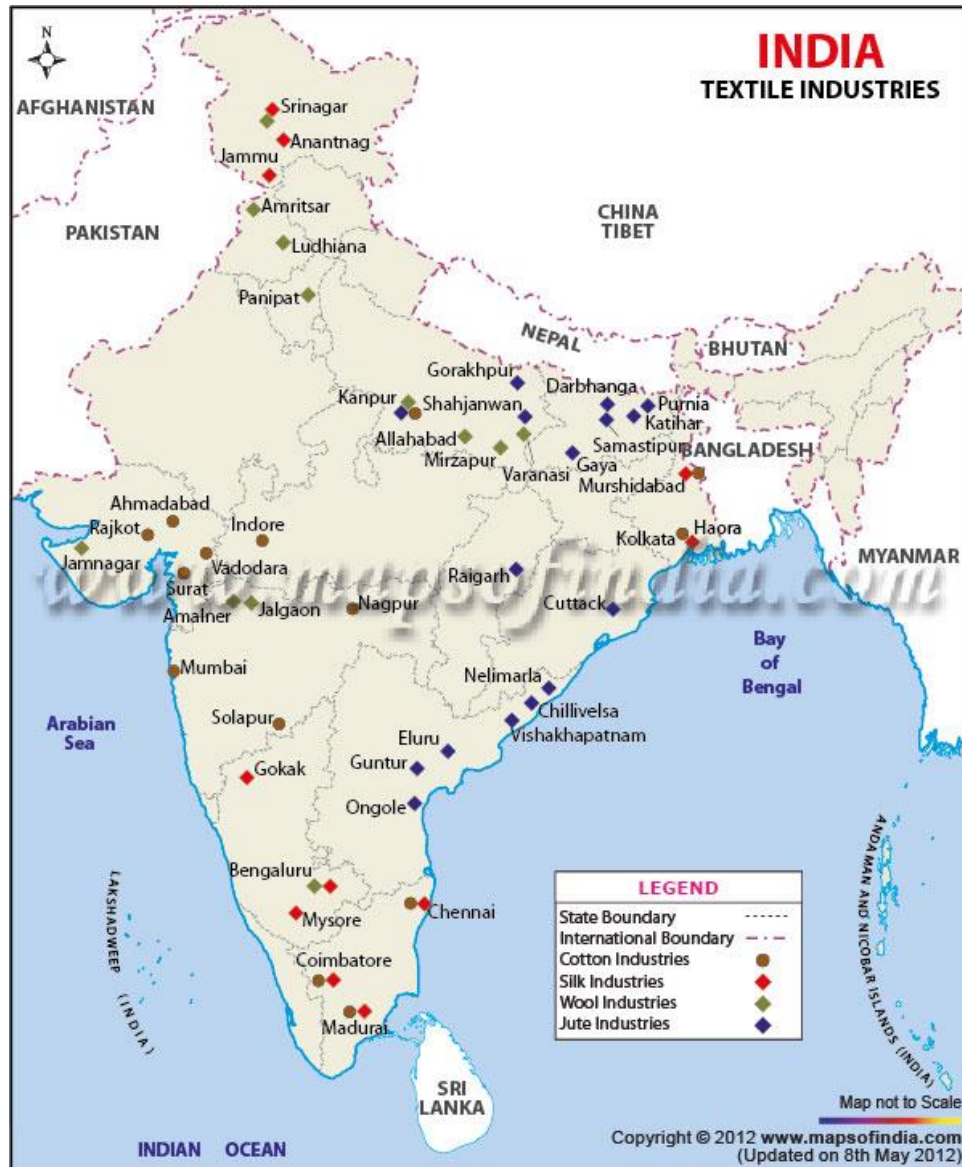


Figure 1: The map showing locations of textile industries in India

Table 1: India's Competitiveness with Other Country

Key countries / regions	Key positives	Key negatives
China	Efficient, low cost, vertically integrated	Growth at the cost of profits
India, Pakistan	Vertically integrated, low cost	Lacks economies of scale and infrastructure support
Mexico (NAFTA), Turkey	Proximity to market, duty and quota free	Lack China and India's degree of competitiveness
ASEAN (Vietnam, Cambodia, Indonesia)	Cheap labor	No other cost or locational advantage
AGOA (African) countries, Bangladesh	Quota and tariff free, cheap labor	Lacks integration and China and India's degree of competitiveness
Hong Kong, Korea, Taiwan	Trading hubs proximity to China	No cost advantage, protected currently by quotas
USA and EU	Non-quota barriers likely to prove irritant to imports	US\$ 400 bn trade loss likely

Source - Industry, I-SEC Research

The contents in the table show that there is no doubt about India's competitiveness. The country will become even more competitive once its infrastructure issues are sorted out. China has probably already reached its peak and further improvements may not be as dramatic.

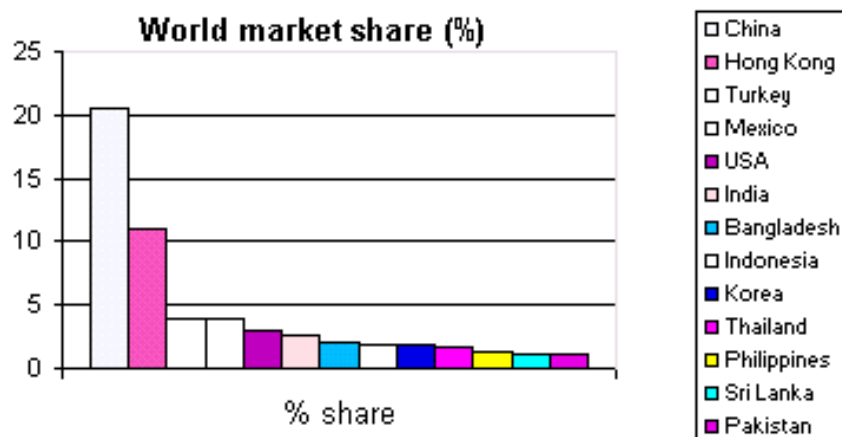


Figure 2: The world market share

2. SWOT Analysis of textile sector

	HELPFUL (for your objective)	HARMFUL (for your objective)
Internal (Within Organization)	<p>Strengths</p> <ul style="list-style-type: none"> • Tradition in Textiles and long operating experience • Large and growing domestic market • Strong raw material base • Production across entire textile value chain • Stable, low-risk economy, safe for business growth • Easy availability of abundant raw materials like <u>cotton</u>, wool, <u>silk</u>, <u>jute</u> • Widely prevalent social customs • Variety of distinct local culture • Constructive geographic and climatic conditions 	<p>Weakness</p> <ul style="list-style-type: none"> • The textile industry of India is one of the highly disintegrated industries. • Few segments of this industry are not highly productive. • There is a huge dependency of the industry on cotton. • The mill segment is gradually declining. • Labor laws are not very favorable. • The power and interest rates, and indirect taxes are high. • Inadequacy of technological development which in turn is responsible for affecting the productivity. • The act of generating economies of scale lacks.
External (Outside Organization)	<p>Opportunities</p> <ul style="list-style-type: none"> • The textile industry records an annual growth of around 6-8%. • A shift towards the market of branded ready-made garment is being observed. • More number of emerging malls and retail industries are providing opportunities to industry's segments like handicrafts and apparels. • There is a provision of more FDI and investment opportunities. • Withdrawal of quota restriction is contributing immensely in market development. • The global needs are being catered with product development. • An upsurge in the purchasing power and disposable income of Indian customers has opened room for new market development. 	<p>Threats</p> <ul style="list-style-type: none"> • Competing with other progressing countries like China. • Striking a balance between the quality and price of products. • Satisfying the demands of people all across the globe and at the same time, steadily improving the quality of the products. • Striking a balance between demand and supply. • Environmental and international labor laws. • Removal of quota system will fluctuate the export demand.

3. Environmental issues of textile industries

The textile industry is water and labor intensive and produces pollutants of different forms. The manufacturing operation also generates vapors during dyeing, printing and curing of dye or color pigments. Dust emission is associated with fiber processing/boiler operation. Other than these process operations, textile mills have wood, coal or oil fired boilers and thermic fluid heaters which are point emission sources.

Major environmental issues in textile industry result from wet processing. Wet processes may be carried out on yarn or fabric. The transformation of raw cotton to final usable form involves different stages. The various important wet processes involved in the textile industry are as follows:

- **Sizing / Slashing:** This process involves sizing of yarn with starch or polyvinyl alcohol (PVA) or carboxyl methyl cellulose (CMC) to give necessary tensile strength and smoothness required for weaving. The water required for sizing varies from 0.5 to 8.2 litre / kg of yarn with an average of 4.35litre / kg.
- **Desizing:** The sizing components which are rendered water soluble during sizing are removed from the cloth to make it suitable for dyeing and further processing. This can be done either through acid (sulphuric acid) or with enzymes. The required water at this stage varies from 2.5 to 21 L /Kg. with an average of 11.75 L/Kg.
- **Scouring / Kiering:** This process involves removal of natural impurities such as greases, waxes, fats and other impurities. The desized cloth is subjected to scouring. This can be done either through conventional method (kier boiling) or through modern techniques (continuous scour). Kiering liquor is an alkaline solution containing caustic soda, soda ash, sodium silicate and sodium peroxide with small amount of detergent. The water required for this process varies from 20 – 45 L/ Kg. with an average of 32.5 L/Kg.
- **Bleaching:** Bleaching removes the natural coloring materials and renders the cloths white. More often the bleaching agent used is alkaline hydrochloride or chlorine. For bleaching the good quality fibre, normally peroxide is used. The chemicals used in peroxide bleaching are sodium peroxide, caustic soda, sulphuric acid and certain soluble oils. The water and chemical requirement and the effluent generation normally vary based on the type of operation and the material (yarn / cloth) to be processed. Bleaching the yarn both through hypo-chloride and hydrogen peroxide methods require same quantity of water and it varies between 24 to 32 L/kg. But in the cloth bleaching, the water requirement is much higher and it fluctuates between 40 - 48 L/kg.
- **Mercerizing:** The process of Mercerization provides lustre, strength, dye affinity and abrasion resistance to fabrics. It is generally carried out for cotton fabrics only for easy dyeing. Mercerization can be carried out through cold

caustic soda solution followed by washing with water several times. The water required for this process varies from 17 to 32 L / kg, with an average of 24.5

- **Dyeing:** Dyeing is the most complex step in wet processing which provides attractive color for the product. Dyeing is carried out either at the fiber stage, or as yarn or as fabrics. For dyeing process, hundreds of dyes and auxiliary chemicals are used. In brief, the water requirement for dyeing purpose (include all types and shades) varies from 36 – 176 L/kg with an average of 106. The effluent generation during dyeing process fluctuates from 35 to 175 L/kg with an average of 105 L/kg.

Table 2: The characteristics of the textile wastes after the various processes

Processes	pH	Total Suspended solids mg/L	BOD mg/L
Sizing / Slashing	7.0 – 9.5	8500 –22500	620 – 2500
Desizing	6 – 8	16000 –32000	1700 – 5200
Scouring / Kiering	10 –13	2200 –17400	100 – 2900
Bleaching	6	6500-22000	-
Mercerizing	12 -13	430 –2700	150 – 280
Dyeing	10.5	10200	400 - 700

4. Effluent Treatment System of textile units/CETPs

As in the case of other countries, textile industries in India are also highly water polluting, besides causing air pollution. Major air pollution sources are the boilers and thermic fluid heaters. The liquid effluent characteristic and effluent quantity vary according to the processes involved, chemicals used and the scale of operation. Therefore, very often the quality of effluent from one industry varies from the other similar industry.

As the textile manufacturing units use different type of raw materials, chemicals and processes, the wastewater treatment may require the use of unit operations specific to manufacturing processes in use. Techniques for treating industrial process waste water in this sector are - source segregation and pre-treatment of waste water streams.

The major treatment processes can be summarized as follows:

- Precipitation, coagulation and flocculation (Primary treatment)
- Biological oxidation (Secondary Treatment)
- Membrane filtration
- Reverse osmosis
- Adsorption by activated carbon
- Advanced chemical oxidation

The above treatment processes are briefly discussed below:**Primary and Secondary Treatment**

The conventional treatment systems like Physico-chemical treatment or Physico-chemical treatment followed by biological treatment system are installed in majority of textile industries. The first step in the wastewater treatment is to mix and equalize the waste water streams that are discharged at different time, and different intervals from different stages in the processes. Some industries also prefer screening, oil trap prior to equalization for removal of solids and oil and grease. Equalization ensures that the effluent have uniform characteristics in terms of pollution load, pH and temperature. The effluent is then subject to flash mixing for the addition of coagulants such as lime, alum, ferrous sulphate, ferric chloride, poly-electrolyte and processed through clari-flocculator or flocculator and settling tank. Selection of appropriate coagulants and doses of chemicals is determined on the basis of treatability study of effluent samples. The chemical treatment helps in reduction of color and suspended solids. A significant reduction in BOD and COD values is also observed. This Physico-chemical treatment is followed by biological treatment process which further reduces BOD and COD values. The textile process houses which undertake chemical processing do not have much organic load in their effluents. In such cases, the recent trend is to set up an activated adsorption system or an Ozonation unit instead of biological treatment.

Tertiary Treatment

Textile effluents may require tertiary or advance treatment methods to remove particular contaminants, dissolved salts or to prepare the treated effluent for reuse. Some common tertiary operations are removal of residual organic color compounds by adsorption and removal of dissolved solids by membrane filtration. Sometimes the wastewater is also treated with ozone or other oxidizing agent to destroy many contaminants. Evaporation and crystallization are other methods to minimize effluent disposal problems.

Advance methods for tertiary treatment

Adsorption

The adsorption process is used to remove color and other soluble organic pollutants from effluent. The process also removes toxic chemicals such as pesticides, phenols, cyanides and organic dyes that cannot be treated by conventional treatment methods. Dissolved organics are adsorbed on surface as waste water containing these is made to pass through adsorbent. Most commonly used adsorbent for treatment is activated carbon.

The activated carbon once it is saturated needs replacement or regeneration. The chemical regeneration can be done within the column either with acid or other oxidizing chemicals.

Ion Exchange

Ion exchange process is normally used for the removal of inorganic salts and some specific organic anionic components such as phenol. In the ion exchange process the impurities from the effluent streams is transformed into another one of relatively more concentrated with increased quantity of impurities because of the addition of regeneration chemicals.

Reverse Osmosis

After primary, secondary and/or tertiary treatment, further purification by removal of organics and dissolved salts is possible by use of reverse osmosis. The process of reverse osmosis is based on the ability of certain specific polymeric membranes, usually cellulose acetate or nylon to pass pure water at fairly high rates and to reject salts. To achieve this, Water or waste water stream is passed at high pressures through the membrane. The applied pressure has to be high enough to overcome the osmotic pressure of the stream, and to provide a pressure driving force for water to flow from the reject compartment through the membrane into the clear water compartment.

RO membranes are susceptible to fouling due to organics, colloids and microorganism. In a typical reverse osmosis system, the feed water is pumped through a pre-treatment section which removes suspended solids and if necessary, ions such as iron and magnesium which may foul the system. The feed water is then passed through the reverse osmosis modules at high pressure.

Table 3: Performance of Treatment System for Wash Water Parameter

Parameters	Influent	Primary Treatment	Ozonation	RO Stage I			RO Stage II
				Permeate	Reject	Permeate	Reject
pH	9.88	9.61	6.92	6.03	6.72	5.76	7.04
Total suspended solids, mg/L	167	56	19	6	70	6	124
Total dissolved solids, mg/L	3104	1946	3256	922	9830	196	17828
Chemical oxygen demand, mg/L	586	166	130	26	327	17	754
Biochemical oxygen demand, mg/L	190	41	41	1	16	02	208
Total Hardness, mg/L	96	-	-	-	60	Nil	1080
Chlorides, mg/L	334	636	692	314	108	34	4416
Color, % purity	<10	<10	Colourless	Colourless	<10	Colourless	10-20

5. Implementation of ZLD in textile processing in global and Indian Context

So far as textile sector is concerned, Pakistan, Bangladesh, Vietnam and China are the biggest competitors of India. It is gathered that globally these countries are yet to implement ZLD so far. Though Bangladesh has expressed its willingness to implement the system for the textile industries in their country primarily for the purpose of water conservation and to reduce water pollution in rivers, streams etc.

6. Policies regarding ZLD in textile processing in India:

In view of the indiscriminate use of the water, its insufficiency, its conservation and the issues related to the waste water disposal and the pollution of the natural streams/rivers; the government is intending to issue a notification under the E.P.A. -86 for implementation of ZLD in textile units having its effluent discharge more than 25 m³ /day and also for all textile units in clusters irrespective of their waste water discharge. The draft notification is issued in this context by MoEF&CC. In Chennai the judiciary has directed the CETPs of the textiles to go for ZLD in 2009 and then to the textile units in 2011.

7. Need and viability of ZLD in textile processing in different textile Clusters in India

The industries i.e. textiles in different parts of the our country have adopted the concept of ZLD strictly according to their requirements e.g. the units in Tirupur in Chennai have installed ZLD system in order to comply with the directions of the Hon'ble court.

In Rajasthan the industries opted for ZLD because of the directions from the court, scarcity of water, its requirement for conservation.

8. Challenges against ZLD

- In his response to the draft notification by the Ministry of Environment, Forest and Climate Change, Textiles Secretary, S. K. Panda, has said the proposed standards — mandating 'Zero Liquid Discharge' (ZLD) for textile processing units where waste water discharge is over 25 kilo liters a day — will be "too stringent" for the domestic textile processing industry that is largely unorganized and comprising of SMEs, according to reliable sources.
- Power usage due to the implementation of ZLD has shot up as a result of the treatment plants — 50 per cent of power used by industry goes into these plants alone. As a result, the industry as a whole, has become less competitive due to a forced additional 4 per cent hike in the final garment price, which is a huge loss to the consumers.
- ZLD results in generation of the huge amount of hazardous solid wastes (particularly waste mixed salt) causing disposal challenges, which is being stored in storage yards within the CETPs. ZLD is generating thousands of tons of sludge as solid waste. This sludge has to be disposed of in a Secured Land Fill (SLF). The un-recovered Common Salt or Glauber's salt and the contaminants are sent to solar evaporation ponds for natural evaporation or sent to final Forced Circulation Multiple Evaporators for converting into Solid Waste. If we assume that all the dyeing factories totally use about 600 tons of salt daily, then the rejected salt will be about 100-150 tons every day. Imagine this for a whole year and for several years. We do not know what we are going to do with this future. It is a sleeping monster. In future this solid waste management will be another tough task. May be we will have to use incineration to burn them with modern machinery fitted air pollution control equipment. Still we may end up with salt.

- The major challenges faced were related to corrosion of metal, scaling and choking in tubes and necessity of skilled manpower to operate the plant.
- For the chemical sludge, the best way to dispose it off is its gainful utilization for cement coprocessing but it needs tie up with a willing/recipient cement company
- The recovery of water and salt (Sodium sulphate and brine) offsets this costs significantly, but it would apply only to water scarce areas where the cost of water is high.
- High Carbon foot print of a ZLD facility is another major concern. The typical power consumption ranges from 8 to 10 kW/m³. The thermal evaporators alone consume about 20-40 Kw/m³ in addition to several tons of firewood for the boilers.
- Implementation of ZLD requires a host of advanced wastewater treatment technologies. Implementation of ZLD in Tamilnadu has highlighted several Technology shortcomings such as in Thermal evaporation & brine concentration, Salt separation and Crystallization, Color removal etc.
- ZLD requires use of higher amount of chemicals in wastewater treatment
- ZLD Increases the energy usage tremendously.
- Impact on cost of processing (implementing ZLD pushes up costs of production by 25-30%)
- ZLD is an 'end-of-pipe' concept to mitigate the impact of wastewater pollution on the environment and human health
- ZLD has very High CAPAX.
- It will be necessary to stop production if there is a breakdown in the Zero Discharge Plant which is a great loss.

- The ultrafiltration is a requisite before RO to minimize the damage to RO membrane which increases the cost of initial investment as well as the cost of treatment drastically
- Maintenance and operation cost of RO (ZLD) is very high
- The problems of Corrosion/leakages are encountered while using ms pipes which is required to be replaced by HDPE pipe which increases the cost and more so in the case of ZLD.
- The use of PAC to reduce the color content of the effluent requires the handling of powdered carbon leading to the issues of carbon dust emission (air pollution) in the plant
- MEE operation consumes more power and (thus more carbon footprint).It also generates salts which create problems of handling and disposal
- The entire ZLD system is highly sophisticated and needs skilled and experienced man power for its efficient operation which again increases the overall cost of treatment, operation as well as maintenance.
- The Zero Liquid Effluent Discharge is a very tough task. The plant must be designed very lavishly. All the tanks, pipe-lines, pumps, equipment, machinery, RO membranes, Multiple Evaporators should be designed for at least 20 – 30 % more than the requirement. During back washing, sand filters, carbon filters & Ultra Filtration generates contaminated wash water of about 20% of effluent feed. This is sent back to effluent collection tank and hence the plant needs higher design capacity by 20 – 30 %. Automation & Instrumentation is a must to safeguard the plant. A good laboratory is a must. All the critical equipment must have stand by ones.
- Biological plant needs continuous monitoring. Any mistake may stop the entire plant for several days. RO Plant needs maximum protection. Any small mistake will easily damage all the Membranes and it will cost several Lakhs of Rupees. Multiple Evaporators will easily get scaling & choking. For this it will be necessary to select a combination with costly Forced

Circulation Multiple Evaporators instead of simple Falling Film Multiple Evaporators.

- Most of the textile units in India are small scale & medium scale with land area below 10000 sq. yard. Putting up new ZLD compatible plant will require as much more land which is very costly & not available with the industries into their premises or in the adjoining area so the commercial viability will not be there.
- A ZLD plant is combination of RO & evaporator, a typical process house would be consuming 200 to 1500 m³ water daily, to treat such quantum of water & evaporate the same will require huge amount of electricity ranging from 3000 to 15000 kW per day. To produce such amount of electricity lot of fossil fuel, natural gas or enriched uranium is required and subsequently to control water pollution we will contributing equally for air pollution.
- The cost of ZLD will escalate to such level that production will not be globally competitive and it will add more troubles to the already depleted export market of the Textile sector.
- The figure for consumption of the water in Textile sector in the country is just @ 2% of the total water consumption.
- The cost of ZLD plant was estimated as follows

Capital cost	- Rs.18 crores per MLD + Land cost (varies in different Areas) + Cost of disposal of solid waste
Land	- 1.5 acre per MLD + the cost of finance
Operating Cost	- Rs.225 per m ³ + Depreciation
- 90-95 % water can be recovered from the effluent, but cost of fresh water varies from area to area. For e.g. in UP it is free, Ichalkaranji it is Rs 17/m³ whereas in Tirupur it is Rs 75/m³.

Table 4: Recovery & Loss in Zero Liquid Effluent Discharge

Item	% Recovery for Reuse	% Loss
Water	75 – 80 %	20 – 25 %
Common Salt	35 – 50 %	50 – 65 %
Glauber's Salt	75 – 80 %	20 – 25 %

9. Comparison of the cost between ZLD and non ZLD

- The operating cost ZLD is @ Rs 200-250 Rs/KL in Tirupur
- The cost of non ZLD is @ Rs 15-30 /KL for primary and secondary treatment.
- Providing appropriate pretreatment for increasing the membrane life.
- Maximize renovated water recovery (permeate)
- Recovery of salt for reuse
- Minimize the quantity of rejects and minimize the O&M of reject management

10. Alternatives to Zero Liquid Effluent Discharge

Sea Discharge

The state of Gujarat is blessed with the largest coastline in the country and so the treated effluent from CETPs can be safely discharged in to the sea. Sea discharge is a better alternative against ZLD. In sea discharge we have two methods. One is to treat the mixed effluent with primary, secondary and tertiary treatments and dispose into the sea. Here all the water and salt are lost in to the sea.

Another method is to treat with the above methods and recover water for reuse by RO Treatment. Then send the final reject to sea discharge. Here we recover about 85% of the water for reuse and avoid only the Multiple Evaporator losing the salt. But the reject from RO Plant will have more contaminants more than the sea Discharge Norms. Hence the RO reject cannot be easily discharged into the sea. Therefore only the fully treated water (Primary, Secondary & Tertiary) can be discharged into the sea. But for this we have to carry-out a large scale Environment Impact Assessment study through the renowned institutes like NIO or NIOT. This may take some time.

Inland Surface Water Discharge

We have already seen that since the mixed effluent has a TDS of about 4,000-6,000 ppm, we cannot discharge into inland surface water. There is one possibility of mixing 1 – 2 times normal raw water with the treated effluent till the TDS reaches less than 2,100 ppm and then discharge. This is to be done with special permission from the Government. Even this is possible only after doing primary, secondary and tertiary effluent treatment. If you assume a total effluent generation from Tirupur Dyeing factories to be around 10 crore litres per day, then we need another 10 – 20 crore litres of normal water per day to be mixed with it. This will be against the principle of worldwide philosophy of “Water Conservation”.

11. Practical feedback through site visits:

In order to know the response of the industries/clusters actually implementing the ZLD system in their units, the field visits were carried out in the state of Gujarat at Rakanpur-Ahmedabad, Kutch and also at Tirupur-Chennai. Their views/opinion are incorporated in the chapters of **challenges against ZLD** and also **comments/suggestions**.

12. Comments/Suggestions:

- The concept of establishment of ZLD is good but it cannot be generalized and implemented hastily and uniformly over the entire country as it is very sophisticated, expensive, requires skilled manpower, consumes more power and emits more carbon leading to global warming. Further it also requires high operation and maintenance price for its execution and running.
- Each state has its own uniqueness about its eco system and the environment, therefore in all such states where sea disposal facility is available, the system of disposal of treated effluent it may be allowed as while disposing treated effluent in to the sea, huge dilution is available and the impact on the marine eco system will be minimum.

- There are safe locations in the country especially in the state of Gujarat and such other coastal states; where scientific disposal of the effluent in to the sea is feasible and is at present being practiced very successfully. This mode of disposal is practical, safe, cost effective and also environmentally acceptable as it consumes less power compared to ZLD and has less carbon foot print. Accordingly the option must be given to such states (SPCBs/PCCs) to direct concerned textile industries/clusters to treat their effluent as per marine norms and discharge at a point in to the sea to be decided by the expert marine agency.
- Imposing ZLD in the states where marine disposal is available will put unnecessary huge financial burden and mental stress on industries/clusters and there are all chances of closing down of the units/clusters leading to huge unemployment and all other related nuisances.
- ZLD is an innocuous and worthy solution at such places/states where fresh water availability is limited and no other safe disposal facility like marine disposal is available.

Capital cost - Rs 2.5 crores per MLD + Land cost

- Operating cost - Rs 15 per m³
- It is emphasized that the need for ZLD has to be considered on a case to case basis, instead of implementing the same across the country due to different geographical conditions and requirements.
- It is agreed that in areas where there is a shortage of surface water, the underground water strata is depleting and no other economical water sources are available, the ZLD may be insisted upon.
- There are states/places where there is abundant availability of huge quantity of fresh surface water i.e. rain water collected in lakes/dams which would otherwise flow into the sea, does not require any ground water abstraction.
- The option of disposal of treated effluent in to the sea is a safe and cost effective alternative to ZLD.

- The Member Secretary of a SPCB opined that ZLD should be tried in highly polluting industries rather than textiles. Textile effluent is easily treatable to achieve consented norms. In places of water scarcity, Treated Domestic Sewage can be supplied to Industries, as being done in the cities of Surat and Ahmedabad.
- The ZLD plant consumes huge power and fuel leading to pollution of the environment. Implementation of ZLD will require an investment of Rupees One Lakh Eight Thousand Crores (6000MLD @ 18cr/MLD) in addition to land for setting up the plants. In many existing industries and textile clusters established by State Governments, availability of required land is a constraint. Cost of acquiring land, wherever available is also variable. The huge capital and operating expenses of the ZLD plants will render the entire textile industry unviable, resulting in collapse of the whole chain. It is important to note that the Textile Industry of India is the second largest employment generating industry only after agriculture. Unskilled labour is easily absorbed in this industry. The textile industry commands a high position in the economy of the country and earns valuable foreign exchange.
- The Government has come up with revised Textile Upgradation Fund (TUF) scheme to give capital subsidy to the new units and also to the existing ones which want to bring modern machinery and increase output. The approval to 24 Textile Parks in last one year and others are also given earlier. Total would be 74 Textile Parks under which Rs.30000 crore investment is expected, ZLD would be a big obstacle to attract investments and the entire system would be out of the gear and will critically affect the overall economy of our country.
- Textile processing sector is facing many challenges like increase in raw materials cost, hike in equipment price, labour cost, lower productivity, easy availability of skilled/unskilled labor, scale of economy, cut throat competition amongst producers within and outside the country and many others. All these issues are ultimately converting in to higher production cost and making it difficult for textile industries to have leverage over the other competitors and survive. Forced implementation of ZLD will make matter worse and prove deadly to SMEs in textile sector. Countries like

China, Philippines, Malaysia, Thailand, Korea, Brazil, Indonesia, Bangladesh, and Myanmar etc. are posing a big threat to Indian textile sector with enhanced global competition on commercial ground.

13. Photographs of site visits:

A. Meeting at SGTPA Surat:



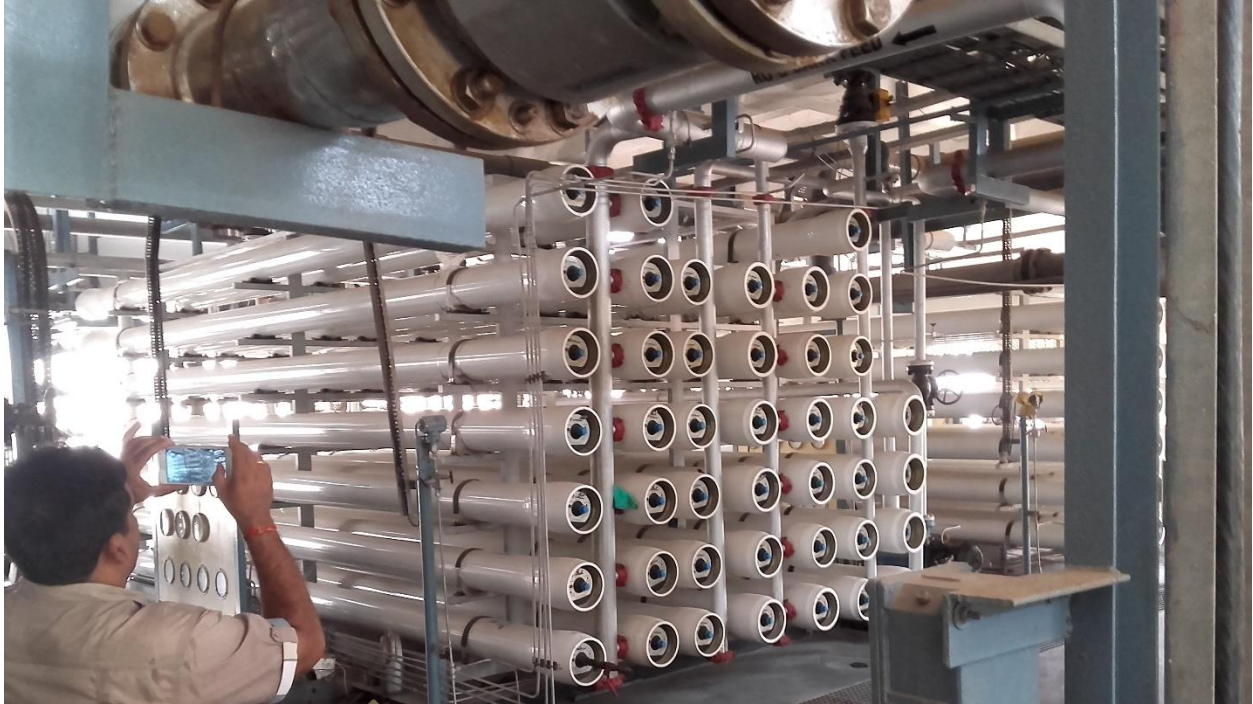
B. Site Visits and consultation:



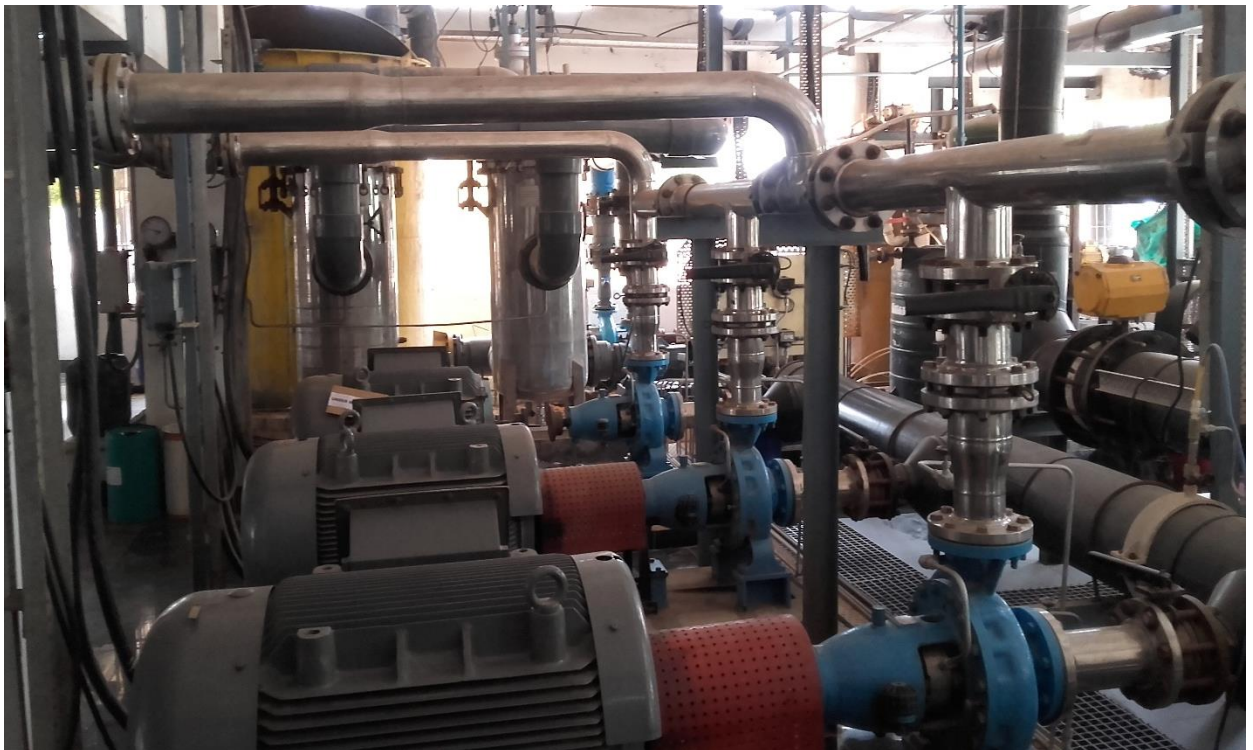
Different units of ZLD



Sand filters



Reverse Osmosis Units involving high cost



Pumps, Blower and pipeline network showing highly power extensive process of ZLD



Mechanical Vapor Recompressor (MVR)



Multiple Effect Evaporator (MEE) high power consumption and maintenance



Aeration Tank

