

**Quote by Kanishk Maheshwari, Co-Founder & Managing Director, Primus Partners**

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## **From dirty to dazzling: Why Tiruppur is recycling 130 million litres water everyday**



**Authored by Neha Dewan**

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### **Article Content:**

#### **Synopsis**

**A 360-degree change in Tiruppur may have only come through an enforced court order, yet it is a transformation that has been fully embraced. In the second instalment of a three-part series, ET Digital presents you with a comprehensive ground report on how the cluster has taken the lead in sustainability.**

It was 2011, a year deeply etched in Tiruppur's memory. The Madras High Court, after hearing a contempt petition, delivered a landmark judgment, ordering the closure of all dyeing and bleaching units in Tiruppur to save the Noyyal River from pollution and toxic waste emanating from these units. Additionally, the HC instructed these units to achieve zero liquid discharge of effluents before resuming operations.

Following the court order, over 700 bleaching units, dyeing units, and common effluent treatment plants (CETPs) closed their shutters, leading to a loss of employment for more than 40,000-50,000 workers and an estimated daily financial impact of Rs 50 crore. Tiruppur is the largest textile hub in the country, contributing over 54% to India's overall knitwear exports.

The judgement was a pivotal moment that changed everything for Tiruppur; it served as a wake-up call for the textile cluster and marked the beginning of their sustainable journey. More than a year and a half after the HC ruling, 18 CETPs reopened in June 2012 after implementing a zero liquid discharge (ZLD) system, which recovers and reuses nearly all industrial effluent, leaving only solid waste.

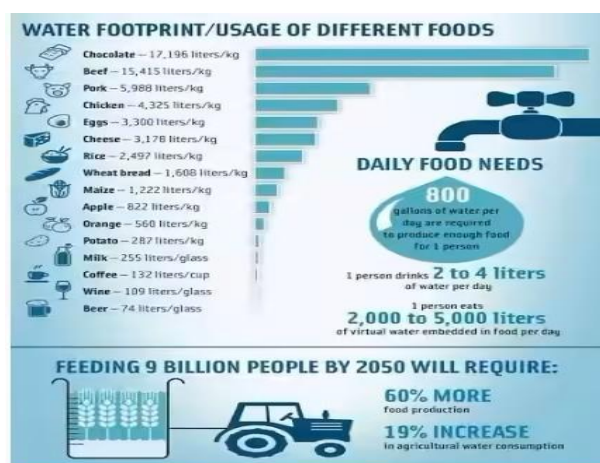
Initially, the units were allowed to operate at a minimum of 15% to 30% of their capacity by the Tamil Nadu Pollution Control Board (TNPCB) for trial purposes. Next, the latest technology machines and equipment were installed, which significantly improved capacity utilisation.

In December 2016, the central government approved Rs 200 crore for the Tiruppur dyeing industry, which was on the verge of closure due to huge investments in the ZLD project. "The move will help ailing CETPs and 450 dyeing units to recover from the financial crisis and help them to complete the project to achieve 100% capacity utilisation," the Union Textile Ministry stated in a release.

At that point, 450 dyeing units had collectively set up 18 ZLD-enabled CETPs at a total cost of Rs 1,013 crore. In fact, they have doubled down on their sustainable efforts since then. Tiruppur, as a cluster, currently recycles nearly 130 million litres of water every day. "The project has become a global standard and appreciated by the environmentalist and processing industry world over," the ministry stated.

"Tiruppur has formed CETPs and implemented ZLD in all CETPs as a result, there has been significant improvement in the water quality," says Indumathi M. Nambi, Professor in Environmental Engineering, Department of Civil Engineering, IIT Madras. She suggests that textile clusters in Erode, Kancheepuram, and Rasipuram, as well as other states like Punjab, Gujarat, Haryana, UP with textile hubs should also implement ZLD.

It is widely known that the textile industry is a water guzzler and a major contributor to environmental pollution, chipping away at the planet's natural resources. According to a recent report by the World Economic Forum (WEF), producing just 1 kg of cotton requires 7,500-10,000 litres of water; additionally, dyeing processes demand 5 trillion litres of water annually, with 200 tonnes of water needed to produce each tonne of fabric during dyeing. Notably, 20% of industrial pollution worldwide stems from dyeing and finishing fabrics, the report says. The WEF states that producing and consuming garments more sustainably could enhance the global economy by nearly \$200 billion by 2030.



Against this backdrop, can the Tiruppur model serve as an inspiration for others to adopt practices that may aid in reducing water consumption and waste pollution within the sector?

### Showing the Way

The amount of water the Tiruppur cluster recycled every day is equivalent to 50% of the total drinking water consumed by people in Tamil Nadu, according to Sudhakaran Kalidas, Joint Secretary, Dyers Association of Tiruppur (DAT). He tells *ET Digital* at the association's office in Tiruppur that they have been doing this for more than a decade now.

Currently, there are 360 dyeing units operating in and around the city. Of these, 60 are Individual Effluent Treatment Plants (IETPs), while the remaining units have established 18 CETPs for the treatment of the generated effluent, as per data from DAT. CETPs are designed to treat wastewater from multiple industries, reducing the environmental impact of industrial activities. When integrated with a ZLD system, CETPs can achieve zero wastewater discharges, thereby minimising environmental pollution.

Tiruppur is using this process to its fullest potential. “Distilled water is usually let into the streams here; not a single drop of water reaches the earth. So even a single drop will be taken, recycled again and again every day, and a number of times. And it is not just water; we are recycling plastics, fibre, carton boxes, and more. It (Tiruppur) is an entire recycling hub,” says Kalidas, the sense of accomplishment evident in his voice.

He notes that the extent to which ZLD is being implemented in Tiruppur makes it the only such cluster to be pulling off such sustainability efforts of this scale. Advanced technologies are employed to treat and recycle wastewater, which makes the water suitable for reuse in the dyeing process. The CETPs and IETPs at Tiruppur not only treat 130 million litres of dye effluent daily, but also recover 92% of pure water for reuse in processing through the ZLD technology.

The appropriate term for textiles in Tiruppur, as per Kalidas, should be ‘eco-friendly and recycled’, instead of ‘biodegradable’. “From an environmental angle, everything that we do is sustainable. Cotton comes here after spinning; we don’t use raw cotton. It is then converted from fibre to yarn, and then that yarn comes to Tiruppur for converting to fabric. So, from the yarn stage itself, all companies are going forward on the sustainable front,” he explains.

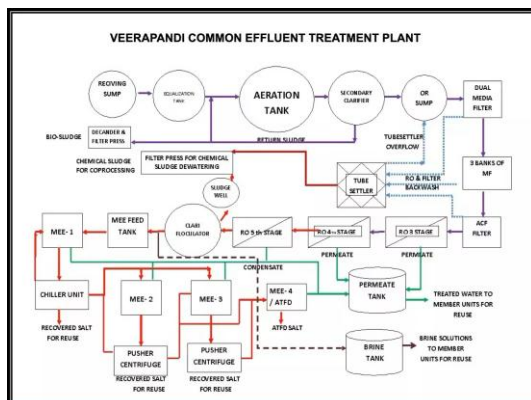
He says that the future is in recycling, whether it is biodegradable or not. “Everything is getting recycled here; even wastages from the garment are taken back, recycled and converted into fresh yarn.”

### **Making Every Drop Count—How it Works**

A thorough examination of the production processes at Tiruppur offers further insights into the integration of various elements that contribute to huge environmental savings daily, particularly in terms of water usage. DAT emphasises that the operation of CETPs using the ZLD system entails a series of steps that help in meeting the primary objectives. The initial step involves the collection of wastewater, which is gathered from member dyeing units through underground pipelines. The second step involves the pre-treatment and primary treatment of wastewater, which focuses on the removal of suspended solids and organic matter.

Thereafter, wastewater undergoes further additional treatment in secondary and tertiary treatment processes to produce high-quality effluent. The treated effluent is then fed into the ZLD system, where it undergoes evaporation, crystallisation or other processes to achieve zero wastewater discharge.

The final step is residual management, which essentially involves managing the three types of sludge generated during the effluent treatment process: chemical sludge, bio-sludge and mixed waste salt. Chemical sludge is directed to cement factories for co-processing as a raw material for cement production, whereas bio-sludge is sent to cement factories to be used as fuel. The final reject, mixed waste salt, is stored in sheds on the CETP’s premises, as no proper disposal method has been identified so far.



As per the association, the accumulated mixed waste salt in CETPs at Tiruppur exceeds 100,000 tonnes. "Currently, we don't have the technology for this salt, so we pile up huge amounts of salt...[disposal] technology is yet to evolve. Many research organisations are working on that, and we are even looking at possible solutions that can be helpful," Kalidas states.

In addition to water conservation, dyers in Tiruppur are also engaged in the recycling of effluent salt. This minimises the amount of salt discharged into the environment and decreases the demand for fresh salt, resulting in cost savings and reduced environmental impact. "The ZLD process recovers valuable salts from wastewater, transforming what would be waste into beneficial resources, illustrating a circular economy in action," explains DAT.

DAT claims that it saves 1/4th of the salt consumed by the Indian population every day through this process. "1,000 tonnes of salt is the approximate quantity of salt consumed by the entire Indian population, and we are saving 1/4th or 20% of this every day," DAT states.

## Challenges and bottlenecks

At the core of these sustainability initiatives, however, lies a different narrative—Tiruppur's struggle to stay afloat, given the high operating costs. "The main problem is that we are consuming a huge amount of power to treat the effluent water. All the 18 CETPs, together, are spending around Rs 30 crore every month only on electricity," informs Kalidas.

To put it in perspective, the monthly energy consumption of only these 18 CETPs is approximately 10 million units, which includes wastewater treatment but not fabric colouring or other processes. The Tiruppur cluster currently has a green energy capacity of 1,950 MW, including 1,600 MW from wind and 350 MW from solar energy, but it is much lower than the total energy requirement.

Dyers' units in Tiruppur, especially CETPs and IETPs, are planning to invest in renewable energy projects, such as solar and wind power, to reduce their dependence on non-renewable energy sources. However, investment is a challenge for these struggling units. "We want a one-time subsidy for solar and wind power projects from the government, which we have been asking for a long time," Kalidas says, while expressing his disappointment.

The cluster has also been taking measures in energy by way of changing machineries, implementing best practices and investing in renewable energy. Additionally, it is spending a huge amount on imported coal as thermal energy is used to operate the water. They are looking for technology that can reduce costs or installation of a co-generation plant, which can help achieve the same goal. "Without such incentives, we cannot be competitive or even survive. Previously, 800 dyeing units used to exist in Tiruppur; these have now narrowed down to 400. Tomorrow it will be 200 units, and 10 years on, only 100 will exist since there is no level playing field for us," says Kalidas. Without holding back, he asserts, "We are not asking for profit, only for our survival."

Experts say that research and development are crucial to help the Tiruppur cluster grow, making processes more efficient, lowering costs, and improving the sustainability of CETPs with ZLD systems.

Kanishk Maheshwari, Co-founder & MD, Primus Partners, says that the integration of solar power plants presents an additional opportunity for the textile hub, which supports clean energy adoption, lower carbon emissions, and reducing long-term energy costs for the industry.

As part of additional measures, he suggests drawing from countries such as Sweden and the Netherlands, which implement digital traceability systems using blockchain technology. “This would allow brands and consumers to track the entire lifecycle of a garment—from raw material sourcing to final production—enhancing accountability, promoting ethical sourcing and opening access to sustainability-conscious global markets,” he adds.

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### **A Global Model?**

Tiruppur’s integrated approach to sustainability—including water conservation, renewable energy, circular economy practices, and stakeholder collaboration—has made it a global model for sustainable industrial growth, as per Maheshwari. “The textile hub’s evolving sustainability journey reflects a broader shift in how the textile sector can balance industrial growth with environmental responsibility,” he says.

The government has also acknowledged the crucial role played by Tiruppur, as Commerce and Industry Minister Piyush Goyal noted at an event that 75 textile hubs similar to Tiruppur should be established. These hubs would support textile product exports, ensure the inclusion of sustainable technology, and generate huge opportunities for employment.

Considering Tiruppur’s strong reputation for its commitment to sustainable practices, experts advise advancing and empowering the cluster to intensify its efforts further. The government support and guidance can significantly contribute to the cluster’s success as a global textile hub while also setting a precedent for others to follow with élan.