



# FROM THEORY TO PRACTICE

Thapar Institute of Engineering and Technology (TIET) takes remarkable steps to practice responsible waste management



Across India, educational institutes have scaled substantially over the last twenty years. Likewise, the spectrum of degrees and courses has become increasingly diverse. It is also satisfying to see sustainability and specifically waste management feature in private universities that now offer a degree on these critical subjects. As a waste management company, Saahas Zero Waste has been at the forefront of aligning the theory in the class-room with the realities within the campus. Over the last 11 years, across schools, colleges and indeed premium B-schools we have documented a disappointing disconnect with what young minds learn in the class room and what is practiced within their own campus. Unfortunately, there is little attention given to Source Segregation and the downside continues as most educational institutes simply hand over mixed waste to collectors with no efforts to practice sustainable and responsible waste management. There is however a silver lining. We are now beginning to see the management and trustees of a few private institutions seek change and anchor education with a walk the talk approach.

**We are very pleased and proud to present to you a case study of the Thapar Institute in Patiala. We hope this story of change which began in December 2023 triggers a shift in the mindset of many more educational institutions.**



## CONTENTS

Introduction	04
The Starting Point	05
Recognising The Problems	07
The First Six Months	10
Interim Solutions For Wet And Dry Fractions	16
Social Inclusion	17
Current Impact	18
The Zero Waste Journey Moves Forward	19
In Conversation	20
A Higher Purpose	22

## INTRODUCTION



**Thapar Institute of Engineering and Technology (TIET)**, Patiala, Punjab is part of the Thapar Group, a family run diverse conglomerate with companies such as Greaves Cotton, The Pioneer, Karam Chand Thapar & Bros Limited and, Lavasa Corporation Limited.

The 68-year-old engineering and technology education institute is a deemed-to-be-university located at the former site of Thapar Polytechnic College on an expansive 250-acre campus.

In 2023, TIET decided to look closely at the waste generated within its campus. They realised that the system within their campus had gaps which required to be addressed.

This is when the institute reached out to **Saahas Zero Waste** to help them become a zero-waste campus. As a goal, 'Zero Waste', is ethical, economical, efficient, and visionary. It guides people in changing their life styles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use.

## THE STARTING POINT



*Conducting a waste audit is tedious but a useful tool*



On any given day, the large campus has 15,000 individuals on campus which includes about 10,000 students.

The campus houses 48 buildings including 16 hostels, 16 kitchens, 12 conference halls. There are faculty residences also that comprise 5 buildings with 8 floors each. Additionally, there are a total of 12 food stalls within the campus premises.

In August 2023, Saahas Zero Waste was engaged to do a detailed audit. The audit determined that the institute generated an estimated **3.5 tons per day** of wet and dry waste.

There was little source segregation as a single bin system was used for all waste throughout the campus except the kitchens and dining areas where two bins were installed for wet and dry waste respectively. Only some of these bins were labelled. Additionally, liners are used in all the bins in the kitchen area.

Additionally, there were other waste streams including biomedical waste, e-waste, battery waste, waste oil and hazardous waste generated on the campus.

## Change from the top at TIET

It was the leadership inclination and vision that was able to move the organisation towards its zero-waste goal. Through this decision, the institute is looking to become a model by walking the talk on ideas it teaches on its campus. Some of the courses offered include:

- ◆ **Professional Development Course on Waste Management and Resource Recovery** (Online model) which covers topics such as Integrated Solid Waste Management, waste characterization for efficient waste utilization, technologies for sustainable waste management, sustainability, and circular economy and, National and international policies for waste management. The course is meant to enhance the knowledge of industrial employees, pollution control board employees, academicians, entrepreneurs working on the environment, environmental enthusiasts, Urban local body authorities and other working professionals in the field of solid waste management.
- ◆ **M. Tech Environmental Science and Technology** which includes a course on Solid Waste Management
- ◆ **Online Postgraduate Professional Development Program on 'Energy Management and Climate Change'** as well.
- ◆ **Lifestyle workshop on "Household Waste Management"** under the Environment Education Programme, 6 March, 2024 to 7 March, 2024 funded by the Ministry of Environment, Forest, and Climate Change.

## RECOGNISING THE PROBLEMS

At the starting point, waste management at TIET has the same challenges as most organisations. Here are some of the main waste management issues at the institute:



### No waste ecosystem

TIET did not have arrangements for collection and storing of waste in a systematic manner. There was a single bin system put in place which was followed throughout the campus, with the exception of kitchens and dining halls, wherein a 2-bin system was put in place for dry and wet waste. Moreover, no labelling was being done on the single bins. There was a composting facility for management of a small quantity of the wet waste. Additionally wet waste was also sent to a piggery. Small quantities of dry waste were selectively picked up because they had a better economic value. The focus was more on disposal where the mixed waste was disposed or rather dumped with no understanding of the impact of this on health and environment. There was a composting facility for management of a small quantity of the wet waste. Small quantities of dry waste were selectively picked up because they had a better economic value. The focus was more on disposal where the mixed waste was disposed or rather dumped with no understanding of the impact of this on health and environment. There was no system in place to recover maximum resources from the waste generated on campus.





## Lack of awareness

The absence of a system led to the next problem which was the absence of information to the different stakeholders so that they could follow the system.



## No segregation

In turn this resulted in the absence of segregation at source and subsequently the contamination of different waste streams on account of collection of mixed waste.

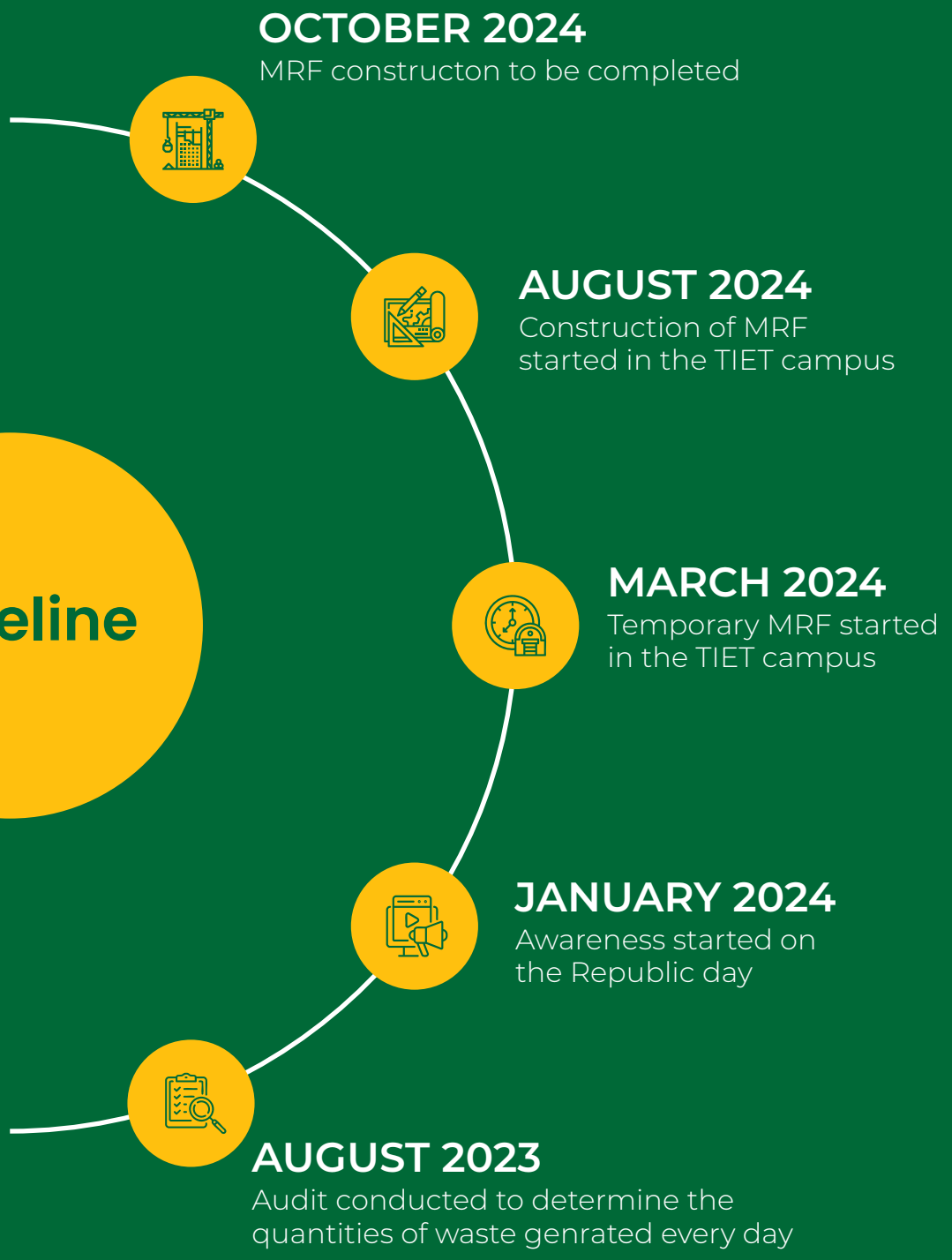


## No traceability

There were small quantities of waste which was selectively picked out because they had better economic value. This waste did move up the value chain. But the transactions that ensued were informal with breach of environmental and social regulations. All the waste handled throughout the chain was by informal wage workers. As this is the way waste has always been handled there was resistance to change in the process and system. Since only some of the dry waste was sent to formal (registered with Pollution Control Board) recyclers, the rest of the waste could not be traced. Traceability can help identify potential problems or inefficiencies in the waste management process.



# Timeline



# THE FISRT SIX MONTHS

## Audit

Saahas Zero Waste in association with the team at TIET conducted a detailed waste audit to dive into current practices in the campus as well as to determine the quantities of waste generated every day.

## Methodology

### A multi-step approach was adopted to carry out the audit

- ◆ Initial Survey Form – Information related to current practices was captured through a questionnaire.
- ◆ Audit Planning – Ensuring waste from the different locations were included in the audit, assigning roles and responsibilities.
- ◆ The audit was conducted over two days and it encompassed a comprehensive assessment of waste flow and generation in the campus. This included monitoring of the Standard Operating Procedures and handling of the waste stream.





## Key data points from the audit

- ◆ Total waste generated was an estimated 3.5 tons on a regular working day.
- ◆ Only 10% of Wet waste was composted. Large volumes of cooked food are being discarded.
- ◆ Waste collected was mixed. Similarly, there was no provision for collection of sanitary waste separately
- ◆ There was an extensive use of bin liners. This adds to plastic waste in the name of convenience.
- ◆ There was little visibility of the next steps after the waste was collected

## Acting on the audit

### Infrastructure Plan Was Shared

Exclusive areas were mapped for waste aggregation, composting and dry waste sorting. A plan for setting up an integrated waste management facility was shared with the management. This included a composting facility for composting all the wet waste and garden litter and a Materials Recovery Facility (MRF) for sorting, aggregation and preparation of different materials for recycling and co-processing. Meanwhile the institute decided to dive straight into the next steps.



## Awareness through the launch on Republic Day

Republic Day, 2024 was used as a platform to announce the zero-waste programme. Saahas Zero Waste was invited to participate in the celebrations and create the first round of interest and awareness.

The launch event was followed by intensive sessions to introduce and enforce source segregation. Staff was not only oriented and trained for better waste management but is also continuously made aware and updated on waste management practices on the campus.

Awareness material was disseminated and prominently displayed. The IEC and training drives were organised extensively to all buildings and groups of people throughout the campus from department heads to housekeeping staff and food outlets. Even door-to-door drives were held informing residents on the campus about their role in waste management.



“

EDUCATION IS THE MOST POWERFUL WEAPON  
WHICH YOU CAN USE TO CHANGE THE WORLD

Nelson Mandela

”





*Door to Door Awareness*



*Food Shops Awareness*



*Housekeeping Team Awareness*



*Household waste management workshop*



*Awareness Classes*

## Source segregation

At TIET, labelled bins were installed for wet, dry, and hazardous waste at every point of disposal such as at hostels, dining areas, administrative block etc. The segregated dry waste was also collected separately.



## SOLUTION FOR WET, DRY & REJECT WASTE

There is an ISWMMU in place with a 2000 sq. ft. area allocated for the MRF and 1200 sq. ft. for the food waste management facility. The facility can manage approximately 1.5 to 1.75 tons of dry waste and 1 ton of uncooked food waste daily. Reject waste is sent for co-processing to an authorized vendor, while sanitary waste is sent to a biomedical waste vendor. In addition there is 1200 to 1500 kg of cooked food waste which is sent to the piggeries currently. There is a plan to set up a bio-gas plant to manage the cooked food waste in future.



## SOCIAL INCLUSION

Previously TIET worked with waste workers in an informal framework. They worked on daily wages and flexible timings. They received daily wages which was not in line with minimum wages. They were expected to enhance this wage through the sale of some waste which had economic value. This situation leads to exploitation and also a form of cherry picking because only a large fraction of the waste (as much as 70%) generated on campus does not have an economic value and therefore ends up in the landfill.

Initially the workforce was apprehensive when SZW stepped in. They thought there would be further exploitation and they would have to work longer hours.

We were able to quickly dispel the apprehension through the introduction of our social inclusion framework. The workforce were inducted as employees of TIET. They were given a fixed monthly salary which was in line with minimum wages and other social security benefits. They also had fixed working hours.



*A total of 21 waste workers are now full-time employees of TIET. They have also been trained on processes including health and safety measures*

## CURRENT IMPACT



Behavioural change through continuous and widespread awareness sessions



90% segregation at source achieved



Formalization of 21 waste workers for waste management as employees of TIET



Reduction in waste going to dump site

## THE ZERO WASTE JOURNEY MOVES FORWARD

All eyes now stay glued to the Materials Recovery Facility and a new composting centre which is scheduled to become operational later this year.

**TIET will be investing a considerable amount on the new facility which will enhance resource recovery to 96%.**

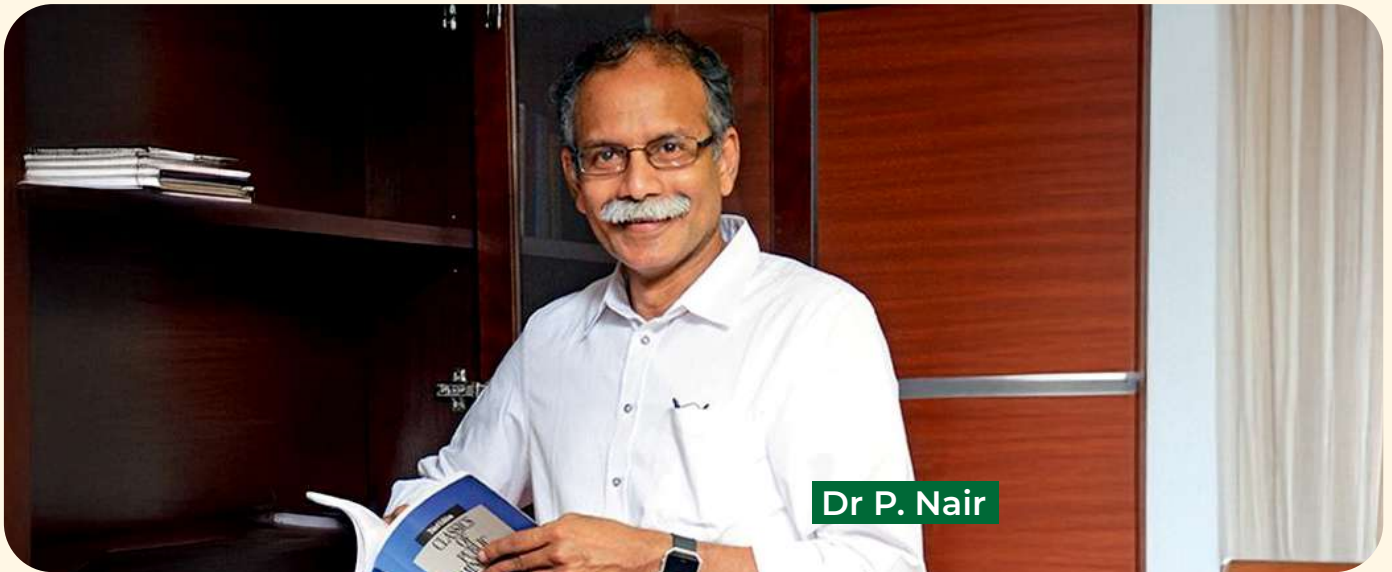
The MRF will have IoT devices for weighing and tracking the waste, a conveyor belt, and a baler to improve the efficiency of the facility.

Additionally other waste streams including E-waste, C&D waste will also be monitored to bring them into a better system.



## IN CONVERSATION

Wilma Rodrigues, Chief Transformation Officer and Haris Mir from SZW speak to Dr P. Nair, Director TIET about his role as an enabler to bring in the Zero Waste mindset.



Dr P. Nair

**SZW:** *We are pleased to now have a footprint in Patiala. It is good to make an entry into the state through working with an educational institution like Thapar*

**Dr. Nair:** We are looking at the Zero Waste programme as an important initiative and we are very enthusiastic to see the outcomes. For me it's not just about the waste management, rather it fits into a larger framework (related to sustainability). Our curriculum subsumes business learning strategies with the focus on sustainability and we call this framework as 6 E framework, viz. Environment, Economics, Essential Materials, Energy, Ethics and Expectancy. So, waste management would cover two to three of these aspects. Now we have also embarked towards working in the area of measuring energy use and looking at areas where we can incorporate and promote the ideals to reduce, optimize and reuse. That's the whole mission we have about being sustainable and this project with Saahas Zero Waste is an excellent start in our overall plan.

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**SZW:** *Through this case study we hope that other institutions will understand that waste management and sustainability is more an action and needs to come on the ground. So, do you think that this is something that other institutions can adopt?*

**Dr. Nair:** Absolutely! Long time back we had done a project on the Derabasi campus and we are the initial signatories to the UN Charter called PRME, Principles of responsible management Education. We went around that region and helped many colleges to sign for PRME. The impact it had might seem to be minimal but our efforts emboldened some of these business schools to incorporate sustainability and environmental ethics into their curriculum. We have some experience in Advocacy and have done a plethora of student projects. We are also looking into the different methods of making a template for policy makers to facilitate them in drafting a comprehensive policy which is implementable.

**SZW:** *How difficult was it for you to take other board of directors and management in the process?*

**Dr. Nair:** It was very difficult. Most smart managers in India are efficiency focussed. My goal is to focus on efficiency and this is a slight offshoot from other criteria including the number of students enrolled, minimum cutoff, NIRF rank etc. My criteria is student satisfaction, long term student career prospects. (through this programme), efficiency will show up but it needs patience.

**SZW:** *You look at resource recovery and this form of resource management as an example of excellence (and efficiency)?*

**Dr. Nair:** Absolutely! I even have research scholars who are working towards excellence. In fact, she has made a scale and you can use that scale to measure sustainability in cities. We can share the scale with you and can even do the analysis for you.

**SZW:** *Yes definitely. That would be great. We will take up this in future. We are now almost one year since we started and we are now into the 2nd phase of operations. One of the things that we appreciate is the understanding of the informal sector and how we have to be mindful of the people working.*

*When it comes to social inclusion and the need for formalizing in the waste management sector, what are your views on that?*

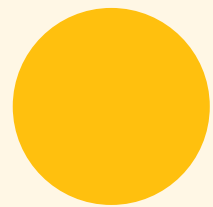
**Dr Nair:** It's a great idea to be implemented and its very important. Western countries are focussing on these aspects and it is indeed making a major difference in their productivity, including in the sphere of waste management. We talk about SDGs in our curriculum and other aspects related to sustainability as well and our endeavour is to inculcate a sense of individual responsibility and accountability among students in the way of achieving social inclusivity on all fronts.

**SZW:** *Regarding the upcoming Materials recovery Facility (MRF) at the campus, how do you see it as an inclusion with the capability of improving the waste management in the campus and its eventual contribution towards reducing the overall waste being diverted to the landfills?*

**Dr Nair:** That's definitely promising and will be a gamechanger in future waste management. It will enhance sorting categories which will result in the overall efficiency in recycling. However, in addition, we need to disseminate the ideals of segregation of waste at source through awareness and we need to do more granular sorting at source.

**SZW:** *We should have an MRF as soon as possible and once it is applied in Thapar university, we would like Thapar university to create awareness about this facility and its contribution in waste management. Will that be fine?*

**Dr Nair:** Absolutely! We are planning to do that and invite all the possible universities.



## A HIGHER PURPOSE



### OUTCOMES

### BENEFITS

Improved brand image of TIET

Taking on SWM is viewed positively by people as a commitment to social responsibility

Preparation for relevant certifications and reporting (Primarily 'True Zero')

Starting SWM voluntarily is the first step to getting globally recognized certifications in responsible management of environmental and social parameters

Improved environment at campus


Better waste management has immediate and palpable improvement in the ambience on campus


Alignment with Global environmental protection goals such as the UN's Sustainability Goals


Acting in line with global goals gives higher purpose to a seemingly unrewarding endeavor. It provides a sense of pride in contributing to such greater goals.

To explore how we can help you optimise your waste management with total compliance & transparency, get in touch:



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