

Review

Supply chain sustainability initiatives at Bajaj Electricals Limited to achieve Zero Waste to Landfill

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Abstract: Subject area: This case allows management students to engage with the implementation of sustainable supply chain management practices both at the macro and micro levels. The decision to make supply chain operations sustainable is no longer an option for many organisations. The question is not “should we do it? but how can we implement sustainable supply chain management practices?” **Study level/applicability:** This case has been developed for management institutes and schools that teach undergraduate and postgraduate programmes. Sustainability has become an essential module in management curriculums; thus, this case is relevant for management programmes (operations, logistics, supply chain management, business studies, and management). **Case overview:** This case highlights the achievements of Rameshwaram (plant head at the Nirlep factory of Bajaj Electrical Ltd.) and his team for successfully completing a sustainability initiative—Zero Waste to Landfill (ZWTL)—in a short span of six months. This case is divided into two parts: the first part presents their initiatives in making all echelons of their supply chain sustainable; the second part specifically outlines how they achieved Zero Waste to Landfill in one of the manufacturing operations in a short span of six months. A cross-functional team was put together to plan and implement the ZWTL project. Initially, the team encountered many challenges, such as poor quantification of waste at the factory site, inadequate infrastructure for waste segregation, a lack of vendor participation, and extensive training of vendors and employees as needed to ensure project compliance. However, with sustained efforts, the goal was achieved. As a result, BEL became the first Indian company in the sector to achieve 99% diversion from landfills for the waste generated at the Nirlep factory in 2021. It translated into a dramatic reduction of adverse environmental impacts. Monetary benefits were also realized by utilizing the waste for commercial use. As customers across the globe appreciated their efforts, their brand equity increased severalfold. **Expected learning outcomes:** The case establishes that supply chain sustainability initiatives can never be completely successful without the unanimous engagement of internal and external stakeholders. In present times, the foundation of business performance has moved away from financial profitability only to the “triple bottom line,” which incorporates environment and social responsibility. The choice between commercial viability and sustainability is no longer available to the companies, as they need to integrate environmental and social goals within their businesses and provide transparency on sustainable performance and value to not only all stakeholders but also policymakers and consumers.

Keywords: supply chain sustainability; Zero Waste to Landfill; 5R approach

1. Introduction

Supply chain sustainability has been a critical topic of discussion amongst academics and practitioners for almost two decades now, more so after the COVID-19 pandemic. As modern supply chains become global, their environmental footprints

become more visible as goods are produced, transported, and consumed across the globe. Supply chain sustainability refers to the companies' initiatives to integrate and manage the environmental and social impact of their products' movement through the supply chain, from raw material suppliers to production, storage, and delivery to the final customer [1]. Consequently, supply chain managers shoulder added responsibilities that include decision-making on sustainable sourcing, zero waste management at manufacturing sites, relationship management with recyclers, and asset recovery, in order to cut down costs and maximise sustainability-related efforts [2]. Although financial profitability and growth still remain the focus for most organisations, the goal to minimize environmental damage through the reduction of energy and water consumption and waste production while creating a positive influence on people and communities is now embedded in the triple bottom line [3].

In response to the wake-up call given globally by various stakeholders to preserve the environment, many Indian organisations are making substantial efforts to reduce their carbon footprints and enhance sustainability goals. This case chronicles the steps taken at Bajaj Electrical Limited (BEL) to make its supply chain sustainable in a broader context. At a granular level, it showcases the successful implementation of a project—Zero Waste to Landfill (ZWTL)—undertaken at one of the manufacturing sites in a very short span of 6 months. Several challenges were overcome to make this project a success by Rameshwaram—Plant Head and his team in June 2021.

The case demonstrates that organizations can change leaders with the help of dedicated teams to create a difference for people, profits, and planets. Often, it is argued that sustainability initiatives come at the expense of profitability, but this case successfully validates that sustainability goals add to the profitable bottom line. The triple bottom line is a business concept that posits firms should commit to measuring their social and environmental impact—in addition to their financial performance—rather than solely focusing on generating profit, or the standard “bottom line.” It can be broken down into “three Ps”: profit, people, and the planet [4].

Rameshwaram had just started the day's work after sipping hot coffee when he received a call from his boss, Vaibhav Raj—SCM and Manufacturing Head at Bajaj Electricals Limited (BEL). He was being urgently summoned to his office. Rameshwaram knew that his boss had a crucial board meeting with the top management the day before. As he made his way to the boss's office, he started thinking about what had gone wrong in the last few weeks. As the plant head of two manufacturing units of Bajaj Electricals Limited, situated in Aurangabad, Maharashtra, he has worked diligently for the past four years. The worker complaints and machine breakdown—two persistent factory issues—had reduced considerably during his tenure—a fact that he was very proud of.

The boss looked worried when he entered the office. On seeing him, he exclaimed, *“Rameshwaram, we have been selected to lead the Zero Waste to Landfill (ZWFL) initiative by the top management—a goal that we need to achieve in six months. I am happy and proud of the project, but there is no preceding history of its implementation in any Indian organization. There is no predefined protocol, and the time period is very short. I know you have experience and have worked with different teams (operations, marketing, procurement, and new product development), but this is clearly out of our domain. What should we do?”*

After assuring his boss that he would have a preliminary plan in two days, Rameshwaram left his office with mixed feelings—excitement and trepidation—as many thoughts churned in his head. He started recollecting the company’s history as he sat on his chair.

1.1. Bajaj Electricals Ltd. (BEL)—The company background

BEL, a globally renowned and trusted company, was part of INR 380 bn. Bajaj Group. Its business was spread across different categories: 1) illumination—lighting of commercial spaces, industrial premises, infrastructure, and cityscapes with LED lighting, conventional luminaires, accessories, and more; 2) consumer appliances—home and kitchen appliances in the latest designs and technologies; 3) exports—to multiple nations across the globe, ranging from the UAE, Egypt, and Saudi Arabia to Bangladesh, Malaysia, and Indonesia; 4) EPC—the entire spectrum of power transmission, distribution, and illumination. It had its own world-class manufacturing and galvanizing plant. Besides consumer products, the company contributed immensely to outdoor projects such as landscape lighting for Chhatrapati Shivaji terminus, sports lighting for Wankhede, the flag mast at Siachen base camp, and the smart lighting project in Jaipur. With 20 branch offices, 5 in-house manufacturing facilities, approximately 500 customer care centers, and over 3000 employees, the company had a pan-India presence. The company had long-term partnerships with global brands such as Securiton, Switzerland; Delta Controls, Canada; Magnum Energy, USA, etc. The company enjoyed tremendous credibility amongst investors as it had witnessed exponential growth in the share price in the last decade.

1.2. Sustainable development vision at Bajaj Electrical Limited

Rameshwaran recalled that his company was one of the pioneering companies in India to recognize the importance of sustainable development, and hence its vision and mission statement—“enhancing quality of life and bringing happiness with sustainability—included holistic development.” The management had invested in six core values: integrity, teamwork, customer delight, empowerment, innovation, and trust, to ensure a 360-degree buy-in from all stakeholders.

Following the Gandhian principles followed by the founding father, Jamnalal Bajaj, the company is strongly associated with the tagline “preserve the environment, deserve a sustainable future”. Their core business strategy had sustainability embedded in it. The top management believed in giving back to the community, and this was evident by several initiatives they had undertaken in the past few decades (Figure 1).

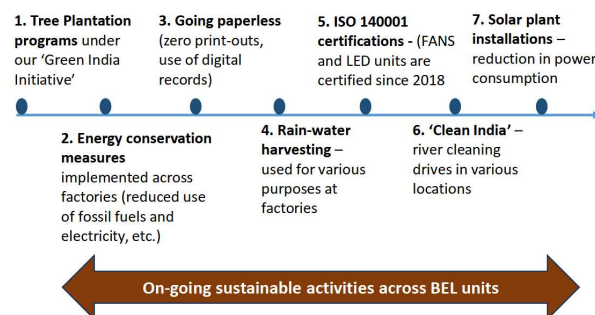


Figure 1. Sustainable activities across BEL units [5].

2. Supply chain sustainability

Rameshwaram had been part of the team that had attended many seminars on supply chain sustainability and led sustainability initiatives at BEL in the past. He had also been part of the newly formed Resilience Group during the COVID-19 pandemic. Although the company was doing well, the management knew that a robust and resilient supply chain was essential for making finished goods available on a timely basis. As with many other companies, BEL also struggled with many challenges due to the COVID-19 pandemic. The company was heavily dependent on the contract manufacturing model for its consumer goods division, and the direct impact was seen in raw material volatility, labour shortages, factory shut-downs, congestion in logistic chains, and restrictions on imports. Indirect impacts such as liquidity crunch, inventory issues, and inadequate supply of subcomponents also posed a serious threat to the smooth recovery.

Rameshwaran's team has undertaken several critical measures to combat these challenges: 1) The 'make vs. buy' analysis for finished goods and critical components, as this aimed to address potential supply shortages and ensure uninterrupted availability of products. 2) 'Alternate supplier development', which helped to expedite capacity augmentation. The initiative focused on revisiting the entire supply ecosystem, covering multiple sub-component suppliers (Tier 2 to Nth), and aiding import localization at a brisk pace via online and offline workshops. 3) 'Project MULYA'—sourcing of commodities was centralised and it offered better controls to support partners in a volatile market. 4) reduction and optimal utilisation of energy, water, raw materials, logistics, etc., by incorporating new techniques and innovative ideas.

a) Sustainable new product development

With the help of the new product development design team, his plant was manufacturing many energy-efficient products, such as Bajaj ceiling fans with anti-germ and dust features, a 5-star-rated fan named 'Kassels Star' that consumed less power as compared to a regular ceiling fan, and a 7-watt LED bulb that delivered as much as 600 lumens more output than a normal 60-watt GLS lamp. Further, none of the Bajaj LED lights used any chemical compounds that were potentially detrimental to the environment. This was in sharp contrast to the CFL, or mercury lamps. The company's range of LED lighting was also safe for domestic usage as it did not emit harmful radiation like ultraviolet light, infrared radiation, or chronic exposure, which caused serious health complications. Also, in view of regular electricity-related issues like power cuts or load shedding that were common in the non-metropolitan regions, the range of Bajaj LED lighting was developed to deal with random voltage fluctuations or abrupt discontinuation of electricity. Last year, Rameshwaran visited the largest Transmission Line Towers (TLT) manufacturing facilities at Ranjangaon in the Pune district of Maharashtra. He had been very impressed as the manufacturing facility was ISO 14000 and ISO 9001 certified and was equipped with the most sophisticated, computer-controlled state-of-the-art machinery. The manufacturing facility had been approved and appreciated by the Power Grid Corporation of India and all reputed electricity boards across the country for its relatively low energy consumption.

b) Sustainable procurement

Rameshwaram also recalled the arguments he had with the Purchase Head, Amit Vohra, last year. He had issued a requisition invoice for raw materials from a new supplier. The new supplier was highly reputed, known for quality and consistency, and innovative in developing eco-friendly raw materials. The supplier had assured Rameshwaram that adequate steps would be taken for safe transportation and optimisation of logistics, which, in turn, helped to mitigate the impact on the climate. In fact, Rameshwaram had been thinking of outsourcing certain key processing activities to this vendor. This would reduce his manufacturing and delivery times to important customers. Although the new vendor had suffered some losses during the COVID-19 pandemic, Rameshwaram had sought approval from the management to support this vendor with technical and financial assistance, which included training for CTQ. All these key initiatives were supported with a “partner-centric approach— a management philosophy that the company had adopted recently wherein the ‘suppliers’ were referred to as ‘partners’ to encourage seamless communication about areas of concern. The company had offered financial help to supply partners and encouraged them to arrange manpower, provide skills training required for the job, and increase shift timings to increase output with limited resources during the COVID-19 pandemic. Financial support was also extended for trade finance and early payments. However, Amit had been against the change of vendor as the new supplier had quoted higher prices (by 15%). After much discussion and negotiation with the new vendor, they sealed the deal, and the new vendor was awarded a contract for 5 years. Amit still reminded him of that tough phase whenever they met for coffee; the contract had been a win-win situation for both the company and the vendor.

c) Sustainable operations

Rameshwaran had been instrumental in adopting technology that remained the bedrock of manufacturing excellence at his plants. Ten years ago, he had been to Germany to receive training on the latest CNC machine for manufacturing home electricals. It had taken almost five years for his team to promote clean energy usage. Rooftop solar panels had been installed at his manufacturing facilities, with an installed capacity of 1.6 MW and the potential to generate ~23 lakh units annually. Almost all consumer products, like water heaters, fans, LED lights, pressure cookers, and mixer grinders, were backed by the latest technology to produce quality products.

His manufacturing facilities faced a tough time when the plants had to be shut down due to the COVID-19 pandemic in March 2020. As the lockdown restrictions eased and manufacturing units started operations again, social distancing protocols were strictly followed. To ensure smooth operations, he has been an integral part of more than six cross-functional teams (CFT) to address key concerns related to productivity, quality, cost optimisation, maintaining adequate inventory levels, increasing operational efficiency, and improving capacity utilisation. Since the workforce was suffering due to ‘no work, no wages’, they had come up with a business continuity plan in July 2020, strictly adhering to COVID-19 protocols that ensured the health and safety of their workers.

d) Sustainable warehouse and transport management

An integral part of manufacturing operations is outbound logistics. Rameshwaram’s workload and stress had reduced considerably when the top

management decided to collaborate with Mahindra Logistics Limited (MLL) to offer innovative logistics optimisation and outsourcing services under 'Project Samridhi'. The project involved end-to-end redesigning and outsourcing of logistics services by MLL, with the twin objectives of achieving improved and best-in-class service levels and reducing logistics costs by over 25% annually. It was one of the biggest deals in the Indian logistics industry, worth more than 1000 crore, to be carried out over a period of five years. MLL would completely redesign and consolidate the company's logistics network with storage optimisation, transportation, and inventory management through the integration of advanced technology and automated processes. MLL was asked to introduce sustainable practices at the warehouses to reduce its impact on the environment. Through the regional fulfilment centres, the goal of improved delivery lead time for pan India customers, dealers, and distributors would be achieved. MLL was also asked to deploy long-haul fleets and local distribution trucks, equipped with the latest tracking technology and set up centralised control towers to ensure smooth operations. MLL promised to eventually use electric delivery trucks from EDel to support Bajaj Electricals' sustainable logistics practices.

e) Reverse logistics and extended producer responsibility (EPR)

An integral part of Rameshwaran's job was to provide a safer and more sustainable manufacturing environment. He held regular meetings with his team to ensure that both his plants met the requirements of the E-waste Management Rules, 2016. Since it had become mandatory to recycle or responsibly dispose of electronic and electrical (EEE) waste and follow strict RoHS compliance requirements as per the directives of the Ministry of Environment, Forests & Climate Change (MoEF), his team had been instrumental in implementing reverse logistics through an efficient PAN India network of hubs and regional collection points. This has resulted in the avoidance of unnecessary transportation costs, a reduction in carbon emissions, and an improvement in air quality.

As the lunch hour was announced, Rameshwaram came out of his reverie. He felt confident and proud, and he was sure that he would be able to meet the company's objectives and expectations, given his background knowledge and expertise. After lunch, he decided to summon his team to his office and set up an action plan.

3. Zero Waste to Landfill (ZWTL)

Linear resource-to-waste systems are unlikely to endure production and consumption practices in the years to come. Zero Waste to Landfill has arisen as a powerful concept that sits at the heart of academic literature from three different streams: sustainable supply chain management, circular economy, and closed loop supply chain management (**Figure 2, Table 1**). The concept has been implemented at multiple levels and with varying degrees of success across the globe. The Zero Waste International Alliance [6] defines zero-waste as "the conservation of all resources through responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health." This grassroots ideology has become an integral part of production policies and consumption patterns at individual and institutional levels. This case is important from a theoretical standpoint, as most Zero

Waste to Landfill projects reported in the academic literature are: a) government-led; b) implemented either at the city or at the country level; c) based in developed countries; and d) have massive allocations of resources. In contrast, the case highlights the successful Zero Waste to Landfill initiative implemented by an organisation from a developing country with limited resources and without any government support.

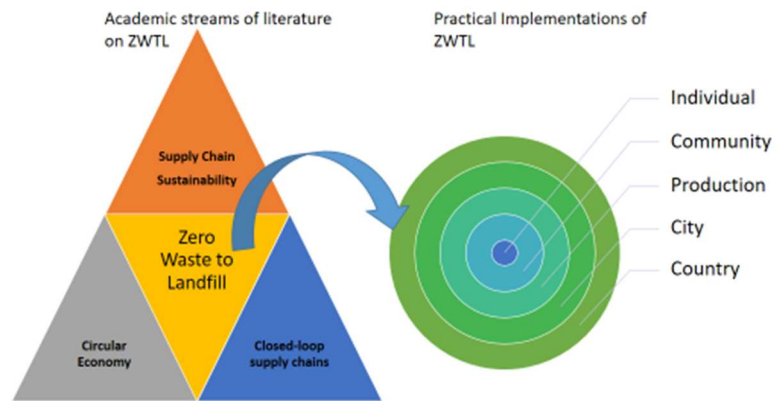


Figure 2. Merging streams of academic literature on Zero Waste to Landfill concept.

Table 1. Key research papers published in the last two decades that can be used for the purpose of theoretical underpinning.

Sustainable supply chain management	Circular economy	Closed loop supply chain management	Zero Waste to Landfill
Seuring and Muller [7]	Geissdoerfer et al. [10]	Guide et al. [12]	Krausz et al. [15]
Carter and Liane Easton [8]	Geng et al. [11]	Kumar and Kumar [13]	Yang [16]
Carter and Rogers [9]		Govindan et al. [14]	Franco-García et al. [17]

In the team meeting after lunch, the following project objectives were formulated.

a) Project objectives

- Institute a robust waste management set-up at BEL factories, ensuring Zero Waste to Landfill with proper waste disposal.
- Follow the 5R philosophy—refuse, reduce, recycle, reuse, remove, and minimize any adverse environmental impact by cutting down waste to landfills.
- Lead by example. Set best practices and standards in the industry for waste management and encourage the ecosystem to work towards zero landfills.

The objectives were to be fulfilled in 6 months (for the Gantt chart, see Appendix **Figure A1**). The following targets were given to the team 1) achieving Zero Waste to Landfill, with a diversion rate exceeding 99%; and 2) continuous reduction in waste for resource conservation and maintaining a sustainable manufacturing process. Rameshwaram, meanwhile, asked his secretary to research ZWTF initiatives implemented in other countries/global organizations.

b) Project team

Although Rameshwaram was leading the project as a project champion, he was required to report to Viabhav, Head of SCM and Manufacturing, supported by the SCM analytics function. Amit and Rajesh Saini (his other plant supervisor) drove the change initiatives at the supplier and factory ends, respectively. Rameshwaram sought

the support of the HR team to conduct extensive training programs for all personnel. The finance team was also brought in to ensure accurate quantification of waste data and supervise changes to be implemented in vendor transactions. A member of the legal team was inducted to ensure all legal compliance and obtain expert input and the required licenses. This cross-functional team (**Figure 3**) agreed to meet weekly and conduct extensive workshops to drive the project. They also agreed to conduct bimonthly reviews to assess progress and re-plan if needed.

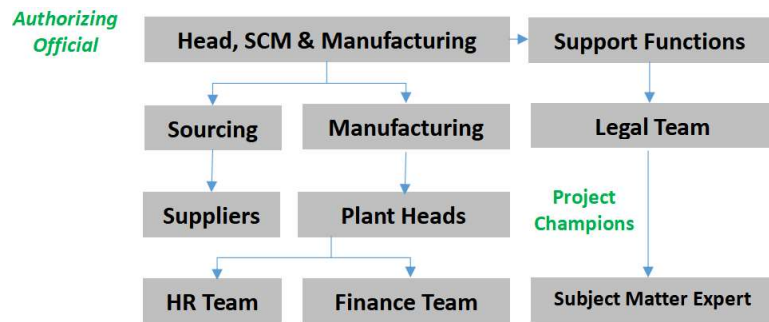


Figure 3. Cross functional team for project implementation.

c) Project planning

Since the manufacturing plant already had a comprehensive SOP as it generated various types of waste (usually disposed of by selling it to scrap dealers and recyclers—70%), a major overhaul was not required. The project was initiated by updating the EHS policy to clearly set out the goal of Zero Waste to Landfill. Communication was sent out to all relevant stakeholders regarding resource planning. The types and quantities of waste generated and the current diversion rate were baselined ‘on an as is, where is’ basis. A gap analysis was carried out to identify the shortcomings. Then, a detailed project plan (**Figure 4**) was chalked out with stringent timelines to reach the desired future state from the current state.



Figure 4. Project plan.

d) Challenges encountered

While working on Week 1 of the project, Rameshwaram and his team members realized the biggest gap was the lack of end-to-end traceability of the waste generated and disposed of. Although 70% of the waste was recycled, there was inadequate identification and quantification of each kind of waste generated at the factory (on the shop floor as well as in office areas). Further, while the workers were well-aware of the defined processes, there was a lack of awareness for proper waste segregation on the floor. Consequently, the waste on the shop floor would sometimes get mixed. The documentation with the waste management vendors also required stringent screening, but when it was conducted, it was found to be incomplete. There was also a lack of visibility on the treatment of non-hazardous waste, especially as waste collectors and government-approved recyclers were ignorant about non-hazardous waste disposal.

e) Investments

Rameshwaram and his team then proposed both financial and nonfinancial investments, which management approved immediately (Appendix **Figure A2**). These investments were made over a period of six months to create infrastructure supporting the waste management system. This included: 1) color-coded waste bins—for segregation of waste at the generation point; 2) waste handling equipment; and 3) a waste storage shed for proper storage of different wastes and providing protection from different weather elements.

More than 40 h of training per month were conducted for all employees and vendors to create awareness regarding the importance of the initiative and help them implement the standard operating procedures. Vendor policy changes were made as the waste disposal was shifted from “through a waste trader to recycler” to “directly to recycler” (with all legal compliances in place).

f) Redressal measures undertaken

Several buyer visits and interviews were carried out to understand the disposal techniques in detail. The legal compliances were researched, and a list of potential vendors who adhered to the legal requirements was made. In one of the meetings, it was decided that a waste management system (WMS) manual covering SOPs and guidelines for various activities would be prepared. The company invested in the necessary infrastructure to ensure the desired WMS manual was circulated in subsequent weeks. It created a documentation procedure that the employees were required to follow strictly. At the supply chain level, it assisted recycling vendors in obtaining all legal documents (such as EHS certificates), and all non-compliant vendors were phased out. The company obtained declarations of waste disposal techniques. A continuous mentorship program was launched for employees and suppliers to bring in a cultural shift to stay dedicated toward a proper waste disposal agenda. Lastly, a stringent 10-point governance program for periodic reviews and audits was established to monitor progress.

- Proper ways of waste identification and classification, segregation, handling, and storage by dedicated teams.
- Suitable vendors for waste—putting together all legal compliances in place
- 100% compliance with the approved process flows.
- Thorough checks of waste disposal data and records.
- Calculation for waste diversion.

- Measures to reduce the waste at the source itself.
- Periodic management reviews and internal audits.
- Extensive training and continuous monitoring of all factory personnel are necessary to ensure correct execution and build a culture of proper waste management across the organization as well as at the supplier end.
- Thorough checks to verify the end treatment of waste, especially in the case of full assistance provided to the vendors while working on the formalities needed to procure the necessary documentation.
- Help from MEPL for a complete understanding of the disposal process and obtaining written confirmation on the correct disposal of hazardous waste.
- Grains.

As the project was completed in July 2021, BEL became the first company in India in the electrical manufacturing sector to achieve 99% diversion from landfills for the waste generated at the Nirlep factory. As a result, the company was able to recycle 247 tons of non-hazardous and hazardous waste. Around 50+ types of waste were identified and tracked in terms of their origin and disposal. It translated into a dramatic reduction of adverse environmental impacts, with the measures being implemented at all levels of organizations and vendor sites. Monetary benefits were realized by utilizing the waste for suitable commercial use. As customers across the globe appreciated their efforts, their brand equity increased severalfold. With Intertek Certification, many new business opportunities opened up for the company in multiple countries where environmental conservation is viewed as a non-negotiable criteria.

After the successful completion of the project, Anuj Poddar, executive director of Bajaj Electricals and Nirlep, was quoted as saying, *“Environment sustainability is a crucial aspect of any responsible corporate today. We are committed to reducing our carbon footprint and have integrated holistic waste management as a central part of our manufacturing process. Our aim is to create a safe and healthy workplace and institute a model that others in the sector can emulate to become environmentally conscious too. The ‘Zero Waste to Landfill’ certification by Intertek is definitely an encouraging milestone that has given us the impetus to amplify our efforts further”* [18,19].

4. Epilogue

Rameshwaram was promoted to lead the initiative in other divisions of the company. Overall, it was a win-win situation for Rameshwaram and his team as they continued to replicate the Nirlep model in other subsidiaries.

Author’s disclaimer note: The case has been developed by the author using secondary data available in the public domain (company website, annual reports, and media coverage along with key inputs from the company executives). The case has been written for the sole purpose of highlighting the company’s achievements in the area of supply chain sustainability and can be used for teaching purposes and demonstrating practical applications of the theoretical concepts.

Conflict of interest: The author declares no conflict of interest.

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Appendix

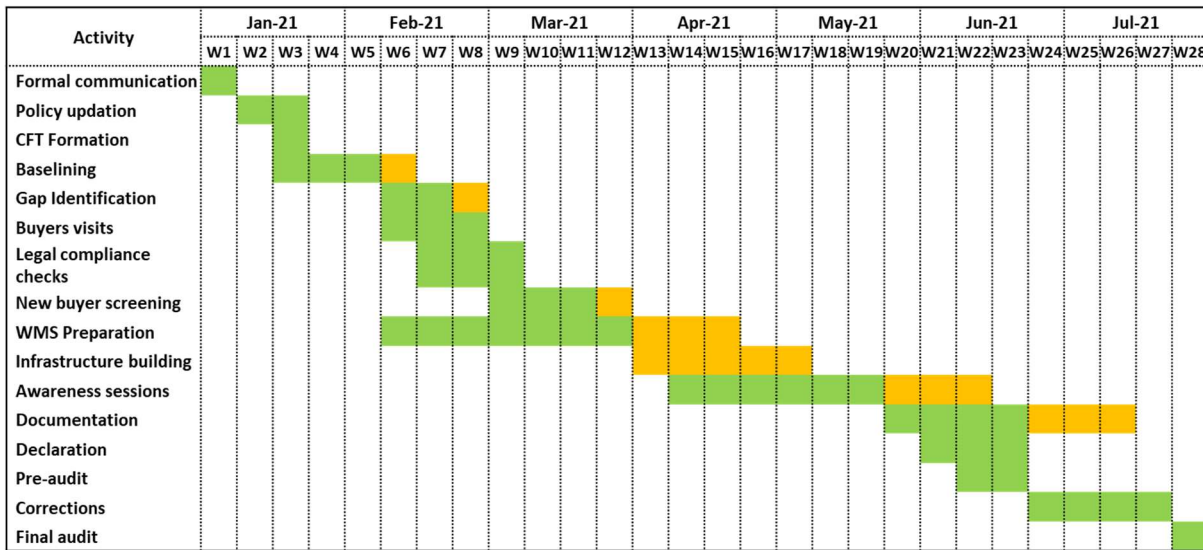


Figure A1. Project timeline.



Figure A2. Resources invested: Colour coded bins, waste segregator, storage shed and extensive staff training.