

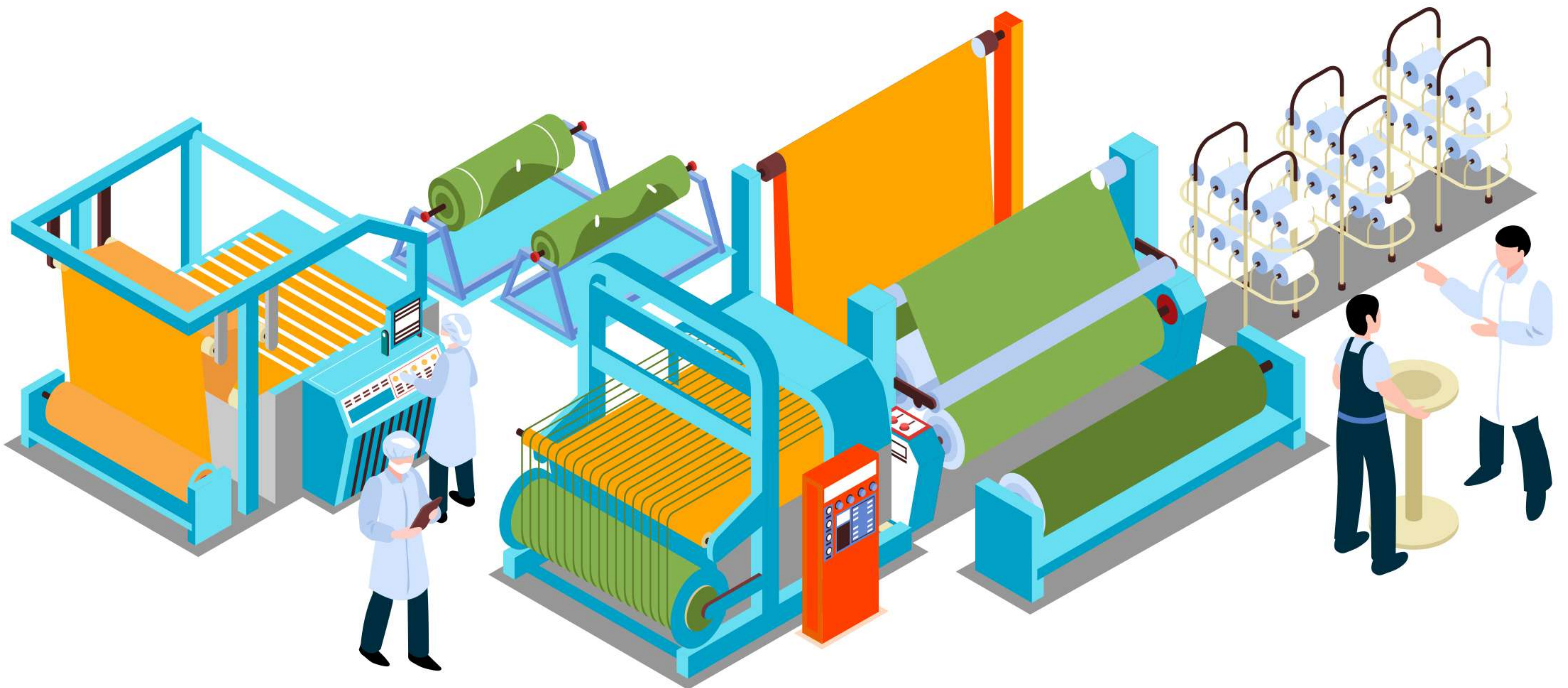
Improvement of labour and environmental standards in Pakistan's textile industry (TextILES)

BUSINESS CASE STUDY ON ENVIRONMENT AND LABOUR STANDARDS

MASOOD TEXTILE MILLS LIMITED

CONTEXT AND BACKGROUND

Masood Textile Mills Limited (or "MTM") founded in 1984, is a large vertically integrated unit based in Faisalabad, Pakistan, engaged in manufacturing of yarn, fabric and finished garments. It has a forte in developing and manufacturing a wide range of knitted apparel products. MTM is a 100% export-oriented organization with about 70% of its exports directed to the US and 30% to Europe. For FY2021, the company reported sales of approximately PKR 38 billion, of which export earnings were recorded at USD 213.05 million.



PROBLEM IDENTIFICATION

Some of the key challenges facing MTM in its quest for environmentally sustainable business operations are showcased as assessed at the baseline stage.

ENERGY MANAGEMENT ISSUES

- MTM faced the challenge of high electricity consumption, recorded at the baseline stage (late 2018) at 41.91 gigawatt hours (or "GWh") to around 2.08 kWh per kg.
- The company also heavily relied on coal power for its boilers, with an estimated coal usage of 40,000 tonnes per annum (39,879 tonnes). Boilers did not have any mechanism installed to recover any heat losses and therefore there were energy efficiency and conservation concerns.
- Good quality light was unavailable at MTM with existing fluorescent lamps having a lux score of 56 lumens per watt (or "Lm/W") which is typical of such installations. Access to high lux score light is essential at modern textile units, where stitching of textiles and garments requires a high attention to detail, and is easily achieved through modern LED installations.
- Green House Gas (or "GHG") emissions as a result of existing energy use (specifically coal and natural gas usage) were recorded at around 143,312 tonnes.

WATER MANAGEMENT ISSUES

- MTM reported water consumption of 2,679,950 cubic meters per year (or "m³/year") or approximately 133 m³ for each tonne of final product produced by MTM. This compared to a best practice of 80-85 m³/tonne achieved by units

invested in sustainable water management practices.^[1]

- MTM appeared not to be focused on wastewater recycling, with no reverse osmosis (or "RO") plant installed at site. Therefore, the company did not treat or recycle any of its input or waste water. In addition to zero recycled water, total dissolved solids (or "TDS") in affluent water of MTM stood at a staggering 1500 parts per million (or "ppm") versus less than 500 ppm generally considered safe.
- For cooling purposes of its boiler operations, MTM was utilizing fresh water, which contributed to the inefficient water management practices.
- There was also limited focus on investment in better water conservation techniques including reuse of water through recycling and investment in studies to harvest rainwater.

CHEMICAL MANAGEMENT

- MTM possessed a chemical purchase management system; however, this was not in line with the best practices. This meant there were issues of misidentification during chemical procurement. As a result, there were often issues with replacements for chemicals used in prior batches with shade variations and production losses.
- Only one common store for its chemical inventory, meant concerns around safety practices and appropriate tagging or marking into hazardous and non-hazardous chemicals remained high. Similarly, compatibility checks of chemicals in accordance with ZDHC guidelines were not carried out and this exacerbated risks to safe storage of chemical inventory. The stores were also not linked with the ERP (Oracle in MTM's case) and therefore active stock management for chemicals was not being carried out.

[1] Source: MTM Management (Industry Benchmark and Customer Requirement)

- Chemicals were not labelled according to the Globally Harmonized System (or “GHS”) which aggravated tagging and compatibility concerns even further.
- There was no concept of segregation into hazardous and non-hazardous wastes, risking appropriate handling and disposal of chemical waste.

Having stated the above shortcomings in its Chemical Management processes and procedures, it is however important to note that MTM did have a Board of Directors (or “BoD”) approved environment policy. In line with the audit requirements of its buyers, it also regularly carried out active EMS Risk Assessments, and use of PPEs remained fairly high. Affluent emissions (smoke/heat) were regularly audited by third parties and remained in the defined parameters or guidelines.

OTHER IMPORTANT CHALLENGES

- Mind-set change and a need for understanding and appreciating the notion of environmental sustainability as not just a business need but also a lifestyle requirement (especially amongst lower cadre employees and workers).
- Lack of appreciation for recycling textile or fabric wastes and reuse expensive raw materials such as cotton and cotton-polyester threads. Existing practices at MTM were such that the organization typically resorted to selling such wastes to external contractors.

MOU WITH GIZ

In 2018, Nasir Ali Zia, Director of Human Resources and Sustainability at MTM, contacted GIZ to seek its assistance in undertaking sustainability initiatives. According to Zia,

for MTM, sustainability was crucial not only due to its social and environmental responsibility dimension but also in view of the requirements and expectations of its foreign buyers who require regular audits to be conducted by independent third parties to validate a supplier’s environmental credentials to continue and grow business.

Thus, the organization realized that there were both social and commercial benefits of sustainability.

An MOU was signed with GIZ in November 2018, and lasted for over a year (ending in December 2019).

SOLUTION PROPOSED

Post signing of MoU, the GIZ team introduced its DfS Methodology to the management at MTM, as a self-help approach aimed at creating an environment of effective dialogue where top management, middle management and workers collectively work towards solution to organizational problems including those affecting its social, economic, and environmental sustainability.

A baseline assessment study was carried out by specialist advisors at the outset to assess gaps in MTM’s environment management practices. Soon thereafter, a Change Management Team (or “CMT”) was formulated at the company, comprising managers and technical experts at MTM, with a focus on energy, water, chemical and environment management. To support the main CTM, mini-CMTs (or sub-CMTs) were also formed.

'Sustainability' was identified as the parent department to partake in the initiative, whilst 'Compliance' as a sub-department also had active representation at both CMT and mini-CMT levels to ensure a smoother implementation of initiatives proposed.

Post the completion of the Baseline Study, DfS based interventions at MTM were targeted at addressing water conservation (including wastewater management), energy efficiency, and chemical management (**Figure 1**).

Sustainability interventions at MTM



Figure 1

DfS INTERVENTIONS AT MTM

A key element of the DfS intervention was centred on capacity development of the MTM CMT and mini-CMT members. Accordingly, GIZ provided technical experts for technical and professional capacity enhancement at MTM. Thematic topics around water efficiency and management, chemical management and energy efficiency were delivered. GIZ experts also advised MTM on further refinements in ethical standards and social compliance. Steps were taken to improve and expand MTM's code of conduct to make it in line with customers' code of conduct.

Training and development sessions were designed and offered by GIZ to develop capacity and analytical skills of MTM staff. Managers and workers were trained to carry out the sustainability SOPs. At the MTM training centre, diverse training was provided from the first line operations to more technical and high skill training as discussed above. As a result, people's efficiency as well as attitude was improved, the supply chain was better managed, and processes were made more efficient. The DfS guided intervention at MTM followed the standard route as suggested by the change management methodology. In addition to thematic CMTs around environment and sustainability, mini CMTs and value added trainings, with advisors helping with implementation of environment-related interventions at MTM.

IMPROVED ENERGY EFFICIENCY AND MANAGEMENT

In terms of energy conservation, problem areas identified at the baseline and subsequently at CMT and mini-CMT levels were discussed, corrective measures identified, action plans formulated and executed. Multiple interventions to ensure improved energy management were made subsequently.

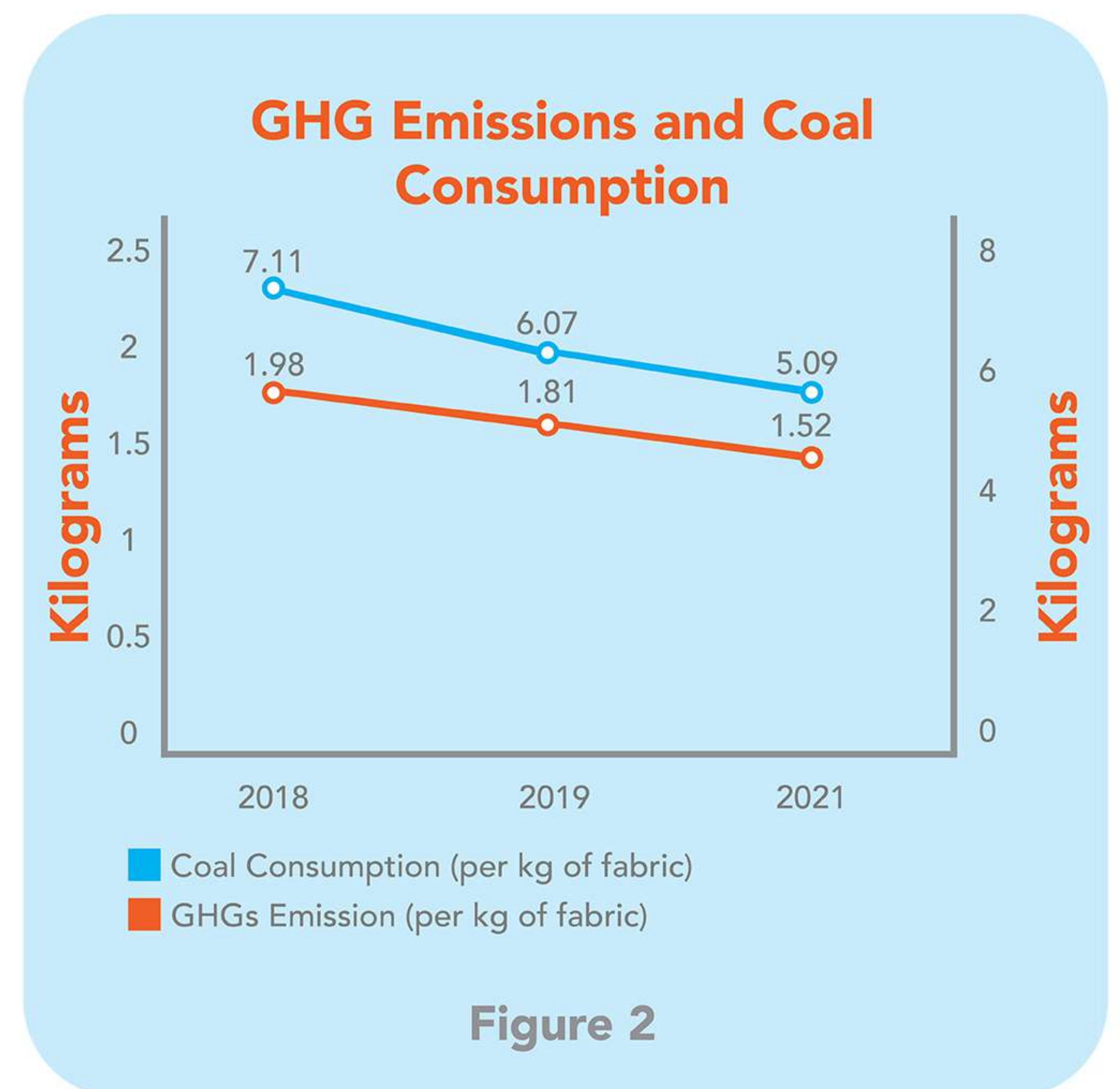
- MTM made an investment of PKR 1.62 million on installation of line filters on compressed air lines in four of its divisions including laundry, yarn, dyeing and processing. This measure also helped significantly reduce maintenance costs of the compressed air system including replacement costs for solenoids, AC or DC coils, pneumatic valves, air regulators and diaphragms. The one year saving in maintenance costs on this account was assessed at PKR 1.73 million by MTM with a payback of less than one year. MTM's decision to invest in line filters emanated from experiential learning of the concerned teams as part of the DfS intervention and further

benefited from the advice of the GIZ-provided expert.

- Improved heat recovery was achieved with MTM investing PKR 90 million for installation of two heat recovery system generators (or “HRSG”) of 1.5-ton capacity each. The system generated 3,000 tons of steam per month and helped reduce reliance on costly coal to generate steam resulting in monthly savings of PKR 12 million. Capital expenditure of PKR 90 million on installation of two HRSGs was swiftly paid back in a period of nine months. While the project was initiated by MTM in 2017 (prior to the DfS intervention), value added trainings provided by a specialist advisor as part of the DfS intervention explained its business impact and guided MTM in calculations and documentations of these savings.
- There was about a 15% decrease in coal consumption overall from the HRSG installation and additionally carbon dioxide (or “CO2”) emissions reduced significantly due to heat recovery and energy conservation measures at the baseline and has further declined to around 28% from the baseline number as per 2021 data from MTM (Figure 2). MTM’s in-house power generation also benefited through this HRSG installation.
- New energy efficient stitching machines or BMR of existing stitching machines (6,900) achieved through installation of new servomotors with longer life span also helped achieving greater energy efficiency. Inverters and heat recovery boilers (discussed earlier) also contributed to this energy efficient operation. This project was initiated from experiential learning and some of these ideas for energy efficient machinery or technology were also learnt from CMTs.
- Heat recovery measures (both HRSG and heat recovery boilers) brought exhaust temperatures

down from 450°C to a range of 100-130°C, a reduction of nearly four times from the baseline.

- Reduction achieved in batch time for processing also helped lower electricity consumption.
- GHG emissions on per kilogram of fabric produced declined nearly 16% pre and post DfS intervention (from 1.98 GHG per kg of fabric in 2018 to 1.52 GHG per kg of fabric in 2021 (a near 18% improvement from the baseline) – see **Figure 2**), and showcases the efficiency of energy conservation measures taken above. It also adds to the green business credentials of MTM, with the company reducing its carbon footprint and contribution to global warming.

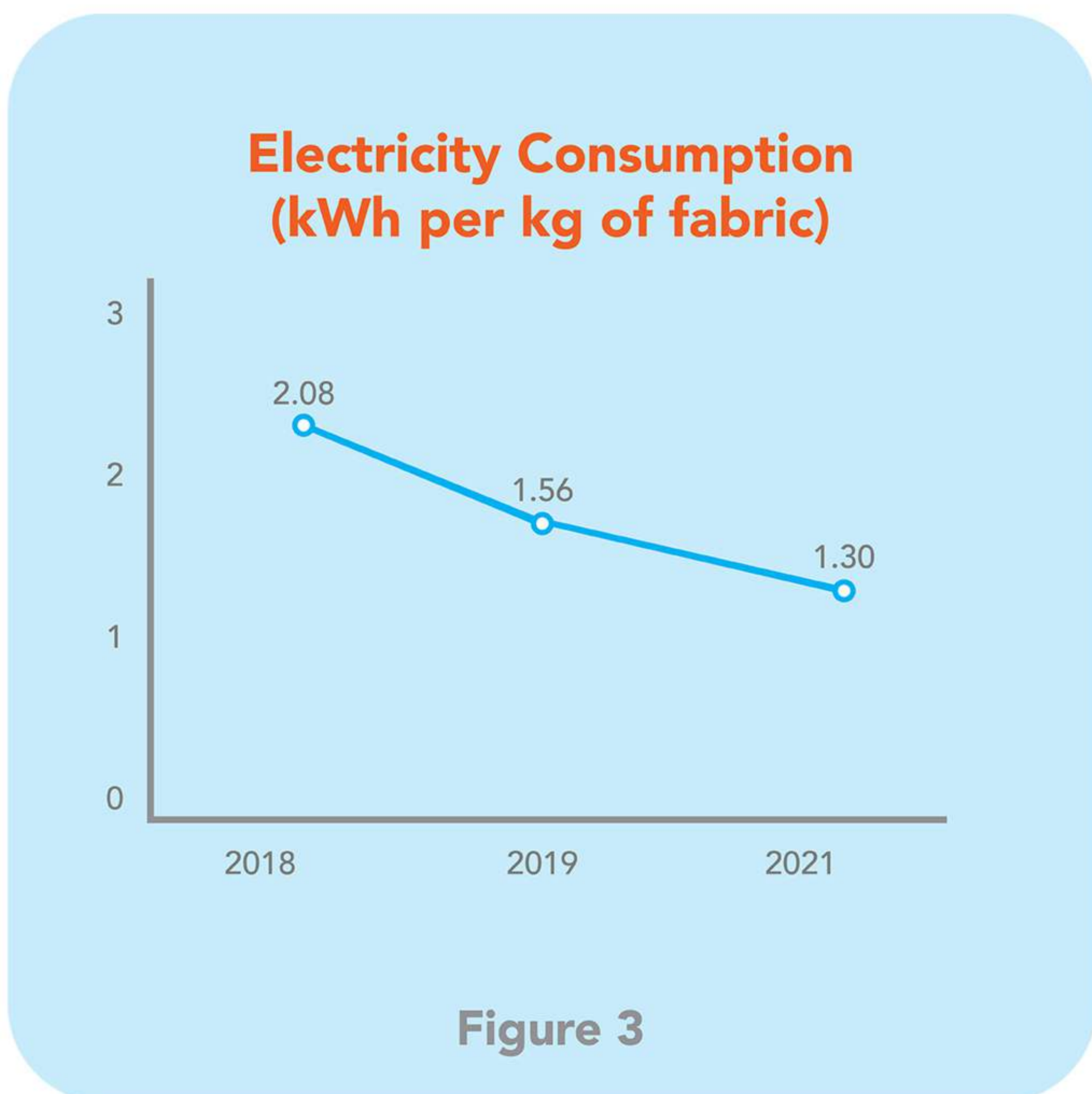


- MTM also saved electricity through the installation of nearly 5,500 energy efficient LED lights, at a cost of PKR 4.2 million. These lights were installed not only for better energy efficiency, but also translated to nearly PKR 0.5 million saving in the monthly electricity bill. The ROI of the investment therefore was realized to be fairly high and as was the case with the other investments discussed above also paid back within the year. While this project was started in

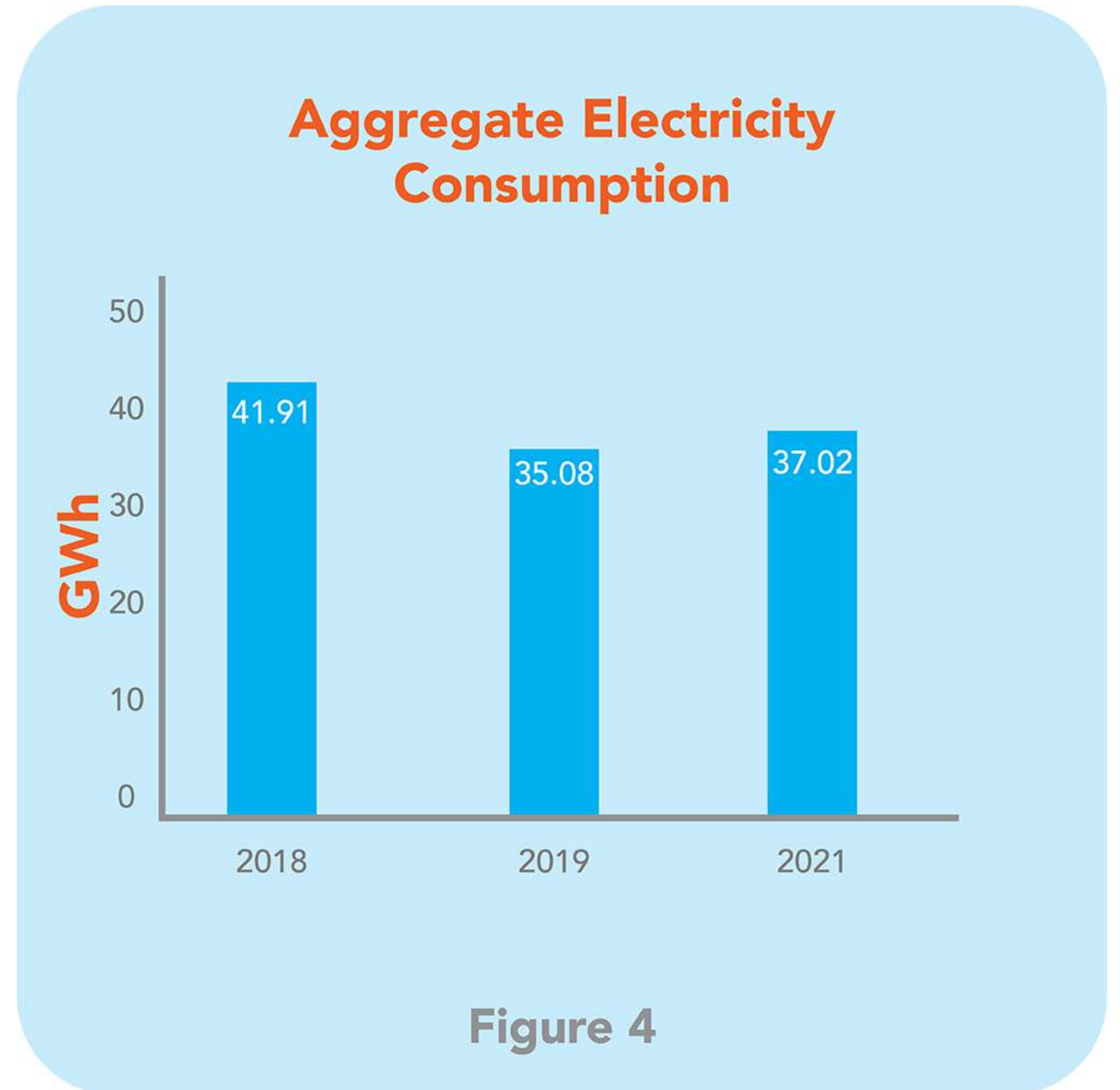
2017, the DfS intervention helped clarify the business case for the investment as an effective and easily obtainable energy efficiency measure.

- In addition to the quantitative improvement in terms of energy efficiency and dollar savings in operating costs, the measure to install LEDs also helped improve the lumen quality (up from lux of 56 Lm/W of existing fluorescent lights to lux of 102 Lm/W) and thereby making available light more suited to the requirements of the line workers, which in-turn improved their productivity and quality.

In terms of energy efficiency, electricity consumption was reduced from 2.08 kilowatt hours (or “kWh”) per kg of fabric in 2018 to 1.56 kWh per kg of fabric in 2019. This figure had further reduced to 1.30 kWh per kg (or nearly 38% reduction from the baseline) of fabric in November 2021 (**Figure 3**).



Aggregate electricity consumption was reduced from 41.91 GWh in 2018 to 35.07 GWh in 2019 and 37.02 GWh in 2021^[2] (or a reduction overall of 12% from the baseline) (**Figure 4**).



IMPROVED WATER CONSERVATION

DfS interventions also enabled better conservation of water. The baseline or GAP analysis coupled with subsequent and detailed water analysis helped guide the MTM team in undertaking measures to improve water use efficiency. These are discussed as follows:

- MTM installed two RO plants with an aggregate installed capacity of treating 150 m³ of water per hour at a cost of PKR 20 million. This enabled efficient utilization of water and chemicals and reduced the processing cost from PKR 17.2 per m³ prior to this installation to PKR 5.5 per m³ post installation. There was approximately 30% less consumption of water per batch of dyed fabric. Batch processing times too were also reduced by an average of eight hours, which translated into a monthly saving of over PKR 180,000. All of these were fairly significant economic savings and cemented the business case for these initiatives. It may be noted that this project was initiated in 2018 to meet the standard requirements of ZDHC. In the first phase, MTM installed 75 m³/hour RO plant

[2] The uptick in aggregate energy consumption needs to be read with care as the company produced a significantly larger output (in terms of the total fabric produced) from 2019 levels. The electricity consumption per kg of fabric therefore reflects a more accurate assessment.

however was unsure of its business case. Value added trainings provided to the CMT and mini CMT members, helped quantitatively calculating savings offered by the RO plant. The data generated initiated the second phase of completely moving to RO water in the processing unit (which included investing in a second RO plant as well). It may be noted that before the DfS intervention in 2018, MTM did not recycle any of its water. However, the RO installation and SS lines for non-contact water soon after the DfS intervention, meant that in 2019, 374.85 dam³ per year of water was recycled, and this figure has increased to 847.88 dam³ per year (nearly 3x levels in 2019) as of November 2021(**Figure 5**).

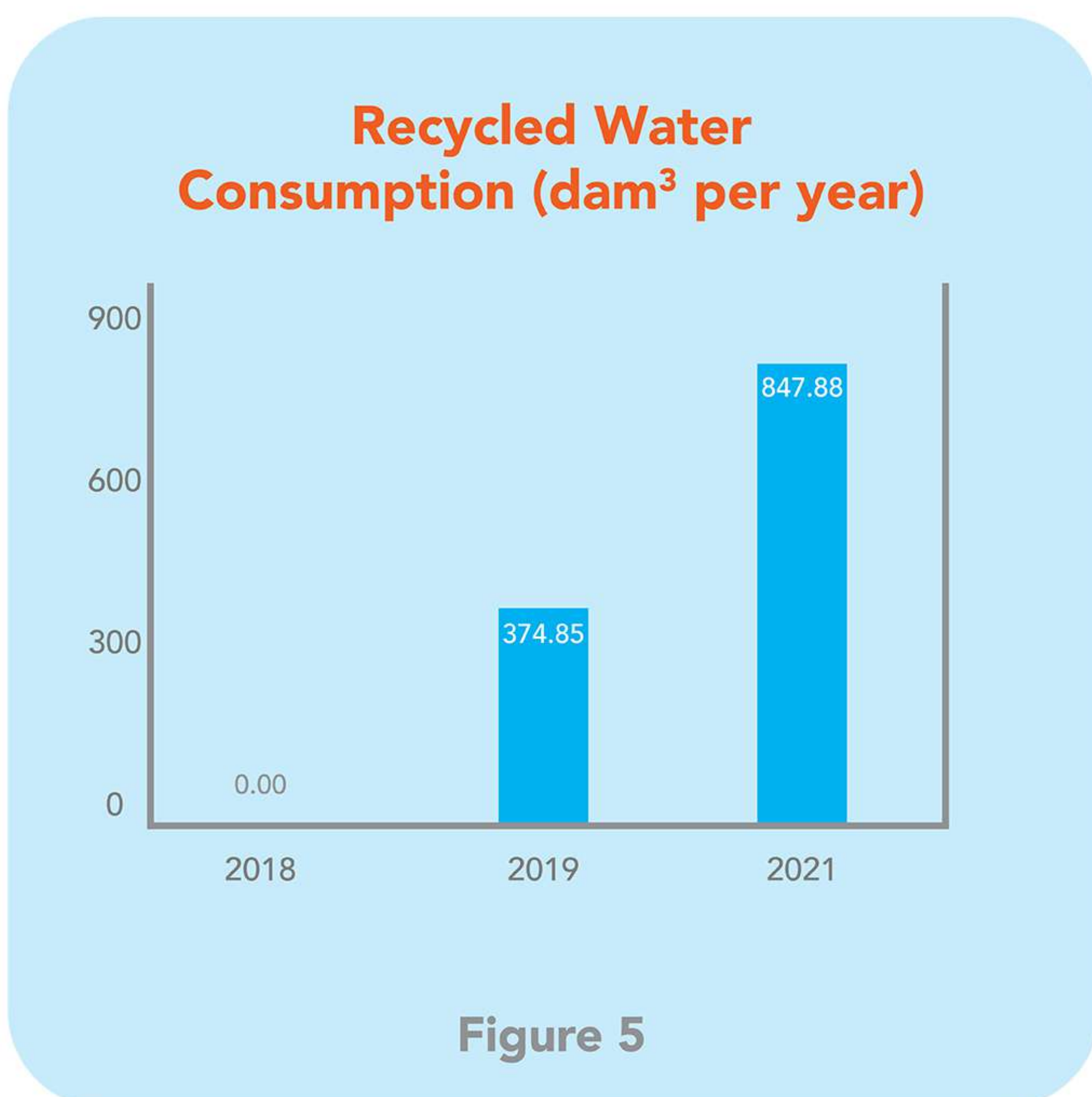


Figure 5

- The installed RO plants also helped in tackling water filtration issues, and TDS ratio which was previously recorded at a very high 1500 ppm, reduced to 50 ppm soon after the installation in 2019 (**Figure 6**).

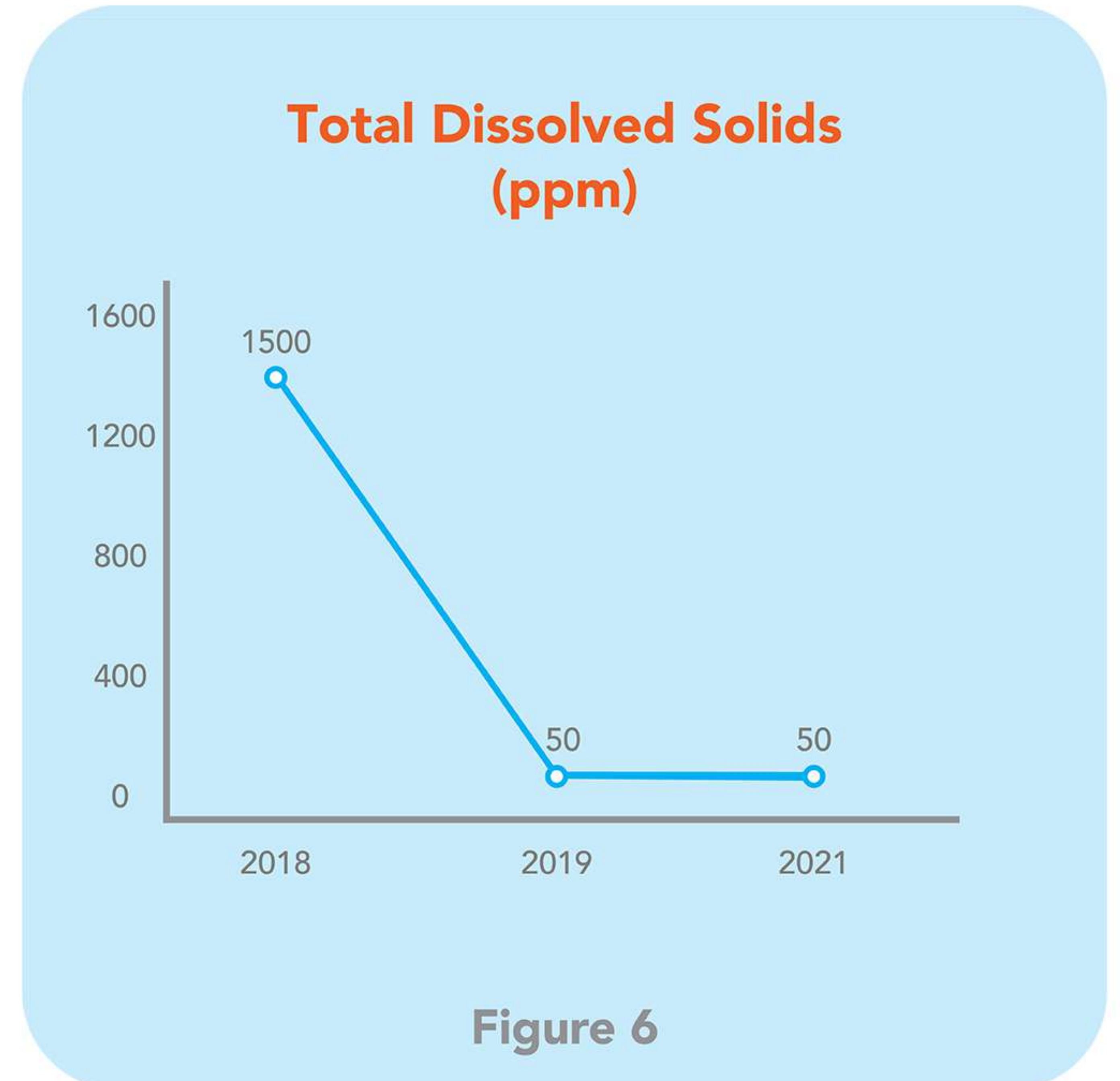


Figure 6

- For water recycling, stainless steel (SS) lines for non-contact cooling water were installed. There was a plan to recycle non-contact cooling water after the installation of RO plants because only then would the project become feasible. The project was initiated post its introduction at one of the CMTs attended by the MTM team along with the second phase of RO installation. Value added trainings at mini CMT levels were also provided to improve learnings.

CHEMICAL MANAGEMENT IMPROVEMENTS

Unlike water and energy management, MTM did have chemical management systems and know-how in place even at the outset of the DfS Intervention. Nonetheless, there were several gaps as identified earlier in the section on problems. In terms of chemical management, MTM strived to achieve ZDHC, from procurement to final disposal of chemicals. Several steps were taken in light of the DfS intervention and these are detailed as under:

- Setting up a brine solution plant utilizing locally sourced common salt in place of the existing set-up reliant on nearly four times more expensive imported Glauber salt in the Dyeing Operations offered significant savings and strengthened its business case. The brine solution plant was installed after the completion of DfS intervention and was evidence of the ongoing impact of a sustainability-oriented culture at MTM. The project was adapted by reviewing best practices implemented in textile industries of Turkey and other textile producing countries, and was introduced by specialist advisors delivering CMT sessions on chemical management and attended by MTM’s representatives. Further value added trainings at mini CMT levels helped rationalize the investment including showcasing the quantitative benefits from the investment.
- The RO plants (discussed earlier in the water efficiency section) also helped reduce utilization of chemicals, with savings of in excess of PKR 2 million per month (nearly 72% of which was attributable to lesser utilization of acetic acid and soda ash).

The company was also able to realize that its Chemical Management Systems had to be organized in accordance with standards stipulated in the ZDHC guidelines, considered the industry gold standards when dealing with the chemical management lifecycle. While the system was under development since 2016, GIZ helped MTM in full implementation of the system through consultation and trainings.

- **Procurement:** Whilst MTM was already following the Chemical Abstract Service (CAS) number for procurement of chemicals (which theoretically avoided purchases from vendors not meeting client requirements), it did not fully help ensure traceability and transparency of chemicals as laid out in ZDHC, BlueSign, Inditex

The List and Restricted Substances List (or “RSL”) – which are all globally accepted standards. As earlier indicated, this led to issues with replacements for chemicals used in prior batches with shade variations and production losses. The DfS intervention at MTM helped correct this. The chemical procurement policy was revised based on MTM CMT’s learnings to make it pliant with the above-mentioned best practices.

- **Storage and inventory management of chemicals:** MTM managed to segregate its single chemical storage as witnessed at the baseline to multiple stores for storing chemicals of each production division in line with best practices. Also, ZDHC Guidelines on stacking of chemicals on the basis of compatibility were followed. Modern inventory management techniques such as First in First out (FIFO) were also implemented to help streamline the process. The stores were also linked with the ERP in place for active inventory management.
- **Labelling of chemicals:** From a previously zero labelling practice, post the DfS intervention, MTM started to adhere to GHS labelling guidelines. This meant that in addition to hazardous sign marking for such chemicals, the correct pictograms for the relevant chemicals were introduced. Workers were trained to understand the GHS labels and take the appropriate precautions whilst storing, transporting, using and disposing off such chemicals.
- **Chemical waste storage:** Chemical wastes are now segregated and marked into hazardous and non-hazardous categories in line with the ZDHC guidelines with separately labelled waste bins for different types of waste, and corrects the no segregation practice of before.

Chemical procurement procedures have been improved markedly as discussed in addition to better chemical storage capacity and its emergency

management. For workers' safety, PPE procedures have been improved and implemented, with quarterly trainings now in place for workers. MTM also reviewed job descriptions (JDs) of managers, supervisors, and workers.

The aforementioned measures introduced post the DfS intervention have helped MTM reduce its overall Chemical Hazards and Risks Index assessment from a 'high' risk operation to a 'low' risk one. This fact remains validated as per the latest review, whose results have been provided by MTM in November 2021. Measures taken to improve chemical management practices at MTM, have also helped the organization reduce its chemical consumption from 8.97 kg/kg of fabric in 2018 (baseline) to 8.25 kg/kg of fabric (8% improvement) in 2019 (a year into the DfS intervention). By November 2021, this consumption has further declined to 7.56 kg/kg of fabric or nearly 16% improvement from the baseline and showcases the strength of the DfS interventions on this account (Figure 7).

Consumption of Chemicals (kg per kg of fabric)



Figure 7

WASTE RECYCLING

The sustainability efforts at MTM also focused on recycling. The company's waste was previously being sold to external contractors without being recycled into the company's processes. Through GIZ's support such as provision of training and industrial visits to learn the best practises of waste recycling, MTM started collecting, recovering, and converting its fabric waste to cotton and then converting it to either pure cotton or a blended cotton-polyester thread. This was not only economically beneficial in terms of cost and customers' needs but was also showcased practical steps taken by MTM towards being socially and environmentally responsible.

INTERNALIZING CHANGE MANAGEMENT

The DfS implementation has opened MTM up as a forward looking organization seeking greener credentials to become a supplier of choice to international buyers. The MTM team appears to be cognizant of environment sustainability beyond being a mantra to now being an end user demand. It seems to understand that with changing compliance requirements and evolving standards, a business such as MTM can only succeed if it evolves with time. A change in mind-set is thus the biggest win of DfS at MTM.

In addition to following up and building on environmental sustainability initiatives including carrying out feasibility studies for investments in harvesting rain water and new water recycling techniques as well as studying solar and renewable energy as a way of further reducing its carbon footprint, MTM appears to be an organization on the move.

It is now a major lobbyist for more active female contribution in the workforce at the appropriate forums. This belief of involving the near 50% of available and possibly more productive staffing supply showcases an evolved mind-set.

PERSONAL IMPACT

GIZ's support and training on sustainability not only had a significantly healthy impact on business and environmental outcomes and routines in the factory, but there was also a visible impact on personal lifestyles and behaviours of individual employees. A few noteworthy examples are provided below.

In the following extract, Mr. Rab Nawaz, a supervisor in the RO department explains how participation in sustainability trainings helped his own personal approach toward energy conservation.

I am looking after water related projects at MTM. Before the sustainability training and initiatives, we wasted a huge percentage of water and were not mindful about environmental conservation issues. However, post training, I trained workers in my department about these issues. I personally monitor if water is being wasted or whether any valve has remained open. I have also applied this approach in my house and explained to my family who used to waste a lot of water. We must save water for the future and plan for the future. Thus, we are spreading the message of sustainability not only in our factory but also in our homes and villages.

Mr. Muhammad Aslam, a supervisor in the Utilities department explains how he became more

mindful of water conservation in his personal life

I have attended training sessions on sustainability at MTM. We are using our national resources like electricity, gas, and water wisely so that our future generations too could benefit from them. We have minimized the usage of electricity. Previously, we were using high energy-consuming lights as compared to energy efficient LED lights used now. Similarly, we did not turn off lights while leaving premises but now we turn off all unnecessary lights. We have persuaded many family, friends and neighbours to minimize consumption of natural resources and use LED lights at home.

In yet another example of personal impact, Mr. Adil, a supervisor in the Health and Safety department, explains how his participation in sustainability initiatives at MTM sensitized him towards the use of plastic.

We were informed about the significance of careful utilization of existing natural resources and to conserve them for our future generations. We carried the sustainability project forward and implemented it across our company. The number of these plastic bags has rapidly grown with the passage of time and the usage of plastic bag and plastic related things has continued to bother me. Post the training, I try to minimize the use of plastic bags and plastic related things in the mill to implement the spirit of sustainability. Similarly, in our village, everything which was previously brought in plastic bags is now brought in cloth bags or homemade bags – an idea that I discovered on internet.