SIWI WORLD WATER WEEK

Seminar: Water, pollution, and systemic challenges: the case of the textile industry

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ABSTRACT VOLUME

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Water and waste: reduce and reuse

Seminar: Water, pollution, and systemic challenges: the case of the textile industry

Contents

From field to fashion: examining textile's grey water footprint

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Highlights

Water Footprint Assessment of polyester and viscose fibres, field cotton and washing, dyeing and finishing mills shows that the grey water footprint is by far the largest share of textile's total water footprint and that this water footprint is often in locations already suffering from poor water quality.

Introduction and objectives

The textile industry is ranked as the second largest polluter globally, after oil industry, with a large share of that pollution ending up in water, making fresh water unfit for other uses and with severe consequences on human health and ecosystems. With production (from raw materials to garment finishing) often taking place in areas under already unsustainable water pollution levels, this analysis aims at understanding the impact of textile production in water quality throughout different production stages, by calculating the grey water footprint of polyester, cotton and cellulosic fibres and for textile washing, dyeing and finishing mills.

Methodology approach

Quantification of the impacts of textile production on water resources has been mainly focused on water consumption. This study analysed the impact of textile at different stages of production – raw materials, fibres production and washing, dyeing and finishing – by applying the Water Footprint Assessment methodology. The grey water footprint, i.e., the volumes of freshwater required to assimilate pollution to meet specific water quality standards (grey water footprint) was calculated for each production stage and for different fibre types and the environmental sustainability of this water footprint was assessed against local pollution levels and their socioeconomic efficiency against benchmarks.

Analysis and results

The studies focused on the Water Footprint Assessment of the production of polyester and viscose fibres globally, production of field cotton in three states of India and on textile processing mills in China and Bangladesh. Results showed that more than 98% of polyester and viscose's water footprint is grey water footprint from industrial processing, and these can reach 30,000 m^3/tonne of fibre, depending on the processes and practices applied. The grey water footprint of filed cotton varies dramatically across the different agricultural practices, reflecting the level of toxicity of the pesticides used, or the overuse of nutrients, reaching in some cases 500,000 m^3/hectare. In textile processing mills, the grey water footprint also represents the largest share of the total water footprint, and can be as high as 563 litres per square meter of fabric. The majority of all production sites analysed for fibres, fields and mills, are located in areas with unsustainable water pollution levels, which worsens the impact of textile production in these regions. Results also indicate, that management practices and processing choices, both at industrial and farm levels largely influence the size of the grey water footprint, i.e. level of pollution caused.

Conclusions and recommendation

Adopting better practices and processes without compromising production can significantly contribute to the reduction of freshwater pollution by the textile industry and consequently enhance water quality where textile is produced. The grey water footprint of textile production assists selection of the most effective practices for reducing the industry's impact on freshwater quality and can be used to prioritise locations in most need of investment into improved practices. These practices include better choices in the chemicals used, both at industrial and field levels, chemical reuse and closed-loop cycle production at industrial level, and enhancement of wastewater disposal and treatment methods.

Taking textile water stewardship to the next level

Presenting Author: Ms. Charlotta Jarnmark, Sweden, Pierre Borjesson

Co-Authors:

Highlights

- Global textile companies bring proof of impact, cleaning up their internal business.
- Collective action push out of existing footprint and sets off a multiplication of impact into new areas, new sectors.
- Movement from a footprint approach to understanding collective action

Introduction and objectives

The aim of this research is to deeper showcase the effect of water stewardship collective action on a multitude of scales.

On a basin level, companies working with risk mitigation that engage local and regional decision makers, local industry and finance interests creates not only tailor made local solutions to water challenges, but also increases the critical mass that transforms governance, creating ripples by the pure pressure of water risks.

A company that claims water stewardship, next step is increasing the amplitude of the wave, expand, recruit more companies for water stewardship and grow engagement to a global scale.

Methodology approach

The stewardship journey, from a clean fish in a dirty pond to a clean brand in a dirty world.

Analysis and results

Where does the scaling up of a successful water steward impact take us?

Looking for global governance support and setting science based targets for water is an adaptive processs on local scale, but globally it may lead the industry to governing power levels.

Conclusions and recommendation

Event participants to contribute what focus on the expansion that give best impact on water management globally.

Targets and textiles: target setting in the private sector

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Highlights

The World Bank estimates 20% of industrial water pollution comes from textile production. The high water intensity of this sector, coupled with increasing demand is straining already stressed water resources. CDP highlights how textiles companies are setting targets to improve their water management practices.

Introduction and objectives

The textiles industry is estimated to be the second largest polluter of clean water resources, with more than 8,000 chemicals used in various manufacturing process including dyeing and printing. It is therefore imperative that the textile industry is a leader in water and wastewater management. This presentation will use data from CDP's water programme in 2016 to provide insights into the targets and goals set by textiles companies to address their impact on water resources on which they rely.

Methodology approach

Companies need to set targets and goals to bring their water impacts to sustainable levels that reflect the ecological, economic and social needs of the river basins in which they operate. The textiles industry is no exception, and must tailor the objectives it sets to the specific challenges it faces. As above, pollution is one of the key challenges for this sector. In this presentation, the information that textiles companies disclosed about their targets is analysed. This includes: category of target, motivation for target, base-line year and proportion of target achieved. Case studies of best practice will be presented throughout.

Analysis and results

In 2016, over 3,000 companies were invited to respond to CDP's request for water-related information, of which 36 were from the textiles sector. Just 13 of these 36 textiles companies responded, representing a 36% response rate. Some of well-known responders include Burberry, Adidas, Coach and Kering. 77% of these companies set targets (quantitative) and/or goals (qualitative) related to water. Some of the most common targets among the textiles industry reported to CDP in 2016 were reductions in product water intensity; improving the monitoring of water use; and seeking a reduction in consumptive volumes. Despite the fact that the textiles industry is the second largest industrial polluter, only 3 out of the 10 companies set targets relating to water pollution prevention. Burberry is one of these few, having set a target to eliminate the use of chemicals that may have an environmental impact by 2020. Companies can also set qualitative goals such as educating their customers to help them minimize product impact; remediating and restoring watersheds and ecosystems; and engaging with suppliers to help them improve water stewardship. Such actions can deliver significant benefits for companies: for example, Adidas AG report cost savings from requiring suppliers to use approved bluesign chemicals, reducing the need to test upstream suppliers and lowering operating costs and Kering have developed a Chemical Management Framework to serve as a standard for their brands and suppliers.

Conclusions and recommendation

There some excellent examples of proactive action from textiles companies, but the sector can do more to address its growing impact on water resources. Meaningful targets are needed to address the specific issues that face the textiles sector, such as water pollution and contamination. As regulation on the textiles industry tightens, companies will have to practice good water management to remain competitive and ensure that they retain their social license to operate.

The ZDHC wastewater discharge guideline for the textile industry

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Ms. Rachel Wallace, Netherlands, ZDHC

Highlights

- First of kind guideline to set pass/fail reporting limits and standardizes testing methods for 15 targeted classes of hazardous chemicals
- Defines equivalence among various national standards and regulations for traditional wastewater parameters
- Creates a three-tiered system to drive continuous improvement on traditional wastewater parameters for direct dischargers

Introduction and objectives

In the apparel and footwear industry, most manufacturing processes use water and generate wastewater that requires treatment before reuse or discharge. Treatment processes often are developed to align with effluent discharge parameters dictated by regulations that govern the receiving waterbody or centralized wastewater treatment. Many countries have developed wastewater discharge regulations, some specific to the textile industry, which reduce the potential for human health issues and/or negative environmental impacts. Leading consumer brands in the textile and apparel industry have recognized an opportunity to drive performance beyond existing regulations and guidelines; and to address 15 classes of hazardous chemicals.

Methodology approach

In the apparel and footwear industry, most manufacturing processes use water and generate wastewater that requires treatment before reuse or discharge. Treatment processes often are developed to align with effluent discharge parameters dictated by regulations that govern the receiving waterbody or centralized wastewater treatment. Many countries have developed wastewater discharge regulations, some specific to the textile industry, which reduce the potential for human health issues and/or negative environmental impacts. Leading consumer brands in the textile and apparel industry have recognized an opportunity to drive performance beyond existing regulations and guidelines; and to address 15 classes of hazardous chemicals.

Analysis and results

Through the years, some multi-brand consortia and individual brands have undertaken the development of manufacturing facility wastewater discharge guidelines for locations at which wastewater discharge standards have not yet matured or were considered insufficient. Despite efforts devoted to developing wastewater discharge regulations, there is no single industry-standard guideline that attempts to standardize discharge criteria and define equivalence among testing methods. Leading textile and footwear brands, in conjunction with the Roadmap to Zero Discharge of Hazardous Chemicals (ZDHC) Program, identified an opportunity where the global supply chain for the footwear and apparel industry would benefit greatly from a single, industry-standard discharge guideline with standardized analytical methods for monitoring wastewater quality. In response to brands' own concerns – and those by raised by civil society organizations – about water pollution and the use of hazardous chemicals, leading brands and the ZDHC collaborated with global wastewater treatment experts and civil society organizations to develop wastewater a discharge

quality guideline for the apparel and footwear industry. This guideline goes beyond regulatory compliance to help ensure wastewater discharges do not adversely affect the environment or the surrounding communities, and is the first in the world to develop pass/fail criteria for 15 classes of hazardous chemicals.

Conclusions and recommendation

In December 2016, the ZDHC released to the public first official version of ZDHC Wastewater Discharge Guideline for the footwear and apparel industry, and is currently piloting the guideline. During World Water Week, we will discuss the methodology used for the development of the guideline, the results of the pilot, and next steps for the guideline.

Wastewater management in Egyptian textile industry sector

Presenting Author: Prof. Rifaat Abdel Wahaab, Egypt, Holding Co.for Water and Wastewater (HCWW)

Co-Authors:

Highlights

The Egyptian textile industry is one of the corner stone of the Egyptian economic strategy. It has a major impact on the social economic and environment quality of life. It faces a challenging condition in the field of quality and productivity due to globalization of the world market.

Introduction and objectives

For the above mentioned reasons, better use of resources, pollution abatement and waste minimization, improved quality and productivity of textiles, cleaner production opportunities, enhancing the competitive edge by using innovative technologies, upgrading the scientific knowledge as well as ecological and technological capabilities of the human resources, in addition to strength the partnership between textile sector and R&D institutions to make innovative happen as well as inclusion of all stakeholders throughout the corporate value chain are the most important priorities of Egyptian textile industry to stay competitive in the long-term and helps to ensure sustainable development and create new jobs.

Methodology approach

The current study intends to search how the Egyptian textile industry can be motivated to reduce their wastewater pollution through implementing process integrated improvements and abatement technologies. In the past several improvements projects in the Egyptian textile industry have taken place demonstrating the viability of the approach of Resource Efficiency and Cleaner Productions. Also as wastewater treatment technology is widely applied in the wet textile processing industry worldwide the question remains how the textile industry can be motivated to implement these technologies to the extent required.

Analysis and results

The present study shows that there are several aspects under which the Egyptian industry operates which should favour its sustainable development:

1. Rising prices of resources which will stimulate their efficient use;
2. Several improvement programmes and service providers demonstrating the viability of resource efficiency, quality improvement and other technological and managerial improvements;
3. An extensive strategy by the Egyptian government to expand (and modernizing?) the textile industry;
4. Laws and regulations addressing the various aspects of sustainability;
5. The desire to increase export to European countries and US which will require a higher level of quality products;
6. Increasing awareness of retailers and brands on sustainability issues in their supply chain;
7. Various business driven initiatives focusing on improving the textile supply chain and notably the social circumstances in the RMG and banned chemicals in wet textile processing and finishing.

It is worth to highlight that improved technology and equipment operations, metering of resource consumption, monitoring and implementation of RECP recommendations in utility, process and waste managements may reduce water consumption on average with 40% and energy with 20%. These both case study and lesson learnt have been replicated in other industrial establishments within textile industry sector.

Conclusions and recommendation

The study is highly recommend cleaner production opportunities, and at the same time reduce pollutants concentrations in the final effluent. Accordingly, the following few pollution prevention opportunities were recommended:

1. Tight closing of dyestuff containers in the chemical store.
2. Replacement of acetic acid by formic acid.
3. Combining the after "full bleaching or dyeing" neutralization-softening steps in one bath.
4. Expanding the use of bi-functional reactive dyestuffs

Poster: Sustainable management practices to the textile industry for growing economy

Presenting Author: Mr. Sohail Ali Naqvi, Pakistan, WWF-Pakistan

Co-Authors:

Highlights

This paper demonstrates the analysis of implementation of agreements (MEAs) and linkage with local standards in the textile sector of Pakistan. This project also highlights the sustainable practices in the textile industry to reduce the water consumption as well as wastewater production in processes with cost-benefit analysis.

Introduction and objectives

Pakistan has ratified a number of international conventions to improve its position in global market. Textile industry in Pakistan contributes 8.5% of the country's GDP and 52% in exports. However, majority of the industry is unable to implement the MEAs and don't know the linkage of international standards with locals. This sector also consumes more water and discharges pollution to water bodies without any treatment. This project will devise some practices which will make this sector resource efficient as well as develop linkage between international and local standards.

Methodology approach

We have engaged different groups of textile sectors from weaving to textile processing and did our analysis on the implementation of Multi-environmental agreements (MEAs) in the industrial sector. We also conducted surveys for the water consumption per process and wastewater production in the textile sector. On the basis of our observations, some practices (Smart Environmental Management Practices) were devised for those industrial sectors to adopt and become resource efficient with cost-benefit analysis. Some techniques of water replenishment were also suggested from the treated or recycled water to reduce the load on the water reserves

Analysis and results

Our analysis revealed that there is a gap of implementation of MEAs on ground because of unawareness among industries. There is a dire need of alignment of local standards with MEAs as a number of industries are complying local standards which also contribute to the MEAs but a clear linkage is needed. Pakistan has ratified many international agreements which links directly or indirectly to industrial compliance but industries are unable to understand.

The survey of industrial sector also showed that there are a series of recommendations for textile industry to adopt for becoming water efficient named Smart Environmental Management Practices (SEMPs). These SEMPs comprise of a wide range of techniques for water management with short term to long term solutions such as from floor washing, reuse of wastewater to technical solution within process like Mercerization process, dyeing bath etc. This analysis also showed the estimated cost of each intervention with benefits and payback period. The case study revealed that if an industry invests upto 100,000 Euros in different interventions, it could save more than 110,000 m^3 of water on annual basis with a reduction of 10-15% of pollution and a payback period of upto 10 months.

Conclusions and recommendation

The alignment of the local standards with the multi-environmental agreements will make it easy for the textile industry to understand and implement on ground. The adoption of SEMPs in textile industries will reduce the resources consumption in the processes as well as increase the production which will be leading towards the economic benefits and productivity of the country. The SEMPs practices are one of the solutions of the problem and could be used as guidelines for industries. By arranging training sessions, the compliance of environmental standards and SEMPs implementation could be made more clear to the industrial sector.