



T2.1 European Consolidated Report - measuring water footprint in textile industry

WP2: Measuring and managing Water Footprint in textile sectors

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1. Introduction

Textile and clothing industries have become increasingly aware that they contribute directly and indirectly to water scarcity and pollution, and this constitutes a risk that they have to respond to. The water footprint is a measure of the appropriation of freshwater for productive activities both in terms of the amount of water consumed (green and blue) or polluted (grey). The Water Footprint Assessment is a structured process which quantifies and maps the green, blue and grey water footprint, assesses its sustainability and uses this information to identify strategic actions to reduce the WF and improve its sustainability. A recent study of the European Commission's Joint Research Center (2018) claims that: 'Competition over limited water resources is one of the main concerns for the coming decades'. The need to generate and spread knowledge, to sensitise producers on the use of freshwater and the impact of their firm is therefore imminent. The textile industry is one of the oldest, longest and most complicated industrial chains in the world's manufacturing industries. The textile industry is also water intensive. Textiles production (including cotton farming) uses around 93 billion cubic metres of water annually, representing 4% of global freshwater withdrawal. For the textile industry, the annual water footprint was found to be 1.8 billion m³. This high amount of water footprint and water pollution may result in depletion of groundwater level and can lead to major health problems for the people, respectively.

1.1 Aim

The aim of this activity was to collect case studies from textile companies, regarding sustainable use of water and collected and summarized information of the case studies present in the consolidate European report. The initial goal was organisation of interviews / focus groups, involving at least 15 stakeholders from Lithuania, Spain, and Greece.

1.2 Methodological aspects

For the collection of case studies, desk research and survey of focus groups were organised by KTU, UPV, UNIWA, LATIA and IDEC, conducting national researches. Partners collected case studies from textiles sector industries, regarding measures and techniques followed by industries in order to reduce their water footprint with the objective to recognise the components of the measurement tool. In the Survey "Measuring water footprint in textile industry" participated 5 Lithuanian, 6 Spanish and 6 Greek industrial companies: in total 17 companies from the textile and finishing sector, 12 of which are SMEs and 5 are large.

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2. Analysis of case studies

In the survey “**Measuring water footprint in textile industry**” participated 17 industrial companies of textile, textile + finishing or only finishing: 5 Lithuanian, 6 Spanish and 6 Greek industrial companies.

The Survey results are presented below:

1. Company profile – profile of companies, participated in the survey, is very broad (weaving, knitting, spinning, nonwoven and finishing); such a broad profile helped to have full view of the situation in the textile sector:
 - Spinning + Finishing: **1 company (large)**
 - Knitting + Finishing + Clothing manufacturing: **3 companies (all large)**
 - Weaving + Finishing: **4 companies (3 SMEs and 1 large)**
 - Weaving + Finishing + Clothing manufacturing: **2 companies (1 SME and 1 large)**
 - Printing: **1 company (SME)**
 - Dyeing + Finishing: **2 companies (both SMEs)**
 - Only Finishing of textile materials: **1 company (SME)**
 - Industrial dyeing - **1 company (SME)**
 - Nonwoven from Textile Waste - **1 company (SME)**
 - Only spinning – **1 company (SME).**
2. Company size, according to the number of employees:
 - SMEs: **12 companies**
 - Large: **5 companies.**
3. Answers to the question “Do you know / measure your water consumption and if so, at what level?” were divided as follows:
 - Company level: **5 responses (2 SMEs and 3 large)**
 - Factory level: **7 responses (4 SMEs and 3 large)**
 - Product level: **3 responses (2 SMEs and 1 large)**
 - Production process level: **2 responses (2 SMEs).**
4. Which technological processes use water in your facilities (please specify):
 - Large companies: washing, dyeing, bleaching, softening of fabrics, washing and dyeing of products, extrusion, steam production, preparation of various finishes.**
 - SMEs: washing, dyeing, bleaching, sizing of yarns, stenter (heat-treating), exhaustion dyeing, digital printing, rotary printing, wet-finishing, pre-treatment of fabrics, reeling silk cocoons, conditioning units of the spinning mills and the steaming machines.**

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5. The summarized answers to the question “What are the most water consuming processes in your organization?” are as follows:

Large companies: “The largest amounts of water are needed for the production of fabrics, i.e., their washing, bleaching, dyeing”; Extrusion; Exhaust dyeing; In dyeing and washing processes.

SMEs: Yarns’ sizing and fabrics washing, dyeing and finishing; Finishing, dyeing, washing; Exhaustion dyeing; Discontinuous dyeing; The conditioning units of the spinning mills and the steaming machines; Fire protection.

6. Origin of water used in technological processes:

- Public water supply: **12 responses (8 SMEs and 4 large companies)**
- Other (please specify): **5 responses (underground water (own well), public supply of water and borehole, Kaunas industrial water, Tertiary, well) (4 SMEs and 1 large).**

7. Where does company’s effluent go?

- Effluent is treated on-site: **3 responses (2 SMEs and 1 large company)**
- Effluent is discharged directly to municipal/off-site wastewater treatment facility: **5 responses (3 SMEs and 2 large)**
- Effluent is not treated (discharged into the environment untreated): **2 responses (both SMEs)**
- Effluent is pre-treated on-site and then discharged to a municipal/off-site wastewater treatment facility for further treatment: **6 responses (4 SMEs and 2 large).**

8. Answers to the question “Do you reuse water at any stage of the production process?” distributed as follows:

- No: **10 responses (7 SMEs and 3 large companies)**
- Yes: **7 responses: (4 SMEs and 3 large).**

More specified answers are:

“Industrial devices are cooled using technical water with the help of heat exchangers. After use, we collect the warmed water and use it in the dyeing process”. (large)

“Treated hot water enters the heat regeneration system, where the heat from treated water is transferred to clean water. The temperature of the received industrial water can be about 8-9 °C, and we heat the water to 38-40 °C. (large)

“Use for washing”. (large)

“We reuse water in the conditioning units and the steaming machines (20%) and collect and reuse the rainwater, covering this way approx. 25% of our annual water needs”. (SME)

“The water used in the rotary stamping process is reused in the same process in subsequent stampings”. (SME)

“We have a cogeneration and use the hot/cold water for cooling or heating coils”. (SME)

“In the cooling phase of dyeing machines”. (SME)

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9. Representatives of the companies were asked: “How well do you feel acquainted with concept of water footprint measuring in your sector?” (where 1 – Almost unaware, 5 – expert level): **level 1 – 3 responses (all SMEs), level 2 – 3 responses (all SMEs), level 3 – 4 responses (2 SMEs and 2 large), level 4 – 5 responses (2 SMEs and 3 large), level 5 – 1 response (large).**
10. Answers to the question “Do you have any water-saving systems, policy, plans or target in your company?” are as follows:
- No: **2 responses (1 SME and 1 large)**
 - Yes: **15 responses (10 SMEs and 5 large):**
 - “Planning to install secondary use of hot water and primary wastewater treatment. We have a related project and are looking for partial support through EU funds”. (SME)
 - “Technological processes are consistently monitored; we try to shorten them while maintaining the same final results”. (large)
 - “We aim to achieve a water consumption of up to 80 l per kilogram of finished fabric”. (SME)
 - “Our goal is to shorten technological processes, which would save water and energy resources and speed up production”. (large)
 - Water tank (SME)
 - We measure and keep records of the volume of the water used with water meters (SME)
 - Environmental policy (large)
 - Using less water for more products together (SME)
 - There is, but it is managed by another department (SME)
 - Process optimisation (SME)
 - Water reduction in processes and machinery (SME)
 - Minimising water consumption to avoid energy and product consumption (SME).
11. What period of the year is your water intake/consumption highest?
- Fall+Winter: **1 response (large)**
 - Our intake / consumption is roughly equal throughout the year: **16 responses (11 SMEs and 5 large).**
12. Is your organization measuring water consumption (and/or footprint) in production processes?
- No **4 responses (3 SMEs and 1 large):**
 - If NO: What would motivate you to measure water consumption and/or footprint?
 - Pressure from customers: **1 response (1 SME)**
 - Tools not available: **1 response (1 SME)**
 - Lack of staff / staff knowledge about water footprint measuring: **1 response (1 SME)**
 - Water is not material to our business: **1 response (1 SME)**

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- Other (specify): **Very low consumption for production purposes – 1 response (1 large)**

What would motivate you to measure water consumption and/or footprint?

- Financial savings: **3 responses (2 ESMS and 1 large)**
- Greener company profile: **3 responses (2 SMEs and 1 Large)**
- Pressure from customers: **0**
- Risk management: **1 response (large)**
- Other (specify): **0**
- Yes: **8 responses (4 SMEs and 4 large)**:
If YES: • For which of these processes do you already measure water intensity, withdrawal, consumption, or other quantitative water-related information (please specify)?

“In the program, we have the opportunity to see the water consumption of the processes taking place in the dyeing facilities, in m³”. (large)

“All processes that require water are tracked - washing, bleaching, dyeing, secondary dyeing. The latter processes are carried out with relatively modern equipment, and these processes are fully tracked”. (large)

We measure the water consumption for the conditioning units and the steaming machines. (SME)

Dyeing (SME and large)

In all processes (SME)

Washing and exhaustion dyeing (SME)

Water consumption (SME)

Dyeing and finishing process (lt/Kg) (ISO14001, GOTS, STeP by Oeko-Tex), and factory water consumption (Air conditions, e.t.c) (large)

- “How do you obtain such quantitative water-related information?”
 - In-house expertise: **15 responses. (9 SMEs and 6 large).**

13. “Which contaminants are released into the local environment as a result of your workflow? Please be as detailed as possible (e.g. by providing residue concentrations in relation to production volumes, proxy rules, etc. per process step – please specify)?”

“Soaps, bleaches, softeners, textile dyes” (SME)

“In the company, we check the following pollutants and their concentrations: pH, BOD7, bichromatic oxidation, total phosphorus (P), total chromium (Cr), chromium (VI), copper (Cu), zinc (Zn)” (large)

“Wastewater is not discharged into the natural environment” (large)

“We are recycling textile waste” (SME)

“No contaminants” (large)

“Chemicals from dyeing and finishing procedures” (SME)

“There aren’t any contaminants released into the environment that are directly connected to the production process, only urban waste water” (SME)

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“NO contaminants released in the environment. In dyehouse the sludge from the wastewater treatment is stored in secured place and forward to certified companies”.
(large)

“Some chemicals from dyeing and finishing procedures”. (SME)

“Non-ionic type detergents. Between 13-5mg/L”. (SME)

“Solids in suspension, detergents, high ph, high conductivity”. (SME)

“All the normal ones in a dyeing process”. (SME)

“Sludge from the sewage treatment plant”. (SME).

14. “Does your organization require its suppliers to provide you with water-related information?”

No, we do not require our suppliers to provide water-related information: **13 responses (7 SMEs and 6 large)**

No, we do not require our suppliers to provide water-related information yet but we plan on doing so within the next 5 years: **3 responses (all SMEs)**

Yes, we require our suppliers to provide water-related information such as (please specify): Dissolved elements: 1 response (SME).

15. “Does your organization provide clients/buyers of final products with water-related information (as part of sustainability policy, as demanded by certification etc.)?”

Yes, we provide water-related information on our final products such as (please specify): **5 responses (3 SMEs and 2 large):**

“Rain water harvesting and reuse”. (SME)

“ISO14001, GOTS (Global Organic Textile Standard), STeP by Oeko-Tex certification”. (large)

“Water footprint per family”. (large)

“Product Water footprint” (SME)

“Ratio of litres/Kg of finished product” (SME).

No, we do not provide water-related information to our buyers: **10 responses (7 SMEs and 3 large)**

No, we do not provide water-related information to our buyers yet but we plan on doing so within the next 5 years: **2 responses (1 SME and 1 large)**

16. “Would your organization be interested in having access to a (free) calculation tool to estimate the water footprint of relevant processes?”

Yes, primarily to understand our own water dependencies and risks: **8 responses (5 SMEs and 3 large)**

Yes, primarily to understand the sustainability/impact of our workflow on water systems/the environment: **6 responses (4 SMEs and 2 large)**

No, because (please specify): **4 responses (3 SMEs and 1 large): “If we did not know the current amount of water used in the processes, we would not be able to operate. We are already doing this”.**

17. May we reach out to you in our development of such a tool?

No: **5 responses (4 SMEs and 1 large)**

Yes: **12 responses (7 SMEs and 5 large).**

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3. Overall conclusions of the report

In the survey “Measuring water footprint in textile industry” participated 17 industrial companies of textile, textile + finishing or only finishing: 5 Lithuanian, 6 Spanish and 6 Greek industrial companies; 5 from them are large industrial companies and 12 are small and medium size companies. Variety of companies’ profile fully covered the textile industry field, water consumption in which have high impact on the water footprint. All of them measure the water use and consumption but in different level. Only some of them responded having deep knowledge in water measurement tools, however, all companies are aware in water consumption and pollution measurement and want to get more knowledge in the field.

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