Impact Index

organicbasics.

Organic Basics' *Impact Index*

1. Introduction

We are on a journey to inspire large-scale action to drive a more sustainable future for fashion. Our ambition is to increase awareness of fashion's environmental impact and show businesses and individuals how it can be done better with more sustainable approaches. To do so, we will combine a data-driven and creative approach to measuring the impact of sustainability in fashion.

We want to show the true cost of fashion by tracking the environmental impact of our clothing in terms of water, energy, waste, CO_2 emissions and chemical footprint[1]. We took a product-lifecycle approach and conducted an assessment of the environmental impact of our garments compared to conventional garments. Comparisons are made based on our choices regarding materials, manufacturers and transportation for the selected materials and processes. We believe that data-driven findings will show the true cost of fashion.

As a result, our data team has developed a quantitative impact measurement tool, called the *Impact Index*, to calculate and report on the impact our products have on the environment. The first version of this index focuses on the water, energy, waste, CO_2 emissions and chemical footprint of each product.

Thus, our *Impact Index* is developed by weighing our approach against traditional industry practices. We then report on the savings we achieve with our choices. We rely on primary data from our own manufacturers whenever available. Otherwise, we cite secondary data in the form of academic life-cycle assessment studies and industry reports.

[1] Organic Cotton and TENCEL™ Lyocell collections only

2. Our Impact Assessment

2.1 Goals

Based on our overarching ambition to increase awareness about fashion's true cost, we defined the goals of our assessment as the following:

- Quantify our products' environmental impact.
- Weigh our product impacts against industry benchmarks.
- Provide key insights into the savings generated by using more sustainable materials.
- Highlight the environmental advantages of our choices regarding more sustainable materials, manufacturers and transportation.
- Identify gaps in data for the improvement of our *Impact Index* in the future.

Apart from informing our customers and aiming to serve as an inspiration for other brands and manufacturers, we also use our *Impact Index* as an internal decision-making tool. With this tool, we aim to drive further sustainable change at Organic Basics by:

- Setting evidence-based impact reduction goals regarding our water, electricity, waste, chemical footprint and CO_2 emissions.
- Analyzing decisions about our current materials, manufacturers and transportation methods.
- Increasing transparency of our supply chain.
- Developing guidelines for future decisions about supply chain partners.
- Deriving guidelines for the design, manufacturing and distribution of our products.
- Developing ambitious improvement initiatives with our supply chain partners.

2.2 Scope of Our Impact Assessment

The scope of our impact assessment has been defined by necessity due to a lack of data transparency, limited data availability and the complex nature of the fashion supply chain.

The scope includes:

- Clearly distinguishing between conventional or virgin and organic or recycled materials (e.g. conventional vs. organic cotton).
- Selecting five main impact measures: water, electricity, waste, CO_2-emissions and chemicals.[2]
- Grouping the fashion supply chain into three overarching life-cycle stages: raw material production, textile manufacturing and consumer use phase.
- Collecting industry benchmarks regarding the impact of conventional garments (e.g. scientific life-cycle assessment studies and industry reports).
- Collecting industry benchmarks regarding the impact of more sustainable garments (e.g. scientific life-cycle assessment studies and industry reports).
- Collecting primary data from our supply chain partners regarding the use of more sustainable materials, production processes and transportation methods.
- Merging industry benchmarks of more sustainable garments and primary data from our supply chain partners.
- Comparing the impacts of conventional garments against our own garments to calculate the savings cradle-to-gate i.e. from production to warehouse arrival, or cradle-to-grave i.e. from production to consumer use phase (for our SilverTech™ Active collection only).
- We will be reporting and visualizing on the savings, not on the individual product impacts.

We are aware that a lot of factors have not been included in our scope. For example, we do not consider the impact of a garment's end-of-life for most of our products, rather we only focus on the cradle-to-gate processes. We only consider the use phase for one product collection (SilverTech™ Active). Further, we do not consider the significant impact of micro-plastic during the use phase due to a lack of data. However, we encourage users to purchase and use a GUPPYFRIEND™ washing bag to mitigate that effect. Please check section 4.1 for an outline of all the assumptions we made for the development of our *Impact Index*.

[2] Organic Cotton and TENCEL™ Lyocell collections only

Resulting from the scope for this impact assessment, we have drawn system boundaries for what we report on (i.e. specific impact measures, materials and processes). Due to limited data availability and resources, we have decided to focus on specific impact measures. These measures include water, energy and chemicals (input), as well as emissions and waste (output). See figure 1 below for an illustration.

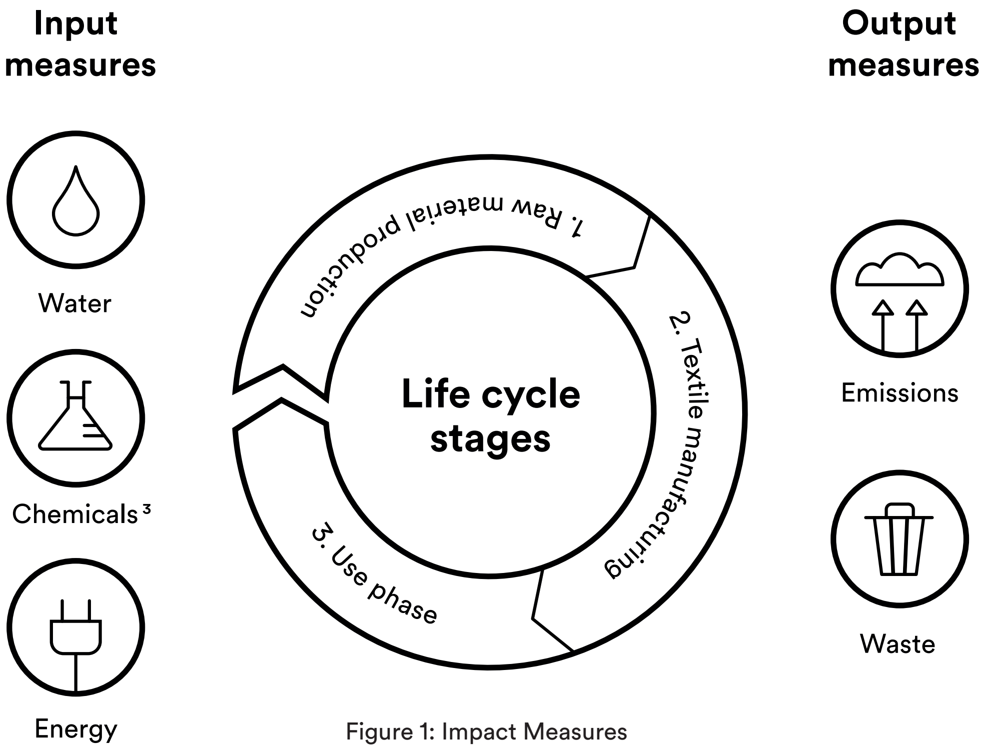

Figure 1: Impact Measures

Within this context, waste constitutes a particular challenge. First, there is an array of different forms of waste in different steps of the fashion supply chain (e.g. cotton fiber production, resin production, dyeing, cutting, etc.). Secondly, data about waste in the fashion supply chain is highly limited. Therefore, we only consider fabric waste from textile manufacturing processes (i.e. fabric scraps; not raw material production). For more information, please check our assumptions under section 4.1.

For the purpose of simplicity, we only analyze and report on materials that our products are made from and contrast them to comparable conventional or virgin materials. Please see table 1 below for an overview of the selected materials.

[3] Organic Cotton and TENCEL™ Lyocell collections only

Our materials		Traditional materials
Organic cotton	*vs.*	Conventional cotton
Recycled nylon	*vs.*	Virgin nylon
Recycled nylon with Polygiene® treatment	*vs.*	Virgin nylon without Polygiene® treatment
TENCEL™ Lyocell	*vs.*	Conventional cotton

Table 1: Selected Materials

In order to work through complex data, we focus on specific life-cycle stages. For the purpose of our assessment, we grouped them into three stages:

1. **Raw material production**. This covers the production of fiber in the case of cotton and TENCEL™ Lyocell and the production of resin in the case of nylon.
2. **Textile manufacturing**. This includes the fabric production, dyeing, product manufacturing, packaging and transportation to our warehouse in Copenhagen, Denmark.
3. **Use phase**. This considers garment care (i.e. washing) by end-users.[4]

We are aware that each of these three life-cycle stages include various steps, which we have acknowledged in our calculations. For the purpose of our assessment, we only report on total savings and not on the individual product impacts. See figure 2 below for an overview of the selected processes we focussed on.

Raw Material Production → **Fabric Manufacturing** →

→ **Dyeing** → **Textile Manufacturing** → **Packaging** →

→ **Transportation** → **Consumer Use Phase**

Figure 2: Selected Processes

[4] SilverTech™ Active products only

3. Methodological Considerations

As already outlined above, we needed to make a series of assumptions for the development of our *Impact Index*. The main reasons are limited data availability, a lack of transparency in the fashion supply chain and internal resource constraints. Because we are committed to being as transparent as possible, we want to share with you a list of the assumptions and resulting limitations regarding the development of our *Impact Index*. This is our first step towards impact measurement and we aim to continuously improve our tool.

3.1 Assumptions

General

- To be able to calculate the impacts across different materials and life-cycle stages, we normalized the collected data to 1 kg of fabric.
- We exclusively consider the impacts on the textile level and disregard impacts from other operations such as packaging.
- We assume that conventional manufacturing hubs are located outside of Europe. Based on this, we assume that 80% of goods are transported via ships and 20% via air.
- Use phase data is only considered for SilverTech™ Active products. Based on our own survey data, consumers wash SilverTech™ Active products half as often as conventional garments. Conventional garments are washed 72 times during their useful lifetime.[5]

Manufacturing Processes

- The same amount of water is used in the dyeing process for each color.
- On average, 18% of 1kg of fabric is wasted regardless of the material type (whether it is cotton, nylon, etc.). Our suppliers recycle their fabric scraps, either due to domestic standards, or internal waste management protocols. We have assumed that fabric scraps are not typically downcycled within the fashion industry.
- Regardless of the material type, dyeing makes up 22.58% of the total water consumption during textile manufacturing.[6]
- Trims such as bra closures, adjusters and loops were found to be negligible and are thus disregarded in our calculations.

[5] Based on a report from Cotton Incorporated (2012)

[6] Sipperly et al. (n.a.); Steinberger, et al. (2009)

Cotton

- Conventional cotton impact data is based on industry benchmarks from industry reports and life-cycle assessments.[7]
- Organic cotton impact data is based on data from our own suppliers and life-cycle assessments.[8]
- Fabrics made from conventional cotton have the same weight as fabrics made from organic cotton.
- Up to 3 kg of chemicals are used for the production of 1kg of conventional cotton garments.[9] Because our cotton is organic, we do not use any toxic chemicals as specified by the Global Organic Textile Standard (GOTS).[10]
- For our own calculations, we only consider blue water consumption. This refers to the amount of freshwater (i.e. water taken from sources such as lakes and rivers) that is used and then consumed as a result of the production of our garments.[11]
- When researching, we found that organic cotton used significantly less water, particularly during the raw material production phase. That is because the life-cycle assessments that we considered investigate different regions and irrigation requirements for cotton cultivation. In the life-cycle assessment of organic cotton, relatively little water irrigation in addition to rainfall is needed to cultivate. In the life-cycle assessment of conventional cotton, relatively high water irrigation is needed to cultivate conventional cotton and rainfall has been excluded from the data.[12] Instead, we decided to conduct a fairer assessment - so we now assume that organic cotton and conventional cotton use the exact same amount of water if they were to be grown in the same area.

Nylon

- Virgin nylon impact data is based on industry benchmarks from industry reports and life-cycle assessments.[13]
- Recycled nylon impact data is based on data from our own suppliers and their life-cycle assessments.
- Fabrics made from virgin nylon have the same weight as fabrics made from recycled nylon.

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7 Cotton Incorporated (2012)
8 Textile Exchange (2014)
9 Ellen MacArthur Foundation (2017)
10 See GOTS: https://www.global-standard.org
11 Textile Exchange (2014) & https://waterfootprint.org/en/water-footprint/glossary/#BW
12 Cotton Incorporated (2012)
13 Fulgar (2016)

Polygiene® treatment

- We have found the environmental impact of the production of the Polygiene® treatment to be negligible.
- Polygiene® is produced from recycled silver and only a very small amount of silver is needed for an effective treatment. For example, 1 m^2 of fabric contains 0.009g of silver.[14]
- Because the treatment is added to the dye water, no additional notable water or energy consumption is required.

TENCEL™ Lyocell

- We compare TENCEL™ Lyocell to conventional cotton.
- Conventional cotton impact data is based on industry benchmarks from industry reports and life-cycle assessments.
- TENCEL™ impact data is based on data from our own suppliers and their life-cycle assessments.[15]
- Fabrics made from TENCEL™ Lyocell have the same weight as fabrics made from cotton.

4.2 Limitations

We realize that our *Impact Index* has a lot of limitations arising from limited data availability and the complexity of fashion's supply chain. A major weakness is that we had to compare different publicly available reports and life-cycle assessments to each other. These competing studies differ in numerous ways.

Firstly, there is not the same amount of information available for different raw materials. For example, there is more information on cotton than on nylon. Secondly, the granularity in data is different. Some studies report on the entire lifecycle of a product from cradle-to-grave, while others report on different segments of the lifecycle of a product (e.g. from cradle-to-gate). Thirdly, there are significant differences in results even for the same raw materials. This is because every study has a different scope, methodology and underpinning assumptions. Next, some studies are very old. Thus, the assumed manufacturing processes may be out of date. Lastly, these studies have different geographic focuses. There may be substantial disparities in different countries when it comes to electricity sources, water usage, wastewater treatment, and other factors.

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[14] http://www.fulgar.com/eng/tabloid/lca-life-cycle-assessment

[15] Shen & Patel (2010)

In order to make the data comparable, we had to normalize it to 1kg of fabric. With the existing data, we tried our best to avoid comparing 'apples to oranges' and to select studies that focus on cradle-to-gate processes. But sometimes this was just not possible. To counteract the difficulties of comparing different studies, we only selected the most conservative estimates for our calculations.

Finally, we have excluded wool data for now, since we lack reliable industry benchmarks for recycled wool. However, preliminary investigations show significant water and energy savings from using a dry, mechanical recycling process.

5. *Impact Index*

In this section, we will show how the exclusive use of more sustainable materials like organic cotton and TENCEL™ Lyocell drive a lower product impact.

5.1 Impact of Sustainable Materials

Organic Cotton

In general, organic cotton has a lower impact on the environment when compared to conventional cotton since organic cotton promotes biodiversity, reduces CO_2 emissions and in particular avoids the use of toxic chemicals. At the same time, growing organic cotton also benefits farming communities by improving their health and safety.[16] It is estimated that in 2015 alone, farmers potentially realized savings of 92.5 million kg of CO_2 emissions and 288.7 million kilowatts of energy.[17]

Our calculations show that we save approx 11% in energy, and 24% in emissions by using organic cotton and partnering with GOTS-certified manufacturers. Here, however, we would like to highlight the savings in toxic chemicals we achieve. By using organic cotton, we ensure that no toxic chemicals and GMO seeds are used. Further, the use of pesticides is absolutely prohibited.[18] For every kg of organic cotton garments, we save approx 3 kg in toxic chemicals from entering the environment.[19]

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16 Cotton Connect (n.a.)

17 About Organic Cotton (2019): http://aboutorganiccotton.org/environmental-benefits

18 About Organic Cotton (2019): http://aboutorganiccotton.org/environmental-benefits

19 Ellen MacArthur Foundation (2017)

Impact category	Conventional cotton	Organic cotton	Scale/ Impact	Unit	% savings
Water	2,169.00	2167,42	**-1.58**	liters / kg	– 0,1%
Energy	127.00	112.58	**-14.42**	MJ / kg	– 11.4%
Emissions	13.28	10.05	**-3.23**	kg CO_2 / kg	– 24.3%
Chemicals*	3,000.00	0.00	**-3,000.00**	g / kg	-100.0%
Waste	180.00	0.00	**-180.00**	g / kg	-100.0%

* toxic chemicals

Table 2: Organic cotton production impact

Recycled Nylon

Compared to garments made from virgin nylon, our products have a much lower environmental impact. The majority of savings accrue to the difference during the raw material production. As opposed to virgin nylon, recycled nylon does not require the use of petroleum. Instead, our supplier exclusively uses waste materials from their own production facilities and mechanically recycles them. This in turn also reduces waste output. Our calculations show that we save approx 85% in water, 50% in energy, and 73% in emissions by using recycled nylon and partnering with more sustainable manufacturers. Here, we would like to highlight the substantial water savings and emissions savings during the raw material production stage. Making yarn from recycled materials reduced CO_2 emissions by 80% and reduces water consumption by 90% during the raw material production.[20]

Impact category	Virgin nylon	Recycled nylon	Scale/ Impact	Unit	% savings
Water	769.00	121.10	**-647.90**	liters / kg	– 84.3%
Energy	305.50	151.43	**-154.07**	MJ / kg	-50,4%
Emissions	51.42	13.80	**-37.62**	kg CO_2 / kg	-73,2%
Waste	180.00	0.00	**-180.00**	g / kg	-100.0%

Table 3: Recycled nylon impact

[20] http://www.fulgar.com/eng/insights/recycled-nylon-q-nova-by-fulgar

Recycled Nylon with Polygiene® Treatment

On top of saving approx 85% in water, 50% in energy, and 73% in emissions by using recycled nylon and partnering with more sustainable manufacturers, the Polygiene® treatment enables additional substantial water savings in the use phase. This is because the treatment decreases washing requirements in the consumer phase. According to data from our own survey, we estimate that our SilverTech™ Active products are washed 36 times during their useful life. Thus, they are washed half as often as traditional garments.[21] This results in water savings of approx 50%, or approx 500 liters of water per kg of fabric, over the useful life of the product compared to traditional garments.

Impact category	Virgin nylon	Recycled nylon w/ Polygiene® treatment	Scale/ Impact	Unit	% savings
Water	769.00	121.10	**-647.90**	liters / kg	– 84.3%
Energy	305.50	151.43	**-154.07**	MJ / kg	-50,4%
Emissions	51.42	13.80	**-37.62**	kg CO_2 / kg	-73,2%
Waste	180.00	0.00	**-180.00**	g / kg	-100.0%

Table 4: Recycled Nylon with Polygiene® Treatment impact

Impact category	Virgin nylon	Recycled nylon w/ Polygiene® treatment	Scale/ Impact	Unit	% savings
Water	997.00	498.50	**-498.50**	liters / kg	-50.0%
Energy	1,000.00	500.00	**-500.00**	MJ / kg	-50.0%
Emissions	29.50	14.75	**-14.75**	kg CO_2 / kg	-50.0%

Table 5: Recycled Nylon with Polygiene® Treatment use phase impact

[21] Compared to data from Cotton Incorporated (2012)

TENCEL™ Lyocell

Compared to garments made from conventional cotton, our TENCEL™ Lyocell products have a much lower environmental impact. Our calculations show that we save approx 86% in water, 35% in energy, and 33% in emissions by using TENCEL™ Lyocell and partnering with more sustainable manufacturers. Thus, for every kilogram of TENCEL™ Lyocell garments, we save approx 1853 liters of water. Further, for every kilogram of TENCEL™ Lyocell garments, we save approx 3 kg in toxic chemicals from entering the environment.

Impact category	Conventional cotton	TENCEL™ Lyocell	Scale/ Impact	Unit	% savings
Water	2,169.00	315.25	**-1,853.75**	liters / kg	-85,5%
Energy	127.00	171.36	**44.36**	MJ / kg	34.9%
Emissions	13.28	8.92	**-4.36**	kg CO_2 / kg	-32.8%
Chemicals*	3,000.00	0.00	**-3,000.00**	g / kg	-100.0%
Waste	180.00	0.00	**-180.00**	g / kg	-100.0%

* toxic chemicals

Table 6: TENCEL™ Lyocell impact

6. Further Development of Organic Basics' *Impact Index*

We are aware that there is an abundance of opportunities to improve our *Impact Index*. As we launch this, we are still developing and improving it. We see improvement opportunities by increasing our scope and investigating our assumptions. Such improvements would include:

- Waste: Including different forms of waste across the entire supply chain (e.g. waste from dyeing processes).
- Additional impact measures: Consistently incorporating additional impact measures (e.g. chemicals for all materials).
- Entire supply chain: Including all supply chain steps such as the transportation between different life-cycle stages (e.g. transportation from raw material manufacturer to yarn/fabric manufacturer).

List of References

The referenced research below comes from secondary research and mainly informed the calculation of industry benchmarks. The presented order is according to fibers.

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