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Changing consumer behaviour towards increased prevention of textile waste

Background report

Rasmus Nielsen and Anders Schmidt (FORCE Technology)

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Content

Introduction

This background report is part of the initiative "Changing consumer behaviour towards increased prevention of textile waste". The aim of the initiative is to communicate to consumers how to prevent textile waste. In this project, textiles cover both clothes/apparel and household textiles like curtains, bedding and towels. Shoes, fur, leatherware and carpets are not included.
Waste is defined as all items which people do not need any longer and which they either intend to get rid of or have already discarded.
According to the EU Waste Directive, "prevention" means measures taken before a substance, material or product has become waste. Waste prevention is the highest priority in the waste hierarchy according to the directive. Waste prevention is defined as initiatives that reduce: (a) the quantity of waste, including through re-use of products or the extension of the life span of products; (b) the adverse impacts of the generated waste on the environment and human health; or (c) the content of harmful substances in materials and products.

Environmental assessment of textiles

Different textile fabrics have different environmental impacts but a general ranking of textile fabrics in relation to the size of environmental impact is very difficult. Many attempts have been made by for instance DEFRA[1], Sustainable Apparel Coalition[2] and Mady-By[3]. There are two main obstacles for doing a general comparison (ranking) between different environmental impacts of textiles; first, the issue of comparing and weighting the importance of different impact categories against each other (e.g. the importance of water use compared to human toxicity) and the second issue is not being able to define an objective functional unit for the textiles. Different designs have different functions and features and thereby fulfil different purposes. Life cycle assessment of different types of textile shows a complex picture where one fibre is a bad environmental choice in one case and the best in another.

There will be significant differences in the environmental burden of the textile life cycle in the four Nordic countries as a result of the high share of renewable energy used in electricity production in Norway and Sweden. This will complicate the following conclusions, calculation and comparisons because the result may differ a lot between the different Nordic countries. For example is electricity consumption for washing and drying of little importance in Norway and Sweden compared to the production of the textile, but this is not the case in Denmark and Finland where the electricity production is largely based on coal and nuclear energy, respectively. The following table shows the CO_2 equivalents (CO_2-eq) emission associated with production of one kWh in the different countries. The data for Denmark are calculated in the LCA software GaBi 6 on the basis of the Danish energy mix from 2012 (Energinet.dk). The data for the three other countries come from country specific datasets from the GaBi 6 database. All data include upstream emission from producing fuels used in electricity production.

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[1] See: www2.wrap.org.uk/downloads/Emerging_fibres_-_summary.de80a4b2.10840.pdf
[2] See: www.apparelcoalition.org/
[3] See: www.made-by.org/benchmarks/environmental

Table 1: CO_2 emmissions from different electricity productions

	Kg CO_2-eq per kWh
Denmark	0.384
Finland	0.357
Sweden	0.073
Norway	0.043

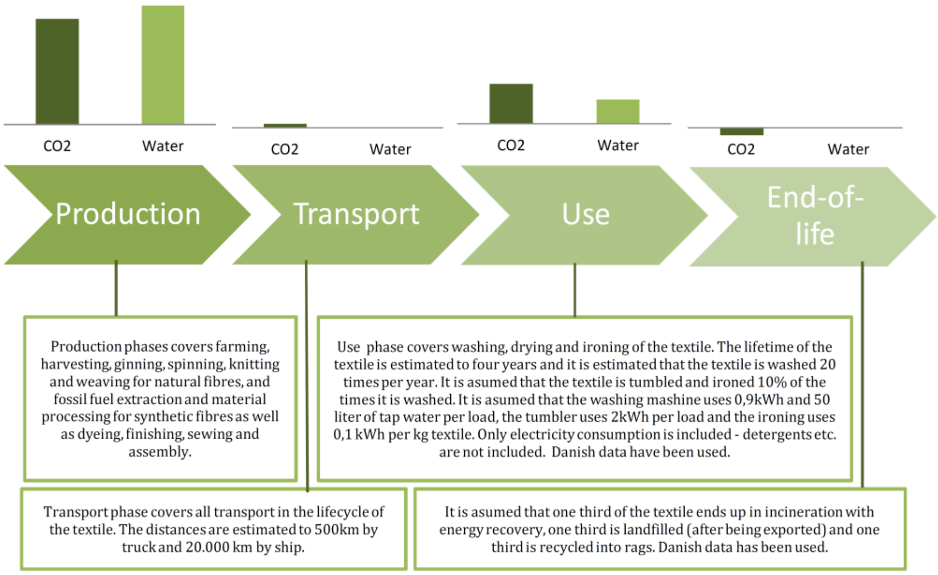
Life cycle of average textile

Figure 1 shows a simplified picture of the life cycle of an average textile[4] in an average Nordic scenario, focusing on climate change (measured in CO_2 equivalents) and water consumption. The two categories are important issues on today's environmental agenda, and at least environmentally conscious consumers will therefore be able to relate to them. Consumption of energy follows closely the pattern seen for CO_2 emissions and it is not shown in the figure.

Other environmental impacts may of course be of equal concern and importance, e.g. toxicity from the extensive use of chemicals in especially the production and use stages. The databases and calculation methods are, however, judged to be of insufficient quality to create a consistent overview of such impacts. The diversity of chemicals used in textiles is described in qualitative terms in the section on "Textiles and chemistry", indicating that some textiles may have a very high impact on human health and ecosystems whereas the impacts of others can be considered to be modest.

[4] The average textile is defined in the next section.

Figure 1. Visualisation of the life cycle of textiles and the related environmental impact



The environmental impact in the use phase depends largely upon the fuel mix of the electricity production. In the above example, the Danish CO_2-eq data are used for electricity. The following table shows the results for all four Nordic countries. The following calculation is based on a t-shirt consisting of 0.3kg of average textile product and the assumptions are the same as described in the life cycle figure above. There have not been accounted for differences in end-of-life phase[5] between the different countries as a consequence of substitution of different electricity fuel mixes in relation to incineration. A Danish electricity mix and natural gas for heating have been substituted accordingly to the fraction of textiles that goes to incineration.

[5] The end-of-life phase is when the product becomes waste and is landfilled, incinerated or recycled. If the product is reused this is part of the use phase.

Table 2: Environmental impact of a t-shirt in different phases of the life cycle

Impact	Production	Transport	Use[6]	End-of-life
CO_2-eq in kg	6.3	0.089	DK: 1.97 FI: 1.83 SE: 0.37 NO: 0.21	-0.14
Water in litre	1,358	0.12	215	-0.71

In the above calculation between 3% and 24% of the total CO_2-eq emissions lies in the use phase of the textile. Other studies estimate that a larger part of the total impact occurs in the use phase. Some studies suggest up to 80% of the impact lies in the use phase[7]. Concurrently with more energy efficient consumer washing machines and a lower impact from production of electricity, the share of environmental impacts in the use phase gets relatively lower. Also the fact that clothes of today have a shorter lifetime alters the size of the impact during the use phase of the textile. The lifetime of textiles varies a lot but in the above calculation it is estimated on the basis of the European IMPRO project[8] (Baton et al. 2011). The latter estimates that the lifetime of typical clothes is between 1 and 3 years and 10 years for curtains and other household textiles.
In most cases, textiles have the largest part of the total environmental impact in the production. The impact during the use phase varies a lot in relation to the lifetime of the textile and the frequency and method of cleaning.

Average textile production

The following table presents an overview of the most common fibres. The distribution of the total consumption between different textile fibres is on a British average but it is assumed to be relatively similar to a Nordic consumption. The CO_2-eq emissions are based on data from a comprehensive study done by WRAP (WRAP, 2012) with the exception of the data for cotton where more accurate data were found in a report from PE International (Jewell et al., 2011). The water consumption in

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[6] It has been assumed that the t-shirt has a life time of 4 years and is used 20 times per year. The washing mashines uses 0,9kWh per 5,5 kg load. The t-shirt is assumed to be tumbled dry and ioned every 10 time it is washed. Tmbling uses 2kWh per 5 kg load and ioning uses 0,1kWh per kg of textile. The assumptions on electricity use in use phase are made partly based on Beton et al. (2011).

[7] See: www.bsr.org/reports/BSR_Apparel_Supply_Chain_Carbon_Report.pdf

[8] See: http://susproc.jrc.ec.europa.eu/textiles/docs/120423%20IMPRO%20Textiles_Publication%20draft%20v1.pdf

relation to the productions of cotton and wool has been corrected so that the allocation between cotton seed and fibre, and wool and meat, is based on economical values instead of weight. The water consumption calculations include both green and blue water but not grey water[9] which is the recommended approach by Joint Research Centre under the European Commission[10].

Table 3: Environmental impact from production of most common textiles

Textile	Part of total consumption[11]	kg CO_2eq pr. kg	Litre water pr. kg
Cotton	43%	13.9	5,597
Polyester	16%	16.9	78
Wool	9%	44.4[9]	16,379
Acrylic	9%	35.4[9]	128
Viscose	9%	26.4[9]	3,829
Polyamide (e.g. nylon)	8%	20.2[9]	78

Based on the table above, the amount of CO_2-eq and water use for the production of the average textile can be calculated to:

- **21kg CO_2-eq per kg of textile**
- **4,527 litre of water per kg textile**

In the following calculations, this *average textile* will be used.

Waste footprint

There is no standardised method for the calculation of the waste footprint of a product. As part of the comprehensive study done by WRAP (WRAP 2012), a waste footprint for textiles used in the UK was conducted. Below, the table shows the waste footprint of synthetic and natural textiles in the UK. The waste footprint can be assumed to be similar in the Nordic countries.

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9 Blue water refers to the volume of surface water (rivers, lakes etc.) and ground water consumed during production processes (i.e. evaporated or incorporated into the product – that does not return to the catchment from which it was withdrawn). Green water refers to the volume of rainwater consumed. Grey water to the volume of freshwater that is required to assimilate the load of pollutants

10 See: www.lct.jrc.ec.europa.eu/

11 Based on British consumption (WRAP, 2012)

Table 4: Waste footprint of textiles

Fibre type	Total waste footprint in kg/kg textile
Natural fibre (Cotton, Wool, Silk, Flax, Viscose)	1.60
Synthetic fibre (Polyester, Acrylic, Polyamide, Polyurethane/polypropylene)	1.43

The footprint includes the waste from the textile product when it reaches the end-of-life which brings the “extra” waste of producing one kilogram of textile down to 0.60 kg and 0.43kg of waste for natural and synthetic fibres respectively.

Different waste scenarios

In relation to waste prevention, it is relevant to discuss the options which a consumer faces when he/she is to get rid of textiles. Below is a table where different end of life scenarios are calculated in relation to CO_2-eq and energy consumption.

Table 5: Waste and reuse scenaries

Scenarios	kg CO_2eq pr. kg	MJ Energy pr. kg (Renewable/fossil)	Notes
Reuse [12]	-21	-38/-112	Assumed a replacement factor of 100%.
Directly recycling of fabric [13]	-21	-38/-112	Assumed no downcycling of textile and niglectable environmental impact from recycling proces
Recycling as fleece (only polyester)	-1.8	0,6/-57	Repolymerization into new polyester.
Recycling as rag (only cotton)	-1.3	-19/-24	Assumed to replace a paper cloth.
Incineration with energy recovery	-1.0	-2.5/-20	Danish incineration with energy recovery.
Disposal	1.7	0.05/1.1	Average European disposal without energy recovery.

The best option from an environmental perspective is definitely different forms of reuse (or directly recycling of fabric). A piece of textile that is reused replaces the production of virgin fibre to produce new textiles.

[12] Reuse is not a waste scenarie but a waste prevention activity. Reuse is included in order to achieve a comparable basis.
[13] E.g. redesign of clothes by sewing new designs from old clothes or making worn out jeans into handbags.

The reuse of textile in the table above is assumed to replace 100% new fibres. The reused textile may not actually replace a virgin-based textile 100% but will typically have a lower replacement factor. A British study (WRAP 2012b) based on a questionnaire with 3,100 people (from England, Scotland and Wales) estimates the replacement factor for textiles (clothes) to 29%. This indicates that one kg of textile being reused replaces 0.29 kg of virgin textile. A smaller Danish study (Farrent 2008) estimates the replacement factor to 62 % for Denmark and Sweden.

Recycling of textiles is also common and especially productions of rags and wipers for industrial use and sound insulation for car industry are wide-spread application areas for textiles. But the environmental benefits from recycling into (low quality) products like insulation and rags are very low. Recycling into new garment/textiles is only conducted for a few textile types. An example of this is the Japanese company Teijin[14] which takes back its own polyester for a closed loop recycling. Another example is the wool recycling in the Prato area in Italy or the shoddy industry in Panipat in India. As for most other materials, prevention of waste through reuse of textiles is better than recycling. Closed loop recycling is also very advantageous, but is only implemented to a very limited extent in today's textile production.

There is a great environmental benefit from reuse compared to recycling, landfilling or incineration. It is, however, difficult to quantify this benefit because it is difficult to determine how much "*environmental value"* is contained in a textile that is reused instead of being treated as waste.

[14] See: www.teijin.com/solutions/ecocircle/

Consumption of textile

The following table outlines the consumption of textiles and the related CO_2-eq emissions as well as water use in relation to production. Only the environmental impacts from the production are included because of the large uncertainties in relation to the use phase. The textile consumption is based on a study carried out for The Nordic Council in 2012 (Tojo et al. 2012). The study did not include Norway and in order to use consistent data, the Norwegian textile consumption is estimated as an average of the other three Nordic countries. In the table the annual consumption is calculated for a person and for one single t-shirt.

Table 6: Consumption of textiles in the four Nordic countries and related environmental impacts [15]

	Country	Consumption of textiles		CO_2eq consumption in production		Litre water consumption in production	
One person per year	Denmark	16.0	kg	338	kg	72,437	kg
	Finland	13.1	kg	277	kg	59,308	kg
	Sweden	14.2	kg	300	kg	64,288	kg
	Norway	14.4	kg	304	kg	65,193	kg
One t-shirt	-	0.3	kg	6.3	kg	1,358	kg

[15] Only the environmental impacts from the production of the textiles are included.

Textiles and chemistry

Chemicals are used in all types of textiles

Textiles and chemicals are inseparable parameters in today's clothing. Large amounts of a wide range of chemicals have been applied to all garments at one or more stages on their way to the consumer, irrespective of the textile fibre type, the processes used and the colour of the garment.

It must, however, also be recognized that there are large differences between the garments that we buy with respect to which chemicals that have been used – and how much of each chemical that is used. There are also large differences with respect to the amount of chemical remaining in the product when it leaves the factory, and the main problem for the conscious consumer is that it is very difficult to distinguish "bad" textiles from those that are "not-so bad". If a garment is labelled with a recognized eco-label like the Nordic Swan or the EU Flower, the consumer can be assured that the garment is made with considerations of health and environment. On the other hand, if the textile has a chemical odour the consumer should be aware that the smell comes from one or more chemicals and therefore, as a minimum, the garment should be washed until it does not smell anymore and can be worn safely.
Here comes the next pitfall for the consumer: If detergents with perfumes are used for the wash, the smell of this can easily drown the smell of the unwanted chemical, and the consumer may therefore be exposed to several chemicals at the same time. Therefore, a good idea is to wash your new clothes at least once before wearing them, especially if they have an undefined chemical odour and to avoid perfumed detergents.

The amount of chemicals used is high

The typical textile cannot be defined. There are dozens of fibre types, with cotton, polyester, nylon, acrylic and wool being dominant today, but with functional fibres like Gore-Tex and Kevlar emerging on the market for specialized applications. Each textile has its own colour scheme, with very different requirements to pre-treatment, choice of pigment and finishing processes and it is not possible to point at any given combination as being the best choice from a health and environmental point of view. The sheer amount of chemicals being used in the life cycle of textiles should, however, be a good argument for reducing the amount of textiles used for clothing, decoration, etc. A Swedish study (Olssen et al. 2009) calculated the amount of chemicals used for different garments:

Table 7: The amount of chemicals used in the lifecycle for different garments.

Type of garment	Fiber type	Amount of chemicals in kg per kg garment	Amount of chemicals in kg per garment
T-shirt	Cotton	3.04	0.76
Jeans	Cotton	2.40	1.92
Work wear (trousers)	Cotton/polyester	1.96	1.49
Sweater	Viscose	5.51	1.10
Sweater (fleece)	Polyester	2.76	0.83

Poulsen, Nielsen and Schmidt (2011) used the Swedish study to calculate the amount of chemicals used for a t-shirt in the "best case with an environmental label", "worst case with an environmental label", and "worst case without an environmental label". The study assumes that the clothes are washed 50 times.

Table 8: The amount of chemicals used in the life cycle of t-shirts with different qualitative properties. (Slighly modified from Poulsen, Nielsen and Schmidt (2011))

Chemical/group of chemicals	Best case Environmental label	Worst case Environmental label	Worst case No environmental label
	Gram/T-shirt	Gram/T-shirt	Gram/T-shirt
Artificial fertiliser	0	136[1]	151
Pesticides	0	0	5
Sodium chloride	80	195	195
Sodium silicate	42	85	85
Urea (Used in dyeing)	240	300	300
Sodium hydroxide (Pretreatment and dyeing)	40	90	90
Mineral oil (spinning)	17	27	27
Dyes and pigments	4	5	5
Hydrogen peroxide (bleaching)	1.5	5	5
Miscellaneous	2	13	14
Tensides in detergents (primarily in the use stage)	80	138	138
Nonylphenolethoxylates (NPEO)	0	33	33
Total	506,5	1027	1,048

[1]. Assuming that 90% of the cotton is conventionally grown with use of artificial fertilizer

It appears from the table above that a t-shirt made and used without environmental considerations requires twice the amount of chemicals used in the life cycle of a "best-case" t-shirt. Not all of the chemicals are harmful. Sodium chloride can thus in general be used without problems for health or environment, but pesticides, dyes, pigments, mineral oil and NPEOs often have properties that make them unwanted in nature or as a source of exposure to humans.

Many of the chemicals used are dangerous for health or environment

For many years, the health and environmental properties of the chemicals used for textiles have been of little concern to most producers. Today, companies are becoming more and more conscious about what they produce and market, but there is still a lack of knowledge about what has happened to the textile upstream in the supply chain. The fibres go through a number of manufacturing steps and each of these may very well take place in a new factory, perhaps in a different country. Information about each production step is in general not communicated downstream, and the result is that both the textile retailer and the consumer have little or no knowledge about the amount and nature of the chemicals used during the production or how much is left in the textile to be sold. The exception from this is textiles with an environmental label specifying what can be used and what not – with the certification system requiring documentation that the provisions are met.

Poulsen, Schmidt and Dammand (2011) summarise which chemicals of concern that have been identified in textiles in the recent years:

- Antibacterial agents (Triclosan, nano-silver)
- Anti-mould agents (DMF)
- Dyes (azo dyes, other dyes, optical brighteners)
- Phthalates
- Brominated flame retardants
- Various metals (As, Sb, Pb, Cd, Cr, Co, Cu, Ni, V, Zn, Ag)
- Impregnation agents (per- or polyfluor compounds, silicone compounds)
- Organostannic compounds
- Various other organic compounds (such as formaldehyde, nonylphenol/nonylphenolethoxylates (NP/NPE), aliphatic hydrocarbons etc.)

The chemicals have been identified in tests made on textiles marketed in Denmark, Norway, Sweden and Germany, covering a broad range of products. Not all chemicals were present in all products, but the combined amount of information from tests shows clearly that the problems with chemicals are not related to a few "bad" products, but is of a much more general nature.

A more recent and similar study made by the Swedish Chemicals Agency (Nylander et al., 2013) identified a non-exhaustive list of around 1,900 chemical substances that are known to be used in textile production. This list indicates that there are a very large number of chemicals used in textile production today. The study only includes the production of the textiles (including raw material production). Of the around 1,900 substances used in the production phase, 165 chemical substances have the EU-classification as a hazardous subtance (including causing allergy). A breakdown of the list results in substances in different harmonised classification categories and substances on the REACH Candidate List as follows:

- Carcinogenic substances: approximately 59 substances.
- Mutagenic substances: approximately 9 substances.
- Substances toxic to reproduction: approximately 39 substances.
- Allergenic substances: approximately 14 substances with respiratory sensitisation.
- Properties and approximately 56 substances with skin sensitisation properties.
- Substances with environmentally hazardous, long-term effects: approximately 57 substances.
- Substances without the harmonised classifications but which can be found on the REACH Candidate List: 24 substances.

The full list of the 1,900 substances can be found in the report (Nylander et al., 2013).
Seen in the perspective of the above information, it definitely appears to be a good idea to reduce the consumption of textiles. The two main advantages will be that the environment will not be exposed to the many chemicals being emitted in the production of new textiles and the consumer will not be exposed to the chemicals that almost inevitably will be present in new garments and other textile products. Secondary to this are the advantages that less water and energy are used and transportation will be avoided. Many of the above mentioned substanses are not allowed or are regulated in textiles granted the Nordic Swan ecolabel.

Prioritising campaign target area

In the comprehensive reports Valuing Our Clothes from WRAP from 2012[16], different scenarios for savings are quantified both in relation to water footprint, waste footprint, carbon footprint and economical impact. In relation to the carbon footprint, the three most influential initiatives to reduce the footprints are first design for durability, second eco-efficiency across the supply chain and the third initiative is to clean cloth less. The eco-efficiency initiative is as a rule outside the influence of consumers. However, by demanding ecolabeling (e.g. the Nordic Swan) the consumer has somewhat influence on eco-efficiency because ecolabels set up criteria in relation to eco-efficiency. The design for durability initiative can be achieved by a consumer demand for durable clothing and changes in consumer behaviours away from fast and disposable fashion. In relation to the impacts from the use phase, other studies (Laursen et al. 1997, Jewell 2011, Beton et al. 2011) show that up to half and in some occasions the majority of the environmental impacts occur in the use phase of the textiles. Textiles are washed often and often dried and ironed using electricity. The most influential initiative with the largest environmental impact potential is reducing the consumption of new textiles. This can be done by buying timeless textile and by lifetime expanding initiatives as repairing but also by substituting consumption of new textiles by second hand textiles.

Concerning the water footprint the conclusion in the WRAP report is that different initiatives in the use phase of the textiles are insignificant compared to the saving potentials by making the supply chain more eco-efficient and demand more durable and timeless designs. Again consumers can have difficulties in demanding more eco-efficient textiles because of the limited selection of textiles granted ecolabels and the main focus area must be to demand durable and timeless designs.

When considering how to prioritize campaign target areas, it must, however, also be considered to what extent the conclusion following from the analysis can be enforced.

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[16] http://www.wrap.org.uk/content/valuing-our-clothes

Here the suggested concept of (durable and) “timeless design” presents itself as a significant practical challenge, as the concept of ”timeless” runs contrary to the dna of fashion.

Outline of campaign target area

- **Reduction in consumption of new textiles** – This is the focus area with the largest potential for reducing the environmental impact. The potential can be realised by increased repair of clothes, buying second hand textiles, leasing, swooping as well as making sure it is possible for others to reuse your own discarded clothes. Many new businesses within sharing, leasing, renting or swopping of textiles are emerging and these are all good alternatives in order to reduce the consumption of new textiles.
- **Demand durable textiles** – The potential of this focus area can be realised by demanding quality[17] textiles and change the consumer behaviours away from fast and disposable fashion. Durable textiles also make it more likely that the textiles will be reused.
- **Eco-efficiency by ecolabels** – this focus area addresses the production of textiles and reduces the environmental burden of the supply chain through the ecolabel criteria.
- **Clean cloth less and correct** – this focus area addresses the high power consumption in relation to washing, dry cleaning, tumble drying and ironing and it addresses the unnecessary wear on the clothes due to cleaning processes. It is also important to clean the textiles according to instructions in order to make sure they are not damaged or ruined and thereby lose their value.

[17] E.g. durable stitchings, textile with high tensile strength, colour-fastness and textiles that keep the shape.

Different impact calculations and comparisons

Box 1

Distance in car

The average car emits 157.7g CO_2 per *personkm* in Denmark. This number is based on average distribution on urban, rural and motorway driving[18]. It is assumed that this number is similar in Norway, Sweden and Finland**. The** CO_2 **emission from the production of 1 person's average yearly textile consumption can be seen in table 6.**

The CO_2 **emission from the production of 1 person's average yearly textile consumption in Denmark equals: 2,143 km by car**

The CO_2 **emission from the production of 1 person's average yearly textile consumption in Finland equals: 1,756 km by car**

The CO_2 **emission from the production of 1 person's average yearly textile consumption in Sweden equals: 1,902 km by car**

The CO_2 **emission from the production of 1 person's average yearly textile consumption in Norway equals: 1,928 km by car**

Box 2

Average household power consumption

The average Danish electricity consumption in the household is 1,600kWh per person (excl. electricity for heating) which causes an emission of 614 kg CO_2eq.

It has not been possible to establish reliable data for the average electricity consumption in the Swedish, Finnish and Norwegian households. The average electricity use in Finland, Sweden and Norway is in the following assumed to be similar to the Danish. 1,600kWh corresponds to Finland: 570 kg CO_2, Sweden: 116 kg CO_2 and Norway: 68 kg CO_2.

The CO_2emission from the production of 1 person's average yearly textile consumption can be seen in table 6.

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[18] Nielsen et al. 2013

Proposal for statement:

(Denmark): **The CO_2 emission from the production of 1 person's average textile consumption equals 55% of the average CO_2 emission from electricity use.**

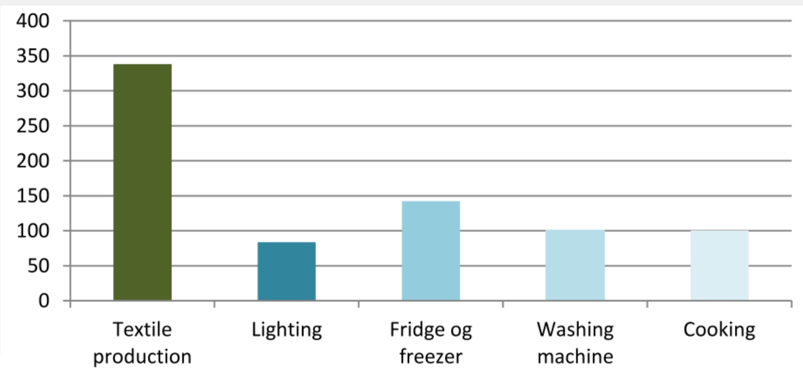
(Finland): **The CO_2emission from the production of 1 person's average textile consumption equals 48% of the average CO_2 emission from electricity use.**

(Sweden):
The CO_2emission from the production of 1 person's average textile consumption equals 2,5 times the average CO_2emission from electricity use.

(Norway):
The CO_2emission from the production of 1 person's average textile consumption equals 4,4 times the average CO_2emission from electricity use.

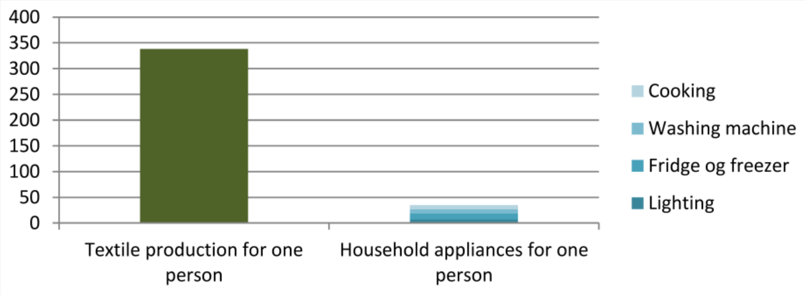
(The electricity use in the household does not include electricity for heating)

The CO_2 impact from production of textiles can also be compared to specific household appliances, for instance the CO_2 impact from production of an average textile use is larger than from the electricity used to supply all your lighting, your washing machine, oven, stove, fridge, freezer and all your other cooking appliances all together (In Denmark only for three of the four mentioned products groups).
In the below table, the emission of climate gases from production of textiles for one person in a year (16 kg) is compared to the emissions from selected household appliances used by the same person. The distribution of the electricity on different household appliances is based on data from The Danish Energy Agency[19]. The x-axis unit is emission of CO_2 equavalents in kg/year/person



[19] http://sparenergi.dk/forbruger/el/dit-elforbrug/hvor-meget-el-bruger-du

Alternative layout of bar chart – made for Norway.



Box 3

Standby Power

A typical standby power of a consumer electronics is 1W.

The CO_2 emission from the production of 1 person's average yearly textile consumption can be seen in table 6.

Proposal for statement:

(Denmark) ***The CO_2-emissions of the production of textiles for one person correspond to 100 household appliances constantly using standby power.***

(Finland) ***The CO_2-emissions of the production of textiles for one person correspond to 88 household appliances constantly using standby power.***

(Sweden) ***The CO_2-emissions of the production of textiles for one person correspond to 472 household appliances constantly using standby power.***

(Norway) ***The CO_2-emissions of the production of textiles for one person correspond to 810 household appliances constantly using standby power.***

Box 4

Average water consumption

The average Dane uses 40m³ water per year which equals 108 litres per day. The following calculation is done on the Danish average of water use, but it must be assumed that the Swedish, Finnish and Norwegian consumption patterns are rather similar.

The water consumption in relation with the production of 1 person's average yearly textile consumption can be seen in table 6.

Proposal for statement:

(Denmark): The amount of water needed for production of textiles for one person per year is 1.8 times higher than the annual consumption of the average household.

(Finland): The amount of water needed for production of textiles for one person per year is 1.5 times higher than the annual consumption of the average household.

(Sweden): The amount of water needed for production of textiles for one person per year is 1.6 times higher than the annual consumption of the average household.

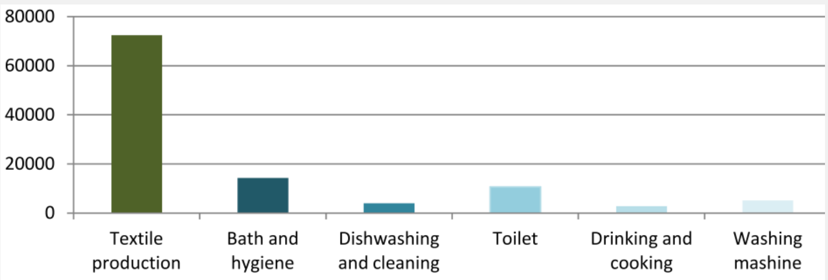
(Norway): The amount of water needed for production of textiles for one person per year is 1.7 times higher than the annual consumption of the average household.

A household of three uses 595 litre of water <u>every day</u> as a consequence of the production of the textiles they consume.

Buying one t-shirt you also buy the hidden water consumption from textile production that equals 2,716 bottles (0,5litre) of mineral water.

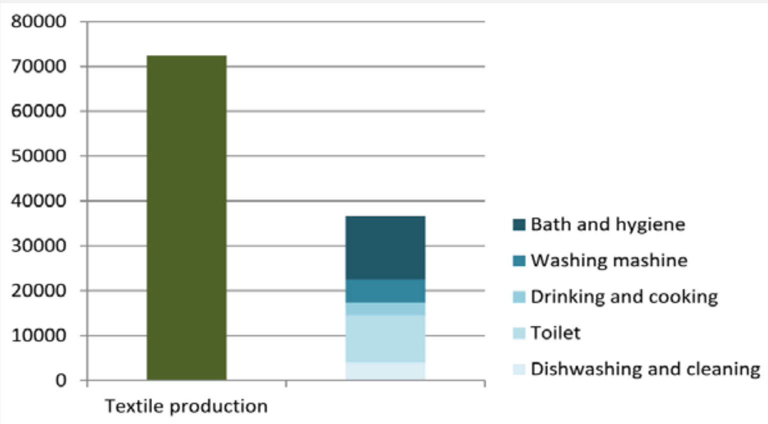
Below a comparison between water consumption in average textile production and different water using activities at home is shown. The distribution of the water on different household activities is based on Danish data from SK forsyning A/S[20]. It is assumed that the Swedish, Norwegian and Finnish consumption pattern is similar to the Danish.

The x-axis unit is litre of water per year.



The chart can alternatively be presented as follows:

The x-axis unit is litre of water per year.



[20] http://www.skforsyning.dk/Spar-p%C3%A5-vandet.669.aspx

How to communicate report findings and recommendations

Any communication strategy must answer the basic question of who should communicate what to whom and with which effect. The recommendations below, which are elaborated in the accompaniying communication handbook, are all suggestions which can be implemented at a low or practically no cost. More ambitious and costly suggestions for campaign activities are not included.

What should be communicated?

Fact and figures relating to the environmental footprint of textile consumption in general and textile production in particular are not commonly known. As the actual figures, for instance the fact that it takes approximately 10 bath tubs of water to produce a single t-shirt, will probably be quite surprising for most consumers, a communication effort or awareness campaign emphasizing and illustrating such hard facts makes perfect sense. In order to maximize the effectiveness of such a campaign, any recommended solutions and call to action must be preceeded by information about the nature, volume and relevance of the problem. Consequently, the first element of the communication should be to highlight the problem and boost awareness among the most influential consumers. The second element should then be the call-to-action messages pointing to the desired behaviour and making it easier for the consumers to reduce their consumption of new textiles, to demand more durable textiles and to demand more eco-labbeled textiles. The latter campaign could for instance vigorously promote the Nordic eco-label, the Swan and/or the EU ecolabel the Flower, or maybe even be integrated as a pioneer project in the existing marketing and communication efforts of one or both of the two eco-labels.

To whom should we communicate?

When it comes to the acquisition of textiles in the individual households, a 2011-report from the Danish/Nordic company “Trendsales.dk” points to the fact that also among younger families the women are in charge when it comes to buying clothes. Put shortly, they buy a lot of the mens clothes, most of the childrens and almost all of their own. Since the budgets for particularly womens, but also children’s clothes, are on average higher than the budget for mens clothes, it would make sense to target a campaign with limited means at families in general and women in particular.

If needed, the target group could be narrowed further to women with children, who – all other things equal - handle bigger textile budgets. Regardless of the exact scope chosen, a communication channel for a family-centred awareness campaign could be a combination of relevant media (PR and advertising in family magazines) and information material designed for day-care institutions, and primary schools, where social and family activities are to a large extent, but obviously not exclusively, based on mothers' engagement and participation.

In order to influence and boost awareness among the next generation of families, it could also be argued to target the campaign at young people. Several communication channels could be considered. As a combination of information and specific action is often an effective way to get the message across, and since many young people are attending some sort of educational facility or institution, an event-based approach involving for instance students' organizations could be considered.

How should it be communicated and with what effect?

The facts and figures could be presented illustratively and for instance the above mentioned fact about water consumption could be strongly communicated visually on practically any platform, be it online or offline advertising, PR, outdoor or video/TV.

Such a campaign based on hard facts visually communicated to a well-defined target group with relevant decision-making power could be particularly effective, since the social context (primary school, daycare institution) where the messages are communicated would also be a potentially fertile ground for some of the recommended actions. Schools and daycare institutions would for instance be obvious places to organize selling and swooping of clothes, events communicating the environmental footprint of textile production and the sharing of information about consumer behaviour and prevention of textile waste. The campaigns hard data could then be combined with local knowledge of where and how to buy and sell clothes for reuse, where to buy eco-labelled clothes and where to get clothes repaired, if feasible.

A similar approach could be adopted as regards the target group of young people. To reach this target group in a social context, where information and action can be combined, a suggested focus could be educational institutions, where young people on a limited budget and with an often strong incentive to safe money are gathered in significant numbers. In such locations a series of social events involving campaign material and information about prevention of textile waste as well as the actual selling and swooping of clothes, could be organized as part of a successful campaign strategy.

Either as a separate campaign element or in combination with the eco-labelling marketing efforts, both types of local campaigns could then be tied together nationally and potentially even regionally (Nordic/European). This could be done using a combination of social media such as facebook and larger local-regional and national PR-events. Such events, targeted at a broader audience and the media, could serve as a launch ramp for the communication of awareness messages regarding the environmental footprints as well as call-to-action messages regarding the desired change of behaviour.

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www.skforsyning.dk/Spar-p%C3%A5-vandet.669.aspx
www.teijin.com/solutions/ecocircle/
www.lct.jrc.ec.europa.eu/
www.bsr.org/reports/BSR_Apparel_Supply_Chain_Carbon_Report.pdf
www.energinet.dk/DA/KLIMA-OG-MILJOE/Miljoedeklarationer

Existing communication material regarding prevention of textile waste

www.medvetenkonsumtion.org/rad-och-tips/klader,

www.fairtradecenter.se

www.martha.fi.

www.ecolabel.dk/da/blomsten-og-svanen/

www.mst.dk/Virksomhed_og_myndighed/Kemikalier/Fokus+paa+saerlige+produkter/Tekstiler/

www.forbrugerkemi.dk/tema/tekstiler-og-kemi

www.forbrugerkemi.dk/udgivelser/ren-information-om-toj-og-kemi-fra-top-til-ta/pdf

www.bsr.org/reports/BSR_NICE_Consumer_Discussion_Paper.pdf

www.forbrugerkemi.dk/nyheder/toj