

Environmental Improvements Potential of Textiles (IMPRO Textiles) EUROPEAN COMMISSION

Joint Research Centre – Institute for Prospective Technological Studies

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Background of the study

- The **Environmental Impact of Product** (EIPRO) identified food and drink, transport and private housing as the highest impacting areas.
- While initially analyzing the current life cycle impacts of products, **the Environmental Improvement of Products** (IMPRO) phase also focuses on identifying technically and socio-economically feasible means of improving their environmental performance.
- As identified by the EIPRO study as a priority group which makes a significant contribution to environmental impacts in Europe, textile products are the focus of this study.

Objectives of the study

- Identify the **market share and consumption** of textile products in the EU-27,
- Estimate and compare the **potential environmental impacts** of textile products consumed in the EU-27, taking into account the **entire value chain** (life cycle) of these products,
- Identify the main **environmental improvement options** and estimate their potential,
- Assess the **socioeconomic impacts** of the identified options.

A 3 steps approach

1

**Determining the
apparent
consumption of all
textile product in the
EU-27**

The EUROPROM database (2007) was used to determine the apparent consumption (production plus imports minus exports).

Products have been categorised by broad types, and further breakdown each type (e.g. fibre type, product type, etc) by their most important characteristics in order to take into account their life cycle specificities (care, disposal, etc.)

2

**Assessing the
environmental
impacts of textile
products**

A bottom-up approach was then used following a Life Cycle Assessment (LCA) methodology

The textile LCA model takes into account impacts of both first and second hand textiles.

All potential impacts associated to the complete life cycle of textile consumed in one year (2007 in the baseline scenario) are taken into account Recipe 2008)

3

**Identifying
improvement
options and
environmental
benefits**

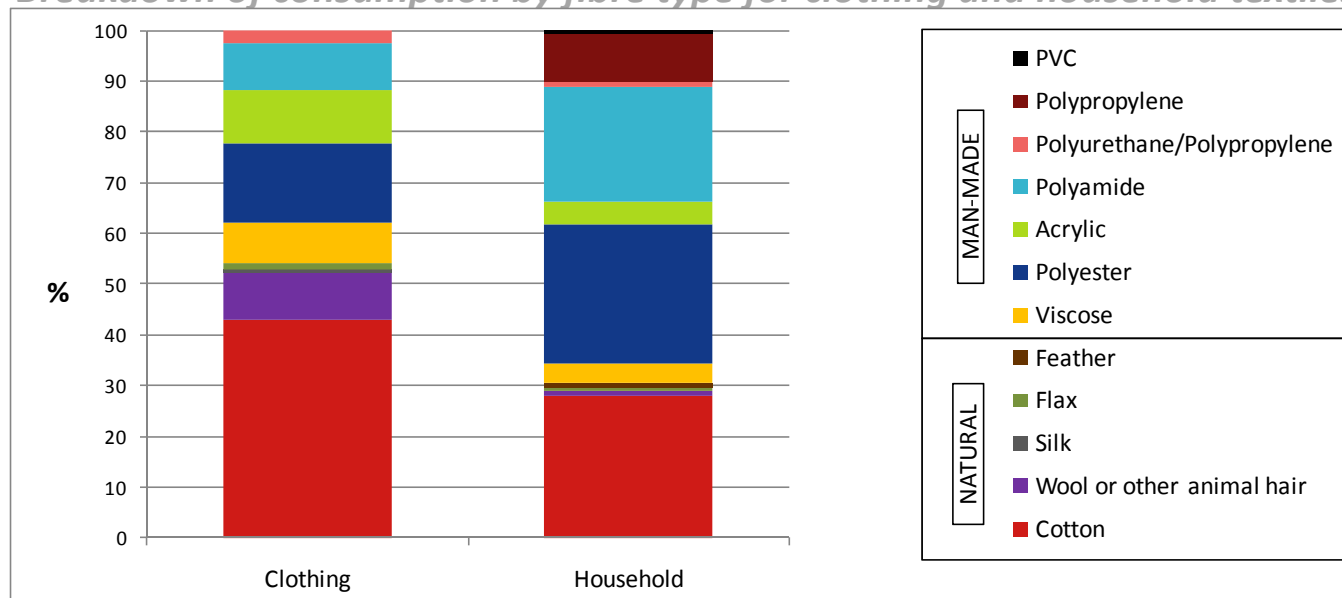
A list of feasible improvement options was established through literature research and consultation of experts and shortened by applying the following criteria:

- Relevance in the context of Integrated Product Policy (IPP),
- Potential to improve processes that generate significant impacts,
- Coverage by existing legislation,
- Reliability and availability of data to quantify the environmental impact

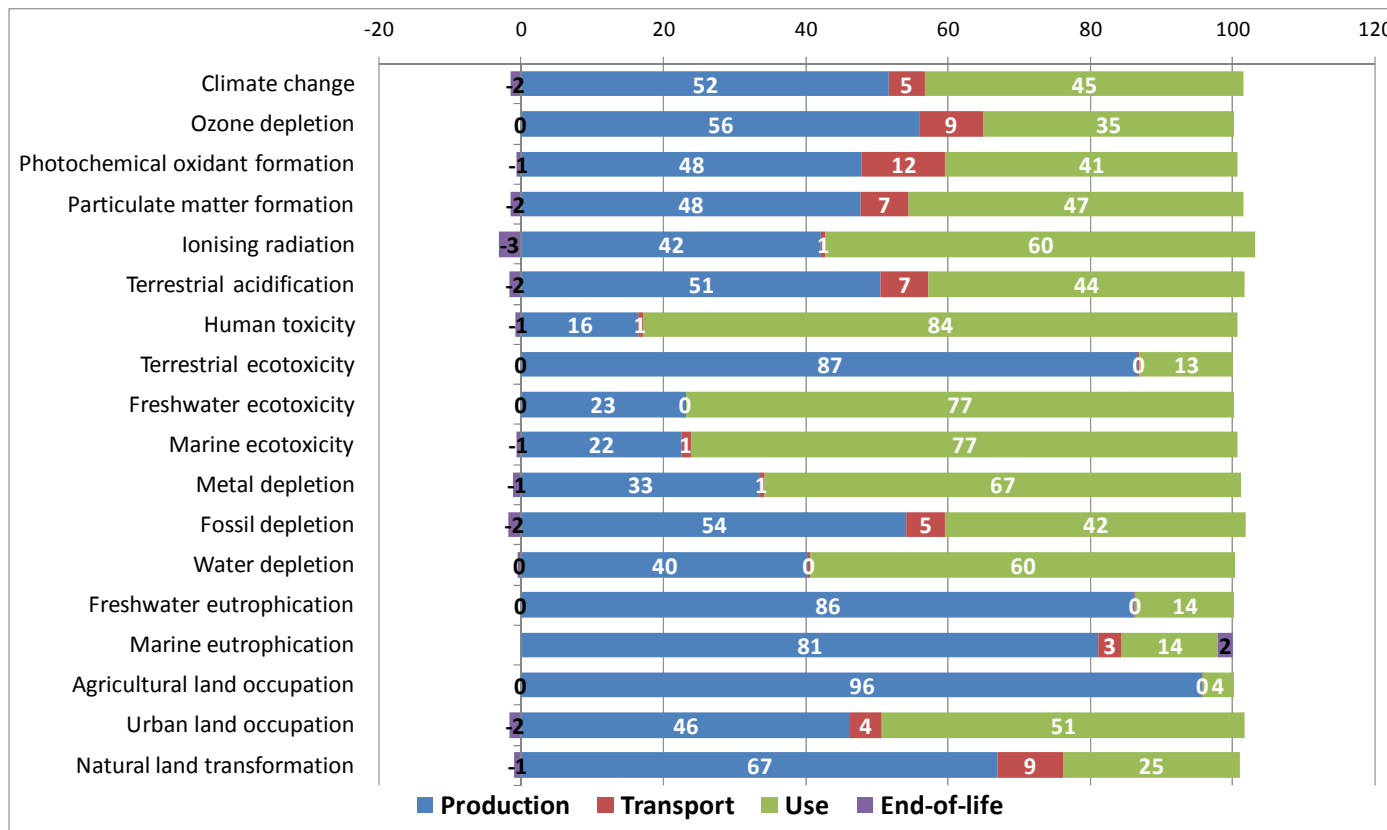
■ The calculations in this study give an average apparent consumption of **9 547 thousand of tons of textile products in the EU-27**

- This corresponds to an average of **19.1 kg per citizen and year**
 - **71% are clothing textiles:** Tops, bottoms and underwear are the most significant items covering more than 78% of the clothing market
 - **29% are household textiles:** floor coverings clearly dominate the market (38%).

Breakdown of consumption by fibre type for clothing and household textiles



Of all the life cycle phases, the production and processing and the use phases contribute most significantly to environmental impacts



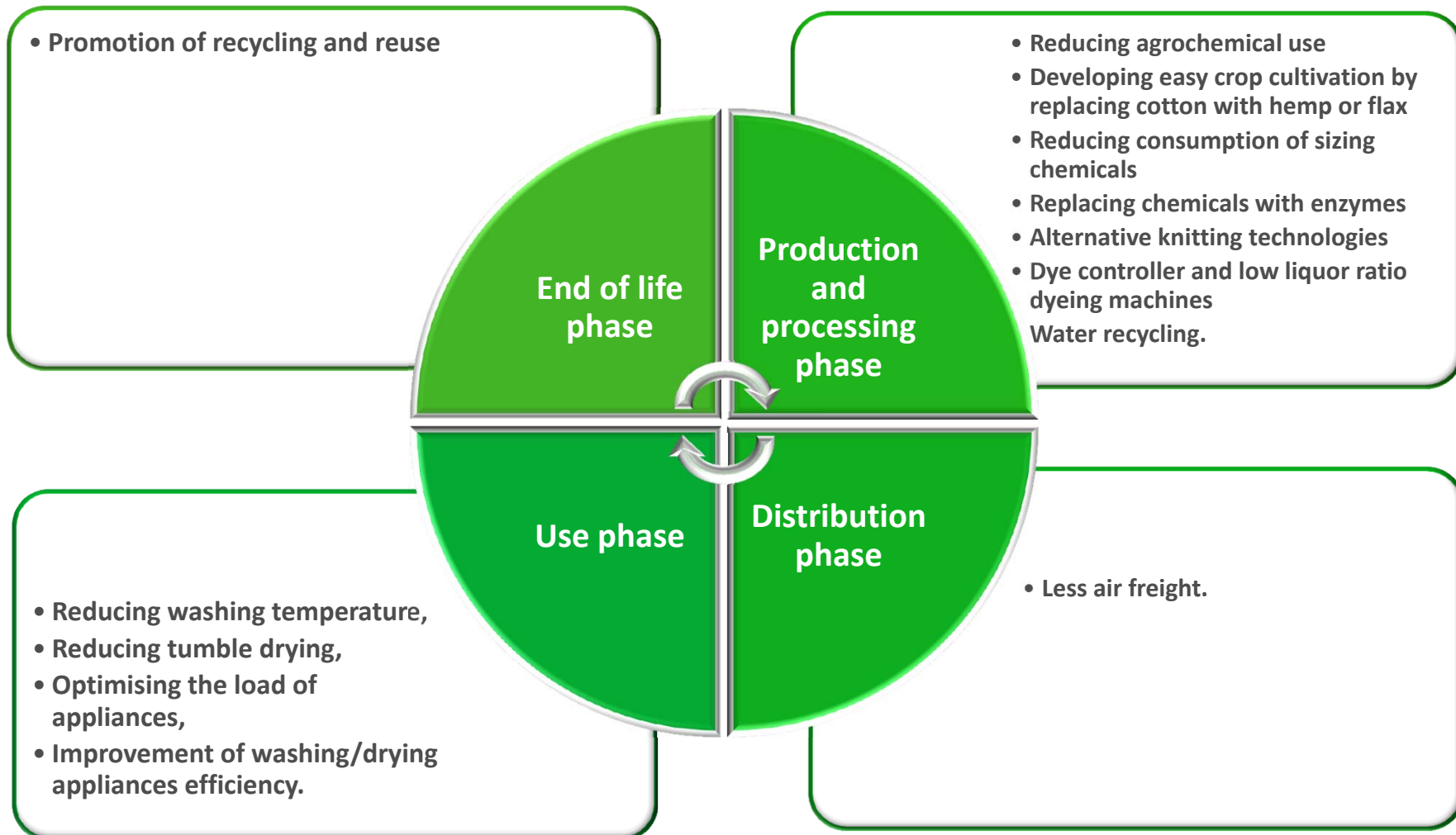
The distribution and end-of-life phases both are of minor importance only. For some impact categories, the end-of-life phase even results in credits as energy recovery schemes (e.g. incineration) contribute to the reduction of impacts

- ❑ **The production and processing phase is predominant for indicators such as climate change, ozone depletion and photochemical oxidant formation.**
 - Air emissions released by combustion processes to produce electricity are the main responsible.
 - Due to its large share in the textiles market and the nature of its production and particularly the high fertiliser use compared to other fibres, cotton is the main contributor to eutrophication.

- ❑ **The use phase includes washing, tumble drying and ironing.**
 - The detergent used for the washing process and the energy used during the washing process itself have been found to be significantly responsible for a high share of impacts.
 - The textile end products that contribute most significantly to overall impacts during the use phase are those which require frequent washing and/or that are consumed in important quantities (tops, bottoms, underwear, etc.).
 - Interestingly, with respect to water depletion, the use phase is even more important than the production and processing phase due to high water use for washing.

- ❑ Despite its relatively small share (8% of the transported textiles), air freight contributes to about 90% of the impacts of the distribution phase.

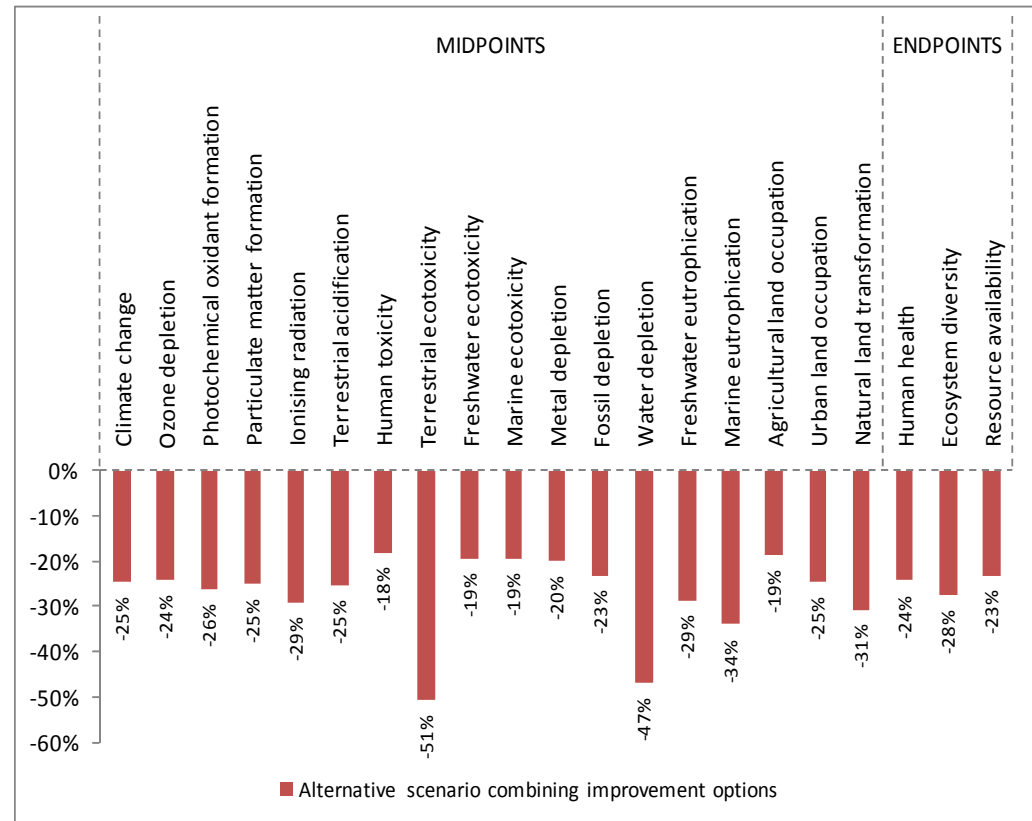
🌿 The following short list of 14 options was determined.



The improvement potential of these combinations compared to the baseline scenario can decrease the total impact of the textile life cycle by 18% to 51% depending on impact category

Top 5 of improvement options

1. Increase of the collection of used clothing for reuse and recycling
2. Increase the load capacity of washing and drying appliances
3. Substitution of cotton by hemp
4. Recycling of effluent water by ion exchange technology
5. Reducing agrochemical use, avoidance of air transportation



Impact variation over the whole life cycle for combined improvement options, expressed in percentage difference with the baseline scenario

The environmental impacts of textile consumption and use in EU-27 is both supply- and demand-driven

| Supply factors | Demand factors |
|--|---|
| <i>Agricultural practices</i> | <i>Choice of products/fibres</i> |
| <i>Production processes of the textile industry</i> | <i>Care practices (washing, drying, ironing)</i> |
| <i>Product design and functionalities of washing/drying/ironing appliances</i> | <i>Lifetime of product in a context of fast fashion</i> |
| <i>Existence of sorting and recycling schemes</i> | <i>Disposal practices</i> |

- ❑ A significant reduction of impacts can potentially be achieved by **targeting consumers**.
 - some of these options would require small behavioral changes: reducing washing temperature, washing at full load, avoiding tumble -drying whenever possible, purchasing eco-friendly fibres, and donating clothes instead of throwing them away.
 - it is necessary for consumers to be aware of these issues
- ❑ Concerning supply factors, significant improvements could be achieved by appropriately encouraging **lesser impacting practices in the textile industry**
 - It is more challenging to accurately assess and hence compare the improvement potential of single actions due to a lack of experience on emerging techniques

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