# THE THIRSTY FASHION INDUSTRY

-

*Unraveling the Water and Other Environmental Impacts of Your Clothes*

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INFO 247: Information Visualization, Spring 2023
https://andyvo.com/thirsty_fashion/

# 1. Project Goals

The fashion business is undeniably glamorous, but few are aware of its shadowy side. The clothing industry generates 20% of the world's wastewater and two billion tons of carbon dioxide annually. According to the United Nations Environment Programme (UNEP), the fabric dyeing process, which primarily utilizes synthetic dyes, is the largest water polluter, only second to global nutrient pollution.

The goals for this data visualization project focusing on the environmental impact of the fashion industry are as follows:

1. Raise awareness: Increase public understanding of the environmental issues associated with the fashion industry, such as water pollution, carbon emissions, and resource consumption.

2. Inform decision-making: Provide clear and concise information to guide consumers, industry professionals, and policymakers towards more sustainable choices in production, consumption, and policy development.

3. Identify trends and patterns: Reveal significant patterns and trends in the data, highlighting areas where improvements can be made to reduce the industry's environmental impact.

4. Encourage sustainable practices: Promote eco-friendly alternatives in material selection, production processes, and consumer behavior, leading to a greener fashion industry.

By achieving these goals, the data visualization project aims to contribute to a better understanding of the environmental challenges faced by the fashion industry and inspire more sustainable practices, ultimately reducing the industry's negative effects on the environment.

# 2. Relevant Links

Final Webpage link:

https://andyvo.com/thirsty_fashion/
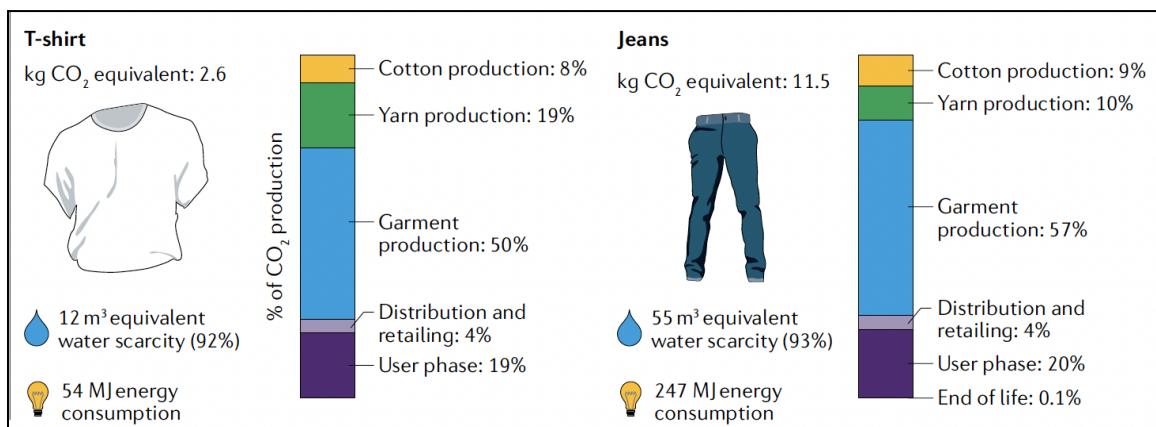
Github link:

https://github.com/andyyvo/thirsty_fashion

Figma Prototype link:
https://www.figma.com/file/Efo6TwR7uJxXfn9ez6PFqA/info-247-final-project?node-id=96%3A2&t=5Ln9kqWsRJPh4TkO-1

# 3. Discussion of Related Work

## Domain knowledge:

1. [A New Textiles Economy: Redesigning Fashion's Future (ellenmacarthurfoundation.org)](#)



**Figure 1.** The case of a cotton shirt and a pair of jeans

"A New Textiles Economy" by the Ellen MacArthur Foundation is a comprehensive report that envisions a circular economy for the textiles industry. This report presents a framework for a sustainable and eco-friendly approach to textile production and consumption. It relates to our project by offering innovative solutions and strategies for tackling the environmental impact of the fashion industry. This report serves as a knowledge base, helping us fact-check our findings and make informed recommendations to our users.

2. [The Myth of Sustainable Fashion (hbr.org)](#)

"The Myth of Sustainable Fashion" by Kenneth P. Pucker is a highly relevant article that provides valuable insights into the sustainability challenges faced by the fashion industry. Despite numerous sustainability initiatives, the industry has failed to reduce its planetary impact over the past 25 years. Published in December 2021, the report exposes this concerning reality and delves into the reasons behind this failure, as well as the

implications for the industry's future. It helps us shape our narrative and encourages our users to reconsider their use of traditional materials such as cotton.

3. [The Environmental Price of Fast Fashion (nature reviews)](#)
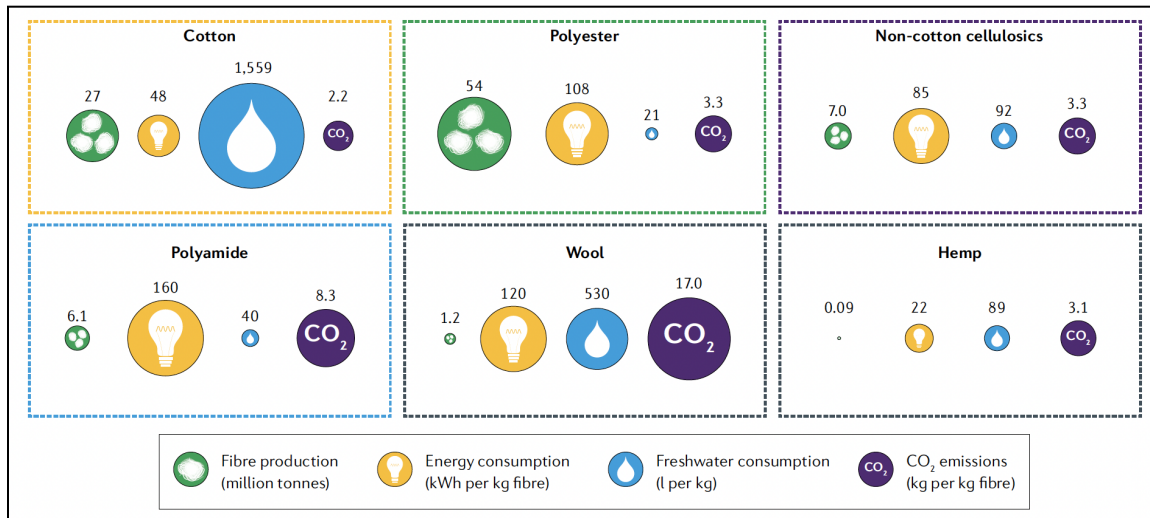


**Figure 2.** Environmental impacts of six types of fibres

Published on April 7, 2020, the article discusses the various aspects of the fast fashion supply chain, including high water consumption, chemical pollution, waste generation, and greenhouse gas emissions. It also highlights the consequences of the industry's rapid production cycles, which prioritize inexpensive and disposable clothing items over sustainable and ethically produced garments. By raising awareness about these environmental and ethical concerns, the article provides detailed data in fast fashion to support our visualization.

# Making recommendation

4. [3 Key Sustainable Fashion Trends To Follow This Year (forbes.com)](#)

Joanne Shurvell's Forbes article, "3 Key Sustainable Fashion Trends to Follow This Year," highlights the latest sustainable fashion practices and their influence on the industry. This article is relevant to our project as it provides current examples and insights into how the fashion industry is addressing its environmental impact. By exploring these trends, we can better understand the effectiveness of such practices, assess their potential for mitigating the industry's negative environmental effects, and make responsible recommendations.

5. [Data and the sustainable clothing market - Think with Google](#)

"How Data is Making the Business Case for Sustainable Fashion" is a thought-provoking report by Think with Google that explores the role of data in promoting sustainable fashion practices. The report demonstrates how data analytics and consumer insights can be used to develop eco-friendly fashion choices and influence consumer behavior. This report relates to our project by helping us understand decision-making and the landscape in the fashion industry's pursuit of sustainability. It also assists us in finding a suitable angle to make recommendations and convey the environmental impact of the industry.

6. [What is Sustainable Fashion - Journal of Fashion Marketing and Management](#)

The article discusses the principles, strategies, and practices that can contribute to a more sustainable fashion industry, including eco-friendly materials, ethical labor practices, reduced waste and energy consumption, and longer-lasting products. This article helps us by providing a solid theoretical foundation and understanding of sustainable fashion. By studying the best practices and principles outlined in the article, we can identify effective approaches for brands and large-scale manufacturers to promote sustainability in the fashion industry. Moreover, it can offer guidance on how to evaluate brands and products based on their adherence to sustainability principles, thus enabling the us to make well-informed and responsible recommendations to consumers.

# Main Visualization Inspiration:

7. [Front Row to Fashion Week - Interactive Feature - NYTimes.com](#)
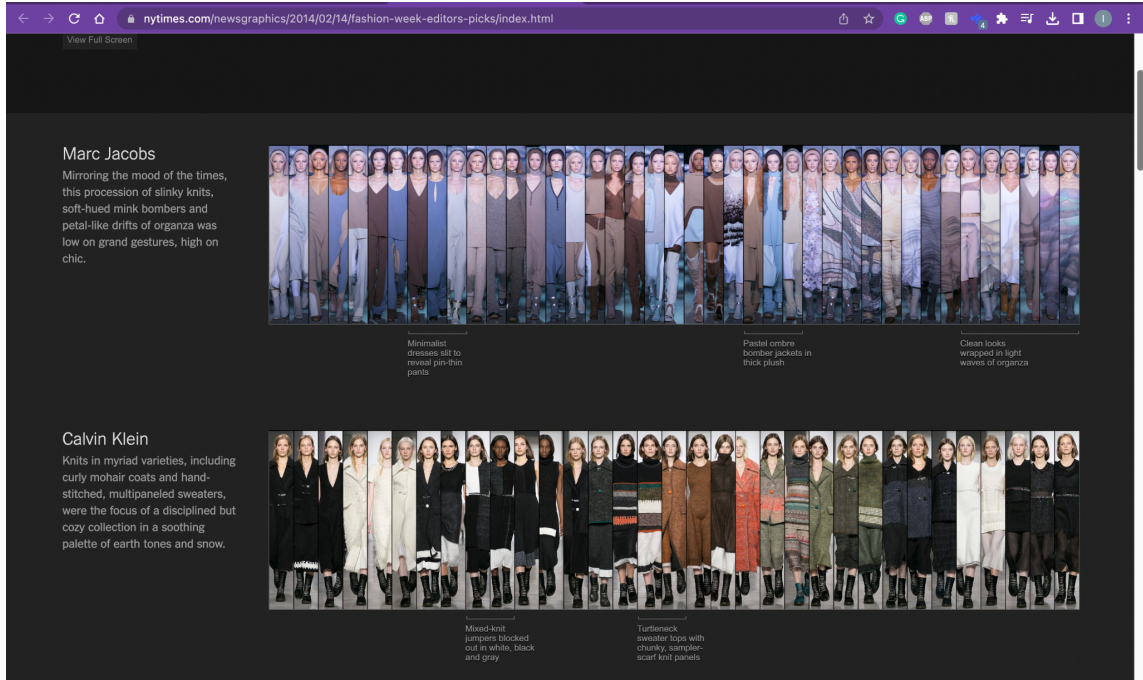
**Figure 3.** New York Times' "Fashion Week Editors' Picks" interface

The New York Times' "Fashion Week Editors' Picks" is a visually rich and interactive presentation of the highlights and trends from the 2014 Fashion Week. This feature showcases various designers, styles, and innovations in the fashion industry in a captivating and straightforward manner. It inspires us to use repetitive storytelling methods and interactive elements to tell our story.

8.  [A visual introduction to machine learning - R2D3](#)
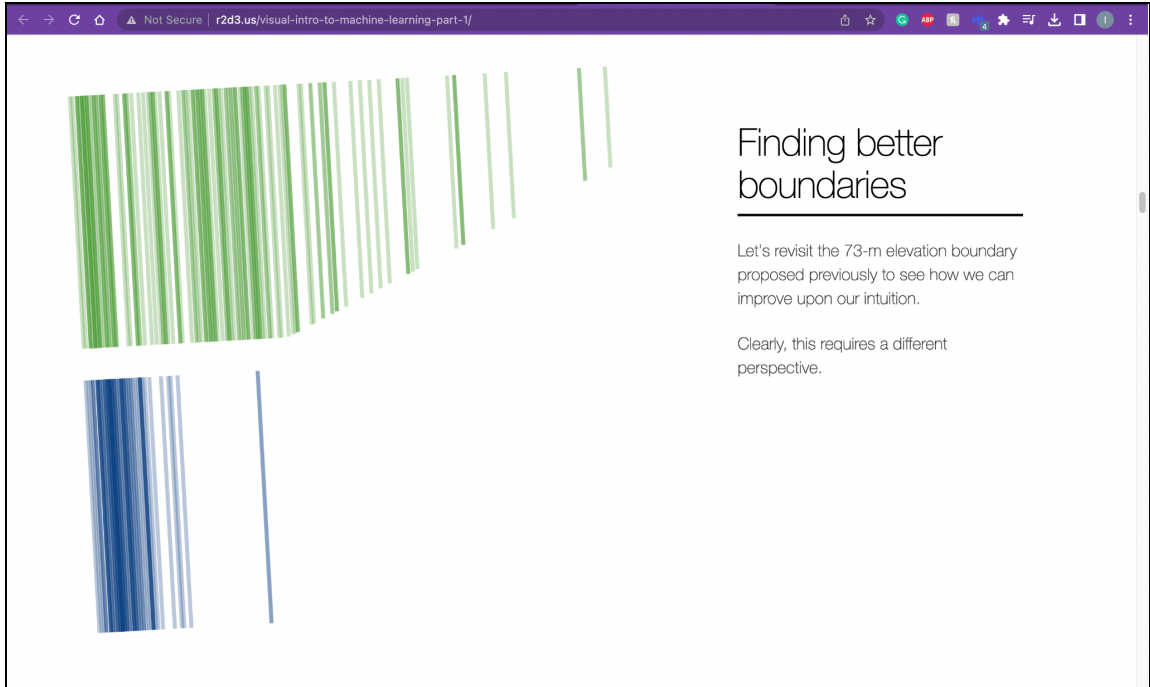
**Figure 4.** "A Visual Introduction to Machine Learning" cascading layout

"A Visual Introduction to Machine Learning" by R2D3 is an engaging and informative report that simplifies the complex concept of machine learning for a general audience. The report breaks down the process of machine learning into easily digestible parts using cascading animation and mouse scrolling down interaction. It serves as a visual inspiration for our website experience.

9. [Awash In Grief (REUTERS)](#)

**Figure 5.** "Awash In Grief" scrolling down animation

This infovis project delves into the effects of the coronavirus pandemic on the grieving process, highlighting the obstacles encountered by individuals who have lost loved ones. It seeks to investigate the repercussions of facing death and loss amidst a time of unparalleled societal transformation, as well as the potential consequences for those still grappling with their grief. The project's scrolling down animation and illustration styles effectively engage the audience, and these techniques serve as a source of inspiration for our own work.

## Other Visualization Inspiration:

https://informationisbeautiful.net/

https://thecolorsofmotion.com/

https://whydocatsanddogs.com/dogs

https://flagstories.co/

https://pudding.cool/

https://highrises.hythacg.com/

https://www.chris-williams.me/fry-universe

https://chitchart.com/

https://fanstudy.byspotify.com/

https://impossiblefoods.com/ecological-footprint-calculator

# 4. Visualization Walkthrough

## 1. Landing page



**Figure 6.** Landing page

The goal of this project is to investigate the environmental impact of the fashion industry, particularly focusing on water consumption associated with different production methods, and ultimately provide insights and recommendations for consumers to make more informed and conscious decisions when purchasing clothing. Our landing page features the project title, "The Thirsty Fashion Industry," with a clear emphasis on water-related issues, further reinforced by the blue text color and the background image.

## 2. Survey
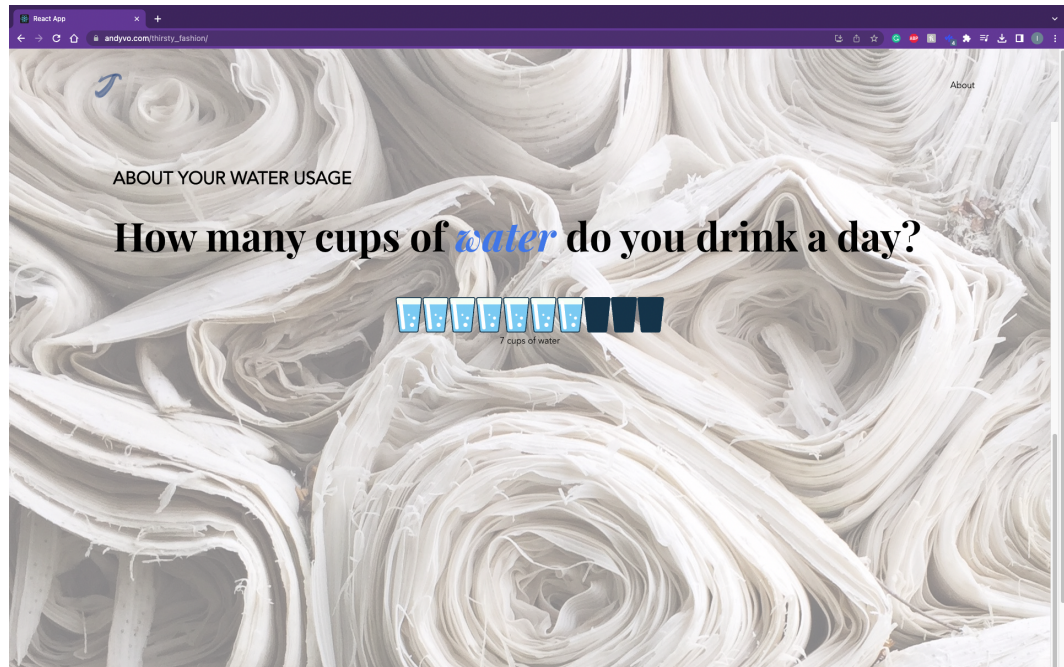


**Figure 7.** Survey page

After scrolling down, users are asked to estimate how many cups of water they drink daily. This interactive element uses a hovering effect on water cup icons, which illuminate based on the user's cursor movement. Once the user selects their daily water consumption, the system records this information for later reflection. This engagement helps users consider their personal water usage and establishes a foundation for comparison with upcoming visualizations. The page transition features a vertical water-filling animation, seamlessly progressing the topic in an engaging manner.
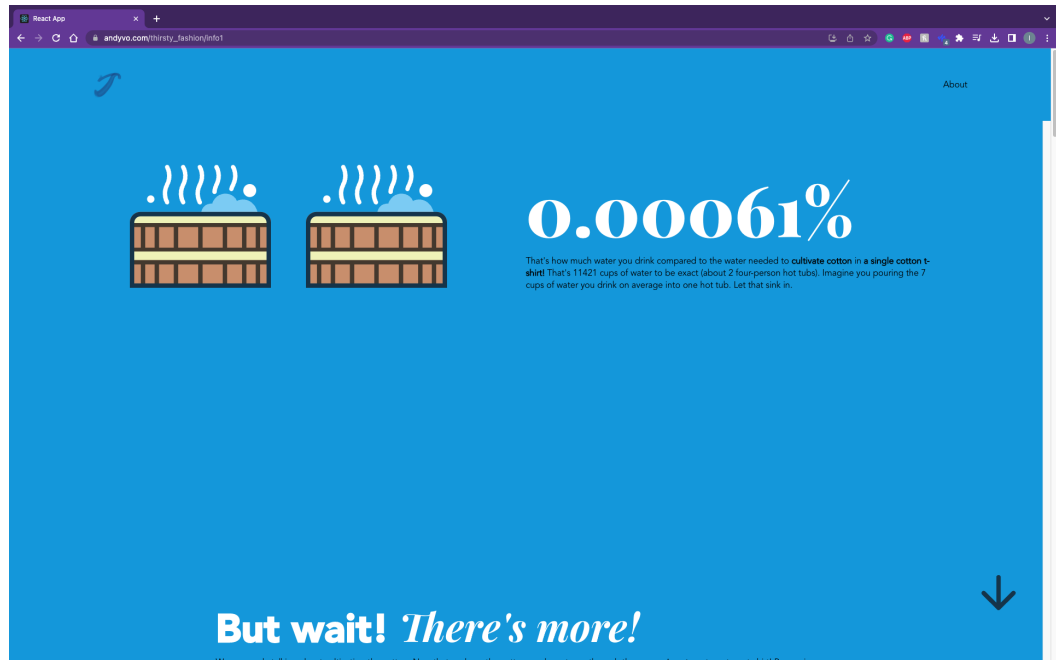
## 3. Production Walkthrough
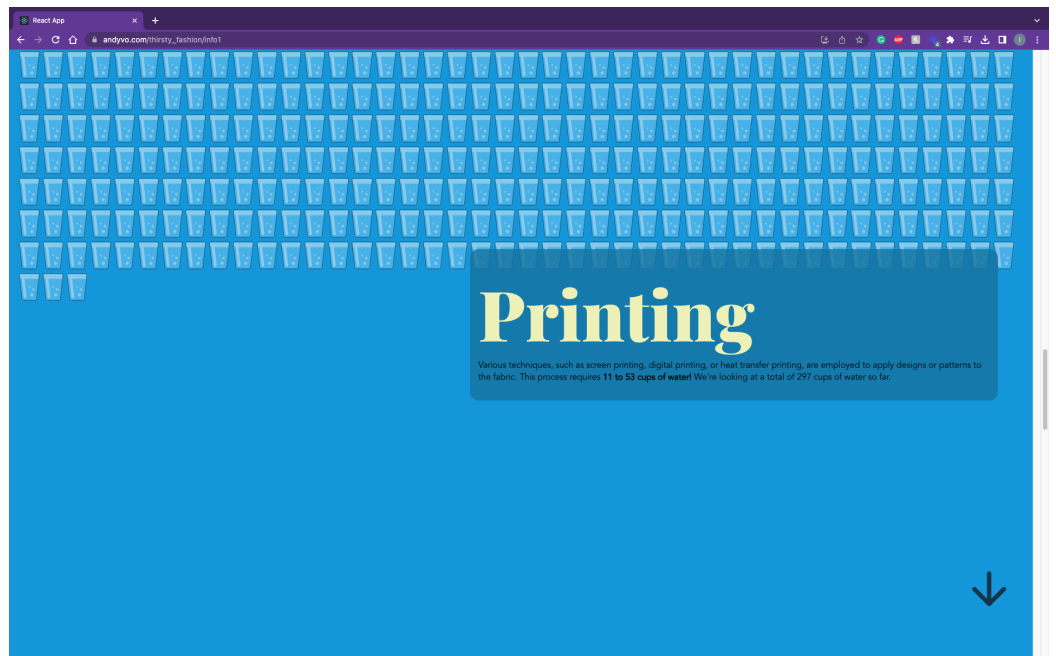


**Figure 7.** Production overview page



**Figure 8.** Production - printing page

Next, users are led through a series of visualizations, beginning with a comparison of daily drinking water to water usage in T-shirt production. They will then explore water consumption at each stage of the process. As users navigate through the pages, the water cups accumulate in the background, offering a

visual summary of total water usage. At the bottom, an arrow encourages users to scroll down to access additional information and visualizations on the webpage.

## 4. Transition
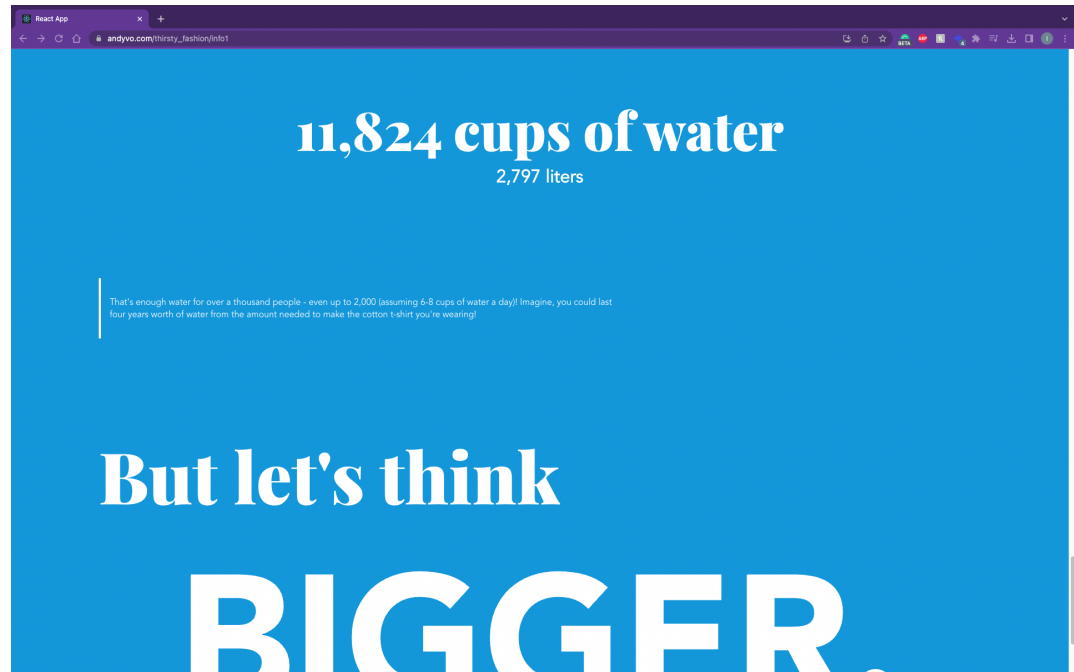


**Figure 9.** Transition page

At the end of the production walkthrough, users are presented with the total amount of water used in the production process, offering a comprehensive understanding of water consumption. A vertically scrolling interactive element leads users to the next prompt, which encourages them to consider the macro-scale of water usage. This cascading interaction mirrors the flow of water and maintains the narrative's momentum.

## 5. Macro Water Usage
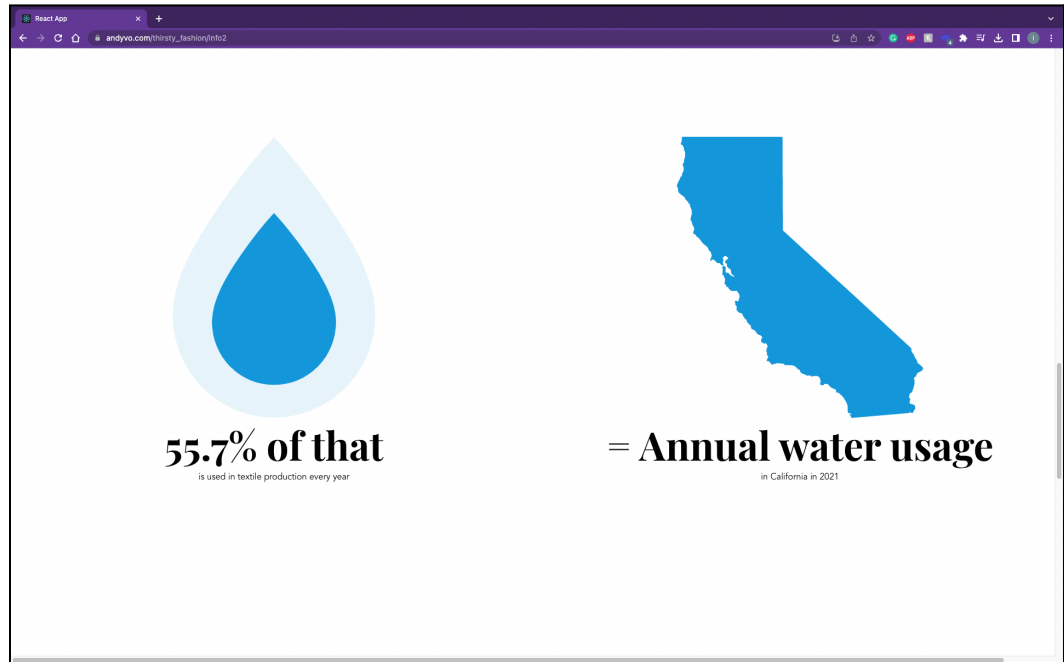


**Figure 10.** Macro Water Usage - textile production page

In this section, users first encounter a large water drop representing the total water used in the fashion industry. This amount is then compared to a real-life water body to help users better understand the scale of the issue. The visualization narrows down to specific aspects of water usage, with diminishing water animations illustrating the magnitude of consumption.

# 6. Environmental Impact of Different Materials
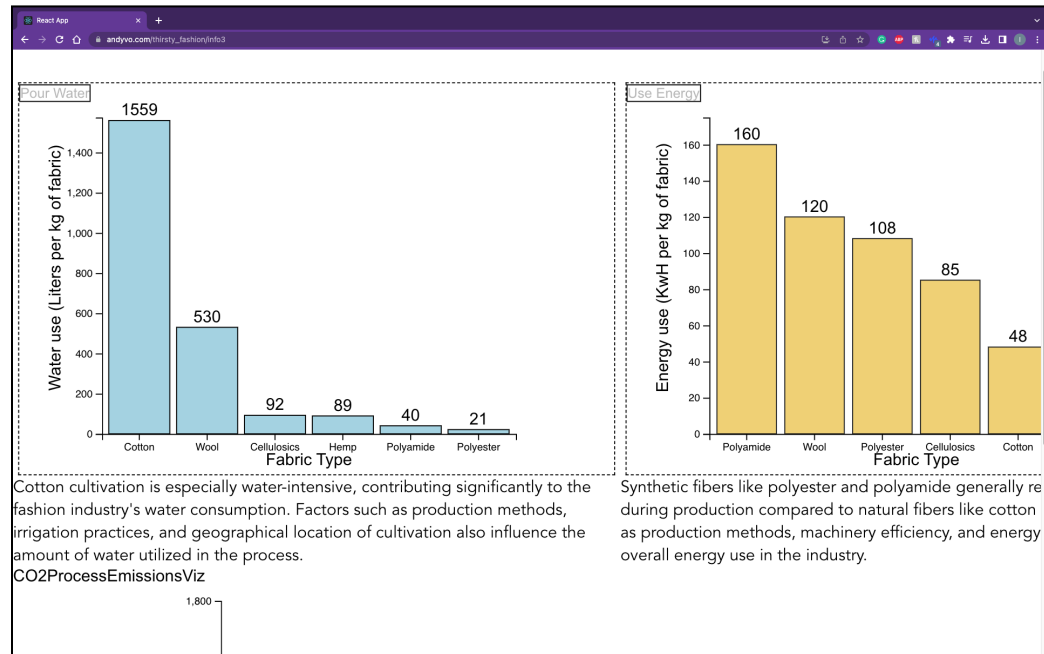


**Figure 11.** Environmental Impact page

Users are presented with bar charts comparing the environmental impacts of various materials, including water usage, energy consumption, and CO2 emissions. Distinct animations accompany each topic to minimize confusion. For instance, a smog effect is displayed alongside the CO2 emissions graph. Animations are activated by buttons labeled "Pour Water," "Use Energy," and "Emit CO2" to enhance user understanding and engagement. A summary of key takeaways from the graphs assists users in synthesizing the information effectively.

## 7. Recommendations



1. **Consider the holistic environmental impacts of fibers.** When choosing materials, take into account the full range of environmental consequences associated with various fibers. Natural fibers typically have lower environmental impacts overall; however, some, like cotton, require significant water resources during cultivation. Synthetic fibers, while offering appealing physical properties and low environmental impacts during production, can have negative effects during use, such as releasing microplastics when washed, leading to water pollution.

2. **Research brand sustainability and certifications.** Investigate brands that emphasize sustainable and ethical practices, like using eco-friendly materials, conserving water and energy, and providing fair labor conditions. Seek garments with certifications like GOTS (Global Organic Textile Standard) or OEKO-TEX, which signify compliance with specific environmental and social standards throughout the production process.

3. **Prioritize quality, durability, and sustainable fashion.** Embrace a conscious approach to fashion by buying fewer items and focusing on timeless, versatile, and high-quality pieces. Avoid short-lived trends and consider adopting recycled fashion, such as opting for used denim and leather items due to their significant environmental impacts during production.

4. **Support local and ethical businesses.** Support local and ethical businesses: Choose to purchase from local designers and small businesses committed to sustainable and ethical practices. This not only helps minimize the environmental footprint of your clothing but also supports your community and allows you to access unique and authentic styles that reflect the culture and heritage of the region.

**Figure 12.** Recommendations page

In the final section, users are provided with actionable recommendations based on the insights gained from the visualizations. This empowers them to make more informed and sustainable choices when purchasing clothing.

# 5. Data

In our visualization, various data sets were analyzed and integrated to provide a comprehensive overview of the environmental impact of the textile and fashion industry. These data sets were collected from research papers and reports published by international organizations, ensuring their relevance and usefulness to the project. Prior to using each data set, exploratory data analysis (EDA) was conducted in Excel to clean the data and ensure its relevance.

1. [Environmental impact of textile fibres – what we know and what we don't know. Fiber Bible part 2](#)

This report, published by Mistra Future Fashion, provides an overview of the environmental impact of various textile fibers. It examines the sustainability of fibers from natural, regenerated, and synthetic sources. The report includes information on the life cycle assessments (LCAs) of different fibers, their water and energy consumption, greenhouse gas emissions, and chemical use. It also

highlights knowledge gaps and research needs related to the environmental impact of textile fibers.

2. [Environmental assessment of Swedish clothing consumption – six garments, sustainable futures](#)

This report, published by Mistra Future Fashion, evaluates the environmental impact of six different garments typically consumed in Sweden. The report analyzes the life cycle of these garments, including production, use, and end-of-life stages. The study provides data on the environmental performance of the selected garments, with a focus on climate change, resource depletion, and water scarcity. It also discusses potential future scenarios and provides recommendations for reducing the environmental impact of clothing consumption.

3. [Pulse of the Fashion Industry - Global Fashion Agenda & BCG](#)

This report, published by the Global Fashion Agenda and The Boston Consulting Group (BCG), offers a comprehensive analysis of the fashion industry's environmental and social performance. The report provides data on various aspects of the industry, such as water use, chemical use, carbon emissions, and labor conditions. It also presents a "Pulse Score," which measures the sustainability performance of different segments within the industry. Additionally, the report identifies opportunities for improvement and proposes various initiatives to help the industry become more sustainable.

# 6. Tools

For this project, a variety of tools were utilized to conduct exploratory data analysis, create visualizations, design web elements, and test usability. Below is an overview of the tools and their specific applications within the project:

1. Excel: Excel was employed in the initial stages of the project to conduct exploratory data analysis (EDA) and clean the data. This process ensured that the data sets were relevant and useful for the project's objectives.

2. Illustrator and Figma: These graphic design tools were used to create iconography and other visual elements for the project. Illustrator is a vector-based design software, while Figma is a collaborative design tool that allows for prototyping and design ideation.

3. D3.js in Observable Notebooks: D3.js, a JavaScript library for creating dynamic and interactive data visualizations, was used within Observable Notebooks. This combination allowed for the development of custom visualizations tailored to the project's requirements.

4. Github Pages and Bootstrap: Github Pages was utilized for hosting the project's website, while Bootstrap was used to design and structure the website's layout and appearance.

5. Zoom: Zoom was used to conduct usability tests, allowing for remote user feedback and collaboration during the development process.

# 7. User Testing Overview (2 rounds)

In this study, we aim to evaluate the effectiveness of our visualizations, which illustrate water usage in the textile industry. These visualizations encompass water usage during various textile production steps, annual water consumption, and the environmental impacts of different materials. We assess users' ability to understand and interpret the visualizations to gather insights into their efficacy and identify areas for improvement.

The study's purpose is to determine how well users can perform basic tasks using the visualizations provided and gauge their opinions on various aspects of the design. By analyzing task completion speed, the number of errors, and questions indicating confusion, we aim to evaluate the clarity, effectiveness, and usability of these visualizations.

We conducted two rounds of user testing, with the first round on our Figma prototype and the second round on our final webpage prototype.

## Method

1. Invited users to try our Figma prototype (round 1)
2. Asked participants to perform specific tasks from three sections of the prototype
3. Recorded the time taken and the accuracy of task completion
4. Gathered further responses with a survey
5. Collected information about confusion and obtained feedback
6. Aggregated the results to identify insights and areas for improvement
7. Developed the needed areas
8. Invited users to use our webpage (round 2)
9. Aggregated the results to identify insights and areas for future improvement and write-up

# Participants

- In round 1, four individuals aged between 23 and 28 participated, and in round 2, two individuals aged between 26 and 28 took part. These participants represent our target demographic of educated fashion consumers, aiming to raise awareness about sustainable fashion practices.
- The group had varying levels of engagement with fashion.
- The gender distribution was balanced, with 2 male and 2 female participants for round 1 and 1 male and 1 female participant for round 2.

# Scenarios & Tasks

## Round 1 - Figma prototype

- Scenario 1: Main Flow Visualization



**Figure 13.** Prototype - Main Flow

In this visualization, you will see an animation illustrating the various stages of water usage in textile production, from the initial cultivation of materials to the final finishing processes. The chart shows the water consumption for each step and highlights the key factors that influence water usage.

Task 1: Identify Water Usage in First Step of Textile Production

- Scenario 2: Large-Scale Water Use Visualization
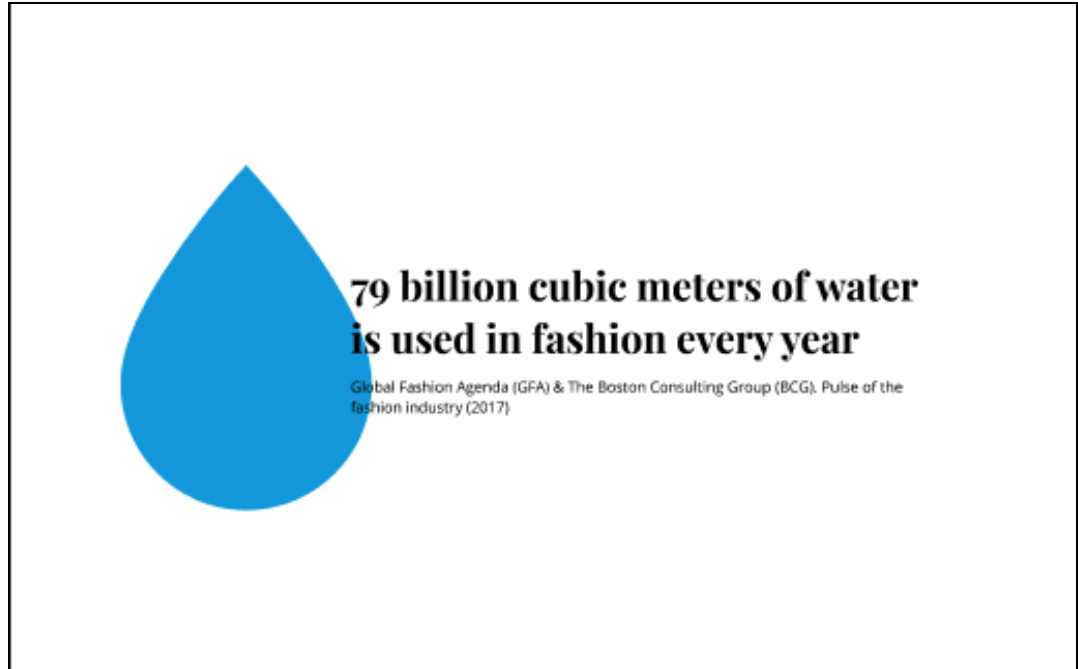
**Figure 14.** Prototype - Large-Scale Water Use page 1
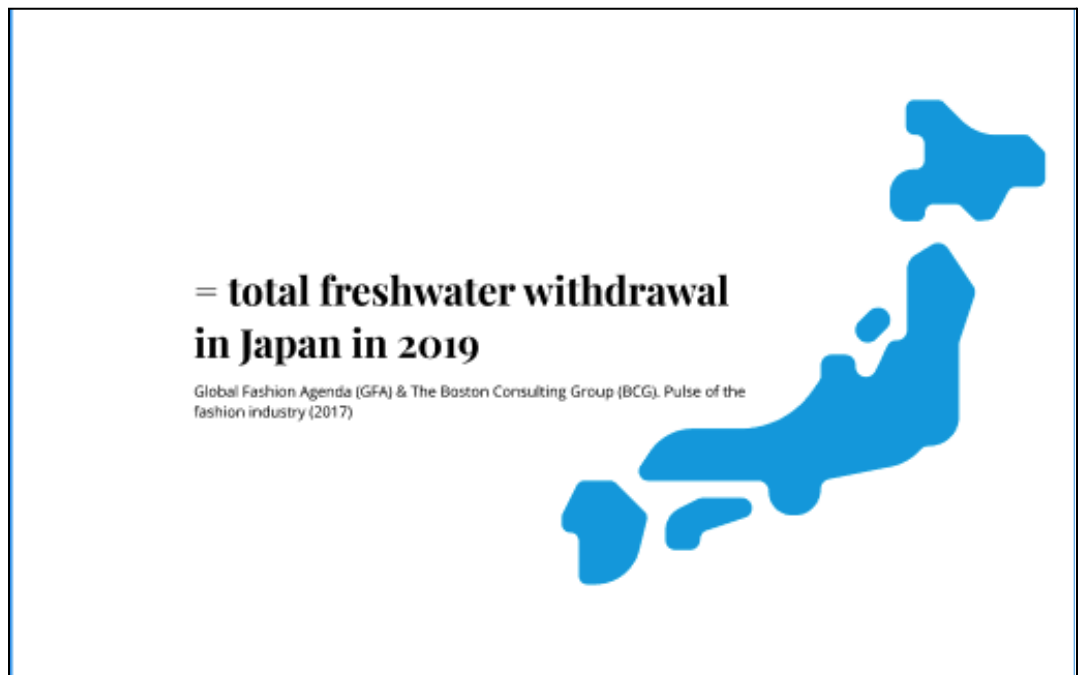


**Figure 15.** Prototype - Large-Scale Water Use page 3

In this visualization, you will see an animation illustrating the various stages of water usage in textile production, from the initial cultivation of materials to the final finishing processes. The chart shows the water consumption for each step and highlights the key factors that influence water usage.

Task 2: Compare Water Usage in Cotton Production to California's Annual Water Usage

- Scenario 3: Material Water Use and Sustainability Visualization
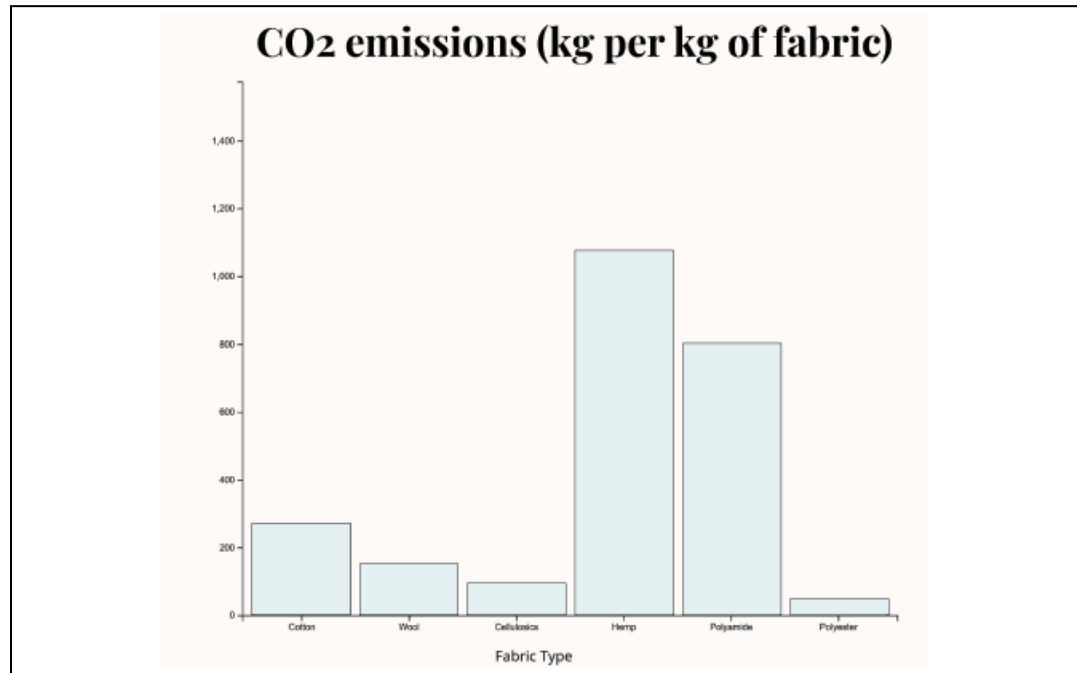


**Figure 16.** Prototype - Material Water Use and Sustainability Visualization page 3

This visualization compares the sustainability (including water usage) of different textile materials, including cotton, hemp, nylon, and others. A dynamic interface allows you to interact with the data by "pouring water" into containers representing each material's water usage, giving you a visual representation of their relative consumption levels.

Task 3: Load the Visualization

Task 4: Determine Annual Water Usage of Hemp Material

Task 5: Compare Water Usage of Cellulosics and Cotton

## Round 2 - Webpage prototype for the final

- Scenario 1: Main Flow Visualization
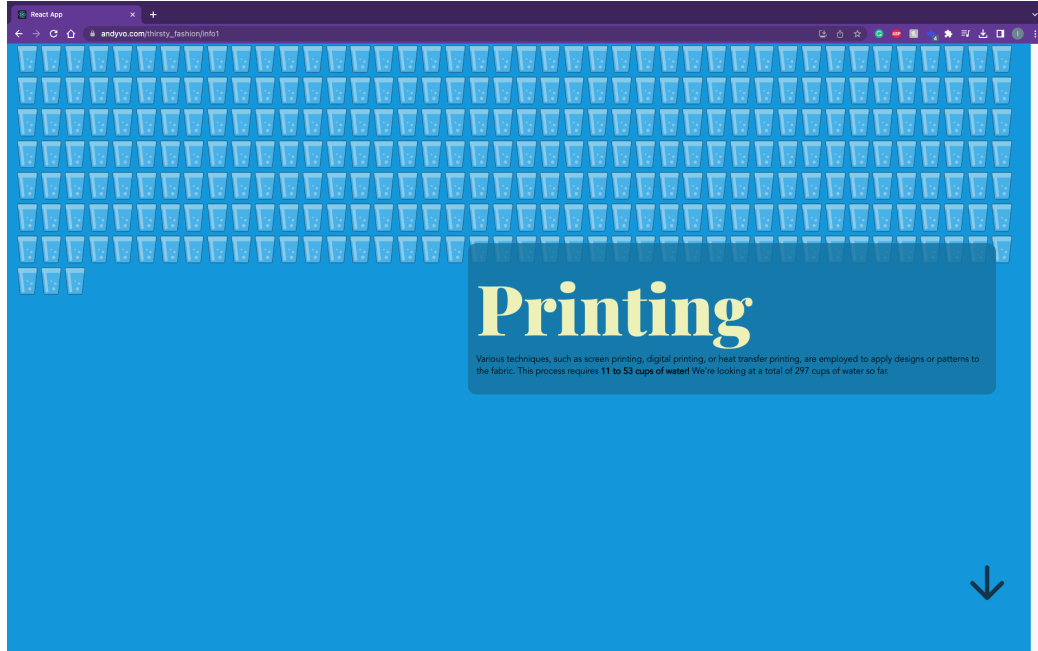
**Figure 17.** Production - printing page

You will see a series of visualizations, beginning with a comparison of daily drinking water to water usage in T-shirt production. You will then explore water consumption at each stage of the process. As you navigate through the pages, the water cups accumulate in the background, offering a visual summary of total water usage.

Task 1: Identify Water Usage in Third Step of Textile Production

- Scenario 2: Large-Scale Water Use Visualization
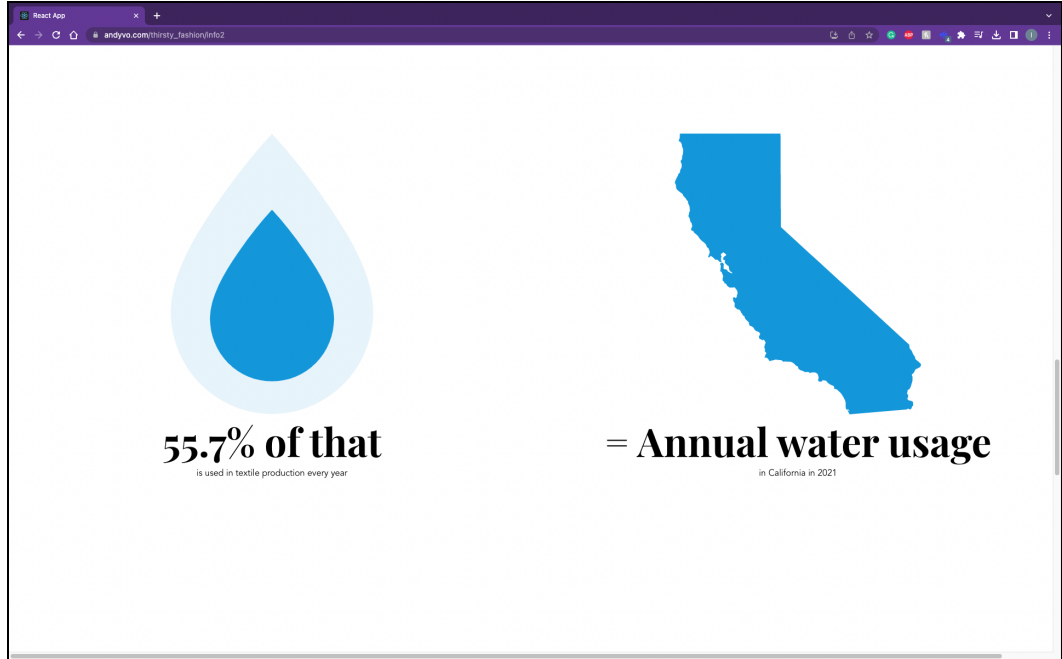
**Figure 18.** Macro Water Usage - textile production page

In this section, you will first a large water drop representing the total water used in the fashion industry. This amount is then compared to a real-life water body to help you better understand the scale of the issue.

Task 2: Compare Water Usage in Cotton Production to California's Annual Water Usage

- Scenario 3: Material Water Use and Sustainability Visualization
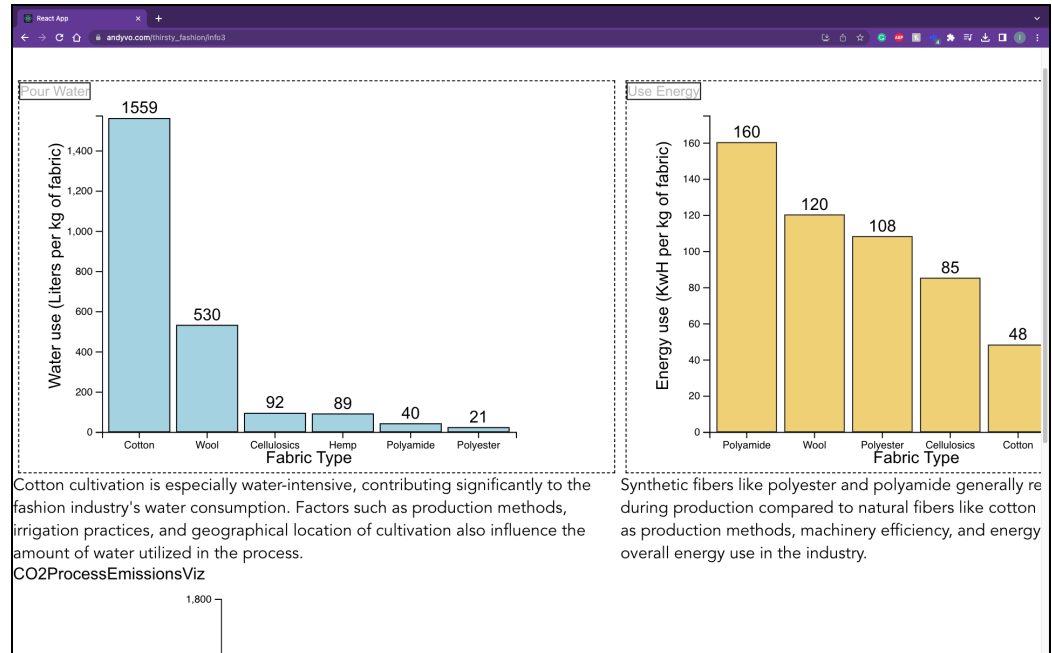
**Figure 19.** Environmental Impact page

This visualization compares the sustainability (including water usage) of different textile materials. A dynamic interface allows you to interact with the data by "pouring water" into containers representing each material's water usage, giving you a visual representation of their relative consumption levels.

Task 3: Load the Visualization for different types

Task 4: Determine Annual Water Usage of Hemp Material

# 8. User Testing Measures

Quantitative measurements:

- Task time: Measured to assess ease of understanding and navigation.
- Number of errors: Tracked to identify confusing or unclear areas in visualizations.

Qualitative measurements:

- Notes: Collected to understand participants' thought processes, reasoning, and areas of confusion.
- Suggestions: Gathered to improve and optimize visualizations for enhanced user experience and understanding.

# 9. User Testing Results (2 rounds)

## Round 1 - Figma prototype

Quantitative Data:

| Participant | Age | Occupation | Main Flow Viz (Task Time, Errors) | Large-Scale Water Use (Task Time, Errors) | Material Water Use (Task Time, Errors) |
|---|---|---|---|---|---|
| Participant #1 | 28 | Industrial Designer | 30s, 1 error | 30s, 0 errors | 5s, 3s, 2s, 0 errors |
| Participant #2 | 27 | Journalist | 30s, 1 error | 50s, 0 errors | 4s, 5s, 2s, 0 errors |
| Participant #3 | 26 | Student/UX Designer | 1m 20s, 0 errors | 45s, 0 errors | 3s, 3s, 3s, 0 errors |
| Participant #4 | 23 | Student | 2m, 1 errors (in understanding) | 40s, 1 error (understanding) | 1s, 2s, 4s, 0 errors |

Qualitative Data:

| Participant | Main Flow Viz Notes | Main Flow Viz Suggestions | Large-Scale Water Use Notes | Large-Scale Water Use Suggestions | Material Water Use Notes |
|---|---|---|---|---|---|
| Participant #1 | Difficulty comprehending large amount of water, forgot previous process, distracting water cup icon | Progress bar, color change to indicate wastefulness, visual comparison to large scale | Large water icon too light | Display 3 water drops stacking up | N/A |

| Participant #2 | General impression of large water usage but not exact amount, forgot previous process, lost focus | N/A | Japan example interrupts | More support on linear thinking, display 3 water drops with different opacity stacking up, relatable examples | N/A |
| --- | --- | --- | --- | --- | --- |
| Participant #3 | Only remembers bleaching as the first step, cannot recall exact cup amount, cannot contextualize large cup amounts | N/A | Separating statistics, too much mental load | Overall correlation visualization (e.g., pie chart) | Fiber production is misleading, difficulty relating size of icons to sustainability |
| Participant #4 | Needs definition of "cup", unclear on 0.0007 meaning, too small font, needs more background/exposition | Bigger themes and ideas, clearer explanations | Likes Japan stat, needs clarity on percentages | Clarity for percentages and context | N/A |

## Round 2 - Webpage prototype for the final

Quantitative Data:

| Participant | Age | Occupation | Main Flow Viz (Task Time, Errors) | Large-Scale Water Use (Task Time, Errors) | Material Water Use (Task Time, Errors) |
| --- | --- | --- | --- | --- | --- |
| Participant #1 | 28 | Student | 25s, 0 error | 10s, 0 errors | 7s, 2s, 2s, 0 errors |
| Participant #3 | 26 | Student/UX Designer | 45s, 0 error | 35s, 0 errors | 5s, 3s, 3s, 0 errors |

Qualitative Data:

| Participant | Main Flow Viz Notes | Main Flow Viz Suggestions | Large-Scale Water Use Notes | Large-Scale Water Use Suggestions | Material Water Use Notes |
|---|---|---|---|---|---|
| Participant #1 | Clear visualization with relatable information, navigation a bit challenging | Increase interactivity | Animation difficult to follow | Create more coherent animation | Clear view, but only able to see one material |
| Participant #2 | Good background knowledge; unsure about using cups as the measuring unit | Cups may be too small, provide alternative options | Animation seems disoriented | Improve animation coherence | N/A |

# 10. Iteration

Based on the qualitative and quantitative data gathered from the user testing round 1, we learned the following:

- Participants had difficulty understanding the specific amounts of water usage and their significance in the visualizations, suggesting a need for clearer and more relatable examples and comparisons.
- Participants recommended using contrasting colors, different fonts, and better-defined icons to improve readability and comprehension in the visualizations.
- Participants expressed a desire for actionable information, such as alternative materials or brands to support, and clearer explanations of terms used in the visualizations.
- Some participants found certain sections overwhelming, causing them to lose focus or miss crucial information.

Considering these findings, we made the following changes to the visualization:

1. Enhanced visualizations using relatable units of measurement and engaging examples, such as cups and hot tubs, to make water usage amounts more comprehensible (Figure 20).
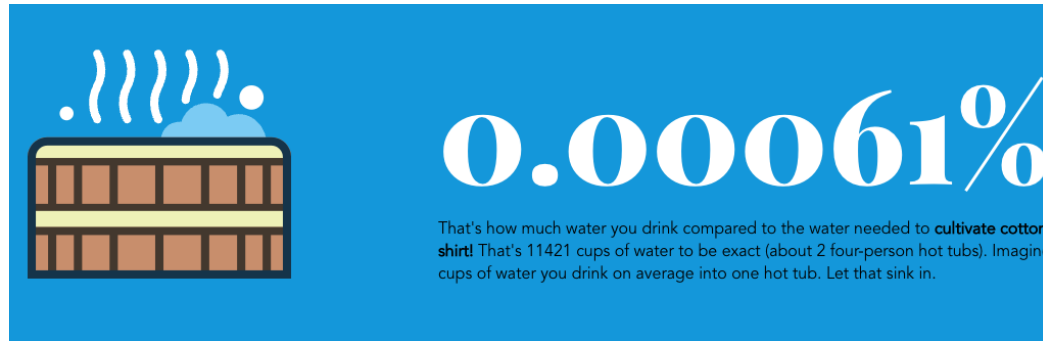


**Figure 20.** Detail of Production overview page

2. Improved visual design by incorporating contrasting colors, appropriate fonts, and well-defined icons to enhance readability and comprehension, while establishing a visual hierarchy (Figure 21).
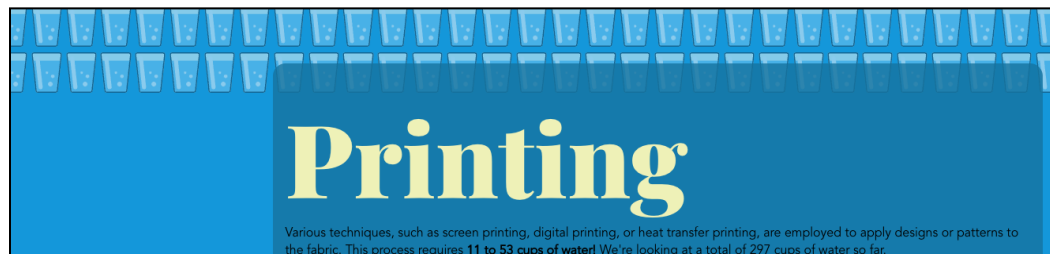


**Figure 21.** Detail of Production - printing page

3. Provided clear explanations of the most widely used materials (Figure 23) and offered actionable insights or recommendations for users to make informed purchasing choices (Figure 22).

## What To Do as a Consumer

**1. Consider the holistic environmental impacts of fibers.**
When choosing materials, take into account the full range of environmental consequences associated with various fibers. *Natural fibers* typically have lower environmental impacts overall; however, some, like cotton, require significant water resources during cultivation. Synthetic fibers, while offering appealing physical properties and low environmental impacts during production, can have negative effects during use, such as releasing microplastics when washed, leading to water pollution.

**2. Research brand sustainability and certifications.**
Investigate brands that emphasize sustainable and ethical practices, like using eco-friendly materials, conserving water and energy, and providing fair labor conditions. Seek garments with certifications like GOTS (Global Organic Textile Standard) or OEKO-TEX, which signify compliance with specific environmental and social standards throughout the production process.

**3. Prioritize quality, durability, and sustainable fashion.**
Embrace a conscious approach to fashion by buying fewer items and focusing on timeless, versatile, and high-quality pieces. Avoid short-lived trends and consider adopting recycled fashion, such as opting for used denim and leather items due to their significant environmental impacts during production.

**4. Support local and ethical businesses.**
Support local and ethical businesses: Choose to purchase from local designers and small businesses committed to sustainable and ethical practices. This not only helps minimize the environmental footprint of your clothing but also supports your community and allows you to access unique and authentic styles that reflect the culture and heritage of the region.

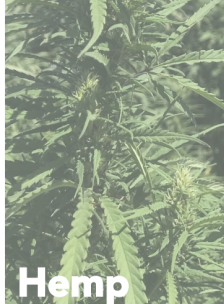**Figure 22.** Detail of Recommendation page



**Figure 23.** Detail of Recommendation page

4. Added more transitional breaks to maintain user engagement, resulting in a final design with the webpage clearly divided into three distinct sections.

# 11. Team Contributions

| Project Phase | Task | Andy | Jo | Tyler |
|---|---|---|---|---|
| Preparation | Background Research | 25% | 50% | 25% |
| | Data Collection + Processing | 25% | 25% | 50% |

| Exploratory Data Analysis | Perform individual EDA assignments based on the Data section | 33% | 33% | 33% |
|---|---|---|---|---|
| Visualizations | Visualizations in Figma | 40% | 30% | 30% |
| | Visualizations in D3 | 5% | 5% | 90% |
| Usability Test | Write Script | 10% | 10% | 80% |
| | Conduct Sessions | 10% | 80% | 10% |
| | Synthesize Findings | 33% | 33% | 33% |
| Website | Narrative + Text | 40% | 40% | 20% |
| | Design | 15% | 60% | 25% |
| | Coding | 50% | 5% | 45% |
| Project Management Activities | Arrange meeting | 25% | 50% | 25% |
| Final Write Up | Final Write Up | 5% | 90% | 5% |
| | Average Contribution | 33% | 33% | 33% |

# 12. Reflection/ Next Step

Our project was an enjoyable learning experience as we experimented with various visualizations to better understand the fashion industry's impact and identify best practices based on our research and the patterns and trends discovered through our visualizations. Due to time constraints and coding limitations, we would like to improve the following aspects of the project if given more time:

- Interactivity:

We would like to explore ways to present only a few or single categories of data to help infer trends and strengthen our storytelling.

- Animation:

Due to technical challenges, we couldn't achieve the desired smooth display of large-scale water information. Currently, the unsmooth transitions require some cognitive load to process the entire visualization.

- Shareability:

We aim to provide actionable insights or recommendations for users, such as alternative materials or brands to support. Making these recommendations shareable on social media will help users make informed and sustainable choices.