

Molly O'Neill
Minnetonka High School
Minnetonka, Minnesota, United States
Italy, Water

Waterway to Runway: The Future of Fabric and Fashion

Milan Fashion Week is one of the most exclusive runway fashion weeks of the year. The chic event is held in Milan, Italy typically in February. Getting invited as both a spectator and a designer is a huge honor. However, these exclusive fashion events come with a shockingly large environmental cost. One of the greatest impacts of textile production is its water usage and pollution. 2,700 liters of water is used to make just one t-shirt. That alone is enough water to sustain the average person for 2.5 years. Research found in 2020 shows the fashion industry uses 79 trillion liters of water per year (Milton, 2023). The fashion industry not only consumes outrageous amounts of water, but also contributes to 0.5 million tons of microplastics, or microfibres, released into the ocean each year.

With a population of 59.11 million, Italy is largely an urban country. This high urban population results in smaller family sizes (*Italy: 2010 Article IV Consultation Concluding Statement of the Mission* 2010). Many citizens of Italy still follow a nuclear family structure, a mom, a dad, and only one child. Italy has a rapidly decreasing population with a growth rate of -0.3 % (Global Data, n.d.). Most developed countries follow the trend of lower births per woman. This occurs as countries moved away from the previous social gender constructs which expected women to stay home as wives and mothers and encouraged women to start careers. However, Italy's decrease is far from normal. This drastic shift occurred in 2010 after Italy's second worst recession, the first following World War II. Italy has since lagged behind other European countries in terms of technology and education. Italy is working to increase its birth rates and stabilize its country's population growth (Mody, 2014). To encourage procreation, some businesses, both small and corporate, offer paid time off, school funding assistance, and even paycheck bonuses to employees with children. If this issue is not resolved soon, the economy will continue to weaken and eventually fail. If Italy continues at its current rate of 1.2 average children per family, there will never be enough people in the workforce to sustain the needs of a more developed country.

Italy is divided formally into four climates: Alpine, Mediterranean, Peninsular, and Po Valley. The Northern and Central parts of Italy consist of an Alpine climate, centered around low nighttime and winter temperatures and moist summers (Climate Change Knowledge Portal, n.d.). These climate characteristics cater to the growth of crops such as grain and soybean. The Northern section of Italy is also known for its meat and dairy production. The mountain ranges are home to a second climate, Po Valley. This climate consists of low winter temperatures, and high summer temperatures and is known for being moist in the spring and autumn months. As you travel to the center of Italy, the climate shifts to become Peninsular. This climate includes mild temperatures, and similar to Po Valley, moist spring and autumn along the coast. The last climate in this formal four is Mediterranean. As you travel south or into the islands in the winter, you will be met with mild temperatures and occasionally rainy weather. In the summer, you will find pleasing hot, sunny and usually dry days. Southern Italy's moist Mediterranean climate is perfect for growing crops like grapes and oils. The Northern and Central parts of Italy have somewhat different

climates. Italy's public health care is rated one of the best in the world. Citizens have access to both public and private healthcare. Italy uses an SNN (Servizio Sanitario Nazionale or National Health Service in English) which acts as their public healthcare system. (International Citizens Insurance, n.d.)

The main issue in the global fashion industry can be found within its textile production. As previously stated, the two biggest environmental hazards textile production creates are, water usage and the pollution of said water back into its sources. The reasoning behind the trillions of liters of water used for textile production stems from the extensive process which converts organic materials like cotton into a material that is usable for textile assembly. This process includes the spinning of raw cotton to produce thread and the weaving of the cotton thread where the thread is woven to create fabric. Not only does this process require water to make these materials, but to grow them as well. Cotton is one of the thirstiest crops. To grow just one kilogram of cotton 10,000 liters of water is required. Cotton is the most heavily sprayed crop in the world. These herbicides runoff into waterways, starting the cycle of low-quality water and soil (Milton, 2023). After cotton has been grown, harvested, and woven into a fabric, it can then be treated in a variety of different ways. Methods to bleach, dye, print, and modify the fabric now account for an estimated 20% of global water pollution. The toxic chemicals and dyes are often dumped back into waterways.

Water pollution degrades the quality of both the water and soil it comes in contact with. Low-quality soil produces low-quality crops, if it can grow anything at all. This is where we start to see how the fashion industry affects agriculture and food supply. With the rise of fast fashion, more clothing is being produced each day, which releases more harmful chemicals into Italy's waterways. Aside from water pollution, the fashion industry also contributes to the 466 tons of textile waste in Italian landfills each year, not to mention the microfibers and plastics that are released into waterways and on land once clothing is produced and discarded. Microplastics harm wildlife that unintentionally consumes them as well as humans who eat those animals. These factors all weaken the food production of a country. The list of environmental harm goes on, clothing also requires energy to produce, meaning it contributes to the combustion of fossil fuels into our earth's atmosphere. Italy is rated the worst European country for textile waste, however some Asian countries like China, India, and Bangladesh have it much worse. As a result, these countries experience very drastic water quality effects. The synthetic chemical dye affects both color and quality of water, causing some lakes and rivers to turn red and sometimes even black.

Microplastics are often a product of textile waste. They are released when synthetic materials used in clothing, such as polyester and nylon, shed microfibers during washing and use. Microfibers then enter the environment through wastewater systems and end up in our oceans, rivers, and other natural ecosystems. Microplastics are particularly harmful to animals. Through a process called bioaccumulation, increased concentrations of microplastics are passed up the food chain. This bioaccumulation is fatal to animals and when consumed by humans causes can be deadly. Along the process of bioaccumulation microfibers can absorb harmful chemicals that are then passed to humans and can potentially cause cancer, chronic inflammation, and other unknown human health effects (Ordoñez, n.d.).

There are many ways to approach the issue at hand. The first one is at the source: cotton. One way to reduce the amount of water used to grow cotton is to use organic cotton. Organic cotton has a 91% lower water consumption rate than regular cotton, needing only 243 liters to make one t-shirt (Rigg, J.). To grow organic cotton pesticides, and herbicides are not used. Growing organic cotton uses “green water”, natural sources of water like rain. Regular cotton is grown with “blue water”, which is taken from water sources like aquifers and watersheds and used through different irrigation methods. Other benefits include 46% less carbon dioxide emissions and lower soil erosion statistics. Unfortunately, cotton is not the only fabric used in the fashion world, therefore, this solution would not encompass the issue as a whole. Another solution that focuses on the materials used to produce clothing as well as reduces synthetic chemical water pollution is to use fabrics made from food waste, mushrooms, and seeds. Now, this idea may sound irrational and unsanitary but this new wave of sustainable fashion will prove otherwise. One company, Keel Labs, created a sustainable alternative to thread. They have cultivated a type of seaweed/kelp-based yarn that has a significantly lower environmental footprint than other conventional fibers like cotton. This new yarn could serve as an alternative to cotton woven fabric. One downside to this solution is that seaweed is a living being and would be subject to exploitation from organizations that are difficult to regulate. Faborg, another sustainable fashion company, has created vegan wool from milkweed. This process requires zero chemicals, drastically reducing the chances of contaminating waterways with synthetic chemicals. The reduction of these chemicals would in turn strengthen agriculture that was once damaged by the synthetic chemicals used in traditional textile production. (Keel Labs. (n.d.). *Kelsun*)

This next solution focuses on one way to reduce/recycle already existing cotton fabrics in a way that is beneficial to the production of new cotton. A series of farming trials in Australia have concluded it is possible to use textile cotton waste to enhance the growth of new cotton crops. The cotton waste acts as a natural fertilizer for growing cotton and has shown no negative side effects during production. This experiment was made possible through a partnership with Better Cotton. Better Cotton is an organization with goals to embed sustainable farming practices and policies into the world, enhance the well-being and economic development of both farmers and workers and drive the global demand for sustainable cotton. (Better Cotton. (n.d.). *2030 Strategy*.)

It is predicted that by the year 2050, there will be more plastic in the ocean than fish (The Maritime Aquarium, n.d.). While it is important to produce fabrics that will reduce the production and release of microplastics, the most pressing action that needs to be taken is the removal of already existing microplastics in our waters. Companies like The Ocean CleanUp are in the process of tackling this enormous project. They use different innovative “systems” that collect ocean plastics and remove them from the ocean (The Ocean Cleanup, n.d.). Once our oceans are clean, stopping the release of microplastics at the source is the next big step. This would be the most effective way to end bioaccumulation and its harmful effects on animal and human health. Ways to do this include the use of innovations for fabrics such as organic cotton, fabrics made from food waste, mushrooms, seeds, milkweed, and seaweed.

An effective way to stop the dumping of harmful textile chemicals into Italian waterways in the first place would be to place laws and regulations making it illegal to do so. These regulations could include limits on the amount of waste that is permitted to be dumped into waterways, as well as the type of chemicals entering the water source. Specific laws could also be put in place to ban the usage of many of these harmful chemicals. A variety of EPR (Extended Producer Responsibility) laws have been passed in France and Sweden. These laws hold manufacturers responsible for the entire life cycle of their products. These laws place limitations on both a company's packaging and the waste that is produced along the way from textile production. The Netherlands, The UK, Bulgaria, and Catalonia are all in the process of implementing these 2023 laws.

For many everyday citizens, the easiest way to reduce their contributions to the environmental effects of the fashion industry is to shop sustainably. This could include shopping with exclusively sustainable brands that are upfront about their sustainability goals and have plans to reach them. This method of shopping is not as accessible to everyday consumers as it is sometimes much more expensive. A second way to shop sustainably is to buy secondhand. This process of shopping reduces the amount of clothing waste in landfills, therefore reducing the amount of contaminated water runoff from landfills back into the water supply of a country. Shopping secondhand is more attainable for the general population as well. It is already seen as trendy among youth populations in America and across other parts of the world. When it comes down to the public's reaction and support of sustainability practices being implemented in a country, shopping secondhand would be the best start. To create a drastic change in the way a country produces a product, you need to be willing to start small. Jumping to large-scale production laws and regulations could result in a lack of support from the public. Each one of these solutions requires a population dedicated to spending immense time, energy, and money to achieve a sustainable earth. This will only happen with government cooperation and citizen support.

The next time you slip into your favorite cotton t-shirt, remember to think about how it got there. Were those 2,700 liters of water worth it? Is there a better way to shop? As humans, we must work together to change our current practices and sustain Earth's resources for future generations. Take time to analyze how what you wear affects the environment you live in. Changing the ways we grow and produce textiles can help free up other resources to tackle the problem of food insecurity. Food security can and will only happen if countries do their part to invest resources into solutions that solve the issues impacting agriculture for the long term.

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