

## About A Sustainable Future

The basis of my research is raising awareness about unsustainable consumption habits that are secretly sabotaging our beloved planet. I researched into the irresponsible consumption of resources, and I learned about its deleterious implications for the environment. As the human population continues to expand at an ever-growing rate, the callous attitude towards consuming natural resources will hasten global warming and challenge the biodiversity of numerous ecosystems. Although this issue persists on many levels, I wanted my project--A Sustainable Future (ASF)--to address a fundamental part of my life: academia. Through my research, I realized I could become a climate activist within my very own community, thus determining the direction of my project. For ASF, I hope to not only create a consumption model to aid my school in addressing its irresponsible paper consumption, but also develop a public resource to aid students in becoming climate activists within their own schools.

ASF is of great consequence to me, as it not only offers an opportunity to further my interest in the statistics field, but also allows me to make a meaningful impact on my school. Moreover, the nature of my project will allow me to combine country-wide data with data I have collected at school to formulate an accurate consumption plan for the school. My prospective experience with gathering data and implementing it to design a consumption plan mirrors the application of data being used to design studies in the pharmaceuticals, a field I hope to one day enter.

Through ASF, I ultimately aim to create a machine learning model for schools to better predict their paper usage based on various factors. First, I will organize a statistics study behind my school's paper consumption. Using data collected, I will analyze these patterns and design a paper consumption/budgeting plan that will aid my school in minimizing its harmful environmental impact whilst streamlining expenses. Originally, I had intended on making a customizable consumption plan/model that could be utilized by any school, as models are typically flexible and based on various inputs that users fill in. However, it is difficult to gather comprehensive data from so many schools, prompting me to focus on my school in particular. Moreover, there are potentially biased sampling procedures to consider if I choose to distribute paper consumption surveys to other schools. While I am still hoping to accomplish this component of ASF sometime in the future, I understand that every mission must start somewhere.

In order to widen the scope of my project's influence, I will also develop a website to house my research and make my work publicly available for all to review! Through making a public website, I can officially start sourcing data from external schools. Moreover, I can make my website a resource to educate others on responsible consumption. This project is of great importance to me, as it not only offers an opportunity to further my interest in the statistics & machine learning fields, but also allows me to make a meaningful impact on my community.

Over the first half of my project I focused on data analysis. First, I make a clear list of all facets pertaining to paper consumption (toilet paper, copy paper, text books, etc.) to determine what

data I want to collect. For my research, I also gathered data on paper usage based on factors such as subject, grade, department, student preferences, etc.

Next, I designed two surveys: one to obtain a better insight into faculty paper usage and another to gauge student familiarity/comfort levels with using technology in lieu of paper. When designing the surveys, I ensured that there was as little bias as possible, and I also made sure to employ random sampling methods.

Distributing these surveys proved surprisingly challenging. Under FDA regulations, all student researchers must first obtain IRB approval before administering any surveys to students. The process--although not arduous--delayed the response rate to my survey, as students had to receive additional parental permission to fill out the survey.

From there, I performed linear regressions through Google Colab (Python) between different sets of bivariate data. The majority of the time, I trained models on certain factors vs. the amount of paper used. There were many interesting patterns in data I observed, which ultimately factored into my final model.

Aside from the technical component of ASF, I also developed a website (<https://che2547.wixsite.com/a-sustainable-future>) that features my thorough research, several presentations, and fun recipes I made all regarding sustainable consumption, for all to view!

A Sustainable Future tackles the irresponsible consumption of paper in the academic setting. More broadly, unsustainably consuming natural resources plays a debilitating role in global warming, particularly in an era where demand only grows exponentially alongside the human population. According to recent estimates, “[t]he global population could grow to 9.7 billion in 2050. The equivalent of almost three planets could be required to provide the natural resources needed to sustain current lifestyles” (Joint SDG Fund). All of humanity, both countries and individuals, must embrace sustainability to prolong their futures.

ASF was developed on the basis of preserving the planet--starting with schools. Every student deserves the opportunity to make lasting environmental contributions in academia, so I created a comprehensive digital resource--reaching others through the mediums of presentations, videos, and research--to advocate for the importance of responsibly and sustainably consuming resources, particularly those that students take for granted (<https://che2547.wixsite.com/a-sustainable-future>). Next, using comprehensive data collected from my school, I designed a consumption model for the district, which I plan to one day make accessible and customizable for all schools.

Oftentimes, change starts local, and although my project may have started small, I have faith it will unfurl into a nationwide environmental initiative. This first step--bringing irresponsible consumption to the attention of others--is the first step towards creating A Sustainable Future.