

**Honors Thesis: Foundational Document and Personal Reflection:
A Reflection on the Rooibos Tea Industry: Empty Tea Bags**

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Project Overview

Tea is a popular beverage enjoyed by tea drinkers in all corners of the globe. There are many variations including green, black, white, and herbal, among hundreds of others, all of which contain special ingredients sourced from global regions. While a great deal of tea ingredients are grown across Asia, specifically in India and China, specific roots, leaves, and spices are also found in South America and Africa. One such plant, known as Rooibos, is uniquely found only within a specific region within South Africa, called the Cederberg Region. With the entire supply of this plant concentrated in just one region, there are concerns about the protection and longevity of the rooibos crops. When a global supply comes all from just one place, forming a bottleneck, there are several complex sourcing issues that could arise if that supply is diminished. This foundational document will focus on the rooibos industry, how it is grown and harvested, the environmental, economic, and social concerns related to rooibos and South Africa, and ongoing solutions to these challenges.

Art Piece Overview

In addition to this foundational document, my thesis is presented in a visual medium, a world map created out of recycled tea bags. The piece highlights the scale of the globe compared to the small land area from which rooibos originates. It is also made using sustainable materials, highlighting the importance of global sustainability initiatives. I chose to produce a fine arts project for my thesis because I believe that the visual medium is an approachable way to introduce and represent complex issues. Current research in the art field has shown that contemporary art today, more than ever, is a catalyst for activism and political identification (Strehovec, 2020). The rooibos industry is plagued by several challenges, one being recognition. A visual representation of industry challenges via the tea map allows viewers to find intrigue in an industry and learn about something that they may not have encountered previously. I think that the interconnections of business, art, and social science in this piece make it approachable to a wide audience, prompting thought and curiosity on a multi-faceted situation.

Personal Connection

This piece reflects my academic journey and combines a number of passions I have both personally and academically. When I first came to college, I wanted to double major in business and ecosystem science and sustainability but was told that the timeline would be too extensive. I opted to prioritize business as my major, in which I concentrated on supply chain management and management and innovation. Missing the sustainability aspect of my academic repertoire, I added a minor in diversity and inclusion in natural resource management. When it came time to select my honors thesis, I knew I wanted something that combined all of these fields. For my international business course a year ago, I had the opportunity to write a paper about a niche product. Unsure what to select, I started digging through my pantry to find something special to write about. This is how I stumbled upon rooibos. I love rooibos tea and after running a quick search on it, I learned that rooibos has a very unique story; one that encompasses my passions and provides a framework for my thesis.

Project Foundation

Rooibos, pronounced roy-boy, is grown in the Cederberg region of the Western Cape in South Africa, which spans only roughly 70,000 hectares, or 3,092 sq miles (Waters, 2019). Rooibos tea is created from the leaves and fine stems of the plant, also known as *A. linearis*, and has been regularly consumed by indigenous groups, especially the Khoi-Khoi tribe for centuries (Bovell-Benjamin, 2022). Widely revered for its health benefits, rooibos is known to have high “antioxidant capacity, chemopreventive potential, modulated immune effect, and antiallergenic actions” (Bovell-Benjamin). Given that rooibos is only grown in a single place, most of the historical knowledge we have about its use, growth patterns, and harvest is based in indigenous knowledge systems, or “understandings, skills, and philosophies developed by local communities with long histories and experiences of interaction with their natural surroundings” (Zhang and Nakagawa, 2017). The knowledge of the rooibos industry is collaborative among the farmers of the Cederberg region, but most knowledge is rooted in the traditions of the San and Khoi tribes who have cultivated the land for centuries (Meyer, 2023). This element of the rooibos industry is crucial and an incredibly important consideration when commenting on and understanding the processes around this product.

Environmental Requirements

While other countries have tried to enter the rooibos market, growing the plant has never been successful in another location. This is due to a number of environmental factors that are unique to the Cederberg region. The soil makeup contains specific microorganisms that allow for correct pH balance. Rooibos requires very acidic soil that is difficult to replicate outside of natural conditions in its native region and improper soil conditions can result in flavor differences and discolorations. “Rooibos grows at altitudes ranging from 200-1000 meters above sea level and is adapted to nutrient-poor, well-drained, and acidic sandy soils with pH ranging between 3.0 and 5.3 (Muofhe & Dakora, 2000) and where the clay layer is at least one meter below the surface” (Mkhanzi, 2023). The conditions are highly specific and not replicable, further solidifying the importance of the Cederberg region. In addition, the rooibos plant thrives in a sandy eroded sandstone geological landscape, which is once again hard to replicate in just any place. The climate also plays a major role in the successful cultivation of this plant, as it is accustomed to “a wet season that spans the southern hemisphere’s winter and spring, and a dry season that is typically very hot and usually lasts the six months from November to April”. If this cycle is inconsistent, the rooibos crop is less likely to succeed. The very specific environmental conditions of the Cederberg region are an important part of this ingredient’s story. (Travislyle, 2022)

Production

Growing rooibos is a highly intensive process, depending heavily on perfect conditions and great effort on the part of the farmers. Rooibos crops are fairly non-damaging to the soil, meaning one plot of land can be used for up to 6 years in a row before taking a couple of off years to allow the soil to recover (Ngcuka, 2021). Rooibos seeds are usually planted around January, and are harvested by hand in December, the start of summer in South Africa. After being harvested via hand scythe, the bundles of crop are cut into a uniform length by machine. After harvest, the plant has to ferment briefly, during which the crop changes from green to the signature red color. It is then dried, and packed. The whole process of cutting, fermenting and drying takes less than 24 hours. After this, it can be stored for around a decade. The growth process from planting to packaging is full of specific and well-kept processes. Since the

product is only situated in one area, much of the knowledge around the details of the process is kept in the region, with those who have been doing it the longest. (Travislyle, 2022)

The Rooibos Market

Important to an understanding of rooibos as a product, is an understanding of the market. It is estimated that in the Cederberg region, there are roughly 450 producers of rooibos, most of whom sell to a singular distribution company that presently owns 75% of the market (Waarts and Kuit, 2008). It is only since 1996, with the end of apartheid, that Indigenous and other marginalized farmers have been able to participate in the rooibos industry competitively (Rampedi & Oliver, 2008; Endo, 2021; Ives, 2014). Based on market data, rooibos tea has increased demand over the last few decades. “South African exports [of rooibos] have skyrocketed from barely 500 tons in 1996 to nearly 9,000 tons today [2023]. That's enough to fill 3.6 billion teabags” (Trenchard, 2023). While “rooibos tea constitutes less than 0.3% of the global tea market, it represents 10% worldwide of the growing herbal tea market and 30.9% of the South African tea market” (Wynberg, 2017). The presence and growth of this industry are substantial on the global playing field.

Due to increasing demand for the product, more land is being cleared every year to accommodate new rooibos farms, with around 2.7 hectares of untouched land being cleared for new farms every day in the previous 15 years as of 2008 (Waarts and Kuit, 2008). Stakeholders regularly invest in new farms and rooibos plantations. Important to note is that these outside stakeholders own the land and rent it to Indigenous farmers. In fact, “all of the 77 farmers of the Wupperthal Original Rooibos Co-operative rent their plots from the Moravian church” and “Black and mixed-race farmers still control just 7% of land under rooibos cultivation” (Trenchard, 2023). The market is not controlled by Indigenous farmers, even though these are the people who have the longest and best knowledge of the crop. The industry is growing, but not in a way that is sustainable for the land or the people who cultivate it.

Challenges with industry growth pose difficulties for farmers, and as growth becomes more intense, it becomes even more difficult to farm sustainably. Out of the 450 producers, only around 5-10% are able to sell their rooibos as organic, based on several sustainability agreements (Waarts and Kuit, 2008). Organic rooibos is defined simply as rooibos that are grown under environmental land management standards. Most of the land being parcelled out for rooibos farms is not under regulation for these sustainable practices. Environmental impacts of rooibos also extend to soil composition. It is known that soil is a major source of carbon entrapment. Tilling the soil on large pieces of arid land can cause carbon to escape and contribute to further CO₂ levels in the atmosphere. Despite the historical sustainability of the rooibos agricultural system under indigenous cultivation, since Cederberg is the only place in the world with rooibos, increased demands have led to the infiltration of less environmentally conscious practices, in an effort to match the needs of the tea-drinking world.

Industry Challenges

Arguably, one of the largest challenges facing the rooibos market today is climate change. Increasing temperatures, and the resulting droughts, pose a large threat to growing conditions for the crop (Travislyle, 2022). Indigenous populations in the region, specifically the Wupperthal people, descendants of the Khoisan tribe, have noted the impacts of climate change on the crop. A sustainable farming strategist working in the area said the following:

There are effects in rooibos that run parallel to climate change. You can't take a five-year drought and say it's climate change. But also, you can't ignore anecdotal evidence from farmers whose fathers have farmed. They've been farmers since it started in the 1800s. (Ngcuka, 2021)

An Indigenous farmer, Barend Salomo, noted the following:

When we sense the change in weather, we don't sense it immediately. As we grew up, we came to the conclusion: we have higher temperatures, longer summers, and the winters are so short. There is a different kind of nature that we now experience. (Ngcuka, 2021)

Western scientists and indigenous farmers alike are noting the environmental impacts on the rooibos growing region. Many farmers in 2016 and 2017 lost significant crop yields to extreme drought. Even though stakeholders are encouraging the growth of the rooibos industry, "the research furthermore suggests that under these circumstances about 50-90% of rooibos in the western and northern rooibos regions of the Cederberg area in northern Western Cape, could be wiped out by the year 2070" (Ngcuka, 2021). Rooibos is an industry at risk. As the conditions worsen and supply stores decrease, it is likely that rooibos will become an even less accessible product. Finding solutions to the major climate impacts on the plant will be a necessity in the years to come if this specialized product is to live past the end of the century.

Legal Protections

The rooibos industry is especially unique due to its genetic resource protections, unseen in any other industry to the same degree. The first notable agricultural benefit-sharing agreement was the 1992 Convention on Biological Diversity which groundbreakingly addressed the interconnections between the environment and human injustices around the globe. This, unfortunately, remained fairly unenforced and was supplemented in 2010 with the Nagoya Protocol, which added legal enforcement. This was inspired in part by an instance of biopiracy in 2009 when Nestle attempted to secure five patents for the use of rooibos in skin care products. They were not granted patents since rooibos is considered protected genetic material. In 2014, Nestle signed a benefits-sharing agreement with the SA San Council and the National Khoisan Council" (Meyer & Naicker, 2023). This groundbreaking agreement between farmers, the local government, and a global business is highly unique.

Still, challenges persisted, and farmers in the Cederberg region felt that they were not receiving the necessary recognition for their knowledge of the crop. After a series of legal efforts and inquiries through the Department of Environmental Affairs, the 2019 Rooibos Benefit Sharing Agreement was signed between the Khoi and San peoples, as well as the rooibos industry at large. (Schroeder et. al., 2020). This industry-wide agreement was the first of its kind in terms of global agricultural intellectual property and enforcement, solidifying the Khoi and San peoples as traditional knowledge holders of rooibos. This also resulted in an agreement between the South African Rooibos Council and Khoisan leaders to pay a 1.5% subsidy to farmers for any unprocessed rooibos production (Trenchard, 2023). This milestone is a fantastic step towards protecting indigenous agricultural knowledge and supporting sustainable farming practices.

In 2021, the rooibos plant was given "Protection of Designation of Origin" status by the EU, one of the main importers of rooibos from South Africa, helping to recognize rooibos on the global plane as an at-risk and precious ingredient (Trenchard, 2023). With this new title, the word rooibos can only be used to reference plants grown in the Cederberg region. This protection is similar to a standard trademark, wherein companies outside of South Africa can't claim ownership of rooibos products. Further recognition of indigenous history and knowledge will be a crucial step moving forward, especially since

many of the land plots that rooibos grows on are owned by non-indigenous individuals and outside companies. Continued growth should be done only after consultation with indigenous groups. These are the people who know the right places and times to plant crops, how to conduct the proper fermentation methods, and how to respect the land in a way modern stakeholders in the rooibos industry do not.

Project Reflections

Intent

The intent behind this piece is to demonstrate that issues of global equity, climate, and business are converging around the world. I selected rooibos tea to represent the convergence of these topics because it is a highly unique situation, and yet the issues presented in this case (political unrest, environmental change, respect for indigenous cultures, and global business) are relevant in every industry and every country. Rooibos tea is a bottleneck ingredient in the tea industry because of its unique social and agricultural factors, and if global tea sellers can't learn to support the very specific needs of this industry, their tea bags will be empty in the years to come. The piece notes the importance of approaching challenges from multiple disciplines, while also recognizing the widespread interconnectedness of global industry.

Art Piece Process

The piece is a world map made out of recycled tea bags. The process of making this piece began with the collection of tea bags. With the help of friends, family, peers, and college faculty, I obtained used tea bags which were subsequently dried before being emptied of all residual tea leaves. I did this by carefully cutting a hole in the tea bag and extracting all of the tea. I was left with over 175 empty tea bags to utilize. I prepared the corkboard with a traced projection of the Mollweide map projection. With the world outlined, I glued the tea bags onto the board, forming the shapes of the world's land masses. After creating the world in tea form, I used dried rooibos tea, saved from the tea bag emptying process, to highlight the very small region of South Africa where rooibos tea is grown, the Cederberg region. The final step was to glue leftover tea from the other teabags to the frame. This resulted in a finished project that much resembled my original hopes for it.

Piece Symbolism and Meaning

The piece itself is on a corkboard map, like one you might find in any office or classroom. This foundational element of the piece serves as a medium on which to present the map, but it also serves as a reminder that change starts with knowledge. Corkboards are frequently used in the media and the classroom to show how things are connected. This corkboard serves the same purpose.

The map projection used is a Mollweide projection, selected for its ability to represent Africa in the right proportion and shape compared to the rest of the world. In this projection, Africa is accurate and central on the map. The preservation of the shape and size of Africa helps draw focus but also reflects the literal importance of preserving the Cederberg region of South Africa.

The continents are shaped using empty tea bags, representing the tea industry of South Africa and reflecting the importance of sustainability and environmental consciousness. The use of teabags in this piece also demonstrates the widespread reach of the tea industry as a whole and the number of places that would be affected by the loss of this agricultural product. The fact that the tea bags are empty shows that exact idea: a world without tea.

The use of the actual tea in the piece serves two purposes. The first is the rooibos tea in and around the Cederberg region. The small area provides a visual representation of how small the region is compared to the rest of the world. The tea around the frame is simply because I wanted to use as much of the saved material as possible, an important goal of sustainable art.

Project Reaction

I anticipate that the reaction to this piece will be intrigue. By creating an art piece from recycled materials, the piece is visually noticeable and recognizable. I hope that viewers will see it and become curious. The piece is meant to demonstrate how a failure to approach a global business challenge through multiple perspectives will result in a global shortage of rooibos tea. I hope that business students will see this and reflect on the positive and negative role that business could have on niche industries. I want them to see that business issues are not just about finances and profits, but rather the longevity of resource access and the environmental and social factors that make products renewable. I hope that general viewers of the piece can reflect on their personal consumption and understand how their lives, and the lives of billions around the world, could be impacted by the failure of even just one agricultural industry. I hope that when people look at this piece they are drawn to the Cederberg region and how small it is compared to the rest of the world. I want them to understand the widespread reach that this product has, and how the deterioration of such a small place in the world can have resounding impacts on distant places. The project aims to cover a lot of ideas, but I hope that viewers will be intrigued and reflect on something new to them.

Lessons Learned

Putting together this project has been such a rewarding way to complete my time in the honors college and at Colorado State University. I learned several things, but two important lessons stand out. The first is that success is a healthy blend of personal discipline and reliance on others. Throughout the project, I maintained a very independent structure, allotting myself time to work, collecting materials, and conducting research. However, this project would not have been possible without the support of my community and peers. I drink a lot of tea, but not nearly enough to have made this map with just my own contributions. I had friends, other students, and even faculty taking the time to set aside their tea bags, dry them, and send them my way. Their generosity and willingness to support me made it possible to complete my project. With this project, and with anything, you have to handle what you can on your own, but it is okay to ask for help and to accept the support of those around you. We find the most success when we work together as communities to reach goals.

This sentiment is also a part of my second major lesson: complex issues require complex solutions. The rooibos tea industry faces so many challenges, and it is impossible to solve anything without looking at all the factors. It is only through an understanding of the political, economic, religious, racial, agricultural, environmental, and global factors around the industry that we can even begin to create expansive solutions to ongoing problems related to social and environmental longevity for the region. This takeaway more broadly serves as a reminder that the more perspectives you can hear regarding a situation, the more all-encompassing a solution can be. Problem-solving must be collaborative and inclusive. In my own life, this idea will be the foundation of how I approach situations because I will seek out the expertise of many, not just rely on my own opinions and perspectives. My academic career has provided me with an interdisciplinary education, and my thesis has demonstrated that I can think complexly about global challenges in the context of business, people, and the environment. I look forward

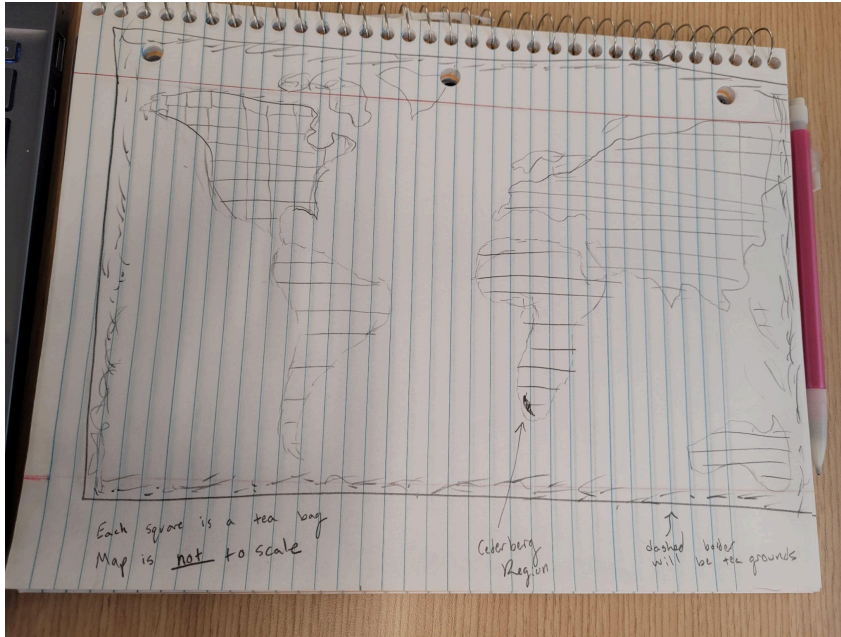
to taking these experiences with me as I finish my degree and enter the workforce in search of ways to make the world a better place, one tea ingredient at a time.

My biggest takeaway from this experience has been the value of acknowledgment, and the power of education. We as individuals can't solve global issues alone, but we can seek out information, share that information, and build communities that can make change. This art piece serves to acknowledge the unique challenges of a singular industry and start a conversation about the successes that have come from past instances of acknowledgment. The social successes of the rooibos industry can serve as a blueprint for effective integration and support for indigenous agriculture, but also for all industries looking to better support their foundational suppliers. We as individuals can't fix every industry, but we can certainly start talking about the problems we see. This idea applies to the broadest scope of our global challenges: climate change. We can't solve it alone, but if we keep talking and keep asking for change, eventually the companies and governments with the resources to do so might make a positive stand. The rooibos industry has shown that positive progress is possible through a collaborative effort of the global market, companies, governments, and individuals.

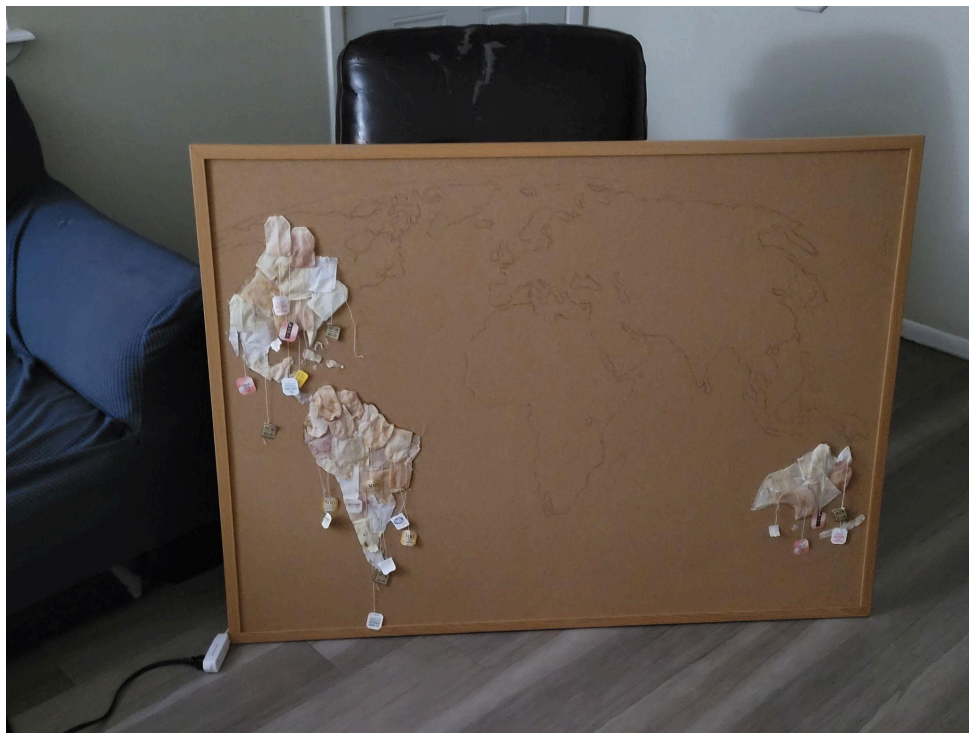
Appendix

A. Process Images

- a. In order: Initial Sketch, Mollweide Projection Sketch Outline, Completed Outline, Tea Bag Preparations, Map Progress 1, Map Progress 2







B. Exhibit Placard

Molly Peek (Graduated Dec. 2024)

Empty Tea Bags, 2024


Honors Thesis: **A Reflection on the Rooibos Tea Industry: Empty Tea Bags**

Rooibos is uniquely found only within a specific region within South Africa, called the Cederberg Region, spanning just over 3,000 sq. mi.. With the entire supply of this plant concentrated in just one region, there are concerns around the protection and longevity of the rooibos crops. Not only does rooibos require highly specific growing conditions, but most of the historical knowledge we have about its use, growth patterns, and harvest is based in Indigenous Knowledge Systems, or “understandings, skills, and philosophies developed by local communities with long histories and experiences of interaction with their natural surroundings” (Zhang and Nakagawa, 2017). The knowledge of the rooibos industry is collaborative among the farmers of the Cederberg region, but most knowledge is rooted in the traditions of the San and Khoi tribes who have cultivated the land for centuries (Meyer, 2023). The Khoi and San peoples have been internationally acknowledged as traditional knowledge holders of the rooibos crop, a groundbreaking development in international agriculture. If this crop is to persist though, ongoing support for the communities who cultivate it, as well as a strong stance on climate change mitigation must be maintained. If we has a global community can’t support niche industry farmers, their crops will go extinct, be it from lack of land to grow on, or lack of people who know how to farm the crop. If we don’t approach global industries with well-rounded solutions, our tea bags will be empty.

C. Final Digital Image



D. Oral Presentation Slides

- a.  Rooibos Presentation

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