Team Research Plan

What steps has your team taken to understand the framework of the circular economy? (250 words maximum length)	Our team runs in the footsteps of promoting a sustainable environment that requires a change in resources and waste management. We understood the circular economy in Banana fiber extraction that minimizes the waste losses from the high growth of this plantation in Rwanda. We want to close the life cycle of these products through the increase and optimization of their use (Alzate Acevedo, et al., 2021). We were also more concerned about the most imminent problem the world is facing today, poor waste management. We will be able to open gates for economic growth while allowing the raw materials to transform into circular loops with technology adoption and a sustainable recovery process in the banana industry. This will reduce the waste accumulation from the banana industry and promote the sector more sustainability, hence promoting the circular economy.
What is the wicked problem your team is interested in addressing? (250 words maximum length)	The key issue that we are attempting to resolve is the management of banana fibers. Bananas, Rwanda's main crop, are farmed by an estimated 80% of small farmers and serve an important role in household food security. From 2005 to 2010, Rwandan bananas were infected with a disease known as Banana Xanthomonas Wilt (Feed the Futurecritical, n.d.,2021). Banana wilt (Banana Xanthomonas Wilt) is a disease caused by bacteria from discarded banana fibers. It is a bacterium that spreads rapidly from dead banana fibers to newly planted bananas. The infection may survive for a more extended period if it is exposed to water and dead plant components such as dried leaves and rotting banana fiber. Insects, notably bees, and farm equipment, are the primary vectors of the disease. The disease is spread when bees drink fluids from an infected male bud and then drink liquids from a healthy male bud. Plant dead components, such as dried leaves and banana fibers, can help the disease live longer (Plantwise, 2015). People were urged to chop down every banana that had symptoms to decrease the disease, resulting in a massive hunger effect due to a scarcity of banana production. The project aims to eradicate Xanthomonas wilt, which affects the banana and results in poverty. In addition, the initiative will bring job opportunities to the youth and the community where we will be obtaining these banana fibers for use in the production of the chosen items, such as textile and paper.
Description Area	What context is critical to help others understand the wicked problem your team is interested in addressing? Provide 3 web links that provide this context.

Link 1	https://www.plantwise.org/KnowledgeBank/FactsheetAdmin/Uploads/PDFs/20127801776.pdf
Link 2	https://www.textiletoday.com.bd/clothing-banana-fiber/
Link 3	http://webistem.com/psi2009/output_directory/cd1/Data/articles/000082.pdf
What human, technological, and ecological factors impact the wicked problem your team is interested in addressing? (250 words maximum length)	After conducting an in-depth study in the field, we realized that many environmental and productivity benefits are associated with banana fiber extraction. We believe in the power of a circular economy to contribute to sustainable development. As we progress through the 21st century, human activities are closely related to climate change and habitat destruction for both fauna and flora. Banana fiber extraction would be one of the ways to achieve sustainable development and make our planet healthier. We also intend to use technology, as we will be using machines throughout this project. As we move forward in the new technology era, we want to use technology to help us achieve our goals.
How could addressing this wicked problem support the development of a circular economy? (250 words maximum length)	Rwandan banana output is around 2.5 million metric tons per year. The crop is farmed on about 165,000 acres and accounts for approximately 23% of all arable land. Seasonal Agricultural Survey reports (SAS, 2021). As the banana demand increases, we find it an opportunity for the banana fiber extraction project, which will support the development of the circular economy by waste management to produce a fabric used to make carpets, rugs, and textile material designs and paper. By designing out the waste of banana fibers, it will help the development of a circular economy since we will turn those wastes into new products. Furthermore, we also plan to recycle used products and turn them into new products and we believe that this process will be cycled and from our project, nothing is going to be wasted. As a team, we strongly believe that this is an excellent way to contribute to the community but also contribute to the development of a circular economy model.
How could addressing this wicked problem support the United Nations' Sustainable Development Goals? Choose 1-3 specific goals to focus on. (250 words maximum length)	Banana fiber extraction would be one of the ways to achieve sustainable development goals by 2030; we plan to manufacture textile from banana fiber that will be free from toxic petrochemicals like polyester, acrylic nylon. These are oil-based textiles manufactured by toxic substances that will eventually cause breathing problems, cancer, disruptions to human hormones. We intend to use biochemicals to develop goal number 3 health and wellbeing, creating employment opportunities to support goal number one: No poverty. The community will be recruited to our project and earn a living. Finally, banana fiber extraction will promote goal number 13 climate action protecting the environment by manufacturing natural fibers that are biodegradable or recyclable fabric. There will be possible recycling of used products to produce brand new ones.

How do you plan to involve mentors and/or subject matter experts in your design process as you develop your solution? (250 words maximum length)	So far, we have reached out to some individuals, including Dr. Kenobi Morris, a professor of mechanical engineering at Ashesi University, who will advise us on the technological aspect required to process banana fiber, and machine quotations. Also, Dr. Anthony Essel Anderson, an expert in financial accounting and, professor at Ashesi University, will help analyze the project's financial area and ensure the profitability of our business model. Dr. Nshogoza Gilbert, an expert in chemistry and a professor of chemistry at Rwanda Institute for Conservation and Agriculture, will help our project regarding chemicals that we shall need to use in our project.
What are your next steps? (250 words maximum length)	Our next plan is to conduct market analysis and market strategy to determine whether our new product will find a suitable market to raise resources to support the sustainable operation of this project. In this research, we want to include the research already developed by Rwanda Standard Board about Made in Rwanda progress. The goal is to gain a better understanding of how to introduce this new product in the country. We also plan to conduct additional research on getting used products to recycle them to produce new products. Therefore, Banana fiber extraction will be a sustainable solution in managing waste and creating new products. We must adapt to a circular economy to avoid climate change and its associated dangers.