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“An ounce of prevention is worth a pound of cure.”

-Benjamin Franklin

“Nearly 70 percent of Burundians live on less than one dollar a day”(GAFSP 2024).

The Republic of Burundi, commonly referred to as Burundi, is located in central Africa. It is persistently ranked as the poorest country in Africa and is among the bottom percentage in global economic measures with the “lowest gross domestic product per capita in the world in 2022”(World Health Organization 2023). Bordered by Rwanda, Tanzania, and the Democratic Republic of Congo, this small country is reported to have an approximate population of 14,390,003 people, 85.1 percent of which live rurally, while only 14.9 percent reside in urban areas (Worldometer 2019). The location of homes and workplaces for the people makes it nearly impossible to have access to necessities such as healthcare, food, and water. For being one of the smallest countries in Africa at a mere 27,830 square kilometers, it has one of the largest populations. This makes sustainable agriculture and even daily life difficult as 82.8 percent of land is considered to be ‘agricultural land’ while only 50.4 percent is deemed arable for farming, 13.6 percent for permanent crops, and permanent pasture coming out to 18.8 percent of the total land mass. This does not include the 10.9 percent of land consumed by forests and the 6.3 percent for miscellaneous or living use. These numbers allow for approximately 0.5 hectares¹ or 1.2 acres of land per family. Each family has approximately 4.8 people (Britannica 2025). These may seem like standard numbers but when compared to the United States, it is easy to see they are anything but normal. The United States’ land, when divided by family, amounts to around 463 acres or 187 hectares per family (GAFSP 2024). As a result of this, families in Burundi tend to live on compounds or in shared housing to preserve land (“Burundi” - the World Factbook 2025 [CIA]).

Despite the land being used for farming and livestock, the yield of harvest is diminishing. This is due to lack of nutritious soil, weather effects, and the climate of Burundi. February to May, and September to November, are wet seasons. June to August, and December to January, are dry seasons. The climate of Burundi is an “Equatorial; high plateau with considerable altitude variation (772 m to 2,670 m above sea level)” (U.S. Department of State 2017). This country is landlocked, therefore, the people have access to one freshwater lake (Lake Tanganyika) that is divided between three countries. Major watersheds for this region include the Mediterranean Sea in addition to drainage from the Atlantic Ocean. Considering its location, Burundi often faces setbacks in infrastructure and farming as a result of natural disasters including but not limited to severe flooding, landslides, and even drought. “Burundians’ living conditions and access to services are deteriorating” as a result of the catastrophic civil war that took place from

¹ hectares/ hek, ter/noun

plural noun: hectares; a metric unit of square measure, equal to 100 acres (2.471 acres or 10,000 square meters).

1993-2005 (Crisis Group, 30 Aug. 2018). Consequently, the country has faced economic failure. The citizens commonly dwell in homes where they cement stones together with clay, weave straw roofs, and have clay floors. In addition to lack of land, housing, resources, and other major necessities, Burundi does not have a sustainable agricultural system to support the population.

Furthermore, healthcare is almost completely overlooked as it is too expensive for most families to afford. Healthcare is also extremely limited as there is a lack of education in the country due to citizens being forced to work on farms and plantations from a young age. According to the World Bank, “Burundi has a total of 2,791,000 pupils enrolled in primary and secondary education”(2018). Although primary education is compulsory, nearly 17 percent of children opt out. If there is no education, there will be no doctors. Without doctors, there will be extremely minimal treatment for illnesses. The lack of a healthcare system combined with an overly densely populated country on a small amount of land, and little reliable infrastructure creates a pit for festering infectious disease. Burundi faces a devastating number of losses each year as a result of communicable and non-communicable diseases. The people suffer the most from the communicable diseases that drown the country including malaria, Tuberculosis (TB), Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS), as well as Neglected Tropical Diseases (NTDs).

In 2021, there were approximately 3.7 million cases and 5,957 deaths reported as an effect of malaria (World Health Organization 2023). Malaria has devastating numbers in Burundi as it is carried mainly by mosquitoes. The Democratic Republic of Burundi is ranked as the country with the highest number of malaria transmission in East Central Africa (Daily Nation). According to Daily Nation, “expectant mothers and children aged below five years are the most vulnerable demographic.” This created an issue in Burundi as the fertility and birth rate per year is 34.11 per 1,000 people (Macro Trends). Another issue feeding the malaria infestation is the location of housing. Malaria often beds in water. People living in areas surrounding Lake Tanganyika face extremely difficult attempts to protect themselves from insects they can hardly see. Recently, other countries have been decreasing their rate of transmission, while Burundi has done quite the opposite.

Unfortunately, malaria is not the only rampant disease they have been trying to get under control. The African region for the World health organization set a goal to deal with one of the biggest issues in the country, HIV/AIDS. This approach was named the 95-95-95. Since 2015, the goal has been to make 95 percent of people living with these diseases aware of their status, 95 percent who know their status join a treatment plan, and 95 percent of people living with HIV and on treatment are virally suppressed. As of the report in 2023, the progress was 93-98-93 (World Health Organization 2023). Despite the rising numbers, Burundians continue to contract the Human Immunodeficiency Virus for various reasons. Statistically speaking, Blood Borne Pathogens (BBPs) and Sexually Transmitted Diseases (STDs) spread rapidly in small, densely populated areas with poor socioeconomic status, as it is very common to come in contact with individuals who have acquired disease. Poor living conditions, lack of access to sexual protection, and lack of hygiene products also play a significant role in the spread of communicable diseases. As a whole, in all areas of the world, once a virus has spread it can be difficult to control due to the molecular components that make up the strand of the virus. However, in other parts of the world, individuals may have greater access to education, preventative measures such as vaccines, and treatments for infectious diseases such as antivirals or antibiotics for bacterial infections. HIV and other STDs create

immunodeficiency in humans as they attack the cells needed to keep a regular and healthy immune system. A Yale University study proves that someone who is healthy has “on average, 750-1,500 CD4 T cells per microliter of blood” (2024). The CD4 T or Helper T cells are a type of lymphocyte (NIH). The job of these cells is to trigger immunal protection signals to help fight infection by “stimulating other immune cells, such as macrophages, B lymphocytes (B cells), and CD8 T lymphocytes (CD8 cells)”(NIH). HIV kills the CD4 T cells causing no reaction to be triggered. As a result of the immunosuppression caused by the human immunodeficiency virus, people become extremely susceptible to the pathogens in other viruses.

There have been various approaches to mitigate the spread of infectious disease. Even so, the resolutions have only been temporary. We need to work to develop plans that will allow Burundi to not only fight off blood borne pathogens but allow for prevention. South Africa is substantially developed especially when compared to countries in East and Central Africa. With this being said, their spread of infectious disease is significantly lower while their ability to handle health issues at hand are much higher. A plan to educate the people of Burundi would make a significant impact. Providing education and training would be incredibly impactful. Not only education to the health care workers and general public on how they can maintain the spread of infectious disease or help infected persons, but how they are able to build a sustainable agriculture system despite the situation. Similarly, working to resolve malaria would possibly mean finding irrigation and water systems that are sustainable for everyday family and farming use or possibly implementing biotechnology techniques that would make certian agricultural practices viable in the particular environment. The various solutions that have already been tried include insecticide in an attempt to keep infected bugs off of food for human consumption.

Although Burundi faces the greatest health crisis, the surrounding countries have their own struggles. Tanzania has limited resources as well as a shortage of staff and equipment. However, since Tanzania does not suffer as great of an economic crisis as Burundi, they have been able to gear more of their income towards bettering and investing in the healthcare system and implement new trials and research in their agricultural systems. They have also worked to expand insurance coverage, and focusing on stopping the spread of communicable diseases. Similarly, Rwanda is recognized for its progressive healthcare system and continuous advancements. Based on the economic status of Burundi, it would not be advisable to implement similar programs or measures as the surrounding countries as they do not have the means to support their country as is. I do feel as though it could be advisable to take a full assessment of the incomes and expenditures of the country. Through the examination of the country's economic values, reallocate money that is not being well spent towards more in depth research and testing on agriculture. Some things that the money could go towards would be testing the hybridization of plants together to see if they are able to grow plants that would be more sustainable and beneficial to the country both for personal use and for trade. Sustainability for Burundi might look different from the surrounding countries. For example, while Rwanda has a more stable and predictable climate, Burundi's climate varies significantly based on the region. This means that the plants would have to be suitable for the climate. To bridge the gap between the healthcare problem, the effects of it, (people not being able to withstand hours of work due to immunosuppression) and farming or sustainable agriculture, it would be ideal that they are able to grow low maintenance crops. Also with the implementation of biotechnology, they would be able to create a water filtration system that would be more efficient than the one in place. This would aid in sanitization as well as decrease the spread of malaria. The issue with this plan is the

lack of education that exists in Burundi. I believe that the root of all the problems stems from undereducated people. Though it is difficult to spread information or educate people around a country with ravaging, festering disease spread, it can be done. There are alternate ways to educate that do not require people to attend frequent weekly or monthly meetings. This may be harmful to the already unstable workforce as it may be difficult for people to attend educational sessions during the work week. One important factor to consider is that the need to mitigate the issue could also be seen as an attack by the government, or even cultural invasion if it is not done properly. It would be ineffective if the Burundi government approached the people of Burundi with new regulations or requirements to live by if they did not recognize the concerns to begin with. Methods of approach must be taken into consideration in order to be cognizant of cultural sensitivities, so that the people will be receptive to the information provided to them. It is so crucial to educate, not only so they are able to come up with new ways and methods to feed the people of their country, but also so they are able to see clearly the terrible danger of the issues at hand with sustainable agriculture and infectious disease. For the people who have access to the internet and technology, which is a small number at only 11 percent (*Pulse*, 2023), it would be feasible to hold safety and education briefings via emails, zoom meetings, or calls. For those who don't, they could dedicate a few members of the government who are already educated on the issue, to travel to the different regions and teach the citizens.

As for the education on sustainable agriculture practices and the development of biotechnology as well as other preventive measures can be developed through education. Nelson Mandela once said, "Education is the most powerful weapon in which you can use to change the world." Another important measure is to make sure that people at all literacy levels are able to understand. Whether this means using picture diagrams on handwashing or practicing safe hygiene practices, or just making sure the information is translated into languages that can be understood by the people. According to the National Library of Medicine, "A poor understanding of the role of PPE and sub-optimal use may fail to prevent or even increase pathogen transmission during routine care or an infectious disease outbreak" (NLM, 2021). This shows that even a simple understanding of how to use materials can go a long way. Money can only change the way of the country if the ways of the country change. If you throw money and funding at a country but do not show them what they should be doing differently, they will use the money to continue doing the same things. Implementing a required class regarding basic health and sanitation practices would be a good addition to the preexisting school system. Even though the numbers of people who attend secondary school are low, the basic knowledge that would be given to the students in elementary school could go a long way. Another way to get information out would be to send home flyers and possibly resources with the children in the elementary school. Teachers can also be trained on the symptoms of malaria which include flu-like symptoms as well as some gastrointestinal issues.

Another way to educate would be to send college students on internships to countries such as Burundi. They can do this sort of as a study abroad program or educational internship. The students would go during a few months to the country and work with the people there to share and implement more sustainable practices whether it be agricultural or health.

I believe that my proposal is feasible with proper networking and communication as it is something that has been done in other countries with the support of the United States. If we provide education resources as well as general knowledge on what can be done, Burundi should be able to construct a system that raises the standard of living for their people one step at a time.

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