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Draught –Tolerant Grain as a Means to Address Global Food Insecurity & Scarcity

Many people may have experienced what not being able to eat feels like for an extended period. Maybe you've gone without breakfast or lunch, but what about all three meals per day in a week? Would you be hungry by then? I believe that under-developed countries should be able to produce safe and healthy food, even with the limited resources that they might have. By using the local resources in the area selected, we can create a system in under-developed countries in order to increase and sustain consistent crop production, even in the drier season. By doing this, we are improving the percentage of positive food security and reducing food scarcity.

Burkina Faso, in sub-Saharan Africa holds a population of approximately 20 million people (Central Intelligence Agency, 2017). A typical rural family contains three or four generations of family members under one roof. The nation is located in West Africa and is a landlocked nation with six other neighbors. The country of Burkina Faso is a primarily French speaking nation that produces corn, sorghum, millet, rice and the precious ore of gold. These exports still do not meet the economic needs of the people in rural areas of Burkina Faso.

The southern half of the country gets about 800-1200 mm of water a year, which helps them produce the corn that boosts their part of the economy. The northern half however, is not as fortunate. They receive about half as much as the south, about 200-400mm of rain each year. In order to produce their grains of sorghum and millet, they must have at least 200mm

These grains are a staple in their diet as well as a necessity to their everyday life. The grain is ground up into flour and mixed with water to form a paste or porridge and is traditionally eaten with a sauce made of either a native plant called Baobab or Sorrel leaves (World Culture Encyclopedia, 2017). They use the heart of the grain for cooking, while the stalk is dried and used for fencing and minor construction. They have no way nor have the adequate knowledge on storing the unused grain from the harvest. There was also no easily accessible way to transport the harvest to the nearest market until June of 2016, when the Board of Executive Directors at the World Bank approved a \$100 million in credit from the International Development Association (The World Bank, 2016).

The amount of grains produced is all due to the particular time of rainfall. If the rain falls at just the right time in the season, then they can produce the exact amount of grain that they planted, and then some. However, if the rain falls too late in the season, then the crops may not be as prosperous, or even die. Other climate conflicts such as alternating droughts and floods have become unpredictable, and the constant threat of desertification has left the soil difficult to sow seeds into as well as leaving the ground

The whole name of the game is timing and listening to Mother Nature. Without the grain in the dry

season or even the growing season, these small farming communities have no way of knowing how they will acquire or a way to feed their family, let alone the entire community. Eighty-five percent of Burkina Faso depends on subsistence farming to produce food to eat within their communities (World Culture Encyclopedia, 2017). This percent of the population is largely impacted if the grains don't germinate and produce during the wet season.

One of the other problems in Burkina Faso are storage and funding. The government does very little to help the northern part of Burkina Faso in the endeavor of trying to produce quality crops. Instead, the government focuses on the bustling mineral industry within Burkina Faso's economy. The farmers can plant all of the crops that they can manage and the rain can come at the perfect time and they can have a high-yielding crop season. But what happens when the rain comes at a later time instead of the proper time and then the seeds don't produce any food? What will happen when the dry season comes and there is little to no food left for the community? The real situation isn't any one of these problems, even if they do occur at some point in time. The point is that when the dry season comes, you should still be able to feed your family *and* the community.

One of the other main points is that when the farmers are planting the crops for the coming season, they use little to no animals to plow the fields. A large part of the economy of everyday people is based upon agriculture. Most of the daily needs of the people depends on subsistence farming. Some of the agriculture crops may include cotton industry production, which is very large at the moment, and some of the southern farming communities herd cattle as well as farm. Most of the work is done by hand, resulting in families producing more children as a means of distributing the work that consumes their life

These farming communities depend on the hands of their children to help make lighter work instead of just one or two people. This results in families having more children to help make the field work easier and go faster. This, unfortunately, does not allow the children to expand their knowledge nor gain new information through formal education. The result of the children gaining education can result in new inventions or experiments that can benefit their local community. If the community had the closer proximity and availability of markets, then the family could generate more income and quite possibly, afford to send their children to school. In December 2013, the United Nations International Children's Emergency Fund (UNICEF) reported 21.4% of Burkina Faso's male population and only 17.1% of Burkina Faso's net female population participated in secondary school from 2008-2012.

Unfortunately, the government is not currently helping the local farmers in order to sell the grain needed for surplus or sale due to their focus on Burkina Faso's bustling gold industry. Because of the northern area's far distance to the capital city of Ouagadougou, the government is out of touch with the more rural communities that need financial help. With the government stepping in to help move along the market delivery and transport, the community would prosper from the quicker selling process within the urban climate and the access to the wider variety of food choices within that particular area.

The repurpose-and-production plan consists of four very different, but very important groups of people. First are the farmers. They produce the grain, and the man-power, while also giving their prior knowledge of the land and how the crops are best cultivated (Lenhardt, Glennie, Intscher, Ali, & Morin, 2014). The scientists come next, and they produce the variations of crops that can possibly produce better in the drier season, while teaching the local farmers how to sustain the new crops and

keep them from running out of food and income. Third is the government; they don't help much, but if the northern region is doing better than it was in the past, will need some support. Then, and only then, will the economic values will increase, leaving the government no choice but to help reimburse the villages of Northern Burkina Faso with the proper silos, schools, transportation, and accessibility to markets and trading outlets. Last but not least, is the extended or international help. These may be Non-Government Organizations coming and helping the farmers by buying a large part of their harvest and supplying them with funds and minor agricultural machines or supplies that the village might need in order to continue to produce more effectively in the future.

This production plan has been attempted by the Groundswell International organization, who specializes in effectively implanting easy, sustainable solutions in countries with conflicts similar to Burkina Faso's, including the United States. Groundswell went into Burkina Faso in December of 2013 and taught the local farmers some techniques that are necessary for sustainable and successful agriculture in order to achieve a larger crop yield and soil fertility. These techniques have proven successful in this instance and go right along with the proposed four part plan (Batta, Bourgou, Diasso, 2013).

The life of the local children can be improved with a little help. Successful organizations such as United Nations International Children's Emergency Fund (UNICEF) come in and provide adequate medical knowledge of how to survive in their harsh climate. Many NGOs like UNICEF volunteer to help with medical reinforcement while the local agency, Keogo, helps with malaria and malnutrition education and prevention (The Alliance for International Medical Action, 2018). These two NGOs, though they may not be working together, are making a large impact in the lives of the native people of Burkina Faso. This will further prevent brain disorders and low immune systems occurring within children. The organizations provide care courses for the mothers, while also teaching them how to properly care for their children. This includes teaching them how breastfeeding is an effective source of nutrition until the children are six months old (UNICEF, 2017). With drought tolerant grain to improve their food security, mothers are better nourished, and then provide better nutrition to their babies.

By sending scientists and researchers into the selected country, they are giving a scientific viewpoint on the situation at hand. They give variations of that particular plant, and Burkina Faso needs drought-tolerant plants. This type of modified grain will help with the food scarcity gap that happens during the dry season, allowing them to produce more prosperous crops, giving them a chance to feed their village. The farmers will learn from the scientists how the plan will improve their lives. They will also learn how to properly sustain the plants that have been placed within their environment. When the prosperous plants have the ability to produce, the communities' income will continue to improve and grow, giving them a better chance at improving their central needs of balancing out their diets, and even sending their children to school. This is a win-win-win situation for the entire country.

The first win is for the farmers. They would be able to afford other food necessary for nutritional sustainability, while using the extra income for needs of their community or their own. The second win is for the country. Due to the increased percentage of food and resources, they are able to use more of the local produce, which benefits the local farmers in multiple ways, while also increasing their amount of crop trade as well as gold trade with other surrounding nations. The third win is due to the reduction of hunger in Burkina Faso and significant decline of food scarcity and insecurity throughout similar countries. With that, the country's welfare as a whole will be improved and encourage other

nations in similar situations to reach out for help.

Once the scientists help the farmers produce more grain throughout the year, then the farmers can produce a larger income with the harvest that they sell to the NGOs and to the government. This will help them be able to purchase the proper farming equipment needed to work on the fields, such as tractors, proper plows, and maybe even more people to work the fields.

Though not always readily available, the farmers could use the easier farming techniques demonstrated by Groundswell International instead of the agricultural machinery. When the government accepts the bulk of harvest that they desire to give to other neighboring countries or to give elsewhere, they will reimburse the village with the income, silos, schools, and market access that they may need with the income generated from the sales.

With the easy access to the market, the farmers can sell more harvest and the revenue will allow the farmers to buy other forms of nutrition other than the carbohydrates that they produce and possibly send their children to school. The impact of sending the children could impact both the country and the village in massive proportions such as doctors, engineers, trained farmers, and teachers. The other part of the sold grain, will be used during their everyday routines. This specific course of action relies heavily on scientific and governmental support. Without that support, there is no possible way for that specific farming community to survive. They will stay in their current situation or worsen.

By having a skyrocket in food production, food for the whole community is nearly guaranteed, and by producing grain on a consistent basis and storing it in the proper facilities provided, they are less likely to have a food shortage or food insecurity problem in their near future. This will ensure the safety of their food without wasting any extra crops and reducing the percentages of food scarcity in the dry season by over fifty percent.

After the plan has been put into place and farming villages and towns all across Northern Burkina Faso are fed, the communities will have the access to market and quite possibly the funding for the appropriate agricultural machinery necessary for their climate, soil type, and farming patterns. The plan implanted would have not only blossomed into a thriving, positive, and natural way for a village to feed and provide for itself, but turned the face of a nation into something greater. This plan can be implanted wherever it may be needed, in countries such as Nigeria, Cameroon and Yemen, or even right here at home.

In conclusion, the reality is that Burkina Faso needs some assistance. If we, as a scientific and benevolent community, can help them overcome the harsh adversaries of widespread hunger and food insecurity, then we can most definitely solve our own hunger crisis here in America. If we can accomplish that, then there is no way that other parts of the world facing similar conflict can't use it. By improving the gross crop harvest, we automatically improve the country's outlook on the future. With a brighter outlook on the future of your trade, comes more hope that the prosperity of it lasts, and when the prosperity of it lasts there's nothing stopping the positive influences that may spread across the world.

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