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Zimbabwe, Factor 6: Sustainable Agriculture

Sustainable Agriculture's Role in Restoring Zimbabwe to the "Breadbasket of Africa"

Far too many projects begin by asking you to close your eyes. They tell you to imagine the impossibilities of a fanatical concept or place, and you find yourself in a world too wild or astounding to be real. In doing so, the presenter or author merely catches your interest. Today, however, I am after something else—something far more valuable. Today, I am going to catch your heart. To begin my research project, I am asking you to keep your eyes wide open. I am pleading that you will read closely, for my topic needs not imagination, but passion. I am asking you to put your heart into reading this as much as I have put my heart into writing this. My topic is real, harsh, and cruel. It attacks the people we love time and time again, slowly and painfully. It rips a child from a mother's arms and has the power to turn friends against each other. You've seen it a thousand times: in pictures, in newspapers, and even in the corners of our streets. Today, I am going to inform you about poverty. Although poverty has stretched its way across the globe, some still have it better than others. Some have always had a roof over their head, shoes beneath their feet, clean water, and food security. Others, however, do not always have the same luck. There are many families who struggle to keep their house, several people who have had to travel the globe to avoid financial trouble, and there are girls my age who act as the head of the household more than their parents do. Some of the most wonderful people you will ever know can tell you some of the grimmest accounts you will ever hear. And, in all of these people, there is a brilliant perseverance in their eyes and an appreciative strength in their smile. For, they have witnessed things I can only imagine and have survived. But, neither I nor anyone I know have come eye to eye with the worst. Therein lies the purpose behind this project. I want to attempt to not only look at those who poverty has taken a toll on, but also discover the root of the problem and solve it. I know that there are boys and girls who toil daily to ensure one more day of survival for their family. I know that there are impaired men, women, and children out there because of malnutrition. And, most importantly, I know that there must be a solution.

Over 13 million people call Zimbabwe, Africa, home ("Zimbabwe: A Profile." 3). Though the country has a tropical climate with fertile soil, the farmers in Zimbabwe cannot keep up with the population (Logan, "Zimbabwe."). In the year 2012, over 72 percent of the people in Zimbabwe faced poverty ("Zimbabwe: A Profile." 3). The president, Robert Mugabe, has led his country since 1980, and he has not yet fixed the undeniable issue. If you looked at Zimbabwe today, you would never guess that it used to be nicknamed the "Breadbasket of Africa" and was a net importer of maize, cotton, tobacco, and sugarcane (Power, "How To Kill A Country."). People have come up with many reasons why the country deteriorated, but Zimbabwe's issue remains neglected. However, we can restore Zimbabwe back to its former glory and rid the country of its poverty. Zimbabwe can increase its farming efficiency through managing educational programs to help farmers learn new sustainable agriculture practices, applying new technologies to the fields and in storing harvests, and incorporating new breakthroughs in plant sciences.

Not only is poverty growing, but so are the families in Zimbabwe, and the country itself is not getting any bigger to accommodate them. Surveys done in 2007 to 2008 showed that households had increased by about 2.8 people from 4.2 people in 2000 to 2001 in resettlement areas in Zimbabwe; however, in the communal areas, the households averaged 4.85 people (Scoones, "Comparing communal areas and new resettlements in Zimbabwe II: People and places."). Also, about 3.5 children are born to every female in

the country (“The World Factbook: ZIMBABWE.” Web.). A female is identified as the head of the household about fourteen to 37 percent of the time, depending on the family’s location. This amount of female-headed households is extraordinarily high considering that the population is facing multiple health issues (Scoones, “Comparing communal areas and new resettlements in Zimbabwe II: People and places.”). In Zimbabwe, a HIV/AIDS epidemic is becoming dangerously prevalent, leaving many children without immediate guardians (Zagheni, “The Impact of the HIV/AIDS Epidemic on Kinship Resources for Orphans in Zimbabwe.”). “In 2009 it was estimated that more than 1 million children in Zimbabwe had been orphaned by AIDS and 1.2 million people were living with HIV” (“Health in Zimbabwe.” Web.). Sometimes, aunts and uncles may be able to take care of the children, but child-headed households are becoming more frequent and customary (Howard et al. 2).

As aforementioned, the HIV/AIDS epidemic in Zimbabwe is serious. Zimbabweans not only face HIV/AIDS, though. Other preventable diseases such as malaria, tuberculosis, diarrhoeal diseases, and health risks for pregnant women plague the country. Zimbabwe struggles to provide the health care necessary for its population to thrive. The reduction in both health-care budgets and health-care professionals has caused a forty percent drop in health-care coverage, with the poor enduring the worst. User fees can also affect a Zimbabwean’s ability to access health-care services (“Health in Zimbabwe.” Web.).

Another non-agricultural problem that Zimbabwe faces is education. Fortunately, the education system in Zimbabwe has expanded greatly since the country gained independence (Materike, “‘Whipping into Line’: The dual crisis of education and citizenship in postcolonial Zimbabwe.” 89). The Zimbabwe African National Union created free and mandatory schooling in Zimbabwe (Materike, “‘Whipping into Line’: The dual crisis of education and citizenship in postcolonial Zimbabwe.” 89), and the literacy rate there has increased to 91.3 percent (“Zimbabwe: A Profile.” 3). The average Zimbabwean spends only ten years in school (“The World Factbook: ZIMBABWE.” Web.). However, the main problem with Zimbabwe’s education system lies in sexism. Girls are guided into the traditional female subject choices (Gordon, “Education Policy and Gender in Zimbabwe.”). “Mathematics, the science, and vocational subjects (except for ‘fashion and fabrics’ and ‘food and nutrition’), are perceived as ‘masculine’...” (Gordon, “Education Policy and Gender in Zimbabwe.”). Thus, girls are not encouraged to pursue these topics. Agricultural sciences are also considered ‘masculine,’ though more women work in agriculture than men. Even in tertiary schooling, women are not commonly involved in the science and technical fields. Girls tend to do worse in school and drop out more often than boys. In the University of Zimbabwe, women make up less than one-third of the students (Gordon, “Education Policy and Gender in Zimbabwe.”).

Zimbabwe has over forty-two percent of its land and sixty-six percent of its population devoted to agriculture (“The World Factbook: ZIMBABWE.” Web.). Zimbabwe’s agricultural industry produces the following: “tobacco, corn, cotton, wheat, coffee, sugarcane, peanuts, sheep, goats, pigs” (“The World Factbook: ZIMBABWE.” Web.). Communal farmers, or multiple farmers working together on the same piece of land, share an average of 7.96 hectares of land (Bangwayo-Skeete et al. 330). Maize, a type of corn, is the staple food for Zimbabweans. The maize is ground into a flour called “mealie-meal” that is used to make thick porridges and drinks. If food is abundant, then the porridge may be served with vegetables, meat, onions, and nuts. Fried cakes, potato chips, dried fruit, and roasted maize are also popular snacks (“Food & Daily life.” Web.).

Current agricultural practices may be the root of poverty in Zimbabwe. At the beginning of the millennium, Zimbabwe's government started to seize experienced farmers' land if they were white. It was considered justice to the blacks, who had faced a small group of white British settlers running the country for many years. The land reform, however, sent the economy rushing downhill because those who received the land often did not know how to farm (Sieff, "Zimbabwe seized white farmers' land. Now some are being invited back."). Also, these inexperienced farmers can be hard to convince to change. When new, labor-intensive methods were introduced, the farmers returned to their traditional farming practices, which consisted of planting thousands of seeds into ploughed burrows ("Conservation agriculture contributes to Zimbabwe economic recovery." Web.). Plus, only commercial farms in Zimbabwe had irrigation, and the others depended on Mother Nature to provide for them (Mafundikwa, "Zimbabwe's farmers struggle to feed the nation." Web.).

Stubbornness, inexperienced farmers, and farming without irrigation are not the only barriers that Zimbabwe faces, however. Individuals who are not farmers struggle finding a job because they lack the skill, money, and personal connections (Luebker, "Employment, unemployment and informality in Zimbabwe: Concepts and data for coherent policy-making." 4). Zimbabweans quite often attempt to employ themselves as carpenters, street-vendors, cross-border traders, sculptors, and brick-moulders. Despite the Zimbabweans' dedication, they usually lack the appropriate license or violate laws against commercial activity in residential areas (Luebker, "Employment, unemployment and informality in Zimbabwe: Concepts and data for coherent policy-making." V). If a person cannot find legal work, then it becomes difficult to provide for themselves or for their family. Although I could not find any sources stating the barriers that Zimbabweans might face in accessing food markets or adequate nutrition, it is obvious that if a farming family cannot feed itself then there would be little room for them to make profits on their harvests. Foods markets would be out of reach unless the family has a steady living wage. A family achieving adequate nutrition depends on their income, the crops they grow, and how much of them they are able to harvest.

Governments, like that of Zimbabwe's, influence agriculture through their policies, whether or not they meant to do so (Ahearn, "American Agricultural Economics Association Meetings." 9). "The major government policies affecting productivity and/or structure include: public research and extension, investments in highway infrastructure, and commodity and conservation programs" (Ahearn, "American Agricultural Economics Association Meetings." 10). Thus, Zimbabwe's government could easily sway the productivity of its country's farms. Based on the information within this research paper, if the agricultural policies are irrelevant or even counter-productive, then farmers will lack the ability to prosper off of their land. Zimbabwe's government must allow and encourage the solutions discussed later in this paper in order to implement them. International and local organizations are also fundamental to increasing Zimbabwe's farming efficiency. International organizations, such as the FAO, must continue to work with Zimbabwe's farmers and educate them. Local organizations, especially those focused on education and agriculture, could work alongside international ones, learning from them and carrying on with their work even after they have left the country. Funds from Zimbabwe's government and international organizations might also be necessary. Ordinary citizens, however, would play the leading role in implementing the solutions discussed in this essay. After all, it is the farmers who will have to learn and adopt new agricultural practices. Other ordinary citizens might take part in improving their country through science. For example, young Zimbabweans interested in furthering their countries agricultural production might travel to other countries to learn from experienced scientists and farmers, and then take their knowledge back to their own country. Similar experiences have helped other developing countries, such as when Dr. Norman Borlaug trained young scientists as they worked alongside him in Mexico, developing high-yielding wheat crops (Hesser, "The Man Who Fed the World: Nobel Peace Prize Laureate Norman Borlaug and His Battle to End World Hunger: an Authorized Biography."). Ordinary citizens can also

join local and international organizations to get involved, or even work to convince the government to change their policies through petitions and peaceful protests.

Despite Zimbabwe's devastating state, all of the aforementioned problems can be solved; if enough farmers and government officials are willing to make a change, then Zimbabwe can replenish itself. The way to restore Zimbabwe back to the "Breadbasket of Africa" is through sustainable agriculture, or how farmers tend to their soil, grow their crops, and store their harvests. If a farmer can care for their fields, they can produce not only enough food for themselves and their family, but they can also sell some of their harvests as well to make an income. When farmers use the traditional methods of farming, the soil is disrupted and erosion degrades the ability of the field to produce plentiful crops for future generations ("Conservation agriculture contributes to Zimbabwe economic recovery." Web.). Zimbabweans' methods of agriculture are getting better, however.

Educational programs have the ability to help create coherent farmers in Zimbabwe. Despite that farmers have been known to be immutable, if we provided enough evidence of the benefits of newer methods, then farmers be more willing to accept the new methods. As a matter of fact, the Food and Agriculture Organization of the United Nations, or the FAO, has a project that hopes to help Zimbabwean farms adopt conservation agriculture, a modern technique in farming that decreases soil disturbance, conserves water, reduces fuel costs, and improves yields and soil quality. However, it requires that the farmers dig individual holes, weed frequently, mulch the soil, and engage in crop rotation. The FAO had to change its strategy in introducing Zimbabweans to these new methods when they realized the farmers were only willing to cooperate when free fertilizer and seeds were involved. In response, the FAO introduced new technologies to reduce the amount of labor necessary, began focusing on the core group of convinced farmers, and created demonstration fields so that farmers could see the increased productions. Now, an estimated 300,000 farmers in Zimbabwe use conservation agriculture ("Conservation agriculture contributes to Zimbabwe economic recovery." Web.). Another example of the importance of education in improving crop yields first appeared in the 1930s. It is known as the master farmer training. It helped spread modern, scientific farming strategies to communal farmers. Zimbabweans who received master farmer certificates and badges were expected to teach their neighbors the new methods. After Zimbabwe gained independence, an upgraded form of the master farmer training program was created. However, there were concerns that the master farmer training was simply just a scheme that only benefited the fortunate farmers and excluded the majority of communal farmers (Economic and Social Development Department. "The agricultural extension system in Zimbabwe."). Therefore, if we scaled up the master farmer training to be a nationwide educational program and added the strategies the FAO applied to their project to help convince farmers, then there would be a respectable turnout of Zimbabwean farmers that would be willing and able to adopt new sustainable agriculture practices.

Despite the importance of the human aspect of farming, modern technology is also required to manage high-yielding farms. As mentioned in the previous paragraphs, new technologies can help farmers reduce the amount of labor needed to grow their crops ("Conservation agriculture contributes to Zimbabwe economic recovery." Web.). But, technology can also help farmers attain the highest possible income by managing other areas of the farm. One of the major areas of farming that I looked into was the storing of the harvests. Traditionally, Zimbabweans store their harvested crops in granaries or polythene sacks (Bafana, "New storage techniques for grain." Web.). These methods leave the product vulnerable to pests, fungi (Bafana, "New storage techniques for grain." Web.), and spoilage due to too little or too much moisture (Koon, "Cozad winner Amber Waves making it easier for farmers to monitor grain in storage." Web.). When harvests are spoiled, every percentage that the grain has either too much or too little moisture, the farmer loses about 6 thousand dollars per every one thousand bushels (Koon, "Cozad

winner Amber Waves making it easier for farmers to monitor grain in storage.” Web.). In addition, Zimbabwe’s high temperatures and droughts heighten the vulnerability of maize grain and legumes. Certain fungi even produce chemical toxins known as aflatoxins, which have been linked to weak immunity, stunted children, and cancer. To this extent, we find that the storing of the harvests not only affects the income of the farmer, but also human health. The solution to this issue is using “airtight metal silos and thick plastic ‘super bags’” to hold the harvests in order to reduce aflatoxin exposure and keep both the crops and their consumers safe (Bafana, “New storage techniques for grain.” Web.). Another technology paving the way to a better and brighter future in storage is Amber Waves Grain Sensing, a wireless system that uses sensors placed within a silo to monitor the temperature, moisture content, and carbon dioxide in stored harvests. This new technology aims to provide a cost-effective as well as easy to install and use system for farmers to monitor their stored crops and even alter the conditions within their silos (Koon, “Cozad winner Amber Waves making it easier for farmers to monitor grain in storage.” Web.). This program could be taken to the next level as well. If farmers were able to track their grain past the silos and into the markets, they would be able to see who buys their grain for the highest price and where. Moreover, if farmers were able to see where the majority of grain goes in Zimbabwe, then they could specifically prepare crops for those specific consumers’ or areas’ needs in order to attain the highest profit available for a farmer. The data a program like this would provide could also prove to be useful for charity organizations. Charities, as well as those who donated, would be able to see which countries have the highest levels of poverty, are the most efficient at distributing the donations fairly, and if there are any donations lost in the process of distributing it, either by stealing or ill-managed shipping processes. This way, charities and their donors could make educated, current decisions on where their donations would go.

This first step in reducing Zimbabwe’s food waste would be to build the farmers sealed, metal silos and give them proper packaging to store their harvested crops within. These silos are appropriate for Zimbabwe because they do not require large advancements that might take several decades to generate. Instead, improved silos could be a “baby-step” towards food security and sustainable agriculture in Zimbabwe. Additionally, a program could be set up to build silos and manufacture packaging for farmers. The local Zimbabweans could receive payment for their work on building silos in their community or even by working at an industrial plant to make the storage bags. This program would not only educate Zimbabweans on the importance of food storage to food security—even though they may not be farmers—but it also would give a portion of unemployed Zimbabweans a source of legal income. Governments and charity organizations might be able to donate to fund the program.

Once these new silos are well-established, Zimbabwe could work towards applying other modern technologies, such as the Amber Waves Grain Sensing, to its farms. Working towards using such mechanisms would require a large advancement in electronic technology and in farming equipment. Since this would be costly and a massive act for Zimbabweans, it would be impractical to place in Zimbabwe right away. Once it was established there, however, it will have opened up a passage for Zimbabwean citizens to study, work with, and invent modern technologies to help their country, economy, and people thrive.

Modern technologies that require large transformations quickly are inappropriate choices for developing countries, like Zimbabwe, simply because the country often does not have the framework for them. When working to help developing nations, we must take things one step at a time in order to keep citizens compliant and willing to change their countries for the better. All solutions must be started slowly and carefully, as to not upset Zimbabwe’s people, government, and culture. No solution to Zimbabwe’s problem can be implemented until education is well-established, and the reason for the solution as well as

the solution itself are fully understood. For, if people do not understand why they must change, they will never do so.

A final influential area on sustainable agriculture in Zimbabwe is the farmers' willingness to incorporate breakthroughs in plant sciences into their fields. Science improves with every passing day, and Zimbabwe's government has yet to apply these new possibilities to help their interminable poverty. Notably, genetically modified crops could help Zimbabwe increase its farming efficiency. However, GMOs—meaning genetically modified organisms—are currently a controversial topic. In Zimbabwe, the Agriculture Minister Joseph Made has banned GMOs. He claimed that his reasoning behind the choice was to preserve Zimbabwe's environmentally clean policy and to prevent pollution. On the other hand, science disagrees with Joseph Made. There is no evidence that GMOs pollute the environment. In fact, certain GM crops have been shown to decrease the use of pesticides and encourage the use of less-toxic chemicals as herbicides. Plus, GMOs have no known safety or health concerns. Perhaps the most important benefit of GMOs to Zimbabwe is that they can be made drought tolerant. Many food shortages in Zimbabwean communities are results of droughts. These drought-tolerant crops might be able to withstand Zimbabwe's dryness and lack of irrigation (Mambondiyani, "Facing drought-Induced food shortage, Zimbabwe confronts GMO dilemma." Web.). Drought-tolerant crops including maize, sorghum, millet, cowpeas, chickpeas, pigeonpeas, and barley have been developed through both participatory plant breeding and genetic engineering ("CGIAR Archives – CGIAR: Research & Impact: CGIAR on Global Issues – Drought Tolerant Crops for Drylands." Web.). Drought-tolerant rice and maize varieties have also been developed (Nezhadahmadi, "Drought Tolerance in Wheat."). By growing GM crops in their fields, farmers would be taking great leaps toward producing higher yields as well as food that is of better quality and easier to sell. Thus, GMOs could help Zimbabwe feed its population and Zimbabwean farmers make a profit (Mambondiyani, "Facing drought-Induced food shortage, Zimbabwe confronts GMO dilemma." Web.). "Overall, the science consensus is that GMO crops would be as sustainable or more sustainable than the crops now grown in Zimbabwe" (Mambondiyani, "Facing drought-Induced food shortage, Zimbabwe confronts GMO dilemma." Web.). However, a senior official in the Ministry of Agriculture fears that, in some areas in Zimbabwe, rain is so scarce the drought-tolerant crops might not survive the heat. Science recommends that farmers in such places focus on what practices work well in their particular areas. In the Beit Bridge, located in southern Zimbabwe where droughts are common, farmers should raise cattle and goats to sell for food if they do not have irrigation. However, the government has not encouraged farmers to adopt new farming patterns as it fears political consequences (Mafundikwa, "Zimbabwe's farmers struggle to feed the nation." Web.). Also, it is still important to ensure that the citizens of Zimbabwe have biodiversity in their diets. Biodiversity in agriculture means growing several different crops. The concept of biodiversity is important to Zimbabwe because it has an impact on Zimbabweans' nutritional intakes (Burlingame, "The International Scientific Symposium." 109). "Biologically diverse diets are more likely to be nutritionally replete, and contain intrinsic protective factors" (Burlingame, "The International Scientific Symposium." 109). However, if GM crops and sustainable agriculture practices were applied together in Zimbabwean fields, then the country would see a dramatic increase in yields and in farmers' incomes.

Zimbabwe's government might face the trouble of their people being suspicious of GMOs. Since genetic engineering is a controversial topic, many people often find it unnatural and unsafe (Ferdman, "Why We're so Scared of GMOs, According to Someone Who Has Studied Them since the Start." Web.). To solve this barrier in incorporating genetically modified crops into farms, Zimbabwe's government should teach not only the youth of the country about genetic engineering in schools, but also show adults its potential through educational demonstrative fields and campaigns. Ordinary citizens can also help overcome the fear of GMOs through peaceful protests, which can be very influential and impactful, against the current ban on GMOs, as well as signing petitions to show their approval towards investing,

studying, and working with genetically modified crops (Basketter, “Why Marching Matters: the Power of Protest.” Web.).

Not only would the farmers benefit from sustainable agriculture, but their families would, too. Since they would have more food available, they could sell portions of their harvest to bring in money. The family could then afford better health care, housing, and education. By putting money back into their communities, the economy would flourish. If the government would encourage it, sustainable agriculture would benefit the whole country.

There are 13 million lives that can be changed with a single factor. Sustainable agriculture is one of the most important aspects of farming, and Zimbabwe can be revived through it. Zimbabwe can restore itself to the “Breadbasket of Africa” through managing educational programs to help farmers learn new sustainable agriculture practices, applying new technologies to the fields and in storing harvests, and incorporating new breakthroughs in plant sciences. I have met hundreds of people as I moved through life, each one different from every other. I have befriended those who have experienced times that I cannot even imagine going through. In them, I have found inspiring perseverance, and—although I have never been to Zimbabwe—I know there is that same powerful strength to keep going inside of Zimbabweans, too. If we find a way to tap into that determination, then we can convince them that their country has a bright future to work towards. We do not need to use creativity to see poverty, but it is essential to fixing the problem. We need all minds to come together and think aloud. Ingenuity and curiosity are the motivation behind this project, and the purpose is to find the root of poverty’s weed. This paper has discussed the possible solutions to restore Zimbabwe through sustainable agriculture, some from research and others from sleepless nights. My imagination reached its fingers through so many websites, articles, and journals to find everything I could to help me solve this terrible issue. Maybe, through this, I actually found that root, or even just a part of it. Every piece matters. After all, you cannot put a puzzle together if even just a single piece is missing, can you? Henceforth, I am encouraging both myself and all those that I have befriended to write down, research, and present every idea they think of. Now, this is me encouraging you, too. I aspire to help others. I want to go college for botany and biotechnology to continue growing my ideas to share with the world. There are thousands of problems on this Earth, and I know we have the power to solve them, if only we try. Today, I hope that I have captured more than your attention. I hope that I have shone a light upon Zimbabwe, or given you just a pinch of passion to help our neighbors living there.

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