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Zambia: Sustainable Agriculture

Zambia is a country plagued by poverty with three quarters of the population under the poverty line. This country is in dire need of a way to be self-sufficient when it comes to food production. Zambia's terrain has few hills and mountains, but it is almost all plateau. On the east side, forming a natural boundary with Zimbabwe is the Zambezi River. Zambia is a landlocked country that is 752,618 square km, which is slightly larger than Texas. This country is bordered by the Democratic Republic of the Congo, Malawi, Mozambique, Namibia, Tanzania, and Zimbabwe. The climate in Zambia is tropical, with its rainy season from October to April. After the rainy season in April, Zambia has reoccurring droughts, which in turn make it increasingly difficult to improve the agricultural sector. Although the agricultural sector has not reached its full potential, it accounts for twenty percent of the GDP (Gross Domestic Product) in Zambia. At this point with sixty-four percent of the population under the poverty line, it is crucial that Zambia cultivate more land for crop production. Like its surrounding countries, Zambia thrives on its natural resources such as copper, coal, gold, and zinc. These minerals are responsible for seventy-nine percent of the GDP, including both the industry and service sectors. ("Zambia CIA Factbook")

In the Zambian culture, it is normal for the families to be a joint family structure. The joint structure is designed so that everyone in the clan is assured the availability of food. The elder male members are the head of the family and give authority. Although the joint family structure is practiced, some families will only live with their immediate family. With these families it is not uncommon for the household to be raised by a single parent due to the fact that the HIV and AIDS adult prevalence rate is about fourteen percent. About sixty-four percent of Zambia's population lives in rural areas while thirty-five percent lives in urban areas. The Zambian diet consists mostly of maize, cassava, millets, and sorghum. These crops are very popular because of their high resistance to drought and arid conditions after the rainy season. For meat, Zambians tend to eat beef from the cattle and fish from lakes and rivers. The average school life expectancy for both male and female is seven years. Out of the total population, the literacy rate is about eighty-one percent. HIV and AIDS is an ongoing battle in the country of Zambia. With the high degree of risk of obtaining these infectious diseases, there is a need for better access to health care. To get to these health care facilities, it is usually a long, strenuous journey for someone who needs medical attention. Usually people in urban areas have better, easier access to health care facilities, than those who live in rural areas. The Zambian government is focused on promoting equality of access to health care for all Zambian citizens. ("Zambia CIA Factbook")

The main subsistence crops in Zambia are maize, sorghum, and cassava. These are some of the food staples of the Zambian's diet. The primary cash crops consist of maize, sugarcane, peanuts, tobacco, and cotton. Tobacco is the most successful agricultural export in Zambia. The average small scale farmer in Zambia will only cultivate about .05 km of land for subsistence farming, which they use to feed their family. If they have a surplus in a good season, they will make money from selling the extra crop that they don't need. Medium-scale farmers cultivate between .05 and .2 square km of farmland. These medium-scale farmers produce most of Zambia's cash crops for the market. Large-scale farmers cultivate more than .2 square km of land. They have to cultivate most of the farmland that is available for many cash crops that they sell to the local markets and the export market of Zambia. Crops in Zambia usually do better than livestock. There have been several outbreaks of cattle diseases since the 90's. The loss of cattle affected farmers in that they depended on the cattle to fertilize their land, therefore reducing steady production of crops for subsistence farming. Currently today, livestock accounts for thirty-three percent

of Zambia's agricultural production. Other livestock that is frequently reared are goats and sheep. Farmers in Zambia do not have any tractors or use much irrigation, as these agricultural practices are expensive. When Zambians farm, it is very hands on in the sense that they use hoes and ox plow systems to make their land prepared for the planting season. Farmers have tried shifting cultivation, and other methods to try to fix desertification. With the labor force at about six million people out of twelve million people, eighty-five percent of the Zambian work force subsistence farm.

A major barrier that is keeping Zambia's agriculture sector from improving is the large population of Zambians. There is an excessive number of people living on land that can potentially be cultivated and used in the future for farming practices. There is forty-seven percent of land that could possibly be used for agriculture, but only seven percent of that land is arable and being used for farming. Another barrier is that the government sees how successful the mining industry has proved to be for Zambia, so they put all their funding into developing the industry sector. Also, the poor infrastructure in the agricultural sector does not increase development. The unemployment rate in Zambia is fourteen percent, and the per capita income is about \$3,000 in US dollars. As was stated before, eighty-five percent of the Zambian work force is farming. Farming in Zambia is very difficult to make money on because of the facts that there are many other people trying to make money off of it, the weather is unstable, and it can be expensive. In Zambia it is very difficult to get to markets where there is an adequate food supply. Most of the roads are unpaved and when people live in rural areas, they normally have to travel a great distance to gain access to markets and services.

According to The National Institute of Food and Agriculture, the definition of Sustainable Agriculture is as follows: "an integrated system of plant and animal production practices having a site-specific application that will over the long term:

- Satisfy human food and fiber needs
- Enhance environmental quality and the natural resource base upon which the agricultural economy depends
- Make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls
- Sustain the economic viability of farm operations
- Enhance the quality of life for farmers and society as a whole." ("Legal Definition of Sustainable Agriculture")

According to the World Bank, agricultural production in Zambia has been responsible for twenty percent of GDP and industrial production and manufacturing has accounted for seventy-nine percent of GDP. ("Zambia CIA Factbook") Looking at the GDP for agriculture versus industrial production and manufacturing, it appears as though agriculture has not given a substantial amount to the national GDP. Therefore, the Zambian government has moved their attention to the sectors that attribute the most percentage of the GDP. Because of the lack of focus on the agriculture industry, the government investment in the programs to support this industry has been very low. The programs to support this industry are inexpensive, and in turn, some of them do not even accurately reflect the environmental conditions that the farmers are living and working in. Consequently, the results of the studies are flawed.

In the early 1980s, The Consultative Group on International Agricultural Research from the Zambian government created the Farming Systems Research and Extension concept to agricultural development. This system was created to help the subsistence farmers develop their production technologies. They use Adaptive Research Planning Teams to help carry out the research and to assist the small farmers in the different areas of Zambia. Each ARPT team is made up of an agronomist, an economist, and a researcher

officer who helps the farmers understand the new concept, and gets information from the farmer to bring back to the team. Included in these teams is a sociologist and a nutritionist. (Marc, Small)

Through their research they have concluded that the technology requirements for each farmer are different based on the following: farmer's wealth, risk aversion, and level of mechanization (manual, oxen, or tractor used for tilling). Throughout the years they have achieved apparent successes in agriculture production efficiencies.

This approach to agricultural development has been beneficial and they have seen many improvements; however, there is still a lack of promoting sustainable agriculture. The current programs are focused on short term success and fast results rather than focusing on repeatable sustainable practices. Examples of the lack of sustainable focus include: producing agriculture on lands that are highly vulnerable to soil erosion and using toxic fertilizers and pesticides. According to the World Bank, fertilizer consumption in Zambia more than doubled between 1970 and 1987. (Marc, Small) Not enough emphasis has been placed on developing "farming systems that are compatible with the particular environmental attributes constraining small scale producers." (Marc, Small)

Sustainability in agriculture "reflects a sense of intergenerational obligation to manage agricultural resources so that subsequent generations can continue to produce food and fiber at acceptable costs." (Marc, Small) In order to make the Zambian farms produce sustainable crops, all of the different problems must be addressed. These solutions can not only be short term because the people of Zambia are in desperate need of a stable source of food. (Marc, Small)

Improving agricultural practices in Zambia would be the start in reducing the poverty level. Forty-seven percent of Zambia's population is undernourished, and producing an abundance of crops can help feed these people. Introducing different ways to deal with drought, desertification, and new farming techniques will help yield a higher amount of food. With a sustainable and self-sufficient agriculture sector in Zambia, people can produce the right amount of food they need to supply their family, and possibly have a surplus to sell for an extra income. Having a successful farming industry can create jobs for people who are unemployed. People could hire employees to work on farms, and perhaps workers to manufacture supplies needed to cultivate land. Bettering the infrastructure in farming will better the economic exports with more diverse cash crops. This in turn can help increase the GDP, which already has a growth rate of about seven percent. ("Zambia CIA Factbook") Since most families in villages take in orphans, they need a higher yield of crops for the mouths to feed. Having a reliable source of food for a single-parent household will make life much less stressful. If smallholding farmers are able to produce their own food, it will save them money for making trips to markets and buying food. After all, Zambians only make a small amount of income, so it would be wise for them to save as much money as they can for health care and other necessities.

There are many factors that contribute to the decline of the agricultural sector in Zambia. One of these factors is the population. As stated before, there is much land that has the potential to be used for farming, but because of the amount of people living in these areas there is no room for crops to be produced. There are also factors such as the climate. In Zambia after April, when the rainy season is over, there tends to be prolonged droughts. These droughts leave the farmers crops in ruin. Farmers in Zambia rely largely on only rain to water their crops. Since rain can't be relied on in the dry season, they can only try to produce crops like maize and sorghum that tend to be okay in dry conditions. These crops are sufficient in providing food for Zambians, but in times of severe droughts cannot continue to grow to provide adequate meals. According the president, Jervis Zimba, of the Zambia National Farmers Union: "Zambia can reach self-efficiency in all the crops that it grows, if marketing issues that the agriculture faces are well addressed...We have enormous potential as farmers to produce more but the high cost of productions [is] killing the industry." ("Zambian Economist: Agricultural Challenges") Here, Jervis Zimba explains how Zambia's prices are so high for their exports that the countries around them buy their

cash crops from a different source. Lowering the prices of production for cash crops will raise the amount of product other countries will buy from Zambia. Fixing at least one problem at a time for Zambia will slowly but surely get the agricultural sector on its feet.

There are many possible solutions to these problems that Zambians face. Due to the severe drought issue in Zambia, implementing a rainwater harvesting program during the rainy season would collect water to save for when the dry season comes. After the rainy season in April, they could use this water to help with irrigating fields. Also, during the dry season there should be a plan to conserve the remaining water in lakes and rivers around the country. Conserving water from these different sources could include finding the best way to irrigate the crops so they only get the amount of water they need. When it comes to agricultural practices, there are ways to farm without irrigating crops. Farmers in California use a technique called dry-farming. It uses the water in the soil that was stored from the rainy season to produce crops. "Dry farming works to conserve soil moisture during long dry periods primarily through a system of tillage, surface protection, and the use of drought-resistant varieties." ("California Agricultural Water Stewardship Initiative: Dry Farming") To access more water for crops that do require a substantial amount of water, borehole drilling is a possible solution. Tapping into the underground water sources could be the start of irrigation for farmers in Zambia. There are answers to the problems farmers are facing; they just need to be implemented in a way that all subsistent farmers in Zambia can take part in. Similar to the Farming Systems Research and Extension program mentioned earlier, creating a group of educated people in agriculture should find a solution that works for each region's problem. After they have addressed the issue, there should then be follow-ups and meetings to ensure that the people of Zambia understand how to keep developing their farms.

Another way to expand the farmer's knowledge is to hold annual meetings. A meeting similar to the World Food Prize/Global Youth Institute would help these farmers discuss their ideas on different farming practices. Not only would they be able to interact with other farmers with similar ideas and/or problems, but they could also discuss questions and ideas with scientists and farmers from around the world. At these conventions, they could have immersion sessions where they work hands on with scientists and other farmers to do trial and error runs of possible solutions to their problems. Getting to see and visualize an idea from one person could be a solution to many other farmers facing the same problem. One citizen could find an answer to a problem and help another farmer fix his or her ways. This conference would be open to the public and can be held in many different places so that everyone who wants to attend has the chance to. Holding classes or having someone speak to different regions about agriculture, can be a great opportunity for small-scale farmers to learn more about agricultural practices. The funding of this meeting would be by donation from companies that are interested in supporting Africans and their education in agriculture. Officials and professionals that would take part in the conference would be volunteer or paid by the donations of companies. If the first meetings make an impact on at least a small region of Africa, hopefully it will get the governments attention and they would help fund the meetings in all different areas. This project would need people willing to help and advocates to spread the word about the goal of these meetings. Getting the word out to different countries and NGOs will be a key play in making the conference work. Starting this conference with citizens of Zambia or any other part of Africa could potentially be the start of many other helpful ideas. From these meetings we can branch off into funding for supplies like tractors and irrigators. Implementing the ideas from these conferences would be the next step to creating better agricultural practices for farmers all across Africa.

There are many different ways that people in Zambia can help get their farming to be more successful. The government of Zambia should invest more in their agricultural sector. Providing subsidies for rural farmers would kick start the agricultural production, and help reduce the prevalence rate of undernourishment. The small rural farmers should make it known that they are in need of better agricultural technologies, and that they are struggling. Some organizations should be constructed to help

these farmers communicate and help each other with their problems. Zambia can take advantage of the natural resources they have such as the Zambezi River and other freshwater sources. Utilizing all the resources they can will add up in the long run and make a difference. There are already non-governmental organizations in place such as the Agricultural and Commercial Society of Zambia. This organization holds a show where Zambians come to learn more about agriculture and developing the farming and living standards of their country. (“Mission Statement Society of Zambia”) More organizations such as this would be very beneficial to the rural farmers of Zambia who need to learn more about the development of agriculture. When the farmers understand how to improve their land based on their problem, they can then go and find solutions to better their farmland.

There are several major issues in Zambia that are all linked to each other in one way or another. Solving one of these problems at a time can help develop Zambia into a more prosperous country. Repairing Zambia’s agricultural infrastructure will help better the economy and help the many people under the poverty line. There are many factors that need to be dealt with in order to better the farms of Zambia. With the large amount of people that reside in the rural areas of Zambia, there needs to be a reliable source of food for these families to survive on. Improving the agriculture sector will start a domino effect in improving their country.

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