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South Africa, Factor 6: Sustainable Agriculture

South Africa: Greenhouses

Introduction

It was not until my fifth year of elementary school that I had gotten some sort of understanding of what it was like to go to bed hungry. My mother, highly involved in our church at the time, had gone on a mission trip to South Africa. When my mother came home we had a large dinner at my grandmother's house. It was normal, almost routine, to have family dinners that contained a grand array of food. My mother, of course, came home with lots of gifts for the family. A couple days after our feast I walked into my mother's office and found her downloading pictures onto her computer. I asked her what they were from and she said they were pictures of her trip. I saw her working at the orphanage our church sponsors, her and her team working on different projects, and the children and housemothers who stayed at the orphanage. What really stood out to me were all the photos taken of the dumps they had visited while in the town of Welkom. There were piles upon piles of trash and garbage. I saw families making homes out of what they could find in those gigantic piles. I mentioned my fascination to my mother and she told me that the people who build their houses at the dump are very proud of what they construct. They even gave her "tours" of their masterpieces. I saw photos of children huddled together and staring at the cameras with curious faces. You could almost smell the overwhelming stench of the garbage and feel the dust of the unpaved walkways between your toes. Not only did I feel sad for those people but ashamed for thinking what I had was not enough; that all of my clothes, the food I ate, and the education I have been given were never satisfying. To this day, it inspires me to take a step of action.

The situation in South Africa continues to be dire. The population of the country of South Africa is 52,981,991 (2013). A typical poor urban family has two to four children. About half of South Africans live on or under \$1.25 per day and between 55-80 percent of families report spending their income on food (Give well). Employment is very strict labor and most jobs offer minimum wage. Agricultural farm workers are entitled to a minimum wage of R650 (\$90) per month if they work more than twenty seven hours a week (Give well). Food and living quarters may be counted as part of their salary depending on where they work, but by law they are not allowed to work more than forty five hours per week. It varies on where you live if you get electricity or not, but that is rare for people making \$1.25 per day. Some towns have access to electricity but without in-house tap water (Givewell). Sanitation is scanned over because all they are focused on is getting that little bit of food or that last few drops of water.

Education and Healthcare

Their education system is governed by two national departments: The Department of Basic Education (DBE) and The Department of Higher Education and Training (DHET). DBE schools are public, private, or independent and are responsible for primary and secondary schooling. Public and private schools are ninety-seven percent of schools in South Africa. DHET schools are for further education and training and are responsible for tertiary education and vocational training (Brand South Africa). If you could not afford or did not have a way to get to school then you simply would not go. You would learn from a parent or not learn at all. South Africa is known for its top of the line universities. In South Africa there are twenty-three universities that teach a wide range of subjects and are home to students who speak many different languages. Health care is similar in ways. There are two different systems of healthcare: public and private. Private healthcare is for the more wealthier-income families, which take up twenty percent of the population. Public healthcare serves a vast majority but is chronically underfunded (Brand South Africa). Just like education, if you cannot afford medical help, you do not get the healthcare.

Barriers and Complications

Major barriers that prevent the improving of agricultural productivity, employment, and access to nutrition are cause and effect. Many people grow up or live in dumps or poor households and therefore effect how they obtain a good education and a job. If you cannot obtain a good education or job then you cannot provide for your family. If you cannot provide for your family you cannot buy food and do not get the right amount of nutrition your body needs. Illnesses are definitely major barriers. Some people who have illnesses are too sick to go out and find a job or to take care of their families let alone themselves. Individuals affected by disease or infection have greater nutritional requirements as well (un.org). HIV/AIDS is a very common disease throughout Africa. HIV stands for human immunodeficiency virus. The virus compromises the body's ability to handle disease and causes AIDS. AIDS stands for acquired immune deficiency syndrome. A person who has AIDS is in the final stages of HIV, after the immune system is unable to defend itself against foreign invaders like bacteria, other viruses, and fungi and allows the development of certain cancers (aidshealth.org). In order to fight the disease and stay alive for a longer time, it is important that you eat healthy foods to help what is left of your immune system.

Competition and jealousy are other barriers. Just like the people who lived in the dumps were proud of their houses they had built, people take pride in what they do or what they make when they have nothing at all. If they see someone who has something better, the easiest thing to do is take what they want. Which leads to the most effective barriers: greed and theft. My mother told me about a group of children who lived at the dump with their cruel aunt. The orphanage brought them some food because the aunt would only find food for herself. When she had found out that the children were getting food she threatened that she would poison the food so they could not have any. If she was not getting food then they would not get food as well. Eventually my mother and her team had to stop bringing the children food.

A major challenge of food security in South Africa is underdeveloped agricultural sector that is characterized by over-reliance on primary agriculture, low fertility soils, minimal use of external farm inputs, environmental deration, significant food crop loss before and after harvest, and inadequate food storage and preservation (un.org). Ninety five percent of the food in Sub-Saharan Africa is grown under rain fed agriculture. Food production is vulnerable to adverse weather conditions as well (un.org). Because the majority of farmers do not have enough income to pay for necessities, they are limited on whether they can buy good fertilizer and other inputs. There is also rapid population growth, limited access to agriculture-related technical assistance, and lack of knowledge about management practices (un.org).

Eighty percent of the land in South Africa is owned by agriculture, including small-scale farmers, emerging farmers, and commercial farmers (WWF). World-class infrastructure, counter-seasonality to Europe, vast biodiversity and marine resources, and competitive input costs make South Africa a major player in the world's markets (Brand South Africa). The role that sustainable agriculture currently plays in causing families in South Africa to not produce, contain, earn income, or get nutrition is a role that can be fixed. From agricultural nutrients that pollute ground water to pesticides and waste streams of animals and humans, it is hard to keep crops fresh and healthy to consume. Forty percent of crop production comes from sixteen percent of land that is irrigated. Many South African towns and villages currently or soon will fail to have clean water to maintain their crops. Since 1945, about seventeen percent of vegetated land has been through human-induced soil deration because of poor fertilizer and water management (Cedarcreek). In 2012, Nedbank, one of the largest banks in South Africa, invested R3.8 million into the WWF-SA Sustainable Agriculture Program in Cape Town. The Sustainable Agriculture Program was launched to promote and support sustainable agriculture production practices (WWF). Thanks to WWF-SA, those practices are currently taking place. Sustainable Agriculture can be measured in a few ways. Some of those ways involve practices that erode soil, remove the habitats of insect predators, and remove trees instead of plant them. Another way sustainable agriculture can be measured is

by examining the changes in yields and total factor productivity (Springer). Because of present measurements, you can see some change, but there is always room for improvement.

Recommendations

By improving sustainable agriculture, people will grow more crops that are healthier which would raise income levels. People with more sufficient incomes would purchase those crops because of the nutrition, and because of those purchases the economy will grow. After time, by improving sustainability, having a clean and healthy garden will become a normal thing and small farmers will be able to sell their crops and make income. Because of water scarcity, pollution, and competition between small farm owners, strengthening sustainability is not going to be easy. For crops to grow you need sunlight and water. Sunlight is free, but water in some third world countries is not. There is always a price to pay, whether it be trading, bartering, or that a certain community does not have the funds to build a well.

One system that could aid in reducing these problems would be the production of food in greenhouses. I have had the privilege touring The Perfect Circle Corporation. The Perfect Circle Corporation located in Lake Mills, Iowa. What they do is grow organic tomatoes using methane gas from landfills located near the greenhouse. By using the methane gas they are able to use that energy for fans and generators in the greenhouse while at the same time use the methane gas for heat. You can use landfills and/or abandoned coal mines, as long as you are able to use methane gas from the ground for energy and heat. This type of greenhouse can help grow food in the dead of an icy winter as well as in the middle of a blazing summer. One acre supplies one million pounds of organic tomatoes per year and would help feed the rapidly growing population of South Africa (Tour-interview, Bill Luetscher, 2014). Using white totes –or bags, and ground up coconuts (coco-coir) for soil they are able to plant two plants per tote (Tour-interview, Bill Luetscher, 2014). It is very important to keep a good airflow in your greenhouse with lots and lots of light. Light is key. It is also important to keep the greenhouses at a certain temperature range in order to keep the tomatoes growing as well as staying one step ahead of the tomatoes with nutrients through the roots.

One of the advantages of having a greenhouse like this is that less water is required. The amount of water used depends on how much light your plants are getting. Again, the more light, the better plants will grow. Everything-walls, ceiling, totes, and trays- are white in order to reflect as much light as possible. The totes that the plants are located in have little holes on the bottom of each side and are placed on top of long trays so the extra water that the plants do not absorb can be reused (Tour-interview, Bill Luetscher, 2014). Nothing in this greenhouse goes to waste. During harvest time employees carefully pick the tomatoes off the stalks, wipe them off, and run them through water that is eventually reused. The Perfect Circle Corporation sends out to their buyers six hundred pounds of tomatoes per week (Tour-interview, Bill Luetscher, 2014). The Perfect Circle Corporation plans in the future to try growing other plants like cucumbers, peppers, or strawberries as well. There is also better security in having a greenhouse. It makes the task of competition and ruining other people's crops more difficult. Another advantage of having a greenhouse is being able to hire employees. The Perfect Circle Corporation currently has eight employees and the company is able to offer 401k plans (Tour-interview, Bill Luetscher, 2014). So not only does this system produce healthy organic tomatoes, but the company is also able to hire and take care of their employees.

Greener Solutions is an American company who makes greenhouses and hydroponic and drive systems in South Africa. They deliver the equipment and build the greenhouse. The Universities of Fort Hare, Free State, and KwaZulu-Natal promote the courses of science and agriculture. The University of Venda promotes courses of science and technology. The University of Limpopo focuses on finding solutions to meet the needs of the African community. If we get a company in South Africa to supply the materials and make the greenhouses, we don't have to bring the materials over from America or another country. The universities in South Africa have a wide range of experts in technology, science, and agriculture. The experts from the universities could, if willing, teach people of the African community how to use the

greenhouse technology. As they teach, the family or farmer who will own the greenhouse can help build the greenhouse to better understand how the system works.

Conclusion

It is important that rural farm and urban families work together in providing fresh crops for their families. The government should be supportive as well. It is their job to take care of the communities in their country and they can do that by providing ways to feed the hungry and cure the sick with fresh and healthy food. It is unfortunate that many governments have not done as much as possible to help the poor and starving. We can work with the local universities, world mission organizations, and local governments as much as possible to finance, build, and train to bring the technology on-line at the local level. By creating greenhouses to grow food we can decrease unemployment, stimulate the economy, provide organic crops and nutrition to the malnourished, stop the spread of diseases, and increase sustainability in agriculture. There are a high number of dumps, landfills, and abandoned coal mines in the country of South Africa that could be utilized for this purpose. Because food security is at an all-time low, there are people who are sick or dying in the country of South Africa. This essay has discussed the lack of sustainable agriculture in many areas of South Africa and several of the factors contributing to this reality. It is further suggested that there are solutions available to increase the level of sustainable agriculture in this area of the world.

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