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Zimbabwe: Why Water is Needed

Zimbabwe is a nation of a multitude of incongruities; land full of riches, such as gold, coal, and platinum, yet inhabited by people who are underprivileged and famished. Zimbabwe once had a great economic standing in comparison to most of Africa, but because of government corruption, droughts, and economic collapse including one of the worst cases of hyperinflation in history, they have suffered. Agricultural experts worry that Africa's soil problems are heading towards a crisis ("African agriculture: Dirt poor"). One of the things leading to this soil crisis is water distribution and scarcity. This is a great problem to the people of Zimbabwe; meanwhile, the numbers of underweight and under nourished is on the rise. Without the proper water, the ability to grow anything on the already atrocious soil is becoming even harder. One must also take into consideration that one of the largest recurring natural hazards in Zimbabwe is drought. Drought actually accounts for the five worst natural disasters that have affected the people of this beautiful country. With the problem of dreadful soil and lack of water, one must expect greater food scarcity.

Life for a typical rural family is harsh in much of the country. Most Zimbabwean ethnic groups have patriarchal families. In these, women play a subordinate role. They are expected to serve their husbands, work for them, and bear them children. A typical family today is made up of a husband and wife and at least two children. However, traditional families are big, including five or more children, plus grandparents and the children of relatives. The families normally eat grains, the main one being maize. They use the maize to create flour which is cooked into a thick porridge that is eaten with green vegetables or meat. A wide range of green vegetables are grown in kitchen gardens and collected wild. They generally are prepared with onion and tomato and sometimes with groundnut (peanut) sauce. However, all of these meals are seasonal; unfortunately most of them are in season at the same time, which causes an extreme lack of food during the off season.

The literacy rate in Zimbabwe is quite good in comparison to some other South African countries. Zimbabwe had a literacy rate of 90% for youth ages 15 and up in the year 2010, according to the CIA and United Nations Educational, Scientific and Cultural Organization (UNESCO). The educational level reached by most students is around nine years. Nevertheless, for most people the real danger is found in the high risk of disease; which is only escalated by water scarcity and lack of nutrition. The whole country has inadequate health care, but the rural population is hardest hit. Some communities do not regularly have the services of a fully trained nurse, let alone a doctor. Medicines are always in short supply. Some of the most common diseases are malaria, bilharzia, sexually transmitted diseases, tetanus, cholera, polio, and typhoid.

Although South Africa, and in particular Zimbabwe, has a dual agricultural economy, it is mainly comprised of subsistence agriculture. Subsistence agriculture (also known as self-sufficiency in terms of agriculture) is a method of farming in which farmers plan to grow only enough food to feed the family, pay taxes or federal dues, and perhaps even provide a small marketable surplus. Subsistence agriculture usually refers to a farm that produces enough to feed the family but will not be enough for the family to participate extensively in the cash market. The typical subsistence farm has the range of crops and animals needed by the family to eat during the year. Planting decisions are created with an eye to what the family will need during the coming year, rather than market price.

Surpluses on these types of farms are a rarity as production is limited to providing a marginal livelihood for the household. The temperature, scarce water, arid environment, and high cost of inputs discourage a farmer from growing any more than what is needed. Thus, risk is a typical mindset and disincentive for a subsistence farmer in the area to produce enough to participate in the market economy, leaving no opportunity for cash activity. Relying on these farms can then be unstable and insecure during events of drought when no other alternative ways of purchasing or obtaining food are available.

To the subsistence farmer cattle are very important, more so in the low rainfall areas. They represent a more viable production system than crops and are used as a form of financial security. Thus, every farmer aspires to have more cattle, leading to over-grazing as cattle numbers exceed the carrying capacity of the land. Goat production is also very important in low rainfall areas (GAIA: ESS). Zimbabwean families, especially in the rural parts of the country, keep animals. Most animals are not just pets but serve other purposes. For instance, cats are kept to kill pests such as mice and rats. Dogs are used for protection and for hunting. However, the grazing animals are hard to support, although very useful, because of the water scarcity, which leads to even less ways to help growth of plants that are already being abused by over grazing.

For farmers it is very hard to grow good plants for their animals to graze on or their families to eat. This is because over time deforestation has caused a great amount of soil erosion. This causes overall land degradation for most of the farmers of Zimbabwe. Some farmers just work with what exists because they have no other choice. Other farmers, if rich enough or in a good situation, can borrow money to purchase 50-kilogram bags of chemical fertilizer for the growing season. Because a bag can cost up to \$24 US, this is much too high of a price for most Zimbabwean farmers to even consider.

There are many barriers keeping Zimbabweans from improving their agricultural productivity. The largest economic damages reported are caused by the drought in Zimbabwe. Over 94.2% of people are majorly affected by drought compared to 3.8% for epidemic and 2% for floods according to EM-DAT. This is a huge problem. The soil of this country is at its worst and the lack of water is not helping keep the already dry and neglected soil from degrading even further. One way they are trying to fix this is by adding fertilizer or no-till farming.

No-till farming is making very little difference. As for the fertilizers, it does make the plants grow better than if they did not have it, but the ground is already so depleted that the overall change does little. The cost of the fertilizer is far too high for a large enough amount to be purchased and used for a long enough time to change the current composition of more than just the top layer of the soil. In addition, it carries along the additional problem of requiring significantly more labor. (“African agriculture: Dirt poor”).

Water scarcity is a major problem in the country. Most rural families do not have tap water. This is hard on everyone involved. Without water plants do not grow. No plants lead to a lack of food: not only for people but also for their animals. The animals are a main supplier of daily food and necessary nutrition for the people. The lack of water effects plant diversity, quality, and quantity. Without a sufficient crop supply they cannot keep their cows and goats alive and without those animals they cannot obtain dairy or protein. If they do not have plants, meat, and dairy, they are unable to obtain adequate nutrition. This leads to a greater risk of illness, which is already a significant risk factor in their country.

This factor is huge according to the OFDA/CRED International Disaster Database (EM-DAT) for the years 1980-2010. Estimated economic damages reported by drought are 2,827,700 (US\$ X 1,000) that is about 91,216 (US\$ X 1,000) per year. The drought has affected 16,488,458 people and caused 6,448 deaths over the last 30 years. The lack of water is harsh on everyone, but very hard on the rural areas that depend on their own food to survive. The reason that they are self-dependent is because most of the roads in the rural areas are not well paved. Without these roads, people have no way of getting enough food to

their family and neighbors. Add the fact that even if the roads did improve, some rural areas are not served by any modern forms of transportation. They would again not be able to get enough supplies to the group to keep everyone fed. This situation only worsens during the rainy season, when they have water but the amount of water is so great in a short amount of time that it is detrimental and causes flooding in some areas. This leads to erosion and decreased soil quality when it does dry up enough to plant on it again.

The water scarcity is putting everyone at a disadvantage but especially those people dependent on self-sustaining or local farmers to feed them. This pretty much incorporates most of the Zimbabwean country, which is classified as lower class. At this point, it matters not if it is men or women, adult or child, white or black; they all feel the lack of water; therefore, food deficiency is a large probability for them.

When a drought occurs in Zimbabwe, today it is just as bad if not worse than it was in the 1980s. Three of the worst droughts that have occurred have happened in the last ten years (EM-DAT). This could be due to global climate change and effects on local weather due to environmental changes around the world. In Masvingo Province, the area the IDS studied, the “production since settlement, for all farmers outside the irrigated plots, has been highly dependent on the pattern of rainfall, and the droughts in many of the seasons since 2000 had a huge impact on people’s ability to establish themselves. By contrast, the good rainfall years resulted in substantial harvests and were vitally important in the pattern of accumulation, allowing for the purchase of new inputs, equipment and livestock (Scoones).” A dependency on the rainfall or lack thereof makes a difference in growth.

Zimbabwean lifestyle remains unchanged, and that is a problem. Yet, they cannot help their problem because they have the bare minimum and have to use all their resources to keep themselves alive. It is due to this that the water scarcity and poor soil condition is taking such a demanding toll on so many people. While things are out there that could help the rural farmers better their crop production; they have neither the time nor the money to implement such changes themselves. If they are not able to do something soon all the land that is used for crops will get even worse. In addition, the fact that they have so little area to grow crops has a great impact; according to the CIA in 2005, only 0.33% of the land was used for permanent crops.

By fixing the water scarcity problem, it would bring new life to a once thriving country. It would help with the poverty of Zimbabwe. In 2008, over 50,000 children in Zimbabwe were severely underweight and the number has kept growing (UNICEF). Not only would all the children suffering from lack of water and food be helped by better use of water, but adults and animals will get to feel the effects. An increase of water use would lead to an increase of food and help the land flourish. With any luck a surplus will come about for the smallholder farmers who will then be able to sell some for extra money which could go to more crops and so on.

Addressing the water scarcity problem would help the rough economy of Zimbabwe. It would start a chain reaction that may lead to more money/stability for the government. A more stable government and increased food sources could cause an increase in government programs for the poor and keep more people out of poverty. More money could be diverted to health care and medicine to stop increasing epidemics. The country would flourish with the extra help it receives through the increase of crop production.

Water scarcity is a factor that is mutually dependent on many other conditions. It is like a web, if you shift one thing it causes all the others to change and evolve to deal with it. If water scarcity or any of the other major issues such as population growth or climate change evolved in a bad way, the lives and the ability to change other issues will evolve in a detrimental way. However, if something like water scarcity is fixed

it would strengthen the web and lift the others up so they are stronger and have a better chance of surviving and changing.

For a farm that has scarce water and bad soil, the hydroponic alfalfa fodder system may be just what some Zimbabwean families' or villages need. This technology is meant to be used in areas of poor soil. However, it could help with the water scarcity problem that plagues Zimbabwe. The system is a no soil growth of plants. It has a seven-day cycle that can provide fresh alfalfa for animals each day. This method eliminates over-grazing by providing fresh fodder 365 days a year to animals and people without dependence on soil. The best part about it is that it cycles and reuses the water to grow the plants and its power usage is small enough to work with solar or air power.

Now how does this tie into the water scarcity issue? Hydroponic fodder fixes multiple problems. The rainy season lasts for three months in Zimbabwe. If a farmer or village could have a water collection basin attached to the hydroponic alfalfa fodder system, they could use the water collected during the rainy season as the source for the plant growth throughout periods of drought. Water would run through multiple levels of trays containing alfalfa or other types of seeds and could be recycled through the system. Some water is absorbed by the seeds/sprouts and a small amount would be lost to evaporation. This means that the water will last longer than if it were poured onto the plants in the ground. Watering ground plants requires more water because of all the other things that need water in the ground. The hydroponically grown seeds sprout and use the nutrition present in the seed to form a mat or turf which can be ready for animal or human consumption in 7 to 8 days. No additional fertilizer or supplements are added to the water.

Then take into account the advantages that come from the fact that the grass not only gets a break from being over eaten but the nutrition not used by the animal from the alfalfa will come out in the feces of the animal. This manure will have the nutrition from a new source, the fodder. This means that the over eaten grass will be getting nutrition to grow as opposed to the lack of nutrition from the feces coming from already nutrition deprived plants. Manure has several effects when added to the soil such as: an immediate supply of nutrients, a delayed supply of nutrients, a lower pH, improved soil structure and enhancement of biological activity. It is proven "[when] incorporated with the soil, [manure] greatly improves the texture, loosening a heavy compact soil and binding together a light leachy one; making the soil more friable, warmer, more retentive of moisture and more congenial to plants in every way" (S. W. Fletcher). Also, in some situations such as in Zimbabwe, manure can serve as protective mulch on soils vulnerable to erosion. However, this can only happen if the animal and in turn manure has the correct nutrition to begin with.

Another problem that people would not need to worry about is the power that the system needs. People could connect the system to a solar panel or wind power unit or multiple units to keep them supplied with energy. While the initial cost of the system may be bigger than buying fertilizer for a year, over time the cost will even out, when it is taken into account that the animals on the farm will have constant food keeping them in good health. That in turn will make sure that the Zimbabweans will have a food supply of dairy from the animals they milk and eggs from their poultry. Several farmers or an entire village could form a cooperative and pool resources to obtain hydroponic fodder system inputs.

The government and other organizations could help fund the hydroponic alfalfa fodder system and teach the farmers how to use it. Any group could put forth an effort to bring this technology to the people who do not have the resources to get it for themselves. Once they teach the people how to do it or even find a way to do it better the people could spread it to their neighbors. A main section of a village could get a large hydroponic alfalfa fodder system and use it to support the farmers who are suffering from over-grazing and poor soil quality. If the government, national or local, could implement a program that would have a fodder system in the main village area near a water source and those who truly need the alfalfa can

obtain it for a certain rate. Otherwise, a system could be created that on certain days people could get a certain amount of the alfalfa produced. Or each farm could acquire or make their own fodder system to grow what they need. The size of the hydroponic system would depend on the amount of area or animals they have.

The funding for this project would have to come from an out of country source because of all the past and current turmoil in Zimbabwe's government. Places such as the United States could take part in such a project, even though their relationship with Zimbabwe is insecure at best, because it is done in the hopes of helping the people of the county. According to the U.S. Agency for International Development (USAID) it has provided assistance to Zimbabwe since 2002 and focused on HIV/AIDS prevention, democracy and governance programs, humanitarian assistance, economic growth and agriculture, and investing in people. As it stands getting the funding and teaching these people how to use them would be considered humanitarian assistance devoted to the promotion of human welfare. By sending out people already involved in government programs of this type, organizations can reach those who need systems or need to learn how to use the systems. People can also take into account that this doesn't just need to be taken care of by government programs. Schools and communities could collect money and materials to be sent to Zimbabwe. People can go on service trips to Zimbabwe and help set up and teach them how to use it. Others have everything that is needed: supplies, money, and knowledge; however, it is up to those who have it to get it to those who need it.

In conclusion, Zimbabwe is a fantastic country that has a wonderful culture. However, it is lacking in some of the necessary ingredients for a prosperous society. The scarcity of water plays a big role in this. The drought makes it hard for the water to be evenly distributed and for food to grow. Add that to the poor soil and erosion and agricultural production becomes severely limited. If they were provided the means to adopt the hydroponic fodder system they would have a better chance to obtain and keep what is needed to support animals. It would have initial establishment costs, but in the end it could help replenish the land by allowing it a break from constant crop farming and over-grazing. Manure from the farm animals could be used to improve soil quality. In addition, the water that would normally be lost to the soil and evaporation in the fields would instead be reused to its fullest potential. As people are better able to keep and feed animals, they will have better nutrition and possibly extra income to put toward improving farms and soil. One thing is for sure, something needs to be changed and we need to consider everything to find out the best way to make that change.

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