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Tanzania, Factor 7: Animal Agriculture

Improving Animal Based Agriculture

Preface

A middle school science teacher's experiences in Tanzania have greatly influenced my course of action in life. It started by him telling stories of hunger and impoverishment in Tanzania. He told many stories of how "little" there was to eat: rice with maybe a few beans. These stories were the inspiration for my then seventh grade science project. I designed, built, and tested a chicken egg incubator, to increase poultry production in developing nations. In developing countries, chickens receive much less than optimal nutrition and do not produce the hormones that cause them to become broody (or want to sit on eggs). The eggs are then left open to the elements and predators. My incubator is different than other incubators due to the fact that it is cost effective (under \$10), easy to ship (2-4 can easily fit in a suitcase) and is easy to use. It was this early mentoring that led me focus on Tanzania.

Tanzania

"Never doubt a small group of thoughtful, committed people can change the world. Indeed, it's the only thing that ever has." Margaret Mead. This is the start, if our work is compiled with other agriculturalists and scientists we can change the future of food insecurity and world hunger.

Tanzania is different than a large majority of African nations; people will identify themselves first and foremost as Tanzanian, then as members of a particular tribe("Tanzania."). Three quarters of the country's inhabitants live in rural portions of the country. A typical family is composed of six members: a father, mother and four children. 16.7% of children under the age of five are underweight (Children and Youth - Kigamboni Community Center KCC in Tanzania). The diet varies across the country; most meals are either maize or rice based with a small portion of meat, fish or beans. The set up of schools in Tanzania is Pre-Primary Education (year one and two), Primary Education (standard one-seven), Junior Secondary Education (form one-four), Senior Secondary Education (form five and six) and Tertiary Education (university) . In the year 2002, the government started a primary education system; after this nearly 100% of children ages six to fourteen began to attend. Secondary school is cost prohibitive to a large majority of families; only one in ten children who pass primary school advance to secondary school. Even fewer advance on to further their studies through vocational schooling or universities. Health care is scarce throughout Tanzania. The infant mortality rate is 65.74 deaths to every 1,000 births (Children and Youth - Kigamboni Community Center KCC in Tanzania). There are never enough trained professionals to care for the ailing, thus health care often falls upon the duties of traditional healers. This is only effective for common illnesses ("Tanzania."). There is access to forms of communication in rural parts of Tanzania. In Tanzania there are Rural Communication Access Centres these are places where there is internet accessibility. In addition there is typically access at most schools and hospitals ("Rural Communication Access Centres in Tanzania."). (This is a brief description of common occurrences in Tanzania.

Tanzanian Agriculture

The average farm size in Tanzania is between 0.9 and 3.0 hectares, which is equivalent to 2.22-7.41 acres. Over 80% of the country is employed doing something agriculturally related. Women are often the ones doing the labor work on the farms ("Tanzania Agriculture Sector."). Most farmers in Tanzania are subsistence farmers; growing only enough for their families. Some of the major crops are: bananas, rice, maize, and beans. Livestock is a critical factor in Tanzanian agriculture with livestock being reared in

drought prone regions of the country; the most common livestock produced are cattle, sheep and goats("Tanzania."). There are currently studies being done in Tanzania on drought resistant strains of maize, also known as WEMA; this stands for Water Efficient Maize for Africa. But, there is not ability to test other genetically modified crops due to biotechnology restriction set in place by the government (Kitabu). In Tanzania agriculture, there are some key barriers to improving productivity; transportation, climate, lack of diversity, lack of training, and, volume. One of the main problems in Tanzania's agricultural economy is transportation; there are very few roads in rural parts of the country, which proves to be a problem in transporting goods to market. Another, is the climate; some parts of the country are extremely prone to droughts; leaving crops susceptible to failure. There is very little diversity in Tanzanian agriculture with only a few staple crops grown. The farmers producing the crops have little formal training in agricultural practices, and many times will make beginner mistakes (i.e. over/under watering). There has been the development of better irrigation methods to help improve productivity in drought ridden parts of the country ("Tanzania Agriculture Sector."). In production, one of the key problems is the amount of food produced per acre is very small compared to international standards. These things are very indicative of a typical subsistence farmer. Farming is not the only part of agriculture. Tanzania has started to encourage other services related to agriculture such as: Ox training farms, tractor repair centers and agricultural research facilities ("Tanzania Agriculture Sector."). This is a brief overview of Tanzanian agriculture.

Poultry is a vital piece of Tanzania's agriculture market. In the years before 2007 Tanzania had a problem with their beef cattle, sheep, and goats contracting a disease (Rift Valley Fever). This disease scared people. They quit buying meat from cattle, goats and sheep. This caused the price of poultry to skyrocket as the demand for chicken had gone up. In late 2007, the disease was under control, but the price of chicken still stayed high ("TANZANIA: Rift Valley Fever under Control, Says Government."). In smaller villages, chicken is a relatively common and easy to find. The chickens are not treated with ideal animal husbandry practices, they don't receive proper nutrition and aren't treated for disease. These factors end with there being poor productivity and a high mortality rate in the chickens. The size of the flocks is typically 10-30 chickens per family. These chickens are used for either meat, egg production, or breeding, all serving as important forms of income for the family (Knueppel 5-6). Women play an important role in chicken production, being the primary caretaker of the chicken flock. Though, they are the primary caretakers of the birds they often do not have the decision making authority to sell the eggs or the chickens; this task often falls upon the men and boys in the household (Knueppel 5). The major disadvantage of small scale poultry production is Newcastle Disease. The mortality rate in chickens is 80%-100% if untreated. The prime season for infection is June to October during periods of little rain. The chickens are all drinking from the same small number of water sources, dry winds carry the virus, and during these months chicken trades are increased. There are vaccinations available, but they do not last for long periods of time and must be updated throughout the year (Knueppel 7). With the intervention of the vaccine the problem of Newcastle Disease is improving. It is also obtainable to the small scale farmer with the cost being only \$0.03 per chicken per dose (Knueppel 9). This still leaves the problem of poor productivity of the chickens in the villages, which is improving.

The United States Grain Council has started to teach poultry producers about better conditions for raising chickens including improving housing, improving nutrition and improving sanitation (USGC Launches Tanzania Food for Progress Program to Promote Poultry Industry). Training similar to the one mentioned prior has proven to be successful on a small scale. A lady who had received training said, "A few days ago, I sold 150 chickens at whose sale price where I got more than 1m/-, which helped me pay school fee for my child, who is in Form One," (Tanzania - Poultry Farming). Another view at teaching poultry classes was to start young. Innovation Lab Communications Team Poultry Skills for Improving Rural Livelihoods had a program that they implemented in Tanzania; they taught around 600 sixth graders basic poultry care and husbandry. There was a meeting held after the conclusion of the class with 48 teachers, farmers and participants whose purpose was to analyze the effectiveness of the program. They deemed

that the program was highly effective in educating the public on better chicken husbandry. They saw the results in local village poultry production (School Children Practice Poultry Skills in Tanzania and Nepal). There was a trial held in Tanzania by the Peace Corp; the trial was to have a five day clinic for Tanzanian farmers to teach proper chicken and poultry husbandry. Twenty-two farmers participated in the trial clinic. Participants reported that they “ couldn’t wait to use some of their new found skills on the farm and in the village”. In addition, the participants were asked by Peace Corp Volunteers on how to further improve and implement the existing program (Watkins). To build off of earlier programs, a FFA type program could be set up in their primary schools to further encourage an interest in not just poultry but in agriculture as a whole. For adults, a Young Farmers program could be set up in regions of the country; this would not only leave an influence on the poultry industry but on, Tanzanian agriculture. Implementing these programs would not prove to be a fast process, it would span over a period of five years to set these programs up countrywide. There would need to be teachers to train people to teach a curriculum. These “teachers” could travel over a designated area to supervise the programs and ensure that the pre designated curriculum is being taught accordingly. Eventually, it would be able to be self sustaining without these “teachers”. Implementing programs like this would require the cooperation of the ministry of education. The best suited group to start these programs would be World Vision. World Vision is supportive of both improving agriculture and education in developing countries. This seems to be an effective tool in teaching people how to further improve production with their flocks of chickens and increase agricultural interest.

Another possible solution for the productivity could be the use of an incubator. There is a line in the FFA Creed that reads “I believe in less dependence on begging and more power in bargaining; in the life abundant and enough honest wealth to help make it so--for others as well as myself; in less need for charity and more of it when needed...”. It is in these lines that the full idea of the incubator came into play. “Less dependence on begging and more power in bargaining...” with the incubator people would be better equipped to bargain and therefore less likely to be put into a position in which begging seems to be the only option.. Another key line is “...in less need for charity and more of it when needed...” The overriding goal of the incubator project is to establish communities where aid is not a necessity to stay functional in a day to day life; but if a sudden traumatic event were to occur, help would be available as need be. Currently, I am working on improving a prototype incubator for use in developing nations. This incubator is different than other incubators. It is cost effective, as it is only \$8.58 to construct. Most incubators on the market start at \$50 and only increase from there. Another difference is the ease to transport. 2-4 collapsed incubators will easily fit in a common 22”x14” suitcase. The typical incubator is incredibly bulky and difficult to ship. The last difference is the ease of use. It requires little technical knowledge to run, where some incubators require a knowledge of electronics. It is constructed of easily obtained cardboard boxes and foam insulation. The incubator has a maximum capacity of 10 eggs. With the incubator you put the eggs in care for the daily duties of flipping the eggs and keeping the water bowl full and in 21 days chicks will hatch. Mentioned previously this is a prototype, the hatch rate has not been fully reached. One trial led to a hatch rate of 20%. Traditionally, the farmers allow chickens to hatch their own eggs in uncontrolled environments. This is the highest hatch rate. The problem was due to the location of the light bulb in the incubator. It was frying the eggs in the center of the incubator. In further trials the location of the light bulb will be moved to a more central location in the incubator, or, the light bulb will be covered by a guard to help better disperse the heat more evenly. The incubator is not the only new technology being test run; in addition alternative energy sources have been discussed. Stanford University Physics Department has been doing research on phase changing materials which you leave out in the sun or heat over an open flame and the material absorbs the heat and radiates it out. It has that small scale incubation projects work in Tanzania. Mr. Eliphaz Kitomari runs a poultry production farm in Tanzania that started out with a small incubator. His production has now changed into a farm that produces over 900 chicks a month. His success started with just a small incubator, a few hens and a rooster (“Case Study 1: Kitomari.”). Contact has been made with Stanford over possibly using this

technology in the incubator. Another idea that was discussed was solar panels; they were quickly ruled out due to the expense that they will bring to the overall cost of the incubator. The most likely solution is having the incubator be operated by car batteries which are relatively easy to come by in all parts of Tanzania; rural and suburban. This incubator has been set up in the University of Kentucky labs and has been supervised by Dr. Austin Cantor. In the research process, Wycliffe Bible Translators were contacted about the use and the practicality of the incubator. They were one of the organizations that stuck out due to their work in very remote and rural parts of the world and their mission to serve others. Very positive reviews came from a meeting with some of their directors. Another, organization that could help implement the incubator is World Vision. They, as an organization want to improve the livelihood of people in developing countries and they send volunteers to go work in small villages. With continued in lab research and improved hatch rate there is a goal of having the incubator field tested by the end of 2015. The cost of the incubator could easily be worked of with the revenue from the product of the incubator. It could be sold on credit, then when it begins to make money it could be paid off. My plan to distribute the incubator is to send it with missionaries who often do work in rural areas of the country. Eventually, this incubator could be manufactured in Tanzania. This would increase the number of manufacturing jobs available in Tanzania and would help to improve the entire economy; not just the agricultural economy. This is not the complete solution to solve food insecurity and poor poultry production in Tanzania but, it is an important step in improving the life of a family or small village.

Food insecurity is not a problem that will be solved overnight. For this problem, there is not one answer that works for all situations. There are many variables that play into food insecurity; these many variables require the thought of many minds put together to solve. We as a generation need to lead the pack in developing and testing innovative ways to solve food insecurity. There are tested methods, that may need refinement to meet the needs of a society; the class and teaching programs. Then there are many new and innovative ideas on how to solve the problem; one being the incubator. Either way the time is now, there has never been a more imperative time to begin the research and take the first step to end not just hunger in Tanzania but, global hunger.

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