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Niger, Malnutrition

### **Decreasing Malnutrition in Niger using deep fertilizer placement**

At one time, people worried about malnutrition and making sure they were getting the proper food for survival. Today, many countries are focused on weight loss and solving the problem of obesity. Although in many countries getting adequate food is not an issue, in Niger it is the most important issue that they are facing. Niger has continually struggled to have consistency in agriculture production. It has a broad range of weather patterns, not only do they suffer from severe droughts, but they also have problems with flooding. Malnutrition is also a major problem in Niger. There is already an enormous amount of people in Niger who are malnourished, but this problem will only grow more rapidly because it is one of the fastest growing countries in the world; however, their fast growing population will continue to struggle because Niger continues to fall behind.

Niger is a relatively small country with a population of 19.8 million people. There is not much for urban life, and about 80% of people living in Niger live in rural areas. The quality of life for them is very poor. About two-thirds of Niger's population lives below the poverty line (AfricaW,2019). There is about 10% more people living under the poverty line in rural areas compared to urban areas (Myers, K, 2018). The endless droughts, floods, and widespread of poverty has really hurt Niger's growth. Rain-fed agriculture supplies 80% of Niger's population with food and money. Most of Niger's people are subsistence farmers and has the 28th highest cattle inventory out of all countries in the world (Farm Journal Inc,2019). Despite the abundance of cattle, they struggle to feed their herds with sustainable and consistent crops. Therefore, agriculture plays an enormous role in Niger's economy.

Many of the people living in Niger struggle to get by. They have difficulty getting food and having any source of income. The average family size is about six people so the struggle to get enough food is even harder since most families are large (Department of Economic and Social Affairs,2018). Most families live in adobe mud houses or portable tents (World Food Programme,2018). Nearly two-thirds of all children in Niger are uneducated because they simply do not have enough money or do not have access to school. The literacy rate in Niger is a mere 15.5% and the world's average is 92% (Northrop, W,2017). However, they have bigger problems that outweigh education such as simply finding food and water. Instead of sending their children to school, most parents will have their kids work at a young age to help support the family. Not only are people in Niger uneducated but they also have poor access to health services. The 80% of Niger's people living in rural areas have an especially difficult time accessing health services. The health services that are available to people are outdated and inadequate. Also, they have a shortage of medical supplies and doctors because most doctors move somewhere else where they will receive better pay. Niger is even farther behind in education and health services than other third world countries

The culture in Niger is very diverse. Niger is made up of immigrants from southern and northern Africa. Although the culture is very diverse the religion is not and almost 98% of the people living in Niger are Islam. Many different types of people who live in Niger are considered unequal. Men and women are considered very unequal in Niger. Men get to work and women do domestic chores. Also there is a huge gap between the amount of men and women being educated, women are far less educated than the men

are even though a majority of men are uneducated (RASMUSSEN, 2019). The practices and culture in Niger has not involved in many years.

A major problem for people living in Niger is finding a consistent and effective way to get food. The struggle to get food really hits the young children hard, as 42% of all children under the age of five are malnourished. Some of the effects from malnourishment include being more vulnerable to deadly infection such as respiratory infections. The young children are also more vulnerable to the negative side effects from malnourishment than adults are. About 331,000 children under the age of 5 in Niger need to be treated for severe acute malnutrition every year. Not only do children suffer from hunger, but also all of Niger does as nearly 20% of their population cannot meet their food needs (World Food Programme, 2018). This number will continue to rise as the population rises. The effects of malnourishment runs deep in the lives of all people that suffer from it. Effects from malnourishment include: poor growth, muscle weakness, problems learning, low energy, weak immune functions, and many more (Weiss, T. C, 2018).

However, some people in Niger do not struggle with hunger. A balanced diet in Niger consist of millet, corn, rice and beans. Millet is a fast growing cereal plant, and it only grows in warm areas. Millet is Niger's top staple crop, and it is known to be superior to corn and rice because it is really high in protein, contains many minerals (phosphorus and magnesium) and many vitamins (B6, thiamine, Niacin, Riboflavin). Most of these crops are rain-fed and are made into a variety of stews. The basic foods that they eat consist of many common staple crops.

Furthermore, Niger has a variety of land types. The Sahara desert covers a lot of Niger but a big portion of the land in southern Niger is arable. About 36% of Niger's land is used for agricultural purposes, but of that land, 13% is arable land. There is about 16,800,000 acres that can be cropped and are arable. Of the total land there, 12.6% was cultivated in 1975, and in 2013, there was 24.5% cultivated. There has been a major push for more agricultural production and that is why so much more land has been farmed. A lot of the land that is arable has sandy top soil. The reason for the poor soil in Niger is because of years of deforestation and overgrazing cattle. Now they are trying to plant more trees and vegetation to keep what arable soil that they have left. Sandy topsoil is easily eroded and blows away from wind, but as long as there is some vegetation covering the land, then it will stay ("Land Use, Land Cover, and Trends in Niger | West Africa", 2019). Farmers in Niger are relatively substance farmers, and on average, they farm 4.5 acres ("Niger | Integrated Production and Pest Management Programme in Africa | Food and Agriculture Organization of the United Nations", 2019). Most farmers do not have a surplus from their agricultural production and only have enough food to barely feed their family.

Since Niger has had such a struggle with malnutrition, I have decided to choose malnutrition as my factor. Malnutrition affects people all ages and the economy of Niger because it heavily relies on agriculture production. When people are not making money, that means there is no money flowing throughout the country and that causes the government to be unstable. Social, economic and political issues are all causes leading to Niger's unstable government (Covey, R). Since the government is unstable, it struggles to be able to help its own people. Without any of Niger's people having any income the government will continue to be unable to help its own people. All farmers that are malnourished simply do not have enough energy to work and the energy to continue to plant crops. This not only hurts farmers but it also hurts their families and generations to come. If they cannot produce anything, then they will have no source of income and prices for food will continue to rise because there will be less food in the market. They struggle to buy food to make up for their shortfall or lack of crops since prices are so high. Over

20% of Niger's population cannot meet their food needs and this number will continue to rise as the population rises (World Food Programme, 2018). Organizations have tried to help the people get the food that people need but there is such a large amount that are malnourished that it is an enormous task to help all of them. As soon as organizations start to provide food and help for the people, then they find others that need food even more and have to move on. These organizations cannot consistently feed people and give them the vital nutrients that they need. The people need to be self-reliant. If these people were able to grow their own food and raise their own livestock, then it would positively affect not only their families but the whole country.

One solution I would like to propose for this situation is deep fertilizer placement. Currently farmers in Niger either use traditional hand-broadcasted fertilizer or they just don't use fertilizer at all but Deep fertilizer placement would give the people of Niger improved and steady yields. Not only would they have food but they would also have a surplus of production and be able to afford necessities for their daily lives. Deep fertilizer placement is placing fertilizer 7-10 centimeters below the ground instead of a traditional hand-broadcasted area. When the fertilizer is placed into the ground, it is near the plants roots and helps to supply key nutrients to the plant during its life cycle. The benefits of deep fertilizer placement is incredible. Some of the benefits include increasing crop yields which leads to increasing incomes and not having to use as much fertilizer to produce abundant crops. With the increased crop yields they would have enough food and a surplus which could be used for other basic necessities. A study shows that crops yield 18% better when using deep fertilizer placement but yet using  $\frac{1}{3}$  less fertilizer. Also since the fertilizer is placed deeper into the ground, it will help lessen the environmental damage and help to ensure that they have clean water. When the ground washes, the fertilizer will be secure in the ground and not runoff into streams, rivers, and bodies of water. If flooding and erosion occurs the fertilizer would not be lost like traditional hand-broadcasted would. This will help to make sure their water stays free from fertilizer. The type of fertilizer which is most commonly used and most effective for deep fertilizer placement is a blend of nitrogen, potassium and phosphorous. These are the three primary nutrients needed for optimum plant growth (IDFC,2017). Since there is drought and flooding in Niger, this method will work very effectively and greatly help the farmers provide food for their families.

In addition to deep fertilizer placement, another solution I would propose is cover crops. When crops are harvested and not in the ground, farmers should plant cover crops. Cover crops would not only help keep the top soil that they have now, but also enhance the soil health. A major reason cover crops would help them is because most of their arable soil is sandy soil and the best way to grow plants in sandy soil is when an abundance of organic matter is present. Also, cover crops conserve soil moisture, protect water quality, protect against soil erosion, help suppress weeds and reduce the need for herbicides. Another key benefit from cover crops is it reduces fertilizer loss (Nationwide, S). A study taken by Iowa Nutrient Reduction Strategy showed in a typical corn-soybean rotation nitrogen loss was reduced by 28%, nitrate loss was reduced by 31%, and phosphate loss was reduced by 29% (Christianson, R., Christianson, L., Wong, C., Helmers, M., Mcisaac, G., Mulla, D., & Mcdonald, M.,2018). When flooding occurs, the plants will provide important roots into the ground to help ensure the topsoil does not wash away. The main seeds used in cover crops are Hairy Vetch, Red Clover, Austrian Winter peas, and Fibrous rooted cereal grains. Cover crops will help the farmers in many different aspects like using less fertilizer and providing healthier soil which will help improve yields long term and help protect water quality (Nationwide, S.). Cover crops will positively affect farmers in Niger with all of their farming tactics and in many aspects of their lives.

Fertilizer is used in Niger by farmers but many people simply do not have enough money to afford it. A way they can pay for the fertilizer is if the farmers get the help they need and resources from an outside organization and take some kind of ownership. In return, the farmers help the organization by working for them in any way that they could and the organization would then provide their aid which in this case would be providing the fertilizer and seed. Another solution for the farmers being able to purchase fertilizer and seed is if Non Government Organizations (NGO's) helped to contribute money if they were informed of the solution proposed in Niger. If NGO's knew that deep fertilizer placement and cover crops worked, then they would contribute money and knowledge to this important cause. An NGO which has helped other countries and regions with problems similar to this before is WFP (World Food Programme) (Covey, R). With money that they would receive, they would then be able to finally have quality crops and then be able to feed their families while having a surplus so they can have a source of income. This cycle would then continue because their surplus of crops would help to create income so then they would be able to use and afford the deep fertilizer placement method and cover crops. To start this, they would need help financially and they would also need to be educated about deep fertilizer placement and cover crops.. They need to know what type fertilizer to use and depth of the fertilizer to place into the ground. They would also need to be educated on what types of seeds and how heavy of a broadcast to use for cover crops. If government corporations or outside organizations could educate a couple people in a variety of communities throughout Niger, then they could carry on their knowledge to farmers in the community. These people would have to be leaders or well respected people in their communities so that way others would listen to what they have to say. People in these communities would be more comfortable being educated by familiar people than being educated by foreign people. This knowledge and these methods would then continue to spread throughout communities and then eventually spread all across the country.

In a country with one of the highest rising populations and with one of the most malnourished people, a solution needs to be found. Unfortunately, in the past, nothing has helped these people to be able to provide food for their families and necessities for a healthy life. Other proposals have only helped the people temporarily but nothing has lasted long term like my proposal of deep fertilizer placement and cover crops would. My proposal of deep fertilizer placement and cover crops would not only help provide people with food but also help keep the environment around them cleaner. The education and application of deep fertilizer placement and cover crops would provide the people with the knowledge on how to grow a quality crop. It is relatively easy to implement onto a farm and to learn about how to effectively use deep fertilizer placement. The financial support would have to come from an outside organization but once they provide them with the resources once, then they will then be self sufficient. Not only will the people be positively affected by being well nourished but the country's economy will be much better because they rely heavily on agricultural production. There agricultural production would increase immensely in all aspects including both crops and livestock. The investment of deep fertilizer placement would affect the whole country in a positive way. The people of Niger are hopeful for a better future, and I believe that their hopes will be fulfilled by the installation of deep fertilizer placement and cover crops. Teaching them a way to plant an abundant crop will provide the people now and future generations with the proper food for survival.

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