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## **The Impact of Malnutrition Due To Food Insecurity; Proposed Solutions For People Of Niger**

### **Introduction**

Despite many of the 21st century's innovations and advancements in agriculture and medical technology, food insecurity remains a global problem faced in particular by developing countries (Agriculture Goods, 2018). In fact, statistics show that globally "34 million children suffer from severe acute malnutrition and die from hunger-related causes" (Action Against Hunger, 2018). Sadly, this means that malnutrition alone accounts for "over half of children's deaths annually with other leading causes of death listed as various diseases and infections" (Neumann, Gewa, & Bwibo, 2018). Malnutrition is typically caused by several underlying factor such as poverty, lack of access to food, food insecurity, disease, conflicts, climate change, and lack of safe drinking water (Causes of Malnutrition, 2018). It is the intent of this paper to discuss malnutrition caused by food insecurity, PEM (Protein Energy Malnutrition), and propose solutions that may alleviate this problem.

### **Country of Interest: Niger**

A main requirement for a stable country is food security. There is a need for food all across the world, and there is a need for people to come together and help fight hunger. Food insecurity throughout the global community is a problem and one country in particular, Niger, (located in Western Africa) caught the researcher's attention as one in six children in Niger will not live to see their fifth birthday due to the high rates of malnutrition and disease (Niger, 2018). The population of Niger in 2005 was 9.2 million compared to 16.6 million in 2018. The main languages of Niger are French (official), Hausa, Arabic, and Songhai. The capital of Niger is Niamey (home to 500,000 people) which is located along the Niger River. Many of the rural families are often divided into two different categories, those that are settled and those who are nomadic.

### **Family Information**

Often many of the Nomadic families have the women and children live in one location to tend to day to day activities while the men travel throughout the region with the livestock to supervise grazing. Cattle are viewed as a symbol of wealth throughout the region and are typically used more for their dairy purposes rather than meat. The religion of the country of Niger is predominantly Islam (estimated to be 94%). Families often have many mouths to feed; it is common for men to have four wives and for each wife to give birth to seven children, thus creating families of 33 people for one father to provide food for (Niger, 2018).

### **Challenges and Impacts**

In the 15th and 18th centuries, Niger was a former slave trade hub and a center for gold and salt trading. From the 20th century until 1960, Niger was considered to be part of French West Africa, and did not maintain its own sense of identity and culture. The geography of Niger is a landlocked country of 490, 0000 square miles.

## **Economy**

Presently, Niger's economy depends on "subsistence crops, livestock and uranium deposits", although it is interesting to note that 4/5 of Niger's population are involved in farming to help feed their families. It was also interesting to learn that in recent years, China has heavily invested in oil refineries in Niger and have built oil pipelines throughout the country (Niger, 2018). Niger is also very rich in uranium which is used by the nuclear industry. In fact, uranium makes up 2/3 of the country's foreign revenue. Niger's coal supply is also used to power the country's mining industry. Despite its riches from mining, the country of Niger is listed one of the poorest countries in the world. In fact in 2005, the country received 100% debt relief from international funds and wiped out the fund with "80 million dollars in debt" (Niger, 2018). The country still runs a continuous deficit on merchandise trade and its imports are dominated by machinery, vehicles, fuels and cereals" (Economy Watch, 2018).

## **Diet**

In the country of Niger, a large majority (83%) of the population lives in rural environments (Southern and Western regions) where settled families rely on farming (raising livestock and growing crops) to exist, and when the supplies run low it is common for people to exist on one meal a day (Niger, 2018). Interestingly, many dwellings and public buildings are made out of mud. In the southern regions of Niger, where the ground is more fertile, families grow beans and vegetables. Since a large majority of the population of Niger is poor, meat (due to the expense of obtaining it) is only eaten on special occasions. The staple diet of Nigerien families (who often live nomadically in the dryer Northern and Eastern regions) consists of "milk and millet which is pounded into flour and then made into a stiff dough and eaten as a porridge" (Niger, 2018). This floured creation is often flavored with hot spices and chili peppers which are a result of the historical impact the Arab world had on this region after centuries of trading spices. Because the typical diet of most families is extremely high in carbohydrates, and low in proteins and vegetables it is no wonder that so many people are PEM deficient. Teaching family's to eat better and making a way for this to happen are two major hurdles and concern in combating malnutrition in Niger (Niger, 2018).

## **Climate**

Nigeriens also face climate challenges, as Niger is among the hottest countries in the world with the Saharan Desert to the North, and the fact that it straddles the Sahelian Climate Zones (Niger, 2018). The Sahelian Climate Zone causes rainfall to evaporate often before it hits the ground. In response to a severe drought in 2012, the World Food Programme, began a program known as 3N (Nigeriens Nourishing Nigeriens) to water irrigation, reforestation, and teaching simply crop and some livestock techniques (Niger, 2018). According to the website, Our Africa, the livestock that are mainly kept in the country of Niger are cattle, sheep, and goats and are mainly fed a grass diet as the corn that is grown is used typically for baking (Niger, 2018).

## **Education**

Aside from the impact of poor diet and climate, the country of Niger also faces another challenge as they have one of the lowest literacy rates in West Africa. Education is a luxury for most families as children are needed on the farm and fewer than one in ten children attend school. In particular girls are encouraged

by their culture to stay home and marry by the age of 15.

### **Political Unrest**

Another challenge Niger has faced has been political unrest. It is interesting to note that in recent years, the United States has had an increased military presence in Niger as its location makes it a major transit route for immigrants that are headed to Europe.

### **Challenge Summary**

To summarize many of the challenges facing Niger include: poverty, food insecurity, harsh climate, drought, political unrest, lack of education, low literacy rates, high malnutrition rates, and large debt ratios. Although these challenges are all difficult, the challenge of combating childhood malnutrition is the most concerning to this researcher as one in six children will not see their fifth birthday (Action Against Hunger, 2018). As so many children are dying, this leads one to ask what can be done to change this situation and how can the country of Niger make changes that are both sustainable and life altering?

## **Solutions and Recommendations**

### **Careful Breed Selection**

As this researcher studied the topic of childhood malnutrition, one component that arose is PEM (Müller & Krawinkel, 2005). As was stated before in this paper, meat is reserved for special occasions due to the expense of raising and obtaining, cattle, sheep, and goats; but what if the people from Niger began to raise more inexpensive types of livestock such as poultry? Eating more poultry or eggs would be one way that the people of Niger could obtain more protein especially since these products are unrestricted by any religion or culture in Nigeria. Also, the process of raising chickens to market weight as broilers or to raise laying hen takes weeks or months compared with the length of time it takes to get other livestock to market weight.

It is important to note that the breeds of chickens would need to be chosen more carefully due to the harsh climate, and intense heat. After researching many different breeds of poultry, some of the breeds that this researcher would recommend that are also native South African breeds are the Ovambo, Potchefstroom Koekoek, and the Naked Neck Chicken. The Ovambo chicken is a hardy bird that is small sized with bright colors that often sleep in trees to avoid natural predators such as wild cats, foxes, etc. The Ovambo chicken is also very drought hardy and is excellent at catching rats and mice, which would be an added benefit as the chickens would help the farmers keep rodents away from their grain storage. The Potchefstroom Koekoek chicken is a cross of the Black Australorp, White Leghorn and Barred Rock chicken. This breed was specifically developed to be drought hardy and tolerant of high temperatures. They are a dual purpose breed and are good for both meat production and egg laying. Finally, the Naked Neck chicken is also a dual purpose breed good for both egg and meat production. The Naked Necks would allow for faster growth since they do not have to produce as many feathers. Also, the Naked Necks on the chickens allow the birds to deal with the high temperatures and be a more heat tolerant bird. This researcher recommends that farmers in Niger consider these three breeds when beginning poultry production because the birds can naturally handle the lack of irregular feed/grain, and grain resources can be instead used for human consumption.

### **Dual Purpose Livestock**

Choosing other livestock with a dual purpose in mind could provide families with milk, wool, meat, and help to graze overgrowth areas. Raising poultry would also provide pest control, fertilizer, feathers, and an inexpensive source of meat. Mentors could help teach the Nigeriens to raise the animals proficiently, along with the current crop classes that are being taught through 3N. The 3 N program is working hard to help Niger become more drought resistant through irrigation systems and better water management systems. These things will help the joint effort of increasing the overall food supply, and help eliminate some of the factors of food insecurity. As the food supply increases, the surplus food could be bartered or sold as income for medical care or for other supplies needed (Niger, 2018).

### **Grant/Mentorship Process**

Last year, as part of a 4-H leadership project, this researcher found sponsors for and implemented a new swine grant project that paid for 6 feeder pigs, and up to \$700 dollars in feed for first time 4-H swine exhibitors in my home county-Tama County, Iowa. The swine grant has provided workshops to exhibitors, and a mentoring process so the youth learn how to efficiently raise swine themselves. The youth have been given a head start to learn skills that will help them as they can continue to raise swine in the future. This year, a secondary goal was added to the leadership project that allows the swine grant to impact our community in a positive way. Since our county fair has a terminal swine show, this year some of the hogs that are raised by the grant recipients will be processed, and the meat will be given to the local food pantries to help those in need, and the grant recipients will receive the opportunity to "pay it forward".

### **Implementation**

Although it would be important to consider climate and religious beliefs that may impact whether or not certain foods may be eaten (i.e. pork); this researcher believes that this same grant/mentorship process could be used on a larger scale to create a mentor/food resource program that villages, and developing countries, such as Niger, could utilize. Perhaps a grant or other resources such as the Red Cross or the current 3N project (from the World Food Programme) who have already successfully been making progress towards improving food security could sponsor and pay for farmers/recipients to receive a mixture of livestock that serve dual purposes such as sheep, chickens, or goats.

Farmers would also need mentoring and veterinary care training (vaccines) to deal with poultry diseases. The 2005 Niger Avian Influenza Epidemic that nearly wiped out the poultry industry in Niger has not been forgotten, so it is critical that farmers receive training on proper veterinary care and disease prevention. Perhaps, graduate students from Agricultural Universities around the world would like the opportunities to do internships and make a difference mentoring farmers in Niger for a semester. It may be possible to earn college credit for their research while the students are here teaching valuable skills to the farmers. Epidemiologists could write grants to pay for them to do field research in Niger perhaps inviting visiting veterinarians on their teams to help teach the farmers to properly care for their livestock. Another option may be creating a program to sponsor farmers from Niger to visit various countries agricultural facilities throughout the world and be trained on raising poultry correctly. In exchange for what they have learned, the farmers could "pay it forward" by teaching other farmers what they have learned and implementing the 3N model approach (Nigeriens Nurturing Nigeriens). It is important to note that governmental agencies would also need to address transportation issues such as overcoming the obstacles of poor travel conditions or arrange delivery for farmers to receive chicks, feed.

### **Resources**

While the idea of raising poultry or other types of livestock might solve protein deficiencies, the question still remains to see how Nigeriens can receive funding to get started raising livestock in the first place? Funding for this project would have to be raised by grants, or donations from global charitable entities, global banks, or civic organizations. Funding ventures is not always a fun or easy process as this researcher discovered this past summer while looking for sponsors for the 4-H leadership project; however, this method could be done even if the project needed to start out small and grow in size over

time. Beginning the project of implementing livestock to farmers on a smaller scale; spending time with them educating them on why protein consumption would be extremely important to the success of this project. Without this type of education, it is doubtful families will understand the need for change and that it is important to have protein as part of one's diet. Educators or mentors should be trained and armed with the skills needed and interpreters if necessary to teach this information as they are also teaching animal care techniques. Once the project is up and running, positive results should make it easier to achieve more funding and duplicate the project in other geographical areas throughout the country. Finally, it should be noted that governmental resources that may be needed as well would be potential security to travel with mentors as political unrest is a possibility and may be an unfortunate reality.

### **Conclusion**

An article was recently published about how farmers in Africa have been able to grow a special variety of orange sweet potatoes that are drought resistant but very rich in Vitamin A. This potato has helped alleviate some malnutrition issues and provide a source of income for farmers (Farm Africa, 2018). The sweet potato is a positive step in the right direction, but it still does not address specific issue of PEM. The grant livestock mentoring program I am proposing would hopefully eliminate PEM, extend life spans, increase the food supply, provide employment, be self-sustaining, and eradicate one of the underlying problems of malnutrition-food insecurity. Since 34 million children in our world suffer from malnutrition (Action Against Hunger, 2018), it is worth fighting for to see things changed and a difference being made. It may be difficult at times to see this project through various hurdles that may arise, but seeing lives changed and survival rates increase would be worth it.

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