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Chad, Malnutrition

## **How to Solve Malnutrition In Chad with Genetically Modified Organisms**

Malnutrition is a huge problem in many underdeveloped countries all around the world. People need a healthy and nutritious source of food to be able to live a healthy and long life. If people early in life do not have access to enough nutritious food then their bodies and mind will not be able to develop properly and will have an increased likelihood of early mortality and other health issues.

Chad is a landlocked country in Central Africa that has one of the highest levels of hunger in the world with 66.2 percent of the population living in severe poverty meaning they are not able to afford nutritious food. This nation has a population of 15.5 Million people which means 10.2 million citizens of Chad are living in extreme poverty right now (WFP). Chad has a lower standard of living than many developed countries with gender inequality, poor housing, high rates of infant mortality, poor healthcare, and a lack of a good education system (Chad World Food Programme). Without a good education the country of Chad is not able to develop new technologies to feed their growing population.

The average family size in Chad is 5.8 peoples per household with an average income of 1,590 dollars per adult (PRB). Compared to more developed countries, this salary is relatively small. With the use of GMOs, crops can be altered and produced more efficiently providing the potential to make resources such as seeds more affordable. Considering that only 3.9 percent of the land in Chad is arable.(Chad Arable Land) The use of genetically modified crops is a good option in order to maximize production of food. Having a mainly rural population provides another challenge concerning farming. While the lower percentage of urbanization results in more free space that can be turned into farmland to feed the growing population of Chad, this country struggles with infrastructure that makes transportation of perishable goods difficult.

The climate in Chad is hot and tropic with a wet season going from May to October. During the dry season there are generally strong winds and cool evenings. During the wet season farmers would be able to irrigate and save water for watering crops and implement irrigation techniques so that families do not have to walk miles multiple times a day to get clean fresh water. Without having to walk to find water, families will be able to be more focused on their jobs but also work in their farms or gardens to produce more food for the community.

Malnutrition has effects that are detrimental to the human body, for example, malnutrition can result in poor muscle strength causing people not to work for as long, your body not being able to heal from injury properly, a weakened immune system, and can cause harm to your important organs

like your eyes, brain and kidneys (10 effects of malnutrition). All of these factors can result in a shorter life expectancy and early mortality. One of the most dangerous effects of malnutrition is the effect it has on the brain if malnutrition starts at a young age the human brain will not fully develop and can result in a lower IQ (The Impact of Malnutrition on Brain Development). Children and Teens who suffered from malnutrition in their youth resulting in their brains not fully developing have a higher chance of dropping out of school or not continuing with their education (The Impact of Malnutrition on Brain Development).

GMOs or Genetically Modified Organisms are organisms that have had their genomes altered in a laboratory to get the traits in which the researchers are desiring (Britannica). GMOs can be useful to create more nutritious food or food in higher quantities. Genetically modified Organisms are banned in all African countries except for four which are Sudan, Nigeria, South Africa, and Burkina Faso (GMO Watch). One example of GMOs used in developing countries is Golden Rice which contains Beta Carotene which is converted to Vitamin A in the body. Vitamin A helps support healthy skin, immune systems, and vision (NYU Med). One-hundred- fifty grams of Golden Rice can provide the needed amount of Vitamin A for one child (Unfairly Demonized GMO). With the healthy immune system that you get from Vitamin A from Golden, Rice people would be able to have a higher chance of surviving diseases than people with a weakened immune system would not be able to survive.

Another GMO that can be used to help fight malnutrition would be Genetically Modified Corn that produces higher yields than traditional corn. Higher production can provide more food to the communities of Chad (GM). With access to more corn, people will be able to have access to more food than they would normally have. With the surplus of corn that could result from high yielding corn, people would be able to feed some of the surpluses to animals like cows and chickens so that they can have a reliable source of meat and eggs that can provide protein and other essential nutrients necessary for survival.

Genetically modified organisms can also be used to grow crops in areas where drought and high temperatures are a common problem. Many genetic engineers have discovered a way for crops to grow in areas with scarce water which will help the people of Chad grow crops during the dry season of November to April (Development of Drought Resistant Crops).

Genetically Modified Organisms are a relatively new discovery so there has not been much time to research and find any long term health or ecological problems that result from consuming and growing them. However with GMO's like Roundup Ready Soybeans that can help with weed management it can result in monocultures when only one crop is in a large area of land which can have negative consequences on the environment such as less genetic diversity resulting in a loss of biodiversity so animals have less diversity in their food sources and have to adapt to survive the changes happening in their ecosystem. There are many common misconceptions of GMOs having negative side effects on the human body, some people believe that GMOs result in higher rates of

allergic reactions due to the proteins of different species being mixed into one organism to get the traits that are desired in the organism (Pros and Cons of GMO Crop Farming).

The African Government has held Genetically Modified Organisms away from the people because they held imports of Golden Rice in warehouses and refused to give it to the African people even though there are no scientifically proven negative effects of GMO consumption.

In order for this solution to be effective, the Chadian Government would need to repeal the laws banning GMOs. Starting a program that provides Golden Rice and Genetically Modified Corn for the families living in extreme poverty to grow GMO crops so they can feed their families and sell any surplus that they might have which would also provide an extra source of income for these families and feed the families who may not have as much land to farm and grow these crops on.

The Chad Government should also start a program where the major farmers in Chad start growing GMO Crops like Golden Rice and Genetically Modified Corn. To encourage the farmers to grow GMO crops the government of Chad can give the farmers who agree to grow GMO crops an incentive such as more land to farm on or a cash bonus so that farmers are more inclined to grow GMO crops to help the whole population of Chad. In more local levels of the Chadian Government, community members can also start to implement community gardens in the communities that are most heavily affected by poverty so the citizens who do not have enough land to farm and can not afford to buy the surplus crops of other families can get healthy and nutritious food to feed their kids and families.

The average income for an adult is 1,590 dollars so that is 3,180 dollars for the average family with two working parents to feed their 3.8 kids which most of that money is most likely going towards food that is not very nutritious like white rice because that is a food that you can buy in bulk for a relatively affordable price and has a long shelf life meaning it will be consumed before it goes bad. Considering the majority of the country of Chad is a rural environment it will be easier to farm on then it would be to do so in an urban environment. However, in the urban areas of Chad property owners can start gardening on the rooftops to provide a reliable source of fresh and healthy produce to the urban areas. Having fresh food grown in the urban areas or near them is important because if the source is closer the food will have more nutritional value because it will take less time to get to market and the produce will be fresher. The longer plants are off the plant they lose nutrients and do not provide the human body with the same amount of nutrients that it would if it was straight off the plant (How Do Fruits and Vegetables Lose Their Nutrients After Picking).

One of the only ways that the Chadian Government will repeal the ban on genetically modified organisms is if the United Nations issues an Humanitarian Crisis Declaration because the Chadian Government has withheld GMO crops from the people of Chad in the past and will most likely not change their mind anytime soon without other nations or the United Nations getting involved

Genetically Modified Organisms are the solution to solving malnutrition in Chad. GMOs will not only provide more nutritious food for the people of Chad but GMOs can also be used to help crops grow in areas with frequent droughts and higher temperatures. Other nations will have to step in and convince the Chadian Government to provide genetically modified organisms to the population of Chad.

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