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Ethiopia, Malnutrition

## **Ethiopia: Battling Malnutrition by Incorporating Nutrients Through a Variety of Methods**

### **Introduction**

It is a widely regarded statistic that by the year 2050, the world will be responsible for feeding over nine billion hungry people. In just a few decades, the modern world will have to adapt rapidly in order to accommodate such a surge in population. However, one glance at the current state of the world is enough to question the feasibility of what must be done by 2050. In every country, food insecurity remains a constant threat to the global attainment of basic human rights.

### **Background**

Ethiopia, which sits atop the Horn of Africa, is in the northeastern region of the continent that boasts a diverse set of mountains and plateaus, deserts and coasts, and languages and religions. It remains among the oldest independent countries in the world and has a population of over 109 million members--most of whom practice either some form of Christianity (the most popular being the Ethiopian Orthodox Church) or Islam (most part of the Sunni branch) and speak either the national language, Amharic, or Oromo (World Factbook). The country has endured years of hardship, outlasting the struggle for Africa, famine, communist overthrows, and countless other difficulties. Despite a long history of monarchy, the nation currently operates under a prime minister and parliament in a federal parliamentary republic. Ethiopia has been ruled by the Ethiopian People's Revolutionary Democratic Front since the political group overthrew the communist agenda of another political group, the Provisional Military Government of Socialist Ethiopia (the Derg), in 1991. However, the Democratic Front has been criticized for abusing power by eliminating opposition and repeatedly winning elections through unfair standards (World Factbook).

Ethiopian culture places a strong emphasis on family values, which is conveyed through the immediate family's heavy reliance on the extended family. The nuclear and extended family will often share resources and contribute to expenses; it is not uncommon for multiple generations to live under one roof. The average nuclear family consists of five children, with the father as the head of the household. Society in Ethiopia is largely patriarchal, but recent legislation has granted women equal property rights to men. Unfortunately, households run by only women tend to be some of the poorest in the country (Ethiopia). Houses in Ethiopia are constructed using different materials depending on class. Wood or mud brick are used for the poor and more expensive materials, like stone, bricks, or cement are used for the middle and upper classes. Rural homes usually consist of a single room or double as businesses. Those that are poor and live in urban areas often deal with crowded conditions, occupying subdivided houses or apartments separated by thin walls; those that are middle or upper class occupy spacious homes. The majority of houses in urban areas have access to indoor plumbing; however, due to frequent electrical outages, electricity is inconsistent. In rural areas, running water and electricity are rare. More often, people rely on communal taps or lakes for water and oil lamps for light (Ethiopia).

The most common food in Ethiopia is porridge--made from corn, barley, oats, or sorghum flour and boiled with milk, with butter added for flavoring. Other common foods eaten include shiro, a chickpea stew; kitfo, raw red meat with butter and cheese; gocho, bread made from either spinach, ensete plant, or teff; and a variety of fruits and vegetables (Ethiopia). Even though there are so many types of food available and many of them are rich in nutrients, nutritious food can be hard to obtain for impoverished families. Also, religious dietary restrictions affect what many Ethiopians can and cannot eat. Members of

the two most popular religions, Orthodox Christianity and Islam, cannot eat pork and often must fast (Ethiopia).

Food insecurity is prominent among the Ethiopian population, as malnutrition is the leading cause of death and sickness in children (Endris). As a result of war, drought, soil erosion, and more, the nation has one of the lowest GDP's in the world (Ethiopia). The poor economy has resulted in a population more susceptible to malnutrition, as nutrient deficiencies are usually tied to high poverty rates.

The poor economy can be attributed to the emphasis on agriculture. Most jobs involve farming, which depends on the climate and other factors that are hard to control. The country is predominantly rural, with around 80% of its population living in rural areas and just over 20% living in urban areas. There is a strong emphasis on agriculture: over 82% of people's incomes are earned by farming on 9,784,131 hectares of farmland (Family Farming Knowledge Platform). Just over 36% of the land in Ethiopia is agricultural and 15% is arable (Ethiopia - Agricultural Land). The average farm size in Ethiopia is around 0.9 hectares, a unit which is roughly 2.47 acres. The country's main exports include coffee; cereals like teff, wheat, barley, and millet; and other items like gold, animal hides, and flowers (Ethiopia).

Ethiopia's poor economy can also be linked to the general education level of the nation; only 49% of the population is literate, with the male literacy rate around 16% higher than the female statistic; less than 5% of government funding is spent on education; and the average number of years of schooling that people go through is 8 years (World Factbook). In addition to the education level of the country, the poor economy can be tied to the poor overall health. The average life expectancy is 63 years old, and the infant mortality rate is about 48/1,000 live births. Ethiopia's inadequate health is exemplified by its lack of doctors--there are only 0.03 physicians per 1,000 members of the population (World Factbook). The high poverty rates in Ethiopia are a significant factor in the prevalence of food insecurity throughout the country.

### **Main Challenge:**

Among the most pressing food insecurity issues is malnutrition, which encompasses a wide range of nutrient and energy imbalances that range from undernutrition to overnutrition. Although an imbalance erring on either extreme is prevalent throughout the world--with 1.9 billion adults being overweight and 462 million underweight--the people of Ethiopia suffer primarily from undernutrition. Undernutrition includes stunting (when height is too low for age), being underweight (when weight is too low for age), and wasting (when weight is too low for height). The undernutrition of a large portion of families can be a result of an inability to obtain healthy food. In many cases, this is due to the relatively high price of nutritious foods compared to less nutritious foods. The higher price of fruits and vegetables deter some families from obtaining necessary nutrients and may steer them toward less healthy alternatives (World Health Organization).

Compared to the rest of the world, Ethiopia fares much worse in terms of nutrition. The country has one of the highest rates of malnutrition in the world among children under the age of five, and around 60% of child deaths are due to malnutrition. The Ethiopian Mini Demographic and Health Survey reported that 42% of the children under five are stunted, almost 27% underweight, and 9% wasted. In rural areas, the issue is even more severe: 27% of the children are underweight and 42% are stunted while 13% of urban children are underweight and 24% are stunted (Endris). People in developing countries, similar to Ethiopia, struggle to obtain nutritious food because of widespread poverty. In Ethiopia, this is due to a number of issues, with an economic reliance on agriculture (which leaves people at the mercy of drought and other weather-related factors) and political turmoil as the forerunners (Action Against Hunger). In fact, malnutrition and food insecurity continue to grow worse as time goes on, largely due to climate

volatility; abnormal temperatures, increased drought and other unusual weather phenomena make it difficult for crops to thrive (Sidhu).

Malnutrition often results in a multitude of other related issues, such as increased risk for infections and death and decreased cognitive development. The impact of malnutrition faced while young ceases to fade well into adulthood, when academic performance and even productivity at work can be hindered, and chronic illnesses become a bigger threat (Endris). However, because of this, the country has made great strides in combating malnutrition, partnering with organizations such as UNICEF and participating in agricultural studies meant to improve the quality of crops.

### **Proposed Solution:**

Malnutrition is a complex issue to resolve, which is why the *Journal of the Science of Food and Agriculture* believes that “it is clear that scientific and technological advances, especially those that promote sustainable practices in agriculture, will be essential in ensuring a nutritious food supply for future generations” (Green). The intersection of modern technology and sustainable agriculture is necessary to ensure people in developing communities have access to nutrition and opportunity for a healthy lifestyle. Seamlessly incorporating nutrients into the daily diets of Ethiopians is not an easy task, but a combination of biofortification, soil nutrient management, and eating insects has the potential to bridge the gap between severe malnutrition and good health.

Biofortification is an agricultural process that aims to increase the micronutrient content in plants. This process focuses on changing the development of the plant rather than the development of the food. Many studies have been conducted on biofortification with a multitude of crops, including sweet potato, rice, wheat, and bananas. One of the most successful attempts at biofortification came into fruition via orange sweet potatoes. These sweet potatoes were rich in Vitamin A and made to look appealing to those eating them (Croft-Cusworth). Another biofortified type of potato in Peru has helped to reduce malnutrition by containing a higher concentration of iron and zinc, which were obtained by breeding together the potato varieties with the highest mineral content. Additionally, the Peruvian potatoes contain valuable vitamins and antioxidants, which result in better eye health, eyesight, and fewer illnesses due to lack of vitamins (Paredes). In Ethiopia, a study has been performed on biofortified maize meant to improve protein synthesis in children. A publication by the International Maize and Wheat Improvement Center reported a study conducted on maize with increased levels of two amino acids needed for protein synthesis. This biofortified type of maize, referred to as Quality Protein Maize (QPM) has resulted in the rate of weight growth in children being raised by 15%. In another region using the same QPM, the rate of height growth in children increased by 15% as well (Akalu).

Because of the promising future of biofortification, several organizations are willing to continue advancing biofortification techniques and knowledge. The US Department of Agriculture currently acts as a major advocate for global food security achieved through building up the local community, improving productivity, and spurring international trade. In order to do this, the department monitors close to 200 communities around the world and supports organizations and programs that seek to end food insecurity, such as the Global Agriculture and Food Security Program. By partnering with reputable programs dedicated to fighting hunger, more crops--starting with some of the major crops, such as teff or wheat--can be biofortified across Ethiopia. Ideally, biofortification will be introduced to farmers in Ethiopia, and Ethiopian farmers and students will have the opportunity to become familiar with the process in order to secure its role in the country’s agricultural practices. Not only will immersing farmers and students in the process familiarize Ethiopians with biofortification, but it can also serve as an introduction to careers outside of farming for some students. Some students may grow interested in the scientific research that goes into biofortification and can explore the possibilities outside of agriculture. Introducing biofortification to Ethiopians through the government and partner organizations delivers necessary

nutrients to those who need it most, stabilizes the quality of crops, and offers educational value to students and farmers.

Regardless of how well a crop can be modified, the success of the project is reliant on its sustainability. One way to ensure sustainable farms is through the use of soil nutrient management. The National Institute of Health has demonstrated the impact that added nutrients in soil have had on crops, and thus general populations. Healthy soil acts as the foundation for sustainable and nutritious crops. Soil nutrient management is used to increase the nutrient content in crops and can be carried out through fertilization, sprays, manure, and other agricultural techniques. Also, while the added nutrients in soil benefit the crops, the deficiencies in the soil itself can be lessened, leaving the soil better than it began (Green). Soil nutrient management is key to improving soil quality, which in turn determines the productivity and quality of crops. The Natural Resource Conservation Service defines healthy soil as meeting the "continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans." A major component of healthy soil is the amount of organic matter present. When the organic matter in soil goes through the decomposition cycle, it releases energy and nutrients that can be used by plants (UC Davis).

Like biofortification, soil nutrient management has garnered enough attention to pique the interest of several organizations. One group, the HarvestZinc Fertilizer Project, has experimented with a variety of fertilizer formulas aiming to raise the levels of zinc and iodine in cereals around the world. The project has already encountered success, with the use of foliar spray on wheat and rice resulting in increased levels of zinc (Green). Although commercial fertilizers may be a cost-effective option, there are many alternatives to chemical fertilizers, including compost, manure, and cover crops. These alternatives can be introduced to farmers in Ethiopia, who can learn to sustainably cultivate crops by ensuring healthy soil. The Ethiopian government can team up with the Food and Agriculture Organization of the United Nations to launch an initiative informing farmers of sustainable products and methods to use. The partnership can also offer these products at a more affordable price, using government funds and money raised by the United Nations to make soil nutrient management more accessible to rural farmers, thus initiating an era of sustainable, healthy soil.

Another source of nutrients and opportunity for sustainable growth in agriculture comes in the form of insect farming. The Food and Agriculture Organization from the U.N. has determined that already, bugs are eaten daily by around 2 billion people around the world. Termites, weevil grubs, and red weaver ants are eaten in places like Kenya, the Amazon, and Thailand (Mishan). Eating insects is not taboo-- it is a normal dish and sometimes even a delicacy in many countries. The people in Ethiopia do not typically include insects in their daily diets, but the two main religions--Christianity and Islam-- do not necessarily prohibit the consumption of insects (Ethiopia). There has been debate over certain Bible and Quran verses, but these verses can be interpreted differently; in fact, there are religious scholars who can see the positive impact of eating bugs outweighing any trepidation. Although eating bugs is not common in Ethiopia right now, the country has a history of consuming bugs and there is even a record of Ethiopian tribes preserving bugs in salt (Seni). Eating bugs holds a number of strategic benefits: there are over 2,000 edible insects, and generally bugs possess high levels of amino acids, protein, omega-3 fats, iron, magnesium, calcium, and zinc, as well as a high energy yield. Farming bugs also provides many advantages: they require less space to farm, generate less greenhouse gases (one-tenth of the methane and one three-hundredth of the nitrous oxide currently produced by livestock), and can reproduce at an incredible pace (Mishan). As eating insects provides the needed nutrients and energy to those eating them, farming insects creates employment opportunities for the people farming; the people who start insect farms will be kept with a job as the demand for insects grows, and the people who start eating insects will be kept with a stable source of energy, protein, fats, and minerals.

Insects as an additional form of protein provides an opportunity for economic growth and sustainable agriculture. With this long list of benefits to eating bugs, it may seem strange that eating bugs is not as

common as it should be, but this is due to the Western opposition to eating bugs. In order for eating insects to become more of a viable option to ending food insecurity, people must be able to change their mindset and look past the grizzly appearance of bugs, instead focusing on their health benefits. This shift in mindset will not be easy to achieve, but the flood of insect-based startups on the American West Coast may assist as they market cricket flour, protein bars, and other products disguising insects as delicious, nutritious options. Although the people in Ethiopia, neighboring a number of insect-consuming countries such as Kenya, should be more easily influenced into eating bugs, there may be some hesitation. Initial obstacles including hesitation at eating bugs or a lack of funding for bug farms can be overcome through aid from the government and external organizations. Since the United Nations has acted as a major advocate for insect eating, the Ethiopian government can cooperate with the Food and Agriculture Organization of the UN to educate Ethiopians about the benefits of eating bugs and raise money for startup bug farms. The bug farms can either be started using species native to the area, or they can build off of starter bug farms that many companies, such as Tiny Farms Inc., have started to produce in response to the U.N.'s encouragement. Some of the most popular bugs eaten around the world include beetles, locusts, grasshoppers, and crickets; in sub-saharan Africa, where Ethiopia resides, caterpillars are popular (Seni). These bugs are popular because they are easily caught and thus are readily available. Once the bugs have been farmed, the insects can be eaten as an added protein source (along with other nutrients) and sold in markets. These bug farms can catalyze economic growth in Ethiopian communities and begin a cycle of education, sustainability, and financial stability. Once people are able to look past their initial disgust at eating insects, the advantages they provide can be explored to a greater extent, and another source of protein may become readily available.

## **Conclusion:**

Ethiopia is an ancient nation that has already endured some of its hardest struggles. Now, it is time for the nation to tackle one of its most significant battles: malnutrition. Through the use of biofortification, soil nutrient management, and insect consumption, nutrients can be sustainably incorporated into many insufficient diets. Because Ethiopia is a country with strong agricultural roots, soil nutrient management and biofortification, which both rely heavily on the actions of farmers, are ideal for ensuring Ethiopian people their role in solving their country's food insecurity. Eating insects is a great way for ordinary people to contribute to the cause as well as secure their own health. It is crucial to the global goal of ending food insecurity that each nation be given the guidance and opportunity to do their part. By strategically partnering with specialized organizations, like the United Nations and those endorsed by the U.S. Department of Agriculture, Ethiopia can continue to improve the welfare of its citizens and fulfill its goals of combating malnutrition. Food insecurity is an issue that must be resolved step-by-step, with careful consideration given to each individual country and citizen.

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