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Mozambique, Factor 11: Malnutrition

### **Mozambique: In the Grips of Malnutrition**

Mozambique is a coastal country in East Africa with an estimated population of 25,930,150 in 2016. Covering 786,380 km<sup>2</sup>, Mozambique encompasses a diverse range of geography. With a coastline stretching 2,470 km, the nation is mostly coastal lowlands. In the center are uplands, with high plateaus in the northwest and mountains in the west; the elevation ranges from 0-2,436 m ("The World Factbook: Mozambique," 2017). The north and west are cooler due to the highland areas, whereas the lower regions are hotter, "with daily temperatures over 30° C" ("Climate & Agriculture," n.d.). The temperature is usually 20-30° C, dropping to 15-25° C in the winter. With Madagascar and the Comoros Islands to the east, protecting it from the brunt of many tropical storms, southern Mozambique experience lower levels of rainfall. Rainfall tends to increase further up Mozambique ("Climate & Agriculture," n.d.). It has a tropical to subtropical climate and is prone to several natural disasters ("The World Factbook: Mozambique," 2017).

After being gripped by civil war for 15 years, Mozambique finally got the opportunity to recover in 1992. The country has accomplished significant economic recovery, though there are prevalent social issues that need to be addressed. With a population of 25,930,150 in 2016, around 52% fall below the poverty line ("The World Factbook: Mozambique," 2017). Although the number of people moving to urban areas has been on the rise, around 80% still live in rural areas ("The World Factbook: Mozambique," 2017). Although modern building materials are being used more often for houses, there are also those that are "made traditionally with mud and wattle walls and thatch roofs" ("Climate & Agriculture," n.d.). Within these abodes, several generations often live together. In Mozambique, women tend to have around 5 children, reaching higher numbers in some rural areas ("The World Factbook: Mozambique," 2017).

After the civil war, which destroyed over half the primary schools, Mozambique has been working to rebuild and improve the education system: the government has built many new school classrooms and hired thousands of teachers, abolished school fees, and helped supply free textbooks ("Current Situation," n.d.). Unfortunately, various factors like poverty, early marriage and pregnancy, distance from schools, lack of safe school spaces, overcrowding, and the lack of a sufficient number and quality of teachers has hindered progress. Although enrollment rates at the primary school level has been increasing due to efforts from the government and various international organizations, there are high drop-out and repetition rates; only about 47% complete the primary level of education ("Current Situation," n.d.). It was estimated in 2015 that the national literacy—those 15 and over who could read and write—was just 58.8% ("The World Factbook: Mozambique," 2017).

With high levels of poverty and limited access to primary health care, there is a very high risk of contracting diseases like HIV/AIDS or major infectious diseases like malaria, the top disease afflicting Mozambique. It was estimated in 2015 that 1,505,900 people are living with HIV or AIDS ("The World Factbook: Mozambique," 2017). About 30% of people do not have access to health services and only 50% have access to an adequate level of health care ("Mozambique's Health System," n.d.). In 2012, there were only 0.04 physicians for every 1,000 people, or 1 physician for every 25,000 people ("The World Factbook: Mozambique," 2017). The need to increase access to health care has been recognized and acted upon. External aid is "being coordinated through a sector wide approach (SWAp) with common funds,"

giving great support for the Ministry of Health and increasing the resources available to the health sector ("Mozambique's Health System," n.d.). Yet, there is little progress in creating a rural primary health care network and management system due to inadequate funding allocated for basic health care annually, limited numbers of trained personnel, high rates of infectious disease and malnutrition, and limited access to potable water ("Mozambique's Health System," n.d.). With limited access to health care and medical help, the rates of diseases and illnesses among the population is high, limiting the life expectancy of females to 54.1 years and males to only 52.6 years ("The World Factbook: Mozambique," 2017).

With 81% of the population working in agriculture, most rely on subsistence farming, working on small family machambas, or farm plots ("Climate & Agriculture," n.d.; "The World Factbook: Mozambique," 2017). The minimum working age is 15, but many children work on family farms at younger ages ("Mozambique (a)," n.d.). The average farm size is 1.5 hectares, though there are many that are smaller than even 1 hectare ("Mozambique [PDF File]," n.d.). Most farmers grow cassava, maize, rice, millet, and beans, tending to the fields by hand. There are also those farms that grow cash crops, like cotton, tobacco, sugar, tea, and cashews for some important extra income ("Climate & Agriculture," n.d.). Animal husbandry is a small and undeveloped part of Mozambique's agriculture. Cattle is the main livestock raised, but the cattle population—in relation to Mozambique's size and population—is relatively low due to tsetse flies, large areas of woodland unsuitable for grazing, and no tradition of livestock raising among much of the population (Timberlake & Jordao, n.d.). Some small farms only keep a small number of livestock which could include goats, sheep, pigs, ducks, chickens, and rabbits (Timberlake & Jordao, n.d.).

Due to the low education levels of people and the severe lack of jobs in industry or services, most people are resigned to working in agriculture. However, there is little extra profit to be made from the mostly subsistence farming that characterizes Mozambique's agriculture. 80% of the population cannot afford an adequate diet, and the inflation rate of consumer prices—estimated at 17.1% in 2016—coupled with the rising food prices has made it more difficult for many to eat properly and nutritiously ("Mozambique (b)," n.d.; "The World Factbook: Mozambique," 2017). The roads are general in poor condition, with about four-fifths being unpaved. The civil war has destroyed markets and roads ("Nutrition Country Profiles: Mozambique Summary," n.d.). Frequent floods and heavy rains further damage the roads, hindering access to available markets. Poor roads and a lack of storage facilities can cause harvests to rot before even making it to the market, and farmers can lose as much as 30-40% of the crops or harvest ("Climate & Agriculture," n.d.). Despite agriculture making up around a quarter of the gross domestic production, food still needs to be imported ("Mozambique: MAFAP Country Profile," n.d.; "Nutrition Country Profiles: Mozambique Summary," n.d.). The reliance on imported foods and the lack of diversity in crops has resulted in poorly diversified diets—lacking in protein and micronutrients—and ultimately malnutrition.

Farmers are also at the mercy of Mother Nature. Being “one of the most disaster-prone countries in the world,” the fate of the harvests, and of farmers' lives, depend on favorable weather conditions ("Mozambique (b)," n.d.). Natural disasters such as floods and droughts have devastating effects for the people of Mozambique. The crops are largely watered by rain, so severe fluctuations endanger the harvest. The current severe droughts caused by El Niño, for example, has subjected around 2 million people to acute food insecurity due to poor or failing harvests, even causing death ("Mozambique (b)," n.d.). The volatile climate conditions prevent stable agricultural production and perpetuates malnutrition as the small subsistence farmers currently do not have the means to make harvests more independent of weather conditions.

With high levels of poverty, disease, teen pregnancy, and food insecurity coupled with poor dietary diversity and feeding practices, malnutrition is a major issue in Mozambique ("Mozambique: Nutrition Profile," 2016). Malnutrition can have long term effects on physical and cognitive development ("The State of the World's Children 2016," 2016). Currently, nearly half of children under 5 are chronically

undernourished, and 42.3% are stunted, with higher percentages in rural areas ("Mozambique (b)," n.d.). Having a diet that consists of mostly a staple, like cassava or maize, means an imbalanced diet. Mozambique diets lack the necessary micronutrients to stay healthy. Micronutrients are important in growth and development, so micronutrient deficiencies are even more harmful to children.

Malnourished, children experience delayed growth, and are more susceptible to disease and sickness. Iron, Iodine, and Vitamin A deficiencies are major factors contributing to malnutrition, and they have profound effects on the family. Iron deficiency, for example, affects 75% of the children who grow anemic, and the children become anorexic and energy-less (Nelson, 2015). Vitamin A deficiency weakens the immune system, making both children and adults more vulnerable to infections and illness. It is even the leading cause of childhood blindness, which would affect the child's prospects (Islam, 2011). This makes it even harder for mothers who are undernourished to breastfeed their children (Nelson, 2015). A malnourished child can be sick more often and burden the family, which would need to give extra care to the child while taking care of the daily necessary tasks like tending to the fields or harvesting. They are more likely to suffer from chronic diseases when older, harming their ability to get a job, work, and provide for their family.

Many Mozambican women marry and often get pregnant as teenagers; as young mothers, they are less likely to know how to properly care for their young, and improper feeding practices at a young age leads to malnutrition ("Malnutrition Persists alongside Mozambique's Economic Growth," 2015). Malnourishment of the mother can also lead to the child being stunted, as her body would not have the sufficient nutrients for the baby to grow and develop healthily.

The issue of malnutrition is made worse with the climate volatility, high rates of diseases, low levels of sanitation, and poor access to health care. Due to the frequent natural disasters Mozambique faces, harvest yields are unpredictable and inconsistent, harming both individual farmers and the men and women who rely on their crops. The high rates of malnutrition in the country can also be attributed to the lack of knowledge about the importance of a varied and nutritional diet and what they can do to eat and take care of themselves better. For example, if the young women and mothers were better educated about nutrition and childcare, they would be better equipped to take care of their child. Due to the low access to health care, many do not have an understanding of malnutrition and how to "fix" it or treat various diseases that compound the effects of malnutrition. Furthermore, the population dramatically increased after the civil war ended. With the rapid increase in population, the current agricultural methods and products and natural resources are heavily burdened.

Given the issues of poverty, vulnerability to natural disasters, and the general lack of knowledge about nutrition and proper healthcare in Mozambique today, malnutrition will not alleviate unless the government works with both external aid and with the people of this country to improve their health and economic situations. There are many ways to help with the high malnutrition levels in Mozambique. One possibility is biofortification which increases the nutritional value of existing crops through selective breeding or genetic modification, altering the plant so that they produce the desired nutrients. By having a plant or crop that already contains high levels of the desired vitamin or mineral, they can then be bred to create plants with even higher levels. This breeding process would repeat many times until a new variety of the plant with the desirable levels of the compound is produced. (Gearing, 2015).

An orange sweet potato specially bred to have high amounts of vitamin A, for example, has already been introduced to numerous African countries. By replacing the usually grown white and yellow potatoes that are poor in vitamin A with the orange sweet potato, the vitamin A intake would greatly increase (Islam, 2011). This would target the rampant vitamin A deficiency, providing more than 70% of all dietary vitamin A and strengthening those afflicted. The sweet potato also requires "less labor than other staple crops... [and] tolerates marginal growing conditions, such as dry spells or poor soil" ("Sweetpotato in Africa," 2013). It can have better yields in poor growing conditions with less effort than other crops, making it particularly appealing to families and farms ("Sweetpotato in Africa," 2013). This can also be

done with other crops like cassava, the main staple in Mozambique (Bafana, 2014). The richer vitamin A cassava can be six times more nutritious than the common cassava. However, in comparison to the vitamin A orange sweet, the enriched vitamin A cassava can only provide up to 40% of the daily amount of vitamin A recommended ("New, More Nutritious Vitamin A Cassava Released in Nigeria," 2014). HarvestPlus, a non-government organization, has already been working to have the orange sweet potato reach Mozambique's farms. From 2006 to 2009, 12,000 households were targeted in the organizations' efforts to disseminate the crop ("HarvestPlus reaching end users," n.d.).

Through government extension services, groups of educated and trained individuals can spread information on nutrition and the benefits of the biofortified orange sweet potato to small communities, where the information can then spread amongst themselves for further reach. Communication between a foreign helper and a native might be difficult, so the cooperation between natives or the government and international organizations is vital in maximizing the success of the implementation of the biofortified orange sweet potato. Cooperation would increase the trust between farmers and external help and facilitate proper communication. A Mozambican would better comprehend the situation and mindset of a fellow Mozambican and would transfer information in a way that would be easier to understand. It would also prevent misunderstandings or mistakes born from not knowing Mozambican norms and respectful behavior.

The government would need to invest more resources into agriculture and infrastructure to improve the situations of the farmers and malnourished people. Improved infrastructure would increase farmers' access to markets so that their crops can get to the customer. There would also be less agricultural products wasted. By investing more resources into agriculture, implementing biofortification and distributing the crop to rural farmers can be done quicker and on a larger scale. The government can also work with international organizations like the Global Fund, UNICEF, the International Potato Center, or HarvestPlus for future projects' funding and the implementation of biofortification to rural areas.

CHAPANI, the Coastal HIV/Aids Prevention and Nutrition Improvement Project, is a grant covering six areas in the province of Nampula. Its objective is to lower "HIV/AIDS prevalence and malnutrition by mobilising people in the fishing communities to ... increase their knowledge and change risky sexual behavior and ... diversify their regular diet" (International Fund for Agricultural Development, 2012). CHAPANI coordinates with health authorities and local authorities to teach communities more about the importance of nutrition and a balanced and diverse diet (International Fund for Agricultural Development, 2012). This project could be scaled up to operate in multiple provinces, spreading vital information about nutrition to decrease the prevalence of malnutrition and working in tandem with the biofortification efforts. While biofortification would apply more to farming families and communities, CHAPANI would work to inform others about nutrition and work in fishing communities, another important industry in Mozambique.

Biofortification is a viable option for Mozambique. It is highly cost-effective with \$15-20 per DALY (Disability Adjusted Life Years) saved (Low, Girard, & Ackatia-Armah, 2017). It also has the great potential to help the great number of people who suffers from malnutrition. It still affects a countless number of people today, and many young children—the next generation and future of Mozambique—are growing up stunted. The lack of proper nutrition as a child will affect them for the rest of their lives, making it more difficult for them to work, get jobs, and get a good education.

Education about nutrition can be introduced at a younger age in schools. By educating the younger generation, they can bring the learned knowledge home to their families and communities. Furthermore, a nutrition and lunch program can be integrated into the school systems, providing nutritional food and education. Pilot programs and efforts in Nigeria and Uganda to incorporate the orange sweet potato into schools are targeting the younger generation to "educate the future parents" (Low et al., 2017). Similar programs may benefit the schools, and people, in Mozambique. Educational school gardens would also expose children to nutrition through growing their own crops. For these ideas to be made a reality, the

Mozambique government, with the aid of other organizations, has to invest more funds, labor, and support into the pre-existing educational system.

To spread awareness about the orange sweet potato and to improve public perception and adoption of the crop, various measures can be implemented outside the school system. In Africa, the sweet potato is generally considered a poor person's food. To spread the usage of the orange sweet potato, its image must be improved to that of a nutritious crop that can be eaten by all. Health centers and clinics can promote the crop and its nutritional value to improve the sweet potato's image. It has also already been integrated "as an ingredient in processed foods such as bakery products and juices" (Low et al., 2017). Using a cheaper orange sweet potato purée to replace wheat flour in baked products can facilitate the crop's adoption into the food industry and thus into the Mozambican society. Wheat flour often has to be imported into the country, so the "purée substitution appeals to farmers, processors, and policy makers" (Low et al., 2017). Furthermore, the orange sweet potato can be introduced into fairs as well as agricultural or health events. There can even be a "sweet potato festival" to introduce the crop and various orange sweet potato products like sweet potato chips or baked products. These types of events can be used as opportunities to not only educate the general populace of the orange sweet potato and its benefits to the country, but to also increase support for the crop in the more urban areas.

Many improvements and efforts have been made in regards to the issue of malnutrition. However, to improve the poor conditions Mozambique faces, the government must work together with the communities and other organizations to diversify diet and impart crucial information about nutrition and health. The widespread lack of knowledge is a major factor that contributes to the perpetuation of malnutrition. To remedy this, all layers of society should be educated about nutrition. For instance, instead of just targeting women, men should also be included. Some projects focusing only on women have made gender inequality worse—increasing domestic violence, for example—because men were not involved in, or informed of, the projects in an appropriate way or not at all (A. Towns, personal communication, July 7, 2017). To facilitate the education, male engagement can include creating programs that teach men about women's inequality, identifying male "gender champions" to influence unjust practices, or by bringing men and women together in culturally or religiously appropriate contexts to discuss household decision-making. The older generations can also be included. Paternal and maternal grandmothers, for instance, "have a huge influence on how mothers (and fathers) feed, clothe, educate, and raise children" (A. Towns, personal communication, July 7, 2017).

The key to improvement lies with communication and cooperation among all levels of government, organizations, and society. Through extension services, education systems, healthcare systems, and cooperation with other organizations, Mozambique can further free itself from the grips of malnutrition.

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