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Somalia, Spoilage and Waste

Somalia: Food Security through Simple Storage

“Eat your food, children in Africa are starving.” Although this saying may be overused, yet effective for American children too stubborn to clean food *off* their plates, it has not yet been effective for families struggling to put food *on* their plates. Often Ethiopia is the stereotypical African country attributed to food insecurity, but now imagine a country who imports their food from this source. Unfortunately, no imagination is needed for this scenario. Somalia, located on the eastern coast of Africa bordering both Ethiopia and Kenya, is one of these countries (FAO, World Food Bank, 2018, p. 98). In fact, 52% of Somalians live on less than just \$1.90 a day, naming it as one of poorest countries in the world (FAO, 2018, p. 4). Solving Somalia’s food insecurity will take massive reconstruction of several levels of the food production chain, and knowing where to start is complex and daunting. Despite these challenges, implementing programs to create a more food secure environment for 15 million Somalians is simpler than one might think.

The average Somalian is very comparable to northeastern Kenyans, some Ethiopians, and the southern populations of Djibouti (Janzen & Lewis, 2019). According to the FAO (2018), about half of the Somalian population resides in rural areas, with the other half being urban (p. 3). The rural population can further be classified as about 26% pastoralist, 23% agro-pastoralist and 1% coastal communities (FAO, 2018, p. 4-5). About 9% of the population is considered internally displaced (FAO, 2018, p. 5). The average family consists of about 5.9 (United Nations, 2017). In settled communities, they live in either *munduls*, African round houses, or a *cariish*, and steel roofed, rectangular house from the Arabs (Janzen & Lewis, 2019). Nomads often live in portable dome huts called *aquals*. Most lack running water and electricity. (Somalia) Agro-pastoralists, what Americans would describe as a “farmer”, on average farm about 2-4 hectares (FAO, 2005, p. 1) in dry, hot, and unpredictable climates. Although many factors contribute to farmers’ inability to provide enough food, the climate may be most influential. In fact, in the last four decades alone, eight droughts contributed to area famine threats (FAO, 2018, p. ix). As probably assumed due to the scarcity of food, diets-relative to Americans-lack diversity. Rice, boiled millet, and *Muufo*, flat corn bread, are most popular, with the occasional addition of meat, besides pork (Somalia). Pasta and marinara sauce are also still popular from Italian (Somalia) colonies in the 1960s (Janzen & Lewis, 2019). Bananas are a popular fruit as Somalia was successful in banana production until recently (FAO, 2018, p. 94).

Like businesses, countries need effective government leadership to prosper and unfortunately, a weak and unstable Somalian government has had rippling effects on food production, education and healthcare. Although a 22 year long civil war technically ended in 1991, the warfare did not, and a strong government was not established. In 2012, the new government was given only limited power (Janzen & Lewis, 2019) and effects of the war are still being felt. According to the FAO (2018), armed militias inhabiting farmland and disputes over ravines create safety concerns

for aid groups and risky and unprofitable conditions for farms and market outlets (p. viii-ix). In addition, the country's education system was severely damaged during warfare. Many institutions, such as agriculture secondary schools and an agricultural college in Mogadishu, the capital, were unable to function. Only about 20% of the population above the age of 15 is literate. (Janzen & Lewis, 2019). The story is similar for healthcare resulting in little to no access for most Somalians (Janzen & Lewis, 2019).

As discussed previously, practically any sector of food production in Somalia could be improved. For livestock producers, climate is increasingly inhibiting production, modern methods and access to inputs are poor for crop producers, fishing is not as profitable as should be of a coastal country, transportation infrastructure is severely lacking, and tension over water availability will only escalate. In addition to these challenges, storage and food loss is critical. Developing Countries, on average *lose*, not to be confused with *waste*, 40% of their crop (FAO, "Key Facts"). Somalia is slightly better than these estimates at 30%, but "better" is a misleading term to use for this issue as 50,000-80,000 tons of cereal are lost per year costing \$15 to \$20 million (FAO, 2011). Not only is the cost initially felt by pangs of hunger and costs of imports, but this also hurts next year's cycle of food production. Less profit means there is less capital that can be invested in better techniques/inputs for the next growing season to increase yields for their growing population, which is important because of the severe production deficit they face¹ (FAO, 2017, p. viii). This issue caught the attention of the Somali Technical Agriculture Group (SATG) and their research showed that post-harvest losses were largely due to storage, rather than harvest techniques in 2009 (FAO, 2017, p. 22).

After the SATG study in 2009, efforts were made to improve the current grain storage system that relies on clay-lined pits. Not only do these pits allow the grain to be contaminated with water, moisture, and bacteria, causing profit deficits, but they are also detrimental to citizen's health. However, they are popular because of their large volume and are easily concealed, which is important for areas in conflict (FAO, 2011, p. 14). In an attempt to improve the current storage methods, the FAO and EU "...introduced metal silos, produced by local artisans, that can hold 120-250 kilograms of grain" (FAO, 2017, p.22). However, the FAO noted that expansion would rely on the government and extension services, which are both lacking. (FAO, 2017, p. 22).

In 2011, the FAO's Office of Evaluation conducted studies on the efforts by the FAO, European Commission, and many other NGOs. In total, 19,555 farmers were trained and about 5,000 silos were distributed² each costing about \$40 to produce. The six-month project cost €888,900 and was expected to reduce storage losses by 25% in participating households. (FAO, 2011, p.). One clear drawback was that relative to the country's population and size, the project was arguably not very effective for Somalia as a whole. In addition, many silos were delivered too late and most farmers found that 250 kg was not large enough for 2-5 hectare operations (FAO, 2011, p. 8), so pits were still being used. On the other hand, some silos were not used because of 2011

¹ "...local food production meets only 22 percent of per capita cereal needs." (FAO, 2017, p. viii)

² 35% of trainees were women and 30% of silo recipients were also women (FAO, 2011, p. 8)

crop failures³ (FAO, 2011, p. 11). Efforts to improve the underground pits were implemented but were found to be too costly and not very effective (FAO, 2011, p. 18). Lastly, although a plan of action for sustainability was considered, it isn't very promising. Although local artisans were trained to produce the silos, access to materials to build and repair them is scarce. Overall the donation effort should still be commended for helping over 5,000 households, but it was not a widespread solution for food security.

A realistic approach to solving food security needs to foster qualities of feasibility, simplicity, and affordability, all while not imposing large financial or safety risks for both Somalian farmers and individuals implementing the strategy. In addition, the storage strategy should be flexible enough to apply to all of Somalia so that their economy can improve over more than just a small percentage of the country. Lastly, it must be internally sustainable, stimulating economic development for years to come.

Purdue University can be recognized for many groundbreaking technologies and innovations; however, a simple bag might be one of their greatest. The PICS bag, or Purdue Improved Crop Storage bag, is a 50 kg or 100kg hermetic form of storage. Essentially, this three-layer bag suffocates insects and protects the grain from moisture, contamination, and other pests so insecticides or other inputs are not needed to retain the original quality of the grain. Although they don't last quite as long as a metal silo, they can be reused as long as holes don't form (on average this is about 2-3 seasons) and the grain can be stored for more than a year. In addition, they are incredibly cost efficient and easy to use. (Baributsa, Baoua, Lowenberg-DeBoer, Abdoulaye & Murdock, 2013).

This solution is nothing new and implementation in many countries similar to Somalia has proven the positive, profitable effects they have on farmers. According to a 2017 PICS newsletter, since 2007 over 5 million farmers have benefitted in 56,000 villages (Baributsa & Fletcher-Timmons, p. 2). Specifically, Purdue has found that "...67 percent of reported losses were eradicated by using PICS technology" in Uganda (Baributsa & Fletcher-Timmons, p. 6) which is considerably higher than the metal silos in the previous effort. The Kenyan success is the most applicable for Somalian farmers considering they border each other. In November 2016, the USAID published a review of this technology highlighting the bags' success and information on the production of the bags themselves (Colm & Wafula). If the bags can work in Kenya, there are little reasons to argue that they wouldn't thrive in Somalia too.

To turn this theorized solution into a reality, funding and implementation details need to be considered. To estimate exact values to fund such a large-scale project, much more research and collaboration would need to be done. For now, simple calculations and information based off of similar projects can provide a rough estimate. First is the bags. In order to provide each agro-pastoral family 4 bags, 2.6 million bags will need to be produced and distributed⁴. On

³ For a Somalian who lives off of only \$1.90, the \$40 used to buy a silo may seem too risky in some cases, but according to surveys in the FAO's evaluation, most seemed to be satisfied with the silos.

⁴ These figures can be calculated in a few ways. First, about 25% of the population produces crops, which is about 3.85 million people. Given the average family is 5.9, that means there are 650,000 families that could use the bags. Each family would be given 4 bags, which is an adequate estimate based on 2011 metal silo surveys. To further

average, a bag costs \$1.90 (Colm & Wafula, 2016, p. 12), but given the size of the project and the profit margins on the bags, the price could probably be negotiated to \$1.50. This means that to buy all the bags, it would take roughly \$4 million. Although funding of the bags probably wouldn't be an issue given the available support from organizations (FAO, USAID, WFP, WFB, AgriCorps, and UN, etc.), a majority of the funding could simply come from a single FFA member, with some help of course. Three of the most popular agriculture organizations are the FFA, Farm Bureau, and 4-H with 8,600, 2,800, and 90,000 clubs respectively⁵. If each state pledged to raise \$80,000, equivalent to each club pledging \$40, the goal would be met. Although contacting every single chapter, county farm bureau, and club individually would be extremely difficult, contacting the CEOs of these organizations is not. In an alternate scenario, FFA members alone could raise the \$4 million if the National FFA organization pledged to donate \$2.80 for 2 years from each member's dues. If each National Convention ticket were raised just a \$1.50, 67,000 bags could be donated, which would provide storage for 16,750 families. The probability of these scenarios turning into a reality couldn't be measured until after consultation with organization leaders, but it goes to show the feasibility of raising enough funds.

Costs for the implementation of the project (faculty, travel, training, etc.) are much harder to estimate and couldn't be known until a plan of action was formally written by many professionals, but based on other projects this could be done with under \$3 million. Because of the simplicity of the technology, a pyramid scheme could be exponentially effective for the training of the bags. Using estimations from above, 650,000 families will need to be trained to use the bags. Recalling from the metal silo project, almost 20,000 farmers were trained in a six month period, which was 279% more than they initially planned (FAO, 2011, p. 7). If we could train 32,500 people to each train just 20 people, everyone could be taught in under six months.

Some may be quick to exploit that storage alone will not feed everyone because serious attention needs to be given to production methods to increase yields. Although this is true, the time it would take to teach each farmer affordable methods would take much longer than bags that can be universally used. By providing enough bags, theoretically, each small-scale farmer could almost eliminate storage losses in the first year, immediately resulting in a profit. This profit then could be used to buy better seeds, tools, fertilizers, etc. For the little time and money it would take to implement across the country compared to other country wide projects (new roads, new methods, etc.), major strides could be made. Of course, any idea can look great on paper. Issues such as safety, supply of bags, and increased plastic usage/pollution haven't been even touched on, but in general, this is very promising.

Having enough food to eat in the 21st century should be a right, especially considering there are enough calories produced to feed everyone. Just because some are lucky enough to be born in a country where the price of hamburgers are equivalent of another's daily salary, doesn't mean the latter is undeserving of a satisfied stomach. For Somalia, great strides could be made if crop producers each had just a little more to eat, a little more to sell, and little more profit to invest

check these estimations, there is about 265 million kg of cereal produced, meaning 2.65 million PICS bags would be needed to store 100% of Somalia's cereal that is produced.

⁵ To put the strength in numbers into perspective, if each club would simply donate \$1.50, 100,000 bags could be supplied.

into inputs. Strength in numbers is apparent in funding calculations, and it doesn't stop there. For possibly less than \$10 million, Somalians could save \$7.5 to \$12 million in just a single year. If the bags⁶ remain in favorable condition for three years, that equates to a total of \$22.5 to \$36 million⁶, with Somalia needing to invest virtually nothing but their time.

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⁶ Estimations based on data from Uganda where 67% of storage losses were saved (Baributsa & Fletcher-Timmons, 2017, p. 6).

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