Amna Shah
Sidwell Friends School
Washington, DC USA
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Regenerative School Meal Programs Combat Food Insecurity in Kenya

In our increasingly interconnected world, one country's food system is never solely dependent on its domestic conditions. Kenya is a prime example of how global policy and political conflicts dictate food security in separate continents. Despite vast economic and technological advancements, as of 2024 approximately two million people in Kenya face acute food insecurity. Furthermore, over one-third of the country's population of over 50 million suffers from undernourishment.[1] The Kenyan vulnerability to food insecurity stems from their dependency on foreign imports, specifically fertilizer imports, to sustain food production. Recent conflicts in the Middle East have disrupted global supply chains, bringing detrimental consequences to the Kenyan agricultural system. There are a select set of short-term interventions and long-term investments that must be leveraged, but **the most effective way to address the growing problem of food insecurity in Kenya is expanding regenerative school meal programs with a focus on aiding local, small farms as they transition to regenerative agricultural practices.**

Kenya presents a striking contrast between rapid urbanization and agricultural struggle. Since gaining independence from the United Kingdom in 1963, Kenya has transitioned from an agrarian colony to a complex economy rooted in technology, trade and tourism. In urban settings families typically live in apartment complexes or gated communities, where they have access to healthcare, education, supermarkets and a highly advanced digital infrastructure.

Despite such technological advancement, almost 50% of the Kenyan population continue to work in the agricultural sector.[2] Comparatively, less than 2% of people in the United States work in agriculture. Although the majority of labor in farming communities comes from women, most of the income earned goes to men. Gender disparities are only one of many concerns for Kenyan farmers. Due to climate change, much of rural Kenya has been experiencing drought for over 5 years. This makes it difficult for farmers to produce large amounts of crops, so many farming families experience a hungry season. Typically, farmers use the food they grow to feed their family and sell any surplus of their crop. During periods where they cannot grow their own food, the families are then able to use their cash profits to purchase food for themselves. However, it is fairly common for farmers to run out of savings, meaning they would experience hunger until the next harvest begins. This reliance on unstable agricultural production, paired with limited finances, makes rural families highly vulnerable to food insecurity.

Kenya is a net importer of grain and fertilizer, which makes the Kenyan agricultural system heavily dependent on global supply chains. This leaves it exposed to disruptions outside of their control. Most notably, the ongoing conflict in the Middle East involving Iran, which plays a significant role in global

[1] "*World Food Programme*, "Kenya."
[2] "Employment in Agriculture (% of Total Employment) – Kenya," World Bank Data.

energy markets. Fertilizer[3] prices are tightly related to global oil and gas markets.[4] The conflict in the Middle East has affected these markets in two significant ways. First, global oil prices skyrocketed because of damage to energy infrastructure in the Middle East, reducing the overall supply. Second, the conflict brought instability to the Strait of Hormuz, a critical waterway for a significant portion of the world's trade, especially energy exports. The Iranian government's tight control over the Strait of Hormuz limits availability and drives up the cost of both fertilizer and fuel. The inability of ships to safely pass through the Strait of Hormuz is a supply constraint that affects millions in Kenya and across the globe.

These seemingly distant consequences of war in the Middle East have significant and immediate effects on Kenyan farmers. As fertilizer prices increase, many small farm owners in Kenya struggle to gather the money they need to purchase a sufficient amount of fertilizer. Meanwhile, the fertilizer they are able to purchase must still pass through the Strait of Hormuz, a difficult task given its current condition. With less fertilizer, it is much more difficult for the farmers to maintain crop yields, and their agricultural productivity decreases. In a country where hungry seasons are prevalent, lower crop production weakens an already unstable food system for many rural farming-owning families. With millions already living on the brink of food insecurity, the continuation of conflict in the Middle East will be detrimental to the well being of many Kenyan farmers unless immediately acted upon.

Some systems to combat food insecurity already exist in Kenya, including school feeding programs. The government-funded Home Grown School Meals Program purchases food from local farmers, supporting both the local agricultural systems and providing nutrition to malnourished children. President William Ruto hopes to expand this program in the future, aiming to increase the number of beneficiaries from 2.6 million to 10 million by 2030.[5] Another example is Food4Education, a locally-led organization that serves over 1,300 schools and 450,000 hungry children daily. These programs offer more than just a meal. They create jobs and support local agriculture in a way that builds up economic strength. However, as of 2024, global increases in food prices and extended periods of drought have doubled the cost of school feedings programs per student per day, making them harder to financially support.

In addition to strengthening existing programs, the Kenyan government could build a national stockpile of fertilizer to prevent future shocks of food insecurity. In the event of a future supply shock, the Kenyan government would tap into their emergency storage units to supply farmers with small portions of fertilizer, lowering the severity of the crisis for each family. However, compiling a reserve of fertilizer is a costly and administratively grueling task to organize. Furthermore, a national fertilizer stockpile is a centralized solution that overlooks the potential of local communities.

A third method to combat the declining availability of fertilizer is to adopt regenerative farming practices. Regenerative agriculture offers an ideal pathway to achieve higher yields while simultaneously reducing dependency on inputs and providing environmental benefits. The core practices of regenerative farming are designed to restore soil structure and allow farming systems to become more self-sustaining. These practices include reducing or eliminating tillage to lower soil disruption, cover cropping to protect topsoil

[3] Most of the world's fertilizer, especially the nitrogen-based products, is developed through high energy processes. One of the most common is the Haber Bosch process which synthesizes ammonia from nitrogen and hydrogen gas.
[4] "Haber-Bosch Process," EBSCO Research Starters
[5] United Nations Development Coordination Office, "From Meals to Momentum."

from nutrient runoff and improve water retention, crop rotation to balance nutrients in the soil, increasing organic bio inputs and reducing chemical inputs. Although chemical fertilizers and pesticides can aid in producing sufficient crop yields, they can degrade soil structure and reduce the balance of nutrients, making the soil more dependent on external inputs. Most fertilizers are composed of nitrogen, phosphorus, and potassium. In synthetic fertilizers, these elements come from natural gases and rocks. However, organic fertilizers are more sustainable and gradually improve soil health since their source of nitrogen, phosphorus, and potassium is compost and animal manure. Complementing chemical inputs with organic bio inputs such as compost, manure and biochar emphasizes feeding the soil directly and restoring its carbon supply rather than feeding the plant. As a result, the soil becomes enriched with nutrients over time and can sustain large crop yields with a decreasing amount of chemical inputs. Furthermore, regenerative farming practices allow farms to function with less water, a key factor in Kenya since they frequently experience drought.By focusing on restoring and enhancing soil health, regenerative farming decreases dependency on external contributions such as imported fertilizers.[6]

The main downsides to regenerative farming are cost and timeliness. It is expensive to shift an entire nation to new farming practices, and it is a gradual process which may result in a short term decrease in productivity during the transition period. A realistic timeline for such a large-scale shift would be to see initial benefits after 1–2 years, but up to 5–8 years to see genuine soil health improvement and sufficient or increased crop yields. A successful shift to regenerative agriculture in Kenya will enable Kenyan farms to be more self-sustainable and able to continue production when their external fertilizer source is disturbed, but it will take some time and significant financial investment.

An effective plan to combat food insecurity in Kenya will ideally prioritize both immediate, short term responses and a long term plan to make Kenyan agriculture more sustainable and less reliant on foreign imports. Specifically:

In the short term, Kenya needs to implement an emergency and rapid expansion of food safety nets. Although there are already feeding programs present, these programs often struggle to reach extremely rural areas or urban slums. Because people living in highly populated urban slums have no defined address, it is hard to bring resources to them. In most cases, these are the people who need the most help to fight food insecurity and yet they are unable to benefit from the pre-established programs. This rapid expansion will need to include processes to ensure that urban slums are benefitting equally to less poor areas in addition to implementing new programs. The Kenyan government should expand school feeding programs to allow children to obtain a nutritional meal at school and reserve a ration for them to take home. All of these programs must pursue a goal to provide access to secluded rural communities. Furthermore, the government could utilize Kenya's digital prowess to track the productivity and efficiency of these programs.

In the long term, more Kenyan farmers need to adopt regenerative agriculture practices to become more self-sustaining and collectively increase agricultural productivity to provide relief in the case of future emergencies. The gradual shift to regenerative agriculture is expensive and strenuous, but the long term benefits will outweigh the immediate burden. Succeeding in getting people to shift their ways is a difficult task. However, it is much more likely to work in times perceived as a crisis. If the Kenyan government

[6] AMTEC Group, "The Pros and Cons of Regenerative Agriculture."

implemented policies and offered training in regenerative agricultural practices, it would realistically take about 5 years to see a substantial, system-wide increase in soil health and crop productivity. In fact, two Kenyan counties clearly demonstrate the profound impact of adopting regenerative farming practices. In both Embu County and Tharaka Nithi County over 70% of farmers have adopted regenerative farming practices. As a result, they have seen an 81% increase in crop yields and a 92% increase in the soil's ability to retain water.[7]

With these short and long-term strategies in mind, my primary recommendation for combatting food insecurity in Kenya is expanding regenerative school meal programs with a focus on aiding local, small farms as they transition to regenerative agricultural practices. School feeding programs have the potential to create a positive feedback loop in their communities. Unlike commercial markets, where prices and demand constantly fluctuate, schools are unique in that they require a consistent supply of food throughout the academic year to ensure they can provide daily meals to students. By creating institutional demand for crops such as maize, beans and vegetables, school meal programs serve as reliable buyers in agricultural markets. Their consistent demand stabilizes markets for local farmers by ensuring them a predictable buyer. As a result, small farmers view school meal programs as a retail opportunity and are more eager to get themselves involved.

To implement a rapid expansion of school meal programs, different schools must adopt different procurement methods based on their logistical, geographical and agricultural conditions. The three main procurement pathways are centralized procurement, local procurement and institutional production, and often individual programs adopt a combination of these pathways. Centralized procurement is best for staple crops such as maize, rice and beans that are commonly required to prepare meals such as githeri or stews. Frequent demand for these crops means they require bulk-handling, interseasonal storage and efficient distribution so they are best supplied through structured chains like aggregators or farmers cooperatives. An alternative method of procurement is local procurement. These methods build connections between school meal programs and their surrounding agricultural communities by purchasing ingredients from local smallholder farms. This partnership allows the economic and ecological benefits of these transactions to remain within the community, promoting community strength over time. While bulk procurement may be more efficient in terms of money and scaling power, local procurement methods are ideal for building resilient local markets and food systems.

Expanding school feeding programs with an emphasis on sourcing from regenerative, local farms has varying impacts for each group of key stakeholders. The first group of stakeholders are the school children who participate in meal programs and their families. They would benefit from a reliable and consistent source of nutritious food. While researching school feeding programs in Nairobi this summer, I learned that many school feeding programs currently fall short of their goals since they cannot guarantee daily meals. Instead, they aim to provide 3 meals per week, even though a typical school week is 5 days. However, the expansion of school meal programs could aid the current programs that are struggling, and help them provide adequate meals every day. With children receiving more of their meals at home, parents can spend less of their hard-earned income on feeding their families. Additionally, students gain knowledge of regenerative farming practices from a young age, which provides advantages for many who aspire to sustain their own farm in the future. I visited the Nyangori Boys School in Vihiga County, where

[7] "Regenerative Agriculture in Kenya Boosts Smallholder Yields by 81%," AgriFocus Africa.

they launched an Integrated Poultry-Fish-Vegetable Aquaculture System that allows them to produce their own school meals in a way that sustains itself through organic inputs. Their system is run by a group of students who have deeply studied regenerative practices. While talking with these students, I learned that many of them have introduced these to their families and seen improvements on their farms at home.

The next key group of stakeholders is the smallholder farmers. While they benefit immensely from gaining a predictable crop market, farmers also face the largest risk in this transition. Regenerative practices may require new knowledge, training, equipment, and time before generating measurable improvements. Individual farmers must sacrifice their time and tradition to make ways for new regenerative practices on their land. To enable widespread success in this transition, the Kenyan government should provide smallholder farmers with multiyear purchasing contracts, agricultural training and financial support, with additional protection for female farmers to aid their transition.

The final group of key stakeholders are the funders which includes the Kenyan government, development organizations and private sector partners. These groups would need to finance initial training programs for farmers or support specific schools. While there is a risk of losing or wasting money, the return on investment for the government and development organizations would be focused on social aspects rather than profit. For example, improved nutrition in the student population, stabilized income for smallholder farmers and reduced vulnerability to fertilizer supply or price shocks. While blended finance will be necessary to kickstart the large-scale transition to regenerative agriculture, Kenya's government should ultimately assume authority and fund routine food purchases to maintain sustainability in the long run. As each smallholder farm integrates regenerative practices they should see healthier soil, reduced cost of inputs and stabilized yields, allowing them to run more sustainably with less financial support from the government.

Altogether, each group of key stakeholders faces different short term impacts of this expansion. School attendance may improve since a guaranteed meal each day encourages students to attend school. Farmers may experience yield uncertainty as they transition to regenerative practices and phase out old techniques. Lastly, government funders and development partners must pay the initial costs of transition programs.

In the long term, local communities in Kenya will benefit from the adoption of regenerative agriculture. Regenerative practices focus on restoring soil with organic nutrients and allows the soil to become more self-sustaining and produce larger crop yields. In turn, this self-sustainability decreases each farmer's reliance on imported fertilizer to aid in crop production and provides a cushion against future supply shocks. Additionally, larger crop yields can help farming families avoid hungry seasons. Funders such as the Kenyan government will continue to fund the school feeding initiative since feeding students is an ongoing public responsibility.

Kenya must take proactive measures to minimize its dependency on foreign imports in order to mitigate external threats to food security. The Kenyan government must partner with other governments, local organizations, and the private sector to strengthen investments in successful programs, build reserves, invest in regenerative farming practices, and continue to support the exploration and development of new scientific methods that will make Kenyan agriculture more sustainable and self-sufficient. Investing in the expansion of regenerative school meal programs while supporting smallholder farms as they embrace regenerative farming practices is the most effective way to combat food insecurity in Kenya today.

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