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The ART of Agriculture: Fortifying Botswana's HIV Response through Food Prescriptions

Disease Transmission: A Brief History

After reaching a fever-pitch in the 2000's, Botswana's HIV transmission rate has been slashed in one of the most effective HIV-elimination programs to date. 25 years ago, one in eight Batswana* children were born with the disease, and the mortality rate for children under 5 had doubled in under a decade (Cox, 2025). Now, the vertical transmission rate from mother to child is under 1%. In 2013, the country worked with the World Health Organization to implement Option B+, a program providing access to antiretroviral therapy (ART) for all pregnant and breastfeeding HIV patients (Cox, 2025). Since HIV can be contracted in utero, at birth, or through breastfeasting, these corridors of transmission were the focus of Botswana's response.

There is no known cure to HIV/AIDS, and ART—a mixed-medication regimen—is the best option for delaying the course of the disease. By reducing the viral load in a patient's bloodstream, ART can make HIV undetectable—its chance of transmission near zero (CDC, 2025). Although the Batswana government has a commendable track record of funding HIV testing and treatment, an economic downturn is threatening this reputation. The country's diamond industry, one of its primary sources of revenue, is in turmoil over rising tariffs and the popularization of synthetic diamonds (Cox, 2025). Meanwhile, Botswana's agricultural sector is dominated by livestock and cattle ranching, but a decline in viable grazing land has caused cattle populations to decline (International Trade Administration, 2024). These issues, combined with dwindling foreign aid, has led Option B+ doctors to believe government support for HIV programs is precarious (Cox, 2025).

HIV and Food Security

While great efforts have been made to limit transmission in Botswana, the reality for people who already have the virus is a continued struggle. Once the virus is contracted it stays in the body for life; thus, medication and lifestyle dictate the quality and longevity of that time. As outlined in the Joint United Nations Programme on HIV/AIDS, a robust diet is paramount for the success of antiretroviral therapy. Healthy eating also serves a role in slowing the disease's progression and combats opportunistic infections. Warding off these additional infections is

***Note:** Batswana is the term used to describe citizens of Botswana (Ba- signifies plural in Setswana, the country's primary language).

particularly significant in areas with insufficient healthcare access, as would become increasingly common if government funding for treatment wanes. Moreover, the UN Department of Economic and Social Affairs estimates 600,000 Batswana are undernourished with an inadequate diet worsening the body's response to ART. The resulting lower patient survival rate and intensified side effects hinder ART from reaching its full potential.

To compound this, 1.3 million out of 2.5 million people in Botswana experience moderate or severe food insecurity (UN Department of Economic and Social Affairs, 2025). Food-insecure households can't continually meet the quantity and quality of food they need, yet these requirements are increased by HIV. Once infected, the virus doubles its host's energy demand while obstructing nutrient use and absorption (UNAIDS et al., 2008). This insufficient fueling aggravates the disease, creating a brutal relationship of sabotage: illness restricts work capacity and potential earnings, reduced income threatens household food security and nutrition, and a poorer diet leaves the immune system vulnerable (UNAIDS et al., 2008). Botswana does not currently target food insecurity in its HIV response, but a Kenya-based operation may provide insight into how testing and treatment can be bolstered by food security.

HAART and Harvest Initiative

Academic Model Providing Access to Healthcare (AMPATH) is a global consortium of medical schools that boasts a massive HIV response program. With over 127,000 Kenyans actively in treatment across its programs, the organization's branch devoted to patient food assistance is particularly pertinent to enhance Botswana's approach. Seeking to improve HIV treatment response in food-insecure patients, AMPATH began the HAART* and Harvest Initiative as a needs-based food distribution system. Seven years into the program's operations, Mamlin et al. (2009) published a paper describing its structure, successes, and challenges.

According to the paper, AMPATH accrues food in three ways: donations from international organizations, purchases from local sellers, and yields from AMPATH-endowed land. When a patient first registers with AMPATH, they meet with a nutritionist who gauges their immunological status, socioeconomic circumstances, etc. This information is then used to determine their level of household food security. Those deemed food insecure are eligible for six months of dietary support based on the direness of their need. At most, this covers the full caloric intake of the patient and their family. Via a month-long "food prescription", the amount and type of food allocated are documented alongside pickup times and locations. Every month, participants return to the nutritionist to renew their prescription and have it recorded in a database. After six months of ART and food assistance, recipients are expected to be independently food secure. However, since households and recovery times vary, AMPATH offers further assistance focused on building income security.

*Highly-Active Antiretroviral Therapy

This approach is by no means perfect, as the costs of purchasing, cultivating, storing, and transporting food will build up. Since no international funding is explicitly reserved for supporting food security in HIV households, paying these expenses isn't easy (Mamlin et al., 2009). Also, though all members of the program receive food, unemployment and the deaths of working relatives present other barriers to food security (Mamlin et al., 2009). Thus, self-sufficiency cannot be guaranteed.

These setbacks are inherent to HAART and Harvest and would likely occur if Botswana attacked HIV food security as well. Nevertheless, since 2,000 patients became self-sufficient in the first two years of HAART and Harvest (Mamlin et al., 2009), it is clear implementing the flawed program is far superior to overlooking HIV food insecurity, as Botswana's current approach does.

This is not to suggest that the program be replicated; Botswana is a different country facing different needs and different hurdles. Thus, the essence of HAART and Harvest—its goals and achievements—should be taken into account when designing an intervention for Botswana's HIV and food insecure population. Nevertheless, program logistics should reflect Botswana's distinctive economy and climate.

Old Lessons, New Model

The first key consideration is obtaining food, as Batswana agriculture faces unique geographic obstacles. Located in Southern Africa, Botswana's land is primarily occupied by the Kalahari Desert, resulting in poor soil quality and irrigation instability across 70% of the country's surface area (International Trade Administration, 2024). Thus, HAART and Harvest's reliance on hospital farms and local food sources wouldn't translate cleanly to Botswana.

There are also economic consequences of Botswana's aridity. Limited productivity means the agricultural sector is predominantly subsistence farming, vital to rural households' food supply and livelihoods but lacking the commercial scale needed to feed an entire population (Faimau & Basimane, 2026). As a result, Botswana imports a whopping 80% of its foods and beverages (Kasimba et al., 2017). This places it at the mercy of foreign supply chains while local markets grapple with price volatility (Kasimba et al., 2017). As a high-importing country, it is no surprise that Botswana is prioritizing the creation of a more independent food supply.

This paper's proposed initiative, named the *ART of Agriculture*, will build upon HAART and Harvest to increase HIV food security through innovative cultivation that defies Botswana's natural constraints. The harsh realities of the country's agricultural sector are hampering such a shift now, but using an AMPATH-inspired intervention as a pilot program could provide a major step forward. Already, Botswana's government has pledged to harness new technology and cultivation methods as part of its National Adaptation Plan. This includes using drought-resistant

crop varieties, shifting planting dates, and investing in rainwater collection and recycling systems (Faimau & Basimane, 2026). Experimenting with these methods in ART of Agriculture's narrow scope can be used to fine tune the country's modernization approach before it undertakes larger-scale projects in the future.

Between initial research, community outreach, and data collection, the need for an ART of Agriculture taskforce is evident. Since Botswana doesn't have AMPATH as its foundation, a new framework is necessary. Most logically, the Batswana government itself could fill this role since it has an active investment in combating HIV and has established its openness to innovative problem-solving with Option B+. Duties may either be delegated to preexisting District Climate Change Committees (as outlined in the National Action Plan), or a new unit can be carved out under the National Action Plan framework. The primary issue with this responsibility is a funding source, considering financial hardships already threaten existing government projects. Therefore, the best plan would be turning to an international audience to fulfill the ART of Agriculture's financing requirements.

The Food and Agriculture Organization (FAO) is the UN's agri-system task force, and its Investment Centre uses its relationships with countries and partner institutions to secure the necessary investment for FAO-supported projects (FAO, 2023). With a preliminary request from Botswana's government, the Investment Centre could organize a conference devoted to introducing the ART of Agriculture to global investors, linking the program with potential funding sources. Such conferences are commonplace, and also include panels on agri-system studies and cutting-edge tech (FAO, 2025). Networking with these panels would provide the foundation for revamping Batswana agriculture, a focal point for the ART of Agriculture's food production.

The early implementation of this program would entail a lot of trial and error with new forms of agriculture, but these risks would be assumed in any course of modernization, and likely at a larger scale. The outcomes of small-scale farmers can help pinpoint successful models so that there are fewer hardships when technological advancement is executed more broadly on commercial farms. This potential to revitalize Batswana agriculture would diversify its economy, reduce its reliance on food imports, and strengthen the climate resilience of its land.

Implementation

Recall that Botswana's agricultural sector is mostly subsistence farming due its climate-prohibited yields. This indicates agriculture practices that are traditionally successful elsewhere aren't fully compatible with the low-fertility soil and frequent droughts. The government has indicated its interest in developing a sustainable agriculture system in its climate resilience policy (Faimau & Basimane, 2026), and the Investment Centre's conference provides the first step: identifying and acquiring methods of modernization.

The next objective is putting these tools in the hands of a preliminary group of farmers. To minimize farm-to-fork distance, patients and farmers in the program should be in close proximity. Therefore, areas with the highest HIV rates and the most food insecurity should be identified. Then, coordination with resident farmers can distribute sustainable methods, keeping modernization on a manageable scale without undermining the livelihoods of preexisting farms. On the contrary, ART of Agriculture would be investing in them.

In a modified version of community-supported agriculture, the Batswana government would reserve a share of farmers' yields. Instead of a monetary transaction, farmers would be given resource endowments (seeds, irrigation systems, etc.) intended to raise yields. Upon agreement to partake in the program, on-site surveys would be used to customize endowments based on the least disruptive changes for each farm. Growers would then receive the materials and any instruction they may require. After harvest, the ART of Agriculture would collect its promised volume of crops. Periodic check-ins would follow to confirm government materials are being properly used and to collect data on the most effective changes. With newer methods and innovations, yields will likely exceed current numbers, meaning food would be left over beyond what feeds farming households and satisfies their contracts. In the event of surplus, farmers can sell crops locally, generating communal wealth and stabilizing the food security of people outside of the program.

Livestock

Cultivating crops offers the ART of Agriculture many grains to distribute, but a comprehensive diet encompasses more than cereals and legumes. Protein is a nutritional necessity, and leveraging the program to promote sustainable animal caretaking would invigorate one of Botswana's most vital industries: livestock and cattle ranching. Its suffering is caused by a shortage of grazing land, but the problem can be targeted at its source in the form of sustainable grazing practices.

Reusing the government-supported agriculture arrangement from crop production, Botswana can reserve stock from consenting livestock and cattle farms upon the condition that they use a rotational stocking system (rotational grazing). This is paramount for the sustainability of Botswana's livestock industry because rotational grazing lets the soil recover its nutrients and structural integrity (USDA, n.d.). As a result, the soil is protected from erosion and absorbs more water, rendering the grass healthier and able to support more animals (USDA, n.d.). The out-of-pocket costs of incorporating a rotational stocking system (e.g., fencing) may deter prospective farmers from signing on, so monetary assistance must be considered. Participating farms should be surveyed to estimate the financing required for additional fencing, water systems, and laneway construction. Once again, periodic evaluations would ensure adherence to the contract and address any maintenance demands.

Food Distribution

Administration and food acquisition has been addressed, yet one more piece of the puzzle remains: distribution. In Kenya, patient proximity to AMPATH sites created a geographic bubble for HAART and Harvest to realistically operate in, but this anchor isn't innately part of the ART of Agriculture. A compact supply chain partially answers this question. Since the ART of Agriculture will grow and service the same communities, transportation costs are lowered while local investment simultaneously bolsters food security.

Although hospitals aren't the overseers of this program, their involvement is still necessary for gathering patients and assessing the extent of ART of Agriculture support needed. In the absence of a hospital network like AMPATH, flagship locations would be selected based on proximity to communities in the program. Storage and packing centers—as in HAART and Harvest—would still have to be off-site (Mamlin et al., 2009). These would have to be built from scratch, but reusing HAART and Harvest infrastructure can cut costs elsewhere. Specifically, the ART of Agriculture should emulate its digital nutrition information system that holds prescription details, work logs, and daily transportation requirements (Mamlin et al., 2009). By gaining permission to use the same system or by replicating it, the ART of Agriculture won't have to experiment with procedures. Additionally, the HAART and Harvest distribution workforce was composed of trained patients compensated for their work (Mamlin et al., 2009). The ART of Agriculture would function in the same vein. Just like in ART of Agriculture's food production, the driving force behind distribution is engaging the very people served by the program.

Conclusion

The consequences of infectious diseases like HIV aren't limited to the body, nor should treatment be. An emphasis on nutritional welfare is fundamental to the effectiveness of antiretroviral therapy, which is fundamental to the long-term prosperity of patient households. Despite the strength of Botswana's medical defense against HIV, the role of food in medicine must be prioritized for the country's public health and economic wellbeing.

A healthier population forms a more productive workforce, and the ART of Agriculture's exploration of sustainable agriculture would keep it properly fueled. During the first pivotal months of ART, household food prescriptions enhance HIV recovery so that families don't have to choose between wellness and income. While temporary food assistance doesn't guarantee permanent food security, the program's collaboration with the areas it serves will foster local investment, enabling communities to also promote food security amongst their members (and beyond ART patients).

Additionally, improving the prosperity of Batswana agri-systems and easing its reliance on imports brings the country closer to the self-sufficiency it seeks. A diversified economy and fewer imports would also mitigate the effects of its current downturn. More money in the country

means HIV mitigation can continue, while the National Action Plan would have more funding to convert policy into practice. In essence, the ART of Agriculture's impact would reverberate from households to farms to the entire country, paving the way for a sustainable future in Botswana.

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