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Re-Assessing Agricultural Subsidies in Kenya: Successes, Challenges and Opportunities for Enhancing Food Security

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Abstract **Review Article**

This review critically examines the implementation of agricultural input subsidies in Kenya, with a focus on their successes, failures, and potential as a strategy for eradicating food insecurity. Drawing on literature review of various research articles, government policy documents, and other related reports on agro-input subsidies, the review assesses how input subsidies, particularly for fertilizers and certified seeds have influenced agricultural productivity and national food security outcomes in Kenya. While subsidies have played a role in boosting maize production and improving access to inputs among resource-poor farmers, the review identifies significant limitations, including political interference, delayed delivery, corruption, and unsustainable funding mechanisms. The uneven targeting of beneficiaries and the lack of complementary support services have further undermined the intended impacts. Nonetheless, the review paper argues that with better targeting, increased transparency, integration with climate-smart practices, and alignment with broader agricultural development strategies, input subsidies hold considerable promise. This is because despite the fact that the achievements are below expectations, there is room for turning the challenges into opportunities for attaining food security through input subsidies in Kenya. The review concludes by offering policy recommendations to optimize the effectiveness of subsidy programs in addressing chronic food insecurity and promoting inclusive agricultural growth in Kenya.

Keywords: Agricultural Input Subsidies, Kenya, Food Security, Smallholder Farmers, Agricultural Productivity.

INTRODUCTION

Food security, as defined by the Food and Agriculture Organization (FAO), exists when all individuals, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 1996: Action 1). In Sub-Saharan Africa (SSA), and Kenya in particular, food security remains a significant challenge. A considerable proportion of the population continues to live below the minimum dietary energy threshold. The agricultural sector in many SSA countries, including Kenya, has struggled to guarantee food security both at the national and household levels (Bezu *et al.,* 2014). Crop yields remain low and unsustainable, a situation that reflects chronic food insecurity across the region (Okalebo *et al.,* 2015).

Despite numerous government efforts to promote agricultural productivity and ensure national food security, Kenya continues to grapple with persistent hunger, low crop yields, and food price volatility. Agricultural subsidies, introduced as a strategic intervention to support smallholder farmers by lowering input costs for items such as fertilizer and seeds, were envisioned as a way to enhance productivity, rural livelihoods, and national food sufficiency. However, more than two decades since the implementation of these subsidies, food insecurity remains widespread—especially in arid and semi-arid regions—raising questions about the overall effectiveness and sustainability of the subsidy model.

A growing body of research and policy assessments point to significant inefficiencies and inequities in the current agricultural subsidy system. Challenges such as elite capture, bureaucratic inefficiency, corruption, and delayed input distribution have often hindered the timely and equitable access to subsidized inputs, particularly among poor and marginalized smallholder farmers. Moreover, the one-size-fits-all approach in subsidy allocation often fails to consider diverse agro-ecological zones and local needs, leading to input misuse and limited returns on investment. These systemic challenges have not only reduced the intended impact of subsidies but also strained public resources that could otherwise support broader agricultural transformation.

Given these concerns, there is a pressing need to reassess Kenya's agricultural subsidy programs in light of evolving food security threats, climate change, and market liberalization. This review seeks to critically examine both the successes and limitations of the current subsidy framework and explore opportunities for policy reform, innovation, and targeted interventions. In doing so, this article aims to offer practical recommendations for redesigning subsidy programs that are inclusive, accountable, and aligned with Kenya's long-term goals of achieving sustainable food security and agricultural resilience.

Causes of Low Crop Productivity and Food Insecurity

Generally, a multiplicity of factors has been identified as responsible for the low agricultural productivity witnessed across SSA. Chief among these is declining soil fertility, a challenge widely acknowledged by numerous scholars (Baijukya *et al.,* 2005; Tittonell *et al.,* 2010; Tittonell & Giller, 2013; Bryan *et al.,* 2011; Shepherd & Soule, 1998; Stoorvogel *et al.,* 2003; Corbeels *et al.,* 2000; Onduru *et al.,* 2001; Vanlauwe *et al.,* 2017; Kiboi *et al.,* 2019; Sileshi *et al.,* 2019). Another key constraint to agricultural productivity is the limited adoption of modern farming technologies. This is influenced by a range of socio-economic, biophysical, institutional, and knowledge-related factors (Asrat *et al.,* 2004; Nigussie *et al.,* 2017; Muhanji *et al.,* 2011; Mungwe *et al.,* 2009; Marenya & Barrett, 2007; Teshome *et al.,* 2016; Adimassu *et al.,* 2016; Hijbeek *et al.,* 2021; Ejigu *et al.,* 2021; Onduru *et al.,* 2001). Poor agronomic practices and inadequate investment in agricultural research also exacerbate the problem (Kogo *et al.,* 2020).

Declining soil fertility is a systemic problem throughout SSA and remains a persistent constraint to agricultural development, particularly in marginal lands. This situation poses a significant threat to food security and rural livelihoods (Corbeels *et al.,* 2000; Onduru *et al.,* 2001; UNDESA, 2013; Vanlauwe *et al.,* 2017). Studies indicate that many African soils are increasingly unable to support food production or deliver other essential ecosystem services due to land degradation and nutrient depletion, largely driven by poor soil management, over-cultivation, and population pressure (Ajayi, 2007; Kiboi *et al.,* 2019; Marenya & Barrett, 2007; Sileshi *et al.,* 2019; FAO *et al.,* 2017). Soil infertility has also been attributed to the insufficient use of fertilizers, removal of crop residues, continuous cropping without nutrient replenishment, soil erosion, and leaching of essential nutrients (Aleminew & Alemayehu, 2020; Endrias *et al.,* 2013; Mulinge *et al.,* 2016). These findings point to a common concern—soil fertility must be improved to achieve sustainable food security.

Low crop productivity and food insecurity in many developing countries, including Kenya, can be attributed to a range of structural and environmental factors. One of the most significant causes is the over-reliance on rain-fed agriculture, which leaves farming systems highly vulnerable to erratic weather patterns and prolonged droughts. According to the Food and Agriculture Organization (FAO), over 80% of agricultural production in sub-Saharan Africa is rain-dependent, making it susceptible to climate change and unpredictable rainfall (FAO, 2023). In Kenya, this vulnerability has been particularly acute in arid and semi-arid lands (ASALs), where recurrent droughts have devastated crop yields, leading to chronic food shortages and increased reliance on food aid.

In addition to environmental challenges, low crop productivity is also exacerbated by limited access to quality farm inputs and technologies. Smallholder farmers often face difficulties in acquiring certified seeds, fertilizers, pesticides, and mechanized equipment due to high costs and poor distribution infrastructure. As Ngigi notes, "inadequate input use, coupled with traditional farming methods, continues to constrain agricultural output and prevent productivity gains" (Ngigi, 2002). Furthermore, the inefficiency of agricultural extension services has hampered the dissemination of critical knowledge on modern farming practices and climate-smart agriculture. This information gap has left many farmers poorly equipped to manage pests, soil fertility, and changing climate conditions effectively.

Economic and policy-related issues also contribute to food insecurity and stagnant productivity. Fragmented land holdings due to population pressure have led to the subdivision of arable land into plots too small to support viable commercial agriculture. Moreover, inconsistent government policies, corruption in subsidy programs, and limited investment in rural infrastructure—including roads, irrigation, and storage facilities—has long stifled growth in Kenya's agricultural sector. As Jayne *et al.,* (2023) contend that food insecurity is not merely the result of low production but also stems from weak supply chains and poor market access, which prevent farmers from receiving fair prices for their produce (p. 30). Without comprehensive policy reforms, robust infrastructure, and climate adaptation strategies, low crop productivity will continue to undermine food security in Kenya and across the region.

Pathways for Soil Fertility Improvement

Addressing soil fertility is fundamental to enhancing agricultural productivity, ensuring food security, and building climate-resilient farming systems, especially in countries like Kenya where the majority of food production is dependent on smallholder agriculture.

Soil fertility degradation as characterized by nutrient depletion, erosion, and declining organic matter is a primary driver of low agricultural yields. Bryan *et al.,* (2011) underscore that the decline in soil fertility is not only a technical issue but also deeply interlinked with socio-economic conditions, farming practices, and land-use patterns. In Kenya, these challenges are particularly acute in high-potential agricultural zones such as the North Rift and parts of Western Kenya, where continuous cultivation without adequate replenishment of nutrients has significantly reduced soil productivity (Macharia *et al.,* 2009). This has led to diminished yields in staple crops like maize and beans and increased vulnerability to pests and diseases.

To reverse this trend, a combination of innovative and context-specific technologies and practices often referred to as Integrated Soil Fertility Management (ISFM) have been proposed and tested. These include the use of organic and inorganic inputs in a balanced manner (such as compost, farmyard manure, and chemical fertilizers), the incorporation of green manures and nitrogen-fixing legumes, appropriate crop rotations, conservation tillage, and agroforestry interventions that enhance nutrient cycling (Vanlauwe *et al.,* 2010). Other promising technologies include the use of phosphate rock for acidic soils, mulching, and the adoption of legume intercrops, which not only improve soil nitrogen levels but also provide nutritional and economic benefits to farmers. In Kenya, initiatives such as the Fertilizer Use Recommendation Project (FURP) and the Phosphate Rock Evaluation Project (PRE-PAC) have aimed to generate site-specific nutrient recommendations, improving the precision and impact of fertilizer use. Meanwhile, the Managing Beneficial Interactions in Legume Intercrops (MBILI) project has demonstrated the benefits of maize-legume systems in enhancing soil fertility while improving household food security (Ngeno *et al.,* 2017).

On a policy and institutional level, the Kenyan government has implemented several targeted programs to promote soil fertility restoration and sustainable agricultural intensification. Notable among these are the Kenya Agricultural Productivity Project (KAPP), the National Accelerated Agricultural Inputs Access Programme (NAAIAP), and the National Agriculture and Livestock Extension Programme (NALEP). These programs have sought to scale up the use of improved seeds, soil fertility amendments, water harvesting techniques, and farmer training on best agronomic practices (Ogada *et al.,* 2013). While these efforts have shown pockets of success, their overall impact has been limited by constraints such as inadequate funding, poor extension service delivery, and limited adoption of technologies by resource-poor farmers. Moving forward, the integration of traditional knowledge, community-based soil fertility management practices, and digital innovations such as mobile-based soil testing and advisory services could help tailor interventions to farmer-specific needs and bridge knowledge gaps. A more inclusive approach that empowers farmers, especially women and youth, and strengthens institutional capacity is critical to achieving lasting improvements in soil health and food production in Kenya

The National Accelerated Agricultural Inputs Access Programme (NAAIAP) was one of Kenya's most ambitious policy interventions designed to transform smallholder agriculture and promote food security through increased access to key farm inputs. Launched in the mid-2000s, the program targeted poor and resource-constrained farmers, particularly in high-potential agricultural areas, with the aim of enhancing crop productivity, boosting rural incomes, and reducing hunger. The program comprised several key components, notably "Kilimo Plus" and "Kilimo Biashara," which represented a strategic shift towards market-oriented agriculture. Under the "Kilimo Plus" component, NAAIAP introduced a voucher-based input subsidy system that enabled selected farmers to access starter packs comprising basal and top-dressing fertilizer, along with improved maize seed. These vouchers were redeemable at certified and registered agro-dealers, thus not only supporting farmers but also strengthening the private agricultural input distribution system. The idea was to overcome affordability and accessibility challenges that limited fertilizer and seed uptake among smallholders. By targeting maize, Kenya's staple food crop, the initiative directly addressed the pressing issue of national food insecurity and low cereal productivity that had plagued the agricultural sector for decades.

The "Kilimo Biashara" arm of the program expanded this support by integrating financial inclusion and risk management mechanisms into the agricultural value chain. It facilitated access to credit and crop insurance services through partnerships with financial institutions such as Equity Bank and insurance providers, making it easier for farmers to invest in modern farming technologies. Additionally, Kilimo Biashara promoted the formation of farmer-based marketing associations and cooperatives, helping smallholders aggregate produce, access better market prices, and increase their bargaining power. In response to the global spike in fertilizer prices in 2008, the government launched the National Fertilizer Subsidy Programme (NFSP), managed by the National Cereals and Produce Board (NCPB). This program aimed to shield farmers from volatile international prices by offering discounted fertilizer to verified beneficiaries, distributed through NCPB depots across the country.

Overall, the NAAIAP and its affiliated subsidy programs represented a holistic approach to input delivery, linking productivity-enhancing inputs with financial services, market access, and risk mitigation. However, despite their transformative potential, these initiatives faced several implementation challenges, including delays in input delivery, targeting inefficiencies, limited coverage, and insufficient extension support. Nonetheless, the program laid a foundation for future subsidy models and demonstrated the critical role of coordinated public-private partnerships in revitalizing smallholder agriculture in Kenya.

Achievements and challenges

While soil fertility has been widely recognized as a key determinant of food security, efforts to improve it have been inadequate. As a result, Kenya continues to experience persistent food insecurity. Maize, the country's staple food crop, continues to underperform, with yields consistently below both global and regional averages (Ochola & Fengying, 2015; Jena *et al.,* 2021). Maize production has frequently fallen short of national consumption levels (Kirimi *et al.,* 2011; Barmao & Tarus, 2019).

Studies suggest that improving access to fertilizer and improved seed varieties can significantly boost agricultural productivity (Liverpool-Tasie, 2013; Liverpool-Tasie & Takeshima, 2013). For instance, Popoola (2022) found that 57% of Nigerian farmers who participated in a fertilizer subsidy program reported improved food security. Similarly, in Malawi, fertilizer subsidies have been linked to enhanced maize production and national food security (Mkwara & Marsh, 2011). In Kenya, Magut *et al.,* (2019) reported increased maize yields following the introduction of input subsidies in Uasin Gishu County. However, these gains have not yet translated into national food security, highlighting the need for a more comprehensive approach. Despite the potential benefits of fertilizer subsidies, several constraints hinder their effectiveness. Chief among these is limited access to capital, particularly after the withdrawal of government subsidies (Franzel, 2009; Jaetzold & Schmidt, 2003). While higher fertilizer application rates are necessary for increased productivity (Anago *et al.,* 2020; Debnath & Babu, 2020), the cost remains prohibitive for many farmers (Barasa, 2019).

Although NAAIAP increased fertilizer use (Mason *et al.,* 2017), it has become financially burdensome for the government, with annual expenditure on fertilizer imports reaching €27 million (Ariga & Jayne, 2011). Additional barriers include lack of financing, risk aversion among smallholders, low returns to input use, and inadequate access to extension services (Mathenge, 2016). Furthermore, imported fertilizers may not be well-suited to local soil types, sometimes resulting in soil acidification and reduced crop performance.

Opportunities for Improved Fertilizer Use and Improved Germplasm

To enhance fertilizer efficiency, three key factors must be considered: local adaptation, the use of organic inputs, and improved germplasm. Local adaptation entails tailoring fertilizer recommendations to specific agro-ecological zones, considering factors such as climate variability, market access, and soil characteristics (Oseko & Dienya, 2015).

Open-ended fertilizer recommendations have been criticized for lacking context specificity, which reduces their effectiveness (Omiti *et al.,* 2000). Studies support the need for localized soil management approaches. Zingore *et al.,* (2008) found that crop response to nitrogen and phosphorus was often constrained by deficiencies in zinc, calcium, magnesium, and potassium. Vanlauwe *et al.,* (2014, 2016) and Sileshi *et al.,* (2008) similarly reported that unbalanced fertilization, rainfall variability, and soil constraints reduce crop response and nitrogen use efficiency. Kihara *et al.,*(2016) demonstrated that soil pH, organic carbon, and phosphorus availability positively correlate with nitrogen efficiency, further supporting the need for context-specific interventions.

High-yielding maize varieties and optimal fertilizer recommendations have been developed in Kenya (Karanja, 1996; Duflo *et al.,* 2008). However, adoption rates remain low and uneven across regions (Ogada & Nyangena, 2019). Many studies underscore the importance of adopting improved varieties as part of a comprehensive input package (Alene *et al.,* 2000; De Groote *et al.,* 2013; Feleke & Zegeye, 2006; Khonje *et al.,* 2015; Langyintuo & Mungoma, 2008; Lunduka *et al.,* 2012; Nkonya *et al.,* 1997). Ogada and Nyangena (2019) noted that the positive impact of certified seeds and fertilizer on yields is only realized when these inputs are used together. Unfortunately, current government programs often provide fertilizer without corresponding seed subsidies, despite rising seed prices (Owino, 2010)

Agricultural subsidies in Kenya have played a pivotal role in shaping the country's food production systems, with notable successes in improving access to farm inputs, increasing crop yields, and supporting smallholder farmers. Initiatives such as the National Accelerated Agricultural Inputs Access Programme (NAAIAP), Kilimo Plus, and the National Fertilizer Subsidy Programme have demonstrated the government's commitment to enhancing food security through targeted support. These interventions have helped reduce input costs, expanded access to improved seeds and fertilizers, and stimulated farmer participation in commercial agriculture.

However, the review also reveals persistent challenges that hinder the full realization of the intended benefits. These include inefficiencies in subsidy targeting and distribution, delayed input delivery, corruption, inadequate extension services, and limited integration of sustainable soil and water management practices. Additionally, the subsidy programs often lack long-term financial sustainability and fail to fully address the diverse needs of smallholder farmers, particularly in marginalized and arid regions.

Moving forward, Kenya has an opportunity to refine its agricultural subsidy framework by adopting more inclusive, transparent, and sustainable approaches. Emphasizing integrated soil fertility management, promoting digital voucher systems, strengthening public-private partnerships, and aligning subsidies with broader rural development goals can significantly enhance the impact of these programs. Ultimately, a well-designed, responsive, and accountable subsidy system is essential not only for increasing agricultural productivity but also for building resilient food systems and ensuring long-term food security for all Kenyans

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