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ZAMBIA

Agrifood System Change and PARI Research on Innovations

INTRODUCTION

Government expenditure on agriculture in Zambia has consistently been decreasing despite the commitment under the 2014 Malabo Declaration to spend at least 10% of its national budget on agriculture. Zambia only met this target in 2015 by allocating 10.3% of its annual budget to agriculture. In the past 5 years, the allocation to agriculture has, on average, dropped to 5%. The agriculture value added growth rate has been negative, hovering at -2.7%. This has been exacerbated by various shocks including erratic weather, market shocks and the COVID pandemic, as reflected in the significant fluctuations of the trend (see Figure 1). Against this background, there is need to not only plan but also implement the innovative initiatives to food systems transformation. The government of Zambia developed these innovative pathways to sustainable food systems transformation ranging from technological advancements, institutional frameworks to policy reforms (see Table 1). It is important to revisit these and other current initiatives to draw lessons, as provided in this brief based on studies done under PARI, to guide future strategies.

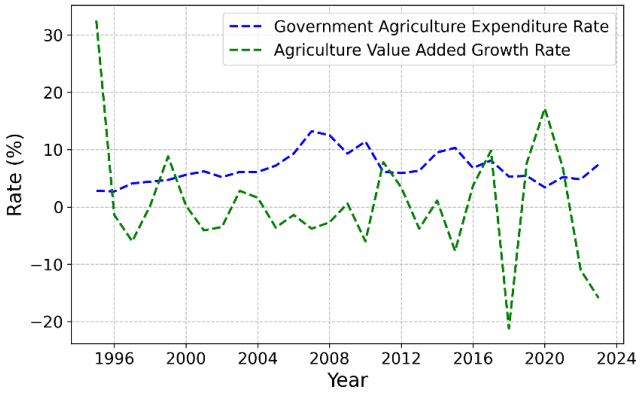

Figure 1: Trend of government agriculture expenditure and value added growth rate in Zambia[1]

Table 1. Summary of innovative pathways to sustainable food systems transformation in Zambia[2]

Category	Key Innovations	Implementation objectives/Strategies
Institution and policy frameworks	▪ Land tenure reforms for equitable access	▪ Promote equitable livelihoods through access to land and finance for women, youth and vulnerable groups
	▪ Implement National Food and Nutrition Act (2020)	▪ Facilitate effective coordination among stakeholders
Technological innovations	▪ Introduce weather-based insurance	▪ Hedge against climate risks
	▪ Provide financial incentives for nature-positive production and connection to green financing and carbon credits	▪ Enhance financial inclusion of farmers
	▪ Scale up E-extension platforms and mobile-based farmer support	▪ Enhance farmer access to information and skills development
	▪ Develop cold chain storage and agro-processing facilities	▪ Reduce post-harvest losses and improve food quality and safety

[1] Source: Authors' illustration using data from https://www.resakss.org/node/3, accessed on 26 May 2025

[2] Source: https://www.unfoodsystemshub.org/docs/unfoodsystemslibraries/national-pathways/zambia/2023-07-21-zambia-national-pathway---english.pdf?sfvrsn=d16e0333_1 , accessed on 11 March 2025

	▪ Promote climate resilient and nutrient dense crops and indigenous species ▪ Promote climate-smart agriculture (CSA) and nature-positive production (e.g. conservation farming, aquaculture)	▪ Enhance resilience to climate shocks

PARI CONTRIBUTIONS

The PARI research in Zambia relates to priorities as indicated by PARI Partners, and took note of initiatives of the Green Innovation Centers.

Innovations in value chains

Innovation platforms have proven effective in promoting agricultural innovations, particularly for the adoption of soybeans and fortified maize (Chomba et al., 2018, 2016). These platforms have brought together key stakeholders along the value chains to address challenges and opportunities related to specific commodities. A notable example is the promotion of fortified maize. In 2010, the government established the National ProVitamin A Orange Maize Steering Committee (NPASC) as an innovation platform, enabling the development of fortified orange maize varieties. This effort was a collaboration with HarvestPlus, the International Maize and Wheat Improvement Programme (CIMMYT) and the Zambia Agricultural Research Institute (ZARI). Orange maize is included in the government's agricultural input subsidy program, helping to address vitamin A deficiency among pregnant and lactating women as well as children under five.

Farmer innovations

Zambian farmers are active innovators to address constraints in agricultural production. However, they need more support to validate their innovations, commercialize them and empower women innovators (Tambo, 2018). A farmer innovation contest implemented by PARI in the country unveiled an impressive range of innovations, mostly in the areas of livestock production and to a lesser extent crop management and storage. Most of these innovations (68%) were adaptations of existing technologies and practices to suit local conditions while the rest were original innovations. The innovators were mainly driven by the desire to increase agricultural production, reduce production costs, and gain knowledge. Despite their limited financial resources – often investing USD20 or less – they managed to create meaningful solutions. While around 53% were aware of others who had adopted their innovation, more support is needed to help interested innovators to validate their innovations and convert innovations with commercial potential into marketable products. In addition, women were underrepresented in the contest, accounting for only 24% of innovations. More efforts need to be made to encourage women to innovate and showcase their innovations.

Herbicides

Edible weeds play a significant role in the diets of rural households in Zambia, especially during the lean season when food is scarce. However, the use of herbicides, while often associated with increased crop yields, may threaten the availability of these important food sources (Daum et al., 2021b). Currently, the adoption of herbicides among farmers in rural Zambia is low, so the full impact on the consumption of edible weeds is not yet clear. However, households that have been using herbicides for an extended period tend to consume fewer edible weeds. These weeds are vital for nutrition, as they provide essential calories and nutrients. For example, Amaranthus hybridus is rich in vitamin A, iron, zinc and protein, while Bidens pilosa is a good source of iron. In regions like the Southern Province, where droughts are common, edible weeds are even more important as a coping strategy. They not only contribute to food security but also enhance household resilience. Therefore, when promoting herbicide use, policymakers must carefully consider the potential trade-offs related to food and nutrition security.

Mechanization

Private sector-led initiatives are playing a key role in advancing mechanization in Zambia, particularly for medium-sized farmers (Adu-Baffour, Daum, and Birner, 2019; Heni et al., 2020). Farmers partnering with John Deere have doubled their incomes by cultivating more land, improved their children's education and

enhanced food security. Contrary to concerns that mechanization reduces rural employment, increased use of machinery has created more jobs opportunities. This is because expanding farmland and reallocating family labor requires more hands on deck. John Deere supports this growth by offering credit for tractor purchases and providing post-sale maintenance services. They have also partnered with two NGOs to make tractors more accessible to farmers. While this model shows great promise for scaling mechanization, it is important to be mindful of the environmental impacts of land expansion. Extension services should be provided to educate farmers on soil fertility management to ensure that mechanisation is sustainable and environmentally friendly.

Improving farmers' knowledge and skills in tractor maintenance can significantly reduce breakdowns and associated costs (Thoelen and Daum, 2019). In rural Zambia, limited access to information and repair services leaves farmers with insufficient capacity to maintain tractors. Farmers need basic knowledge of key systems such as the engine, fuel, lubrication, hydraulics and electricity, along with agronomic skills like adjusting ploughing depths for conservation agriculture and soil fertility improvement. Hands-on vocational training programs could provide a solution. By offering short-term practical courses can equip farmers with essential skills to maintain and operate their tractors effectively.

Gender differences in land preparation are more pronounced in households using tractors compared to those relying on manual labour. However, it is unclear whether women's involvement in land preparation signifies empowerment or disempowerment (Daum et al., 2021a). Mechanization can still empower women by freeing up their time for off-farm work while men take on childcare responsibilities (Daum and Birner, 2019). Tractor use enables households to cultivate more land and reduces labour-intensive tasks like weeding. Yet, men tend to perform the more physically demanding tasks that require greater energy. Policies promoting mechanization should consider these gender dynamics and the energy demands of different agricultural tasks to tackle undernutrition and malnutrition among smallholder farmers.

Youth aspirations

Rural youth in Zambia have diverse opinions and aspirations, carefully weighing the positives and negatives of farming, rural and urban life and even foreign countries (Daum, 2019). Rather than speaking with one voice, young people express multiple perspectives, with even single respondents articulating varied views. Many expressed interest in farming, taking pride in being self-sustaining and enjoying the simplicity of village life. This indicates that rural areas can be attractive given the right supportive policies. When imagining their future farms, most young people envisioned using draught animals, having electricity, diversifying their farms and applying more fertilizer. However, few mentioned modern technologies like tractors and none referenced digital. These findings highlight the need for policymakers and development practitioners to align programs with the actual aspirations of rural youth to avoid well-meaning but misguided policies.

Parents play a key role in shaping their children's career aspirations, particularly in rural areas, where traditional gender norms heavily influence these aspirations (Ogunjimi et al., 2023). Young men are often encouraged to pursue farming, while young women are discouraged, reflecting a patriarchal system. This bias is reinforced by the practice of allocating farmland to sons, fostering ambitions for larger commercial farms among young men. In traditional societies where parents hold significant influence, understanding these dynamics is essential. Young people's satisfaction with farming is closely linked to their parents' attitudes toward it. This underscores the importance of incorporating parents' perspectives into policies and programs aimed at supporting rural youth.

KEY TAKE AWAYS FROM PARI RESEARCH IN ZAMBIA

Scaling agricultural innovations: Innovation platforms promoting soybeans and fortified maize in Zambia have enhanced the adoption of improved seeds, training and market access, and have helped combat vitamin A deficiency among women and children under five.

Farmer innovations: Zambian farmers develop cost-effective innovations to improve productivity but need support for validation, commercialization and greater involvement of women.

Herbicide impacts: Herbicides boost yields but may reduce the availability of edible weeds which are vital for nutrition and resilience. Policies promoting herbicides use should balance crop productivity with nutrition security and household resilience.

Mechanization: Private sector-led initiatives, like John Deere partnerships, have empowered farmers to cultivate more land leading to higher incomes and improved food security. To address environmental concerns and ensure sustainability, training on maintenance and sustainable agricultural practices is needed.

Youth and farming: With supportive policies, Zambian youth see farming as a viable and attractive option. Programs must align with actual aspirations of rural youth to avoid misguided policies.

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All studies are are available at www.r4ai.org.

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