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GHANA

Agrifood System Change and PARI Research on Innovations

INTRODUCTION

Over the past decade, government expenditure on agriculture in Ghana has been relatively low, ranging from 3% to 8% of total annual national budget despite the commitment by the country to spend at least 10% of its annual national budgets on agriculture following the Malabo Declaration in 2014 (see Figure 1). The agriculture value added growth rate shows the same trend with an upward trajectory in the recent years. Ghana developed various innovative pathways to sustainable food systems transformation ranging from technological advancements, institutional frame-works to policy reforms in 2021 as part the United Nations Food Systems Summit to achieve the sustainable development goals including food security. It is important to revisit these and other current innovative initiatives to draw lessons, as provided in this brief based on studies done under PARI, to guide future strategies.

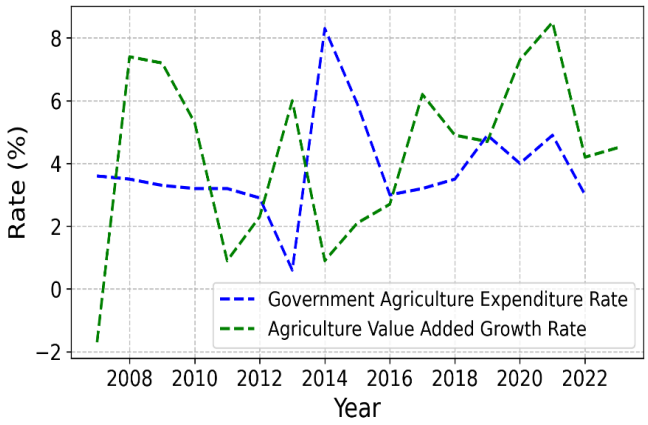

Figure 1: Trend of government agriculture expenditure and value added growth rate in Ghana[1]

Ghana's innovative pathways to sustainable food systems transformation[2]

Institutional and Policy frameworks: To address uncertainties in international development aid, Ghana planned to commit to government funding for food systems transformation with donor assistance as a supplement rather than a replacement. For effective implementation and monitoring of food systems transformation, Ghana planned to establish multi-sectoral technical working groups at national, regional, and district levels overseen by a steering committee at the presidency level. They also planned to facilitate access to productive assets such as land for women, youth and migrant farmers by implementing and enforcing bye-laws at the local level.

Technological innovations: On the agenda regarding technological advancements, Ghana planned tp promote farmer-led adoption, through farmer groups and women-led community-based organizations, of technologies including modern agroecological practices and solar-powered irrigation systems to enhance crop yields and strengthen resilience. To further enhance resilience, it was planned to strengthen seed and breed security for promising innovations (i.e Table 1).

PARI CONTRIBUTIONS

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

[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/ghana/2021-09-15-en-pathways-for-ghanas-food-systems-transformation15-09-21.pdf?sfvrsn=5a70d2c2_1, accessed on 11 March 2025

Innovations in value chains

Improved seed varieties have been the most widely adopted agricultural technology in Ghana, while other innovations have focused on soil fertility and pest management. Innovations in post-harvest processing have received less focus (CSIR et al., 2017). These advancements, developed through collaborations between international organizations (e.g., CIMMYT, IITA) and local research institutes (e.g., CRI, SARI), are designed to increase yields, enhance nutritional content (protein, calcium, iron) and improve resilience to shocks (i.e., Table 1). Despite these advancements, knowledge gaps in input management persist, with some farmers exceeding recommended herbicide levels. Improving access to high-quality seeds and extension services is critical for optimizing input use and boosting productivity.

Table 1. Some innovative seed varieties supporting Ghana's agricultural development

Crops	Varieties	Attributes
Soybeans	Ahoto; Nangbaar	Allow planting during dry seasons Offer shorter maturity period
Groundnuts	Kpanielli; Nkatiesari	Higher yields Faster maturation Resistance to leaf spot diseases
Cowpea	Apagbala; Marfo-Tuya	Higher yields Seed quality Good cooking traits

Key factors for scaling up agricultural innovations in Ghana include capacity building, selecting appropriate innovations, farmer participation, partnerships, policymaker engagement, marketing and funding support (Ampadu-Ameyaw et al., 2017; Egyir and Ampadu-Ameyaw, 2019; Tambo and Wünscher, 2018). A success story is the high-quality cassava flour (HQCF) initiative under the C:AVA (Cassava: Adding value to Africa) program, funded by the Bill & Melinda Gates Foundation. The program trained farmers and processors, connected stakeholders and leveraged financial and marketing support to drive adoption. Initially lacking government backing, the Ministry of Science, Technology and Innovation eventually supported the initiative. Other successes include Improved Nile Tilapia and Simple Water Control Strategies for Rice Cultivation. However, some innovations, such as the Maako-Ntoose pepper variety and Azolla manure for rice, failed due to limited access to inputs including seeds, poor extension services and insufficient funding or marketing. Against this backdrop, the recent reductions of development aid from the UK and US governments could exacerbate these challenges by further constraining the financial resources and technical support needed to adopt and scale agricultural innovations.

Farmer innovations

Farmer innovation contests in Ghana reveal that farmers are creating and applying their own solutions to address production challenges, leading to increased household wealth, greater resilience to climate shocks and reduced food insecurity. A study in Ghana's Upper East Region, one of its poorest areas, highlights how farmers independently adopt and adapt techniques— such as soil conservation, crop spacing adjustments and intercropping—to boost income and food security (Tambo and Wünscher, 2016). These innovations have reduced hunger periods and improved resilience to climate shocks, although household dietary diversity remains low (Tambo and Wünscher, 2017). The findings indicate that while resource-constrained households effectively adapt agricultural techniques, significant challenges persist. Participation in extension programs and collaboration with stakeholders encourage farmers to adopt and innovate further (Tambo and Wünscher, 2018). Policies should prioritize strengthening farmer knowledge through training and peer to peer learning, expanding access to modern technologies and improving nutrition guided by Ghana's pathways to sustainable food systems transformation.

Digitalization

Ghana has a thriving Digital Agricultural Services (DAS) sector, supported by policies, private sector involvement, innovation hubs and improved digital infrastructure. Scaling these services will require investments in skills, financing and advanced

technologies (Omari et al., 2020b). The country's private-sector-led telecommunications industry has grown rapidly, driven by policies promoting market liberalization and infrastructure development. Initiatives like the Ghana ICT for Accelerated Development Policy aim to modernize agriculture, enhance food security and boost agribusiness through digital tools. Ghana is at the forefront of DAS development in Africa, offering services such as extension support, market information, financial tools and traceability. However, many of these initiatives are still in their infancy stage and face challenges including weak policy implementation, limited digital skills, high internet costs in rural areas and inconsistent service quality. To address these barriers, efforts should focus on improving digital literacy, reducing internet costs, increasing funding for start-ups and investing in advanced technologies like drones and robotics.

Beyond DAS, digital technologies are widely used across the country's agricultural value chain. A survey of extension agents, input suppliers and output dealers found extensive use of digital tools to support their professional activities (Baumüller et al., 2023a; Omari et al., 2022). Mobile phones are the most commonly used tools, particularly smartphones which were used by 86% of respondents, notably extension agents and input suppliers. Extension agents employ the widest range of digital technologies, utilizing diverse mobile phone functions to interact with a broad network of value chain actors and share a variety of information. Input and output dealers primarily use digital tools to reduce transaction costs and improve networking and information exchange. However, intermediaries still prefer face-to-face interactions for certain tasks, such as training and price discussions. Digital marketing platforms could capitalize on the digital skills and networks of intermediaries to improve service delivery and enhance access to smallholder farmers in remote areas.

Employment

While public youth employment programs in Ghana have improved employment prospects, they remain small in scale, poorly coordinated and lack regular monitoring and evaluation (Ampadu-Ameyaw et al., 2020a, 2020b). Although the government has launched various initiatives to address youth unemployment, their effectiveness is limited due to short program durations, insufficient funding and duplication across ministries. Many programs are also too static, failing to adapt to technological advancements and the evolving needs of young people. The Rural Enterprise Support Programme (REP) stands out as the most effective initiative, especially in rural areas, due to its nationwide presence and administrative offices that improve outreach and service delivery. REP's success highlights the importance of accessible services, as well as factors like education, marital status, skills training and participation in youth employment programs in boosting employment prospects. To enhance youth employment, policies should focus on improving education, expanding training programs and ensuring better program coordination.

Employment growth in Ghana is increasing more rapidly in agro-processing than in farming, highlighting the sector's potential for job creation. Unlocking this potential requires investments in training and mechanization to improve product quality and safety (Omari et al., 2020a). The food sector alone accounts for over a quarter of employment in Ghana's manufacturing subsector. A major challenge is the limited availability of skilled labour, which increases training costs for companies. Processing firms also face issues like absenteeism, theft and poor hygiene, quality and safety standards. Integrating machinery into production could enhance productivity, but barriers such as a lack of trained maintenance personnel, equipment failures, insufficient funding and limited installation space need to be addressed. Increased investment is essential for both staff training and improving working conditions, including the provision of social benefits and insurance.

While local rice production in Ghana has increased employment, particularly for women, farmers need targeted support to compete with imported rice, including investments in transport infrastructure, improved rice varieties and advanced processing technologies (Ampadu-Ameyaw et al., 2018). The growth of rice production has created jobs across the supply chain, benefiting producers, processors and other stakeholders. Women, in particular, play a critical role in rice marketing and processing. However, local rice production remains uncompetitive, with consumer preferences favoring imported rice. To boost the sector's competitiveness, it is essential to invest in infrastructure that facilitates efficient transportation from rural to urban areas, improve farmers' access to high-quality rice varieties and upgrade production and processing techniques. Furthermore, investments in

packaging and storage facilities are crucial for supporting local farmers and processors, enabling them to deliver products that meet market standards and consumer expectations.

Women empowerment

Women carry a disproportionate burden of unpaid work in Ghana. A fairer division of household tasks and access to time-saving technologies are essential to reducing this burden and supporting women's economic participation (Asante et al., 2024). A study on time allocation in rural Ghana reveals that women consistently spend more time on both work and unpaid activities compared to men, while girls also work more than boys. Household characteristics, such as being a single-adult or low-income, significantly influence time allocation. For instance, girls in single-adult households spend more time on unpaid tasks and women in lower-income households are more likely to perform unpaid work than those in wealthier households, who have more opportunities for paid employment. Excessive unpaid labour reduces women's productivity, creating a trade-off between domestic responsibilities and economic participation. Access to tools, technologies and market opportunities can free up women's time for paid work. These findings underscore the need for policies that promote gender equality through the redistribution of household responsibilities, investments in labour-saving technologies and initiatives to enhance women's economic empowerment, ultimately improving household well-being.

Changes in the time mothers spend on domestic and care work can negatively impact children's diets, but these effects are mitigated by the presence of substitute caregivers and access to water infrastructure (Saleemi et al., 2024). A study of market women in Ghana revealed that children eat less frequently and have less diverse diets on days when their mothers spend more time at the market without other caregivers at home. Access to piped water, however, can reduce these negative effects by freeing up time otherwise spent fetching water. To support women's economic participation, it is essential to provide affordable, high-quality childcare to ensure children receive proper nutrition while parents are engaged in income-generating work. Investments in water infrastructure can further alleviate women's domestic burden and enable greater workforce participation. Additionally, addressing these challenges requires shifting gender norms to promote a more equitable distribution of domestic and care work. This can be achieved through education, advocacy and the promotion of positive role models.

KEY TAKE AWAYS FROM PARI RESEARCH IN GHANA

Agricultural innovations: Improved seed varieties and partnerships have boosted productivity in Ghana, but better input access and extension services are needed.

Farmer innovations: Locally adapted solutions enhance resilience and income but require stronger support systems, including knowledge-sharing, access to modern tools and collaboration with stakeholders.

Digital agriculture: Digital services support extension, marketing and finance but there is need for lower internet costs, investments in digital literacy and advanced technologies like drones to scale effectively.

Employment in agro-processing: Agro-processing outpaces farming in job growth. Investments in training, mechanization and infrastructure are crucial to enhance product quality and support local rice competitiveness.

Women empowerment: Heavy unpaid work limits women's economic participation. Time-saving technologies and gender equality initiatives can empower women and benefit households.

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

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