

How AI can revolutionise Africa's food systems

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Emerging technologies, particularly artificial intelligence (AI), have the potential to revolutionise Africa's food systems by boosting agricultural financing and tackling food insecurity, a new study suggests.

The report titled, *Moving the Technology Frontiers in African Agrifood Systems—the 2025 Annual Trends and Outlook Report (ATOR)* published by AKADEMIYA2063—says that Africa's food security and economic growth depend on rapidly harnessing technological innovations like AI. However, coordinated interventions are required for widespread application and integration. The report identifies hundreds of digital tools—from digital farming and remote sensing to AI—with immediate and long-term potential to transform agrifood systems.

"No single technology offers a silver bullet for transforming African agriculture," says Dr Racine Ly, Director of Data Intelligence and Governance at AKADEMIYA2063 and co-editor of *ATOR 2025*. "However, AI is a powerful emerging yet underutilised tool. It can be used in applications such as drought forecasting, pest detection, and extension and advisory services, boosting yields and reducing losses."

Africa has a growing population that needs to be fed. According to the UN Population Fund, Africa's population will reach 2.6 billion by 2050, a significant jump from the current 1.5 billion. To meet the food needs of this population boom, the Food and Agriculture Organization (FAO) states that African agriculture will need to increase current production by up to 70 percent.

African governments have recently begun introducing digital and geospatial tools into agriculture to boost productivity and investment. For example, countries like Kenya and Ghana have piloted market information and e-extension platforms, while Rwanda has developed digital



fertiliser subsidy systems.

"Artificial intelligence and the ongoing digital revolution will inevitably transform the world and its agrifood systems, making it all the more urgent that the transformations they drive benefit everyone and contribute to solving global challenges," said FAO Director-General Qu Dongyu at a recent meeting of the Business Federations of the G7 in Rome.

Dongyu emphasised that AI is not just a technological shift but is driving a fundamental economic and social transformation at the broadest level.

He noted that the FAO recognises AI's power to bring potential benefits to a wide range of populations and to contribute to improved efficiency and sustainability.

"Digital agriculture can revolutionise how we produce, distribute, and consume food," he said.

Potential benefits for farmers and stakeholders across agrifood systems, he said, include improved pricing data, minimised food loss and waste, enhanced food safety, and stimulated adoption of better seeds, fertilisers, and sustainable practices.

De-risking lending

Agriculture is often regarded as a high-risk sector for investment. As a result, farmers have limited access to the finance needed to improve productivity and access effective markets. Digital tools, including AI-enabled analytics and data platforms, can help de-risk lending to smallholders by improving efficiency and transparency within agricultural





← value chains, contributing to long-term sustainability and resilience.

Dr Ly explained that financial innovations, such as index-based insurance, mobile credit platforms, and weather-triggered safety nets, can de-risk small-scale agriculture across the continent. This makes smallholder farmers more bankable and increases the attractiveness of lending.

He cautioned, however, that new technologies should complement rather than replace local knowledge and traditional wisdom. One of the most exciting uses of digital technologies and data-driven analytics is their ability to scale up knowledge-sharing, allowing local expertise to inform decision-making over larger areas and longer time horizons.

For example, in northern Kenya, grazing committees work with community conservancies to blend indigenous pastoral knowledge with satellite-based monitoring and machine-learning-enabled decision-support tools. Through participatory rangeland management, communities jointly interpret vegetation, rainfall, and land condition indicators alongside their own observations to monitor rangeland health, anticipate stress, and regulate grazing pressure.

Financing and adapting AI

The financing of digital agricultural technologies is currently quite diverse, split between African commercial enterprises, non-profits, and international entities. Private-sector tech startups should be engaged through innovation incubators and results-based finance. At the same time, the AI-readiness index should be leveraged to attract donor funding and investment in markets where it can have the most impact.

Dr Ly notes that climate adaptation funds should primarily finance public goods that reduce systemic risk, such as climate information services, early warning systems, extension programmes, water management, and digital advisory platforms. The reason is that these investments lower the cost and risk of private engagement in agriculture.

“Resilience financing can then build on this foundation through blended finance, guarantees, and index-based insurance that protect farmers against droughts, floods, and price shocks,” Dr Ly observed.

He said when these mechanisms are embedded in national agricultural investment plans and linked to safety nets, they ensure rapid, rules-based support to farmers during climate shocks,

rather than ad hoc emergency responses.

Regarding carbon credits, Dr Ly believes these provide a results-based revenue stream that directly lowers the cost of protection and resilience for farmers.

Revenues from carbon markets can be used to subsidise insurance premiums, finance community resilience funds, and invest in shared measurement, reporting, and verification systems that also strengthen early-warning and risk-index triggers.

“When carbon finance is bundled with advisory services, climate-smart practices, and risk-transfer instruments, it shifts carbon markets from being a standalone mitigation tool to a practical resilience mechanism,” he said, noting that the expected result is an agrifood system in which farmers are not only encouraged to adopt climate-smart practices but also financially protected against climate shocks that threaten their livelihoods.

However, there is a catch. Tapping the potential of carbon finance requires addressing challenges related to price volatility, certification costs, and equitable benefit-sharing for smallholders.

AI readiness in Africa

A first-of-its-kind “Untapped Potential Index (UPI)” identifies African countries with the greatest opportunity to scale AI- and geospatial-enabled transformation in agrifood systems. South Africa and Botswana lead in AI and geospatial technology deployment within the agrifood sector, while Kenya, Egypt, Ghana, and Mali are approaching readiness.

The Artificial Intelligence-readiness index identified South Sudan, Niger, and Zambia as African countries most primed for AI-enabled agricultural transformation. These countries share similar characteristics: very high need for new technologies, large yield gaps, and high hunger rates. Besides this, they have decent AI readiness infrastructure, such as policies and good connectivity, but very low current adoption of AI and geospatial tools.

For example, Zambia, which has the highest UPI score, has a digital agriculture strategy and rapidly expanding mobile connectivity, with cooperative membership increasing the probability

of technology adoption by 11 to 24 percent. Yet there are very few large-scale or sustained precision farming projects in the country.

“It is often less about the individual technologies and more about the enabling environment that countries create through policy, investment, and capacity-building that determines feasibility,” Dr Ly said.

Kenya, Rwanda, Ethiopia, and South Africa, for example, have some of the strongest enabling environments for digital agriculture, with strategies that include AI and geospatial technologies, innovation hubs, and public-private partnerships. Kenya and Rwanda have funded national agricultural technology centres and incubators, for instance.

Rwanda's early drone-based precision agriculture pilots, including nutrient mapping and livestock services, have shown potential for significant yield improvements. Investments to help reduce costs and increase infrastructure would make greater uptake more feasible.

Public-private partnerships work

Public-private partnerships can, for instance, enable the adoption of water management technologies in a variety of ways.

For example, Morocco's Green Plan has used subsidies and credit access programmes for farmers to accelerate the adoption of drip irrigation and other water-efficient technologies. Elsewhere, Egypt's Sustainable Agricultural Development Strategy has institutionalised credit-linked irrigation subsidies, public-private partnerships for solar pumping, and collective water-user financing models.

“Blended finance platforms, green bonds, and sustainability-linked loans all offer growing opportunities for attracting new private investment into transforming Africa's agrifood systems,” Dr Ly said. “Public and private capital should be strategically directed toward high-impact areas underserved by commercial investment, such as digital advisory tools for marginalised farmers, especially in early value chain segments.”



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