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Addressing Africa's Unfolding Food-Security Crisis With 21st-Century, Tech-Enabled Governments

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Executive Summary

Multiple concurrent headwinds have rapidly eroded the food-security situation in Africa. The recent impacts of El Niño, an increasing dependence on imports, weakening domestic currencies, high agricultural-commodity prices, restrictive trade practices and volatile input costs have tangibly worsened prospects of food self-sufficiency across the continent. Political leaders find their governments under-resourced to address the severity or complexity of the evolving food-security challenge.

Yet new technologies offer step-change increments in monitoring and analysing crops and weather, tracking product movements, enhancing breeding programmes, predicting markets and prices, and more. Artificial intelligence has further broadened the scope and scale of these technologies; its relevance in transforming our food systems is becoming clearer by the day. While these new applications have been rapidly adopted by the private sector, they remain largely absent from public-sector toolkits, severely constraining the ability of governments to respond to pressures with the agility required in a highly dynamic food-security environment. The opportunity to transform government's capacity to positively impact food security through sound policies and to strategically position support interventions begins with a tech-enabled agricultural ministry, resourced with a comprehensive toolkit of contemporary technologies.

There are three primary functions of a tech-enabled government response to food crises: data collection and monitoring; data analysis and decision support; and information dissemination and stakeholder engagement. Technologies such as land mapping and tech-enabled extension services can perform these functions, enabling data-gathering, translating those data into actionable insights and supporting decision-makers – from farmers to policymakers – to make informed choices that maximise productivity in a sustainable, resilient and inclusive way.

Central to an effective technological response is a transition plan. Governments across the continent should seek to establish a National Agricultural-Transformation Master Plan, which sets out clearly defined goals, strategies and implementation timelines while remaining aligned with relevant

regional and continental initiatives. This plan should take a multi-faceted approach, aiming to mobilise resources, strengthen infrastructure, enhance capacity building, improve market access and develop context-specific technological solutions in close collaboration with smallholder farmers and local communities. Governments can maximise the effectiveness of transition plans by prioritising end users, effectively engaging with the private sector and implementing policy reforms to create an enabling environment for technology adoption. This will ultimately set up governments to translate technological advancements into tangible progress on food security and agricultural development.

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Introduction: Challenges in Africa

Nearly 282 million people in Africa are undernourished, more than a billion people are unable to afford a healthy diet and around 30 per cent of children are stunted because of malnutrition. Despite the well-intentioned efforts of governments, NGOs and donor organisations to increase agricultural productivity and reduce Africa's reliance on imports, food insecurity is worsening.

The devastating impact of conflicts, crippling debt burdens and eroding domestic-currency values all detract from Africa's long-stated objectives of food self-sufficiency, sustainability and resilience. The continuing need to import staple commodities creates a vicious circle, as global production shortfalls and ensuing export restrictions imposed by major producers result in higher prices, a worsening balance of trade and eroded public budgets. Longer-term aspirations for the sector, including building an export base as the key pillar to economic growth, industrialisation and employment on the continent, appear out of touch with a reality of declining investment in agriculture and a movement away from livelihoods in farming. The ongoing and worsening impact of climate change and wider geopolitical tensions are now placing even more stress on food systems.

Government is central to the future of the agricultural sector and ultimately food security. It defines policy, coordinates public-sector initiatives, supports or restricts trade, and influences markets and pricing. It also awards access to scarce resources, directs research, and determines sector strategy and plans for implementation. In contexts where the agricultural sector is highly fragmented and dominated by low-resource smallholders, and both commercial agriculture and private-sector farmer services are underdeveloped, the public sector is often the only viable stakeholder for driving forward agricultural transformation. Success in the agriculture sector is, therefore, inextricably linked to the government's capacity to actively support development, utilising informed policy instruments that ensure balance between an enabling investment environment, benefits accruing to a broad set of stakeholders, maintaining national sovereignty and functional food systems that ensure access to healthy food at affordable prices.

Whereas the current challenges to agriculture are clear, many governments remain ill-equipped to respond. Monitoring, diagnostics and forecasting capacity is generally rudimentary, meaning that governments are frequently forced to play catch-up, rather than making informed decisions for longer-term planning. Often-touted silver-bullet remedies, like the use of genetically modified crops or digital marketplaces, have been exposed as oversimplifying a complex situation. Many public-sector programmes have breached fiscal limits, while private investment is slow to engage a sector perceived as a high-risk, low-return play beset with policy ambiguity, fiscal uncertainty and the potential for reputational risk. An outdated set of technological, financial and policy-response options leave governments little choice but to apply the blunt instruments of market intervention, trade restrictions and increased control mechanisms – many of which present only short-term solutions and come with unintended, negative longer-term consequences. The rapidly changing dynamics of food security, in concert with increasing climate impacts, call for a step-change in government's approach to monitoring and managing national food systems.

In the face of these mounting challenges our global food systems are being transformed through new technologies. Substantial advances in the field of satellite monitoring and analysis complement parallel breakthroughs in enhanced plant-breeding techniques, novel ingredient formulations, cellular agriculture and precision fermentation, to name a few. AI presents a novel opportunity to scale these new technologies as well as for restructuring inefficient value chains and aligning consumer engagements. Contemporary technologies offer a pathway to intensification, sustainability, improved access, food security, adaptive responses and increased inclusion in the agribusiness sector.

Technology is clearly central to our mission of feeding a growing global population using food systems that also must be resilient and sustainable. But have the needs of governments – the central actor in agriculture – been overlooked in the quest for optimised production and distribution efficiencies? Many governments facing complex food-security headwinds remain reliant on outdated methods of monitoring production, collating information, storing data, forecasting yields and designing policy. Where game-changing technologies exist, gaining access to these essential management tools introduces issues of cost, ownership, data protection and sovereignty. Novel approaches to the development and application of innovative technologies by

government will be necessary to ensure that parallel step-changes are realised by both the private and public sectors and complementarity is achieved.

03

Core Technologies to Enable an Effective Government Response

There are three main categories of technologies that enable governments to more effectively overcome food-security issues:

1. Data collection and monitoring
2. Data analysis and decision support
3. Information dissemination and stakeholder engagement

Three functions of a tech-enabled government and the technologies that support it

DATA COLLECTION AND MONITORING

- Remote sensing
- Satellite technology
- Digital farmer IDs
- Land mapping

DATA ANALYSIS AND DECISION SUPPORT

- Data platforms
- Long-term weather forecasting
- Food-security dashboards
- Real-time market and trade

INFORMATION DISSEMINATION AND STAKEHOLDER ENGAGEMENT

- Tech-enabled extension services
- Digital ID
- Streamlined trade systems at border ports and posts

These functions closely align with and support the overarching demands of agricultural production and productivity, supply-chain and market intelligence,

and planning and risk management.

DATA COLLECTION AND MONITORING

Technologies like digital farmer IDs, land mapping, remote sensing, satellite imagery (the data from which are increasingly available at resolutions as high as 10 metres), AI-enabled analysis, real-time market data and biosecurity monitoring systems enable comprehensive data to be gathered related to farmer identities, land ownership, crop conditions, market dynamics and potential threats. Data gathered through open data infrastructure enable governments to make more informed and targeted decisions. For example, early-warning systems and risk-management tools are necessary for governments to identify best practices and take action to increase crop yields, sustain crop and livestock health, and enhance overall production and productivity.

Across Africa, an increasingly dense network of weather sensors is weaving a more intricate picture of the continent's climate. National meteorological agencies are expanding their networks, while private initiatives like the Trans-African Hydro-Meteorological Observatory's school-based weather stations are filling in crucial data gaps. This shift from manual to automatic stations provides real-time, continuous data streams. Additionally, long-term (30 years or more) data sets like CHIRPS, a satellite-based precipitation record calibrated with ground stations, offer invaluable historical context. This growing wealth of data strengthens the foundation for building sound climatic baselines.

DATA ANALYSIS AND DECISION SUPPORT

The gathered data are then analysed and translated into actionable insights through technologies such as AI-enabled analysis, long-term weather forecasting, food-security dashboards, real-time market and trade-data platforms, infrastructure-planning tools and early-warning systems. These advanced analytical capabilities support decision-making by providing forecasts, identifying vulnerabilities, optimising resource allocation and generating timely warnings. The technologies enable real-time monitoring of market dynamics, facilitate product traceability and streamline cross-border trade processes, ensuring efficient distribution and access to the markets.

Advancements in modelling and downscaling techniques are part of the data-

analysis tools presently transforming global climate models for local use. These localised models can now generate localised forecasts with acceptable accuracy for the short term (ten to 15 days) and even extend to seasonal forecasts (up to six weeks). Beyond immediate weather patterns, these models inform near-future projections (around 2040) with increased confidence. This allows for anticipatory early warnings in climate-adaptation strategies, enabling proactive investment prioritisation and the development of targeted adaptation mechanisms. As Africa grapples with a changing climate, this enhanced understanding of weather patterns empowers communities to build resilience and navigate the uncertainties of the future.

INSIGHTS FROM MALAWI

Transforming Agriculture Through Data

The Challenge

Agriculture in Malawi has long grappled with low yields, pest invasions and climate change.

Since the 1960s, the Malawian government has been operating subsidy schemes with the aim of helping smallholder farmers to access agricultural inputs like seeds and fertilisers.

But subsidies have come under increasing scrutiny due to concerns about inefficiencies and misallocation of resources.

The government wanted to optimise the impact of its subsidies to achieve the highest possible output in food production. TBI worked closely with decision-makers to make this a reality.

Solution and Impact

Collaborative dialogue with key stakeholders, facilitated by TBI, identified a key priority: **revamping beneficiary targeting for subsidies through a data-driven approach**, which would funnel resources more effectively and transparently, ensuring they reach the people who need them most and who can maximise the agricultural input's use. This approach included:

- A comprehensive assessment of existing data sources to compile and harmonise them into a usable farmer registry
- TBI working with the Ministry of Agriculture and the Department of E-Government to roll out a custom mobile app to verify data against real-world conditions
- The development of a machine-learning model to cluster and classify farmers by productivity and land availability, which led to the creation of a "dynamic beneficiary-selection algorithm", which streamlines the process of objectively identifying the most productive smallholder farmers to receive subsidies and improves resource allocation, ultimately contributing to greater crop yields

Implementing this strategic distribution of subsidies is projected to elevate productivity by 50 per cent for programme beneficiaries, enabling them to contribute up to 40 per cent of the food Malawi requires annually.

Lessons

1. The importance of data harmonisation and integration cannot be overstated. Integrating data from disparate sources into a centralised system provides a level of insight and accuracy previously thought to be unattainable.
2. Machine learning and AI can provide new ways to understand and interact with data, enabling targeted interventions and more efficient resource

allocation.

3. For technology and data-driven approaches to be successful, governments must invest in building the digital capabilities of their workforces.

Source: TBI

INFORMATION DISSEMINATION AND STAKEHOLDER ENGAGEMENT

Effective information dissemination and stakeholder engagement are facilitated through tech-enabled extension services, R&D-informed advisory services, track-and-trace technologies and streamlined trade systems at border posts and ports. The information is presented as guidelines on agricultural best practices, research findings, traceability information and efficient cross-border trade processes. It equips decision-makers, ranging from smallholder farmers and supply-chain actors to authorities, with comprehensive data visualisation, planning tools and risk-assessment capabilities. Overall, the technologies in this realm support strategic planning, effective resource allocation, and proactive identification and mitigation of potential risks and vulnerabilities related to food security.

Real-time market and trade data, combined with tech-enabled systems at borders and ports, revolutionise demand and supply management across Africa. They also strengthen cross-border trade in alignment with regional trade agreements like the African Continental Free Trade Area (AfCFTA), the East African Community (EAC) common market and other African economic communities.

The implementation of the Digital Trade Protocol in 2024 will establish a unified African digital single market under the AfCFTA, covering not just goods but also digital services and platforms. Additionally, the ongoing Trans-African

Highway network development will further facilitate a seamless flow of information and goods throughout the continent.[1] To bolster market systems, African countries are also investing in digital platforms as well as farm-to-market traceability solutions. This will enable farmers to access regional markets facilitated by the AfCFTA, in addition to local markets. While a gap exists in equipping smallholder farmers to fully utilise these technologies, countries are leveraging agricultural cooperatives as intermediaries. The cooperatives act as central access points, connecting farmers to digital markets and financing, thereby boosting smallholder inclusion in the digital agricultural revolution.

The private sector is also playing a crucial role in democratising extension services and innovations for farmers. Platforms such as Kuza One and Mastercard's Farm Pass bridge the gap by delivering vital information and resources directly to farmers through mobile phones. These services bypass traditional limitations, reaching even remote areas. Collaboratively, private companies and governments employ innovative models such as farmer promoters and "training of trainers", equipped with solar-powered, portable advisory tools. These approaches empower local champions to disseminate knowledge within their communities, fostering trust and accessibility. Furthermore, AI chatbots are revolutionising access to agricultural advice by offering 24/7 support. This not only overcomes staffing limitations in call centres but also allows for targeted advice based on individual farmer needs and real-time data. By working alongside governments and NGOs, the private sector aims to create a more inclusive and dynamic agricultural-knowledge ecosystem, empowering farmers to make informed decisions and improve their productivity.

Advances in biology and genomics are revolutionising African agriculture on multiple fronts, bolstering food security, processing efficiency and pest management. Rapid testing techniques allow for swift identification of crop diseases, enabling targeted interventions. Biosecurity responses are becoming more effective, safeguarding agricultural ecosystems. Even food processing is benefiting from these advancements, with applications in areas like optimised fermentation and food-spoilage detection. At the core of this revolution lies the development of pest-resistant and climate-resilient seeds, along with biocontrol methods like the use of gene-edited mosquitoes to combat malaria-carrying ones or the engineering of plants to eradicate invasive species. Scientists in Africa are using gene-editing technologies such

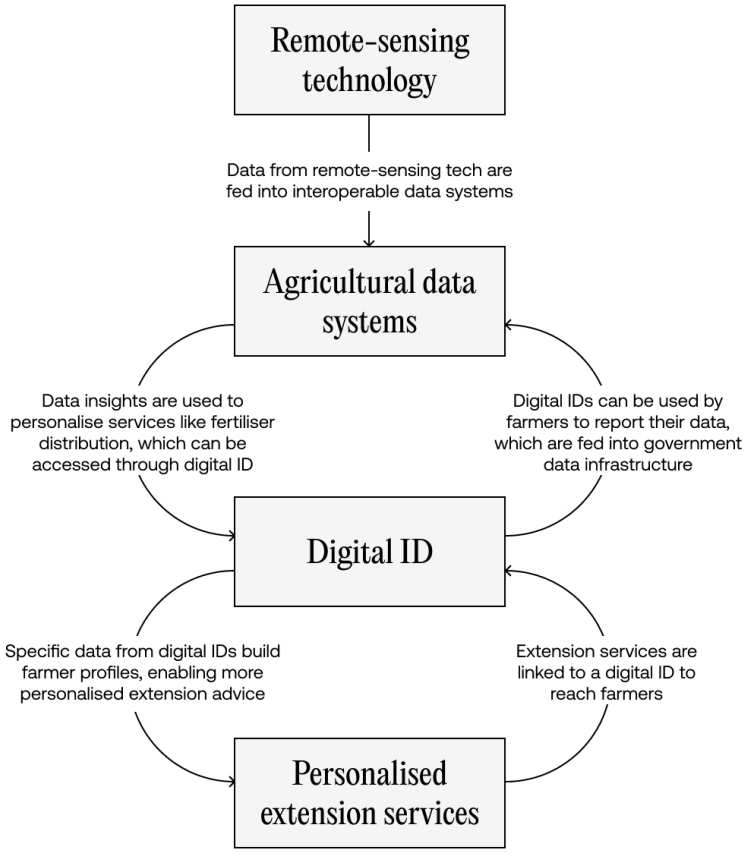
as CRISPR to create more climate-resilient crops, with field trials beginning this year. The African Union's (AU's) Agenda 2063 aims to use gene editing to improve crop resistance, and Nigeria and Kenya have implemented regulations for a case-by-case review of gene-edited crops. But for these innovations to be effective and reach the farmers that need them, they must be accompanied by a tech-enabled government. Developing climate-resilient seeds relies on access to the right data, weather forecasting can help determine what types of seed should be planted and when to protect specific crops, and tech-driven extension services can also encourage the adoption of these seeds.

Notably, technologies like satellite imagery and AI-enabled analysis serve as cross-cutting enablers, contributing to multiple functions and supporting various aspects of food security, from agricultural production to supply-chain management and risk assessment.

A tech-enabled response is not merely an option but an imperative to address rapidly evolving food-security challenges in Africa. By leveraging cutting-edge technologies for data collection, analysis and dissemination, governments and stakeholders can build a robust and responsive system to enhance food security, increase agricultural productivity, streamline supply chains, and proactively manage risks and vulnerabilities. However, the effective implementation of these transformative solutions necessitates collaborative efforts among policymakers, researchers, technology providers and farmers themselves. Overcoming obstacles such as infrastructure gaps, digital-literacy barriers and unequal access to resources – particularly for smallholder farmers, who are central to Africa achieving its food-security goals and embedding sustainable agricultural practices – is paramount. With the right strategies, investments and collaboration, and a concerted effort to ensure inclusivity, technology can prove to be a powerful enabler, unlocking the full potential of Africa's agricultural sector and safeguarding the continent's food security for generations to come.

FIGURE 1

Used together, these foundational technologies offer maximum value for farmers and governments



MODELS FOR TECH INNOVATION AND ADOPTION

Though the need for governments to manage national food security using a toolkit of contemporary technologies is evident, there are barriers to adoption

and transitional pathways must be designed to address the political context.

The most immediate barrier relates to the level of capacity and technical training within government organisations. A fundamental prerequisite for technological transition is the willingness and the ability of the relevant people (analysts, implementers, decision-makers) to deploy the new technologies and gradually phase out outdated ones. As with any example of technological progress, developing the right skills and building up the required level of comfort takes time. However, the new generation of African leaders, who can be rightfully considered digital natives, are likely to make this transition easier. In addition, ensuring that technological solutions are focused on addressing specific and commonly acknowledged problems will be key for securing stakeholder buy-in.

The adoption of new private-sector technologies by governments raises a critical issue around sovereignty. This is perhaps most simply illustrated in the field of genetics. Open-pollinated heirloom-grain varieties remain widely planted across Africa, favoured over higher-yielding hybrids, which, though generally better performing, cannot be replanted and must be purchased every planting season from big corporations. Hesitation around increased exposure to private-sector actors as suppliers of genetically improved seeds represents a serious barrier to the adoption of better-performing crops. In a similar manner, by adopting new digital technologies, governments expose themselves to private-sector developers with whom data must be shared and results interpreted – raising concerns around data sovereignty.

The affordability of new technologies is an additional hurdle for governments already under fiscal stress to support a variety of costly interventions such as input-subsidy programmes. Building a reliance on paid-for “subscription” technology services increases financial vulnerability, with the potential for a sudden loss of critical access. The continued use of simple, in-house data-collection methods is often considered a less risky alternative.

In recognition of these concerns, there is clearly a need for innovative models to overcome barriers in a way that benefits all parties. Many governments have opted for internal innovation to generate solutions to their technology needs. Quasi-government agencies tasked with agtech innovations straddle the divide between the public and private sectors. These agencies offer an opportunity for strategically positioned bilateral government-to-government collaborations, where shared political context can mitigate concerns and

create a common platform for trust and engagement.

The co-creation of tech solutions under a public-private-partnership structure represents a novel approach that ensures the needs of government are at the forefront of tech utility.

04

The Critical Role of the Private Sector: A Call to Action

Government's leading role in food security must be matched by an engaged private sector if Africa is to successfully respond to the scale and rate of change in current food-security dynamics. To fulfil its role, the private sector must understand the challenges faced by governments and develop products that are right-sized, functional and affordable.

At the top of the list of government challenges is data management, in particular the need to build data infrastructure to connect different data sets through API infrastructure, and to analyse and interpret these data into useable information to inform short-term interventions, as well as longer-term policy reforms. Quality data rely on accurate monitoring, and new technologies offer effective ways of remotely collecting data on crops and yield and forecasting unfolding scenarios – crucial capabilities for government departments. With quality analysis and information, governments are able to craft policies that support food security and foster stable social and economic environments, so benefits are far-reaching.

Our food systems are in transition. We concurrently see a return to ecological farming methods and a move towards industrial production through cutting-edge developments in precision fermentation and biosynthesis. Governments need to navigate this increasingly complex environment and ensure their regulatory frameworks can respond to issues related to sovereignty, food safety, the environment and sustainability. Discourse with the private sector to mould the approach offers an efficient and effective method to ensuring fit-for-purpose policies are adopted.

At the farmer level, technological innovations rationally target the large-scale commercial segment as their primary, most viable market opportunity. From a food-security perspective, however, smallholder farmers are critical, and equally require access to new methods and technologies that build their toolkits of responses to climate change, sustainably intensify operations and ensure quality products. Private sector-led innovations offer the potential to transform the smallholder segment and, in so doing, balance the competitive

model to the extent that profitable cultivation is possible at all scales of operation.

The key to the abovementioned collaborations is partnerships that aim to co-develop solutions to the many nuanced challenges modern agriculture faces. Building bridges of cooperation between public and private sectors is an essential prerequisite to designing fit-for-purpose products that cater for the diverse needs of all stakeholders. The Tony Blair Institute for Global Change is currently working with governments and technology partners to promote an understanding of needs and to innovate new products that resonate with the requirements of a broad set of stakeholders. For example, in Kenya TBI is supporting the delivery of a unified agriculture-data platform to ensure the availability of quality data for decision-making, and collaborating with Oracle to explore potential pilots for early-warning systems, which form an essential part of the government's climate-adaptation strategy.

05

A Strategic Transition Plan and Action Steps

Implementation of technology solutions in agriculture to enhance food security in Africa has been relatively slow and generalised as part of wider implementation and delivery plans. This is despite the recognition of its importance in various policies and initiatives such as the United Nations' Sustainable Development Goals, the AU's Agenda 2063 – including the Comprehensive Africa Agriculture Development Programme (CAADP) commitments reaffirmed under the 2014 Malabo Declaration – the Scaling Up Nutrition Movement and the African Regional Nutrition Strategy 2015–2025. To address the challenges hindering progress, there is a need for concerted efforts to mobilise resources, strengthen infrastructure, enhance capacity building, improve market access and develop context-specific technological solutions in close collaboration with smallholder farmers and local communities. Additionally, stronger policy-implementation frameworks, coordination mechanisms and monitoring systems are crucial for translating the recognition of technology's role into tangible impacts on food security and agricultural development in Africa.

A comprehensive transition plan for leveraging technology to guarantee food security must encompass a multi-faceted approach. It must comprehensively allocate resources for acquiring necessary hardware, software and digital subscriptions, and provide training initiatives to equip stakeholders with advanced tools and equipment. Concurrently, it must establish robust data infrastructure, secure data-sharing protocols and well-defined governance frameworks to facilitate seamless data exchange while ensuring privacy and security. Crucially, the plan should develop policies to safeguard national data sovereignty, promote regional collaborations to align data governance and invest in building local capacity for data storage, processing and analysis. This fosters self-reliance and reduces dependence on external technologies. Moreover, the plan should encourage the development of indigenous technologies tailored to local contexts, further bolstering self-sufficiency. Finally, there is a need for a considered approach to training and capacity building to ensure effective adoption of new technologies. By integrating these critical components, the transition plan can lay a solid foundation for data-

driven decision-making, enabling the adoption of advanced technologies and ultimately contributing to enhanced food security across the region. A comprehensive and well-resourced implementation plan should also foster public-private partnerships.

By establishing country-level plans that align with those at the regional and continental levels, African nations can pave the way for a future where technology serves as a powerful enabler in achieving food security, increasing agricultural productivity and building resilience against evolving challenges. At its core, a national plan should encompass the following key elements:

1. STRATEGIC MASTER PLANNING

The transition towards a tech-enabled government should be guided by a National Agricultural-Transformation Master Plan. This transition plan should articulate clearly defined goals, strategies and implementation timelines while remaining aligned with relevant regional and continental initiatives, such as AfCFTA and digital-trade protocols. The master plan should also make clear which problems and challenges require technology-led solutions, as well as the specific role technology is expected to play in achieving the stated objectives. Facilitating cross-border data sharing, harmonising standards and joint infrastructure development will be crucial for realising the full benefits of a tech-enabled approach across the African continent.

The plan should include a multi-year budget-development strategy that is essential to ensure sustained funding for the transition process. This entails conducting a thorough needs assessment across relevant government ministries and agencies to determine the requirements for hardware, software, subscriptions to data services and capacity-building initiatives. Both the initial acquisition costs and ongoing expenses for maintenance, upgrades and skills development must be accounted for. Leveraging a diversified range of funding sources, including government allocations, public-private partnerships and support from donor agencies and development partners, can help mitigate the financial burden on any single entity.

2. POLICY REFORM

A comprehensive review of existing agricultural policies is warranted to identify areas that require reform or modernisation. This assessment should lead to the development of a policy roadmap that aligns with the overarching

goals of achieving food security and leveraging the potential of technology solutions. Mechanisms for continuous policy monitoring, evaluation and adaptation must be established to ensure that the regulatory environment remains conducive to innovation and responsive to evolving needs.

3. WORKFORCE DEVELOPMENT

Successful implementation of the transition plan hinges on the government's ability to acquire and retain the necessary human resources with the requisite skill sets. As new technologies are introduced in the agricultural sector, there will be a pressing need for specialised expertise in areas such as data analysis, precision farming, digital agriculture and technology integration. However, attracting and retaining qualified professionals poses a significant challenge due to the traditionally low civil-servant salaries. To address this, the government must explore innovative strategies. These may include competitive compensation packages that align with industry standards, performance-based incentives, and opportunities for professional development and career advancement. Additionally, partnerships with academic institutions and research organisations can be leveraged to facilitate knowledge transfer, upskilling programmes and collaborative research initiatives. By prioritising human-resource development and offering attractive career prospects, the government can cultivate a talented and motivated workforce capable of driving the technological transformation envisioned in the transition plan.

4. DATA GOVERNANCE AND MANAGEMENT

Advancements in data collection, analysis and dissemination are central to a tech-enabled approach. However, this progress must be underpinned by robust data-governance frameworks that safeguard data privacy, security and national sovereignty. Establishing clear protocols and legal agreements for data sharing between government entities, private-sector partners and international organisations is crucial. Parallel investments in secure data storage and processing infrastructure are equally vital to maintain trust and ensure the integrity of the system. Governments should:

- Undertake a comprehensive assessment of existing data sources
- Address early concerns regarding privacy by putting in place a data-governance framework
- Make data publicly available so the private sector can use it to develop new

agricultural solutions and services
- Bring data experts into government to help build and maintain agricultural-data systems

5. ALIGNING ACCESS TO BEHAVIOURAL CHANGE

Merely providing access to information and decision-support tools is insufficient; a concerted effort must be made to align these resources with the decision-making processes and behavioural patterns of end users. This necessitates conducting user research to understand the specific information needs, pain points and decision-making contexts of key stakeholders, including policymakers, agricultural extension workers and farmers. User-centric design principles should guide the development of information products and decision-support tools that seamlessly integrate into existing workflows. Furthermore, robust change-management strategies are required to drive adoption and sustain the use of new technologies and processes across all levels.

Throughout the transition process, continuous stakeholder engagement, change management and adaptive planning will be crucial. Regular communication and collaboration with farmers, agricultural communities and other stakeholders can help identify barriers, address concerns, and foster a sense of ownership and trust in the transition process. While the transition plan provides a strategic blueprint, the practical implementation requires a concerted effort involving multiple stakeholders and a phased approach. Next, this paper outlines key considerations for initiating the transition process.

Private-Sector Engagement

Recognising the limitations of government capabilities, proactive engagement with the private sector is essential. The first step involves identifying key players in agriculture technology, data services and related domains. These should be partners who: support technology-based programmes that de-risk and boost critical investment in Africa’s food security; direct financial and technical resources to leverage technological tools that modernise food production, storage, marketing and capacity building across Africa; and invest in technology that anticipates and responds to shocks, particularly those caused by recurring natural disasters.

In addition to the mapping exercise, establishing public-private dialogue

platforms will also facilitate the exploration of collaboration opportunities, ranging from service-delivery partnerships to data-sharing agreements. Further to this, developing robust frameworks for procurement, contracting and regulation can provide the necessary clarity and confidence for private-sector investments in this domain.

Governments should both harness remote-sensing technologies to collect high-quality data sets related to agriculture and land use, and introduce digital farmer IDs and connect them to advanced agricultural extension services. To achieve this, they should:

- Form effective public-private partnerships to gain better access to both domestic and global data sets, for example satellite data on weather, location and soil
- Set enabling regulations for the use of drone and satellite technologies
- Ensure data collected by governments are open access

Create the Right Conditions for a Tech-Enabled Approach to Government

Certain policy reforms should be prioritised to create an enabling environment for the adoption of modern technologies and data-driven approaches. This may include revising regulations related to drone usage, data protection and intellectual-property rights, improving internet and compute access, and enhancing digital skills in government. Additionally, streamlining processes for land registration, farmer identification and access to agricultural services can pave the way for more targeted and efficient service delivery. Incentivising private-sector investment in agriculture technology and innovation through supportive policies and incentive structures can further catalyse the transition.

Regional Collaboration

Regional and continental alignment and coordinating efforts with existing regional initiatives, such as the EAC common market and other African economic communities, can facilitate knowledge sharing, harmonise standards and enable cross-border collaborations that magnify the impact of individual national efforts.

Explore Funding Sources

Governments should actively explore funding sources by identifying key private-sector players in agriculture technology, data and services. Complementing this with efforts to establish public-private dialogue platforms will create opportunities for collaboration that allow stakeholders to develop frameworks that provide a structured approach to leveraging private-sector expertise, resources and innovative solutions while ensuring transparency, data governance and mutually beneficial arrangements. By facilitating these collaborations, the transition plan aims to unlock access to tailored financial services, technological advancements and valuable data insights, empowering small and medium-sized enterprises in the agricultural sector to enhance their operations, productivity and overall competitiveness.

Policy Framework Review

Close collaboration with private-sector tech companies and service providers will require a careful consideration of the gaps, weaknesses and possible contradictions in the existing policy frameworks that govern public-private partnerships and technology companies in particular. This may include revising and fine-tuning policies regarding public investment, risk management, technology imports, quality and safety standards, extension services, intellectual-property rights and so on.

Master-Plan Approach

Establishing a cross-functional task force or commission, comprising representatives from various sectors to spearhead the development of a comprehensive National Agricultural-Transformation Master Plan, will be a transition priority. The task force should engage diverse stakeholders, including government agencies, private-sector organisations, civil-society groups and farmers' associations, through an inclusive and participatory planning process. The master plan should clearly define overarching priorities, specific targets, implementation roadmaps with timelines, and robust monitoring and evaluation frameworks. This holistic approach ensures that the master plan addresses the multifaceted challenges in the agricultural sector, aligns with national development goals and incorporates the perspectives and insights of all relevant stakeholders, thereby fostering a shared vision and commitment to achieving long-term agricultural transformation.

06

Conclusion

To date, governments have remained mostly ill-equipped to respond to Africa's worsening food-security crisis. This has led governments to apply blunt policy instruments such as trade restrictions. But technology – particularly the ongoing revolution in AI – is providing political leaders with more tools than ever to effectively respond to the situation. It is essential that agricultural ministries expand their technology toolkits and create transition plans that will allow them to harness new developments most effectively. Ensuring the success of this approach will not be without its challenges: governments will need to overcome barriers such as the technical capacity of their workers, and concerns around data sovereignty and the cost of new technologies. It will also require willingness from governments to engage with the private sector and co-develop new solutions. But if governments get this right, the potential benefits are enormous: more self-sufficient, resilient and sustainable food systems that support, rather than undermine, economic growth. As the private sector races ahead to develop the tools and technologies that will power future food systems, it is time for governments to catch up.

Endnotes

1 https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/00473227-EN-TAH-FINAL-VOL2.PDF

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