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Africa Agriculture Status Report | 2022

Accelerating African Food Systems Transformation

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Foreword

Globally, 2022 has emerged as a critical year for recovery and transformation of Africa's Food Systems. Food systems are in disarray and have been profoundly disrupted by the ongoing effects of the COVID-19 pandemic, extreme weather events, emerging pests and diseases, food price inflation, and the fallout from regional conflicts as well as the war in Ukraine. These events have been felt acutely across Africa where food insecurity and malnutrition have been persistent problems for decades.

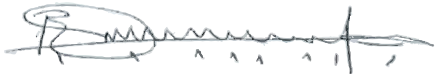
Population growth and economic transformation are increasing pressure on the agricultural ecosystem and climate change continues to exacerbate these challenges. To achieve a true transformation of food systems in Africa, there is a growing recognition that we need to think about food systems differently taking into account the true values and full costs involved in growing, distributing, and consuming food. This is vital not only for the food security of hundreds of millions of Africans but also for African economies and sustainable development on the continent.

A wave of transformation is underway in many parts of Africa consisting of a move from subsistence-oriented agriculture to one that is more commercialized, profitably productive, and increasingly led by smallholder entrepreneurs. This comes at a time when food systems across the continent are responding to rapid urbanization, rising incomes, and changing diets. While this transition comes with its fair share of challenges, these dynamics are creating many new opportunities for growth and investment in Africa's food systems.

This year's Africa Agriculture Status Report (AASR) comes at an important time, as national governments, Pan-African organizations, international institutions, and the private sector are struggling to recover, rebuild, and accelerate the transformation of food systems in Africa. The themes covered in this report—understanding megatrends, catalyzing leadership and coordination, mobilizing financial resources, and developing capacity and capabilities—are all vital to building sustainable, inclusive, and resilient food systems.

I acknowledge and congratulate the Alliance for a Green Revolution in Africa (AGRA) and its stakeholders and partners for their contributions to addressing the challenge of food system transformation in Africa. The Africa Green Revolution Forum (AGRF) is a perfect platform to launch this Report particularly given its growing recognition as the premier annual rendezvous for key stakeholders with a shared vision for a food- and nutrition-secure Africa. It will take all of us—government, development partners, private sector, civic organizations, and research institutions—to achieve this vision.

As the African adage says, "if you want to go fast, go alone; if you want to go far, go together". Africa's transformation process and agenda should leave no person and no country behind.



Emmerson Dambudzo Mnangagwa
President of The Republic of Zimbabwe

Preface

In 2022, global food systems have been characterized by overlapping crises that have significant implications for current and future generations in terms of human development, mitigation of climate change, conservation of biodiversity, and economic progress. In Africa, the challenges of the past few years—including the ongoing impacts of the Russian-Ukraine conflict, the COVID-19 pandemic, supply chain disruptions, conflict, and global environmental change are reversing decades of progress and exacerbating food insecurity and malnutrition.

The need to stay within 1.5 degrees has never been more critical and along with it the need to transform our food system. For Africa, accelerating the transformation of our food systems is more vital than ever. The stakes are extremely high. We have eight harvests to go until 2030—the deadline year for meeting the Sustainable Development Goals (SDGs) and preventing irreversible damage from climate change. If Africa does not transform its food systems towards greater sustainability and resilience and improved ability to achieve zero hunger and provide good nutrition for all, the continent is unlikely to achieve many of the goals on the 2030 Agenda, which is aimed at ensuring better livelihoods, inclusion, and prosperity of people. Moreover, food crises are likely to lead to political instability and conflict resulting in a vicious cycle. The Russia-Ukraine crisis has worsened already-strained global supply chains and economies.

Africa has a few other incentives for transforming its food system; with one of the most degraded agricultural soils in the world and increasing droughts, Africa will face significant exposure to water-related climate risks in the future. As 90 percent of sub-Saharan Africa's (SSA's) rural population depends on agriculture as its primary source of income and more than 95 percent of agriculture is reliant on rainfall, the consequences of unpredictable rainfall, rising temperatures, extreme drought, and low soil carbon will further lower crop yields exposing Africa's poorest communities to increasingly intense climate- and water-related hazards with disastrous results.

The current food crisis has exposed major fault lines in Africa's food system, especially the role of global supply chains for major food commodities and fertilizers. Now, more than ever, it is critical that African leaders raise the profile of food system reform on the continental and global development agenda.

The Africa Agriculture Status Report (AASR) 2021 highlighted the importance of building sustainable and resilient food systems in Africa. The targets for building functional, resilient, and sustainable food systems are dynamic and continue to evolve in the face of global and regional challenges. This year's AASR provides evidence and insights on the prospects of accelerating the transformation of Africa's food systems toward resilience and sustainability anchored in the 2021 United Nations Food Systems Summit (UNFSS), particularly the work of the Scientific Group.

AASR22 highlights several megatrends which governments, donors, non-governmental organizations (NGOs), and the private sector must proactively anticipate and respond to. These demographic, economic, environmental, and social megatrends are shaping Africa's food systems. With an emphasis on a wholistic approach to transforming food systems, the 2022 Report puts the spotlight on the critical roles of leadership and coordination, mobilizing investments, and capacity and capabilities. The Report puts forward recommendations for immediate actions and steps that African governments, Pan-African organizations, development partners, the private sector, and civil society must take to accelerate the transformation of food systems to preserve and increase the welfare of current and future generations as well as the health of our planet. We need to chart a path to greater resilience, which presents the biggest opportunity for transforming its food systems with a clear continental vision set out in the Africa Common Position.

This publication is a product of immense scholarly effort and valuable contributions to the core chapters that I hope will stimulate discussion and a productive synthesis of ideas that will propel us forward. We have involved a very diverse set of researchers and disciplines including agricultural economics, leadership, finance, and education, among others. We have deliberately drawn on the findings and conclusion of the 2021 UNFSS and continue to derive lessons from the ongoing global food crisis as we go.

I am most grateful to the contributing authors for their efforts and support to the much-needed knowledge, analytics, and evidence on the transformation of food systems in Africa. I also appreciate the editors, contributors, and external reviewers for their professionalism, guidance, and insights towards promising pathways for accelerating the transformation of food systems in Africa, and for their roles in increasing the competitiveness, safety, and efficiency of the value chains and distribution systems that feed Africa's growing population.

Dr. Agnes Kalibata
President
Alliance for a Green Revolution in Africa

Acknowledgements

This year's Africa Agriculture Status Report (AASR) focuses on accelerating African food systems. This theme plays a critical role in not only shaping human diets and health outcomes but in also ensuring the sustainability of the environment in which food is produced, processed, distributed, sold, and consumed. Food systems support the livelihoods of people who depend on these activities and they are an important driver of economic development and stability. As a result, the 2022 AASR has involved an unusually broad range of disciplinary specialties and institutional contributors.

The Africa Agriculture Status Report 2022 (AASR22), *Accelerating African Food Systems Transformation,* benefitted from the support and guidance of a wide coalition of contributors who helped to conceptualize, assemble empirical evidence, and summarize the current critical issues and key messages in this report. We wish to recognize Agnes Kalibata, Andrew Cox, Boaz Keizire, Vine Mutyasira, Tinashe Kapuya, Gaitano Simiyu, Josephine Njau, and Betty Vata for their invaluable contributions to the development and production of this Report. I am particularly grateful to Jane Njuguna who led the development of the AASR22.

On behalf of AGRA, I am indebted to the technical editors of the AASR 2022: Dr. Robert Richardson (Michigan State University), Dr. Edward Mabaya (Cornell University), and Dr. Thomas Jayne (University Foundation Professor Emeritus, Michigan State University) provided editorial support and guidance on the development of its content. We are grateful for the leadership of AGRA President, Dr. Agnes Kalibata, who has been a champion of engaging the private sector in accelerating the transformation of African food systems.

We are grateful to all the individuals and institutions who provided different types of support towards the preparation and production of this Report. In particular, we extend our thanks to the following chapter authors and contributors:

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AASR22 is an important accomplishment and a timely and relevant publication. We recognize and express our gratitude to everyone who made it possible and contributed to its production and apologize to any individuals or organizations we may have inadvertently omitted in this acknowledgement.

We hope the Report serves as a useful contribution to international efforts to accelerate the transformation of African food systems.

Andrew Cox
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Acronyms and Abbreviations

4IR	4th Industrial Revolution
AAP	Alliance for African Partnerships
AASR21	Africa Agriculture Status Report 2021
AASR22	Africa Agriculture Status Report 2022
ACBF	African Capacity Building Foundation
AERC	African Economic Research Consortium
AfCFTA	African Continental Free Trade Agreement
AfDB	African Development Bank
AFFM	Africa Fertilizer Financing Mechanism
AFS	Agrifood system
AGRA	Alliance for a Green Revolution in Africa
AGRF	Africa Green Revolution Forum
AL	African Leadership (in reference to the African Leadership Group/African Leadership Academy)
ALAN	AL for Agribusiness Network
ALP	Action Learning Project
AMI	African Management Institute
AR4D	Agricultural research for development
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
ASTI	Agricultural Science and Technology Indicators
AU	African Union
AUC	African Union Commission
AUDA-NEPAD	African Union Development Agency-New Partnership for Africa's Development
CAADP	Comprehensive Africa Agriculture Development Programme
CALA	Centre for African Leaders in Agriculture
CAP	Common African Position
CBOs	Community-based organizations
CGIAR	Consultative Group on International Agriculture Research
CIF	Climate Investment Fund
CIMMYT	International Maize and Wheat Improvement Center
COMESA	Common Market for Eastern and Southern Africa
COP26 26th	Conference of the Parties (United Nations Climate Change Conference)
COVID-19	Coronavirus Disease 2019
CR	Crop receipt
CSA	Climate-smart agriculture
DALY	Disability-adjusted life year
DFI	Development finance institution
DRC	Democratic Republic of the Congo
EAC	East African Community
ECA	Eastern and Central Africa
ECOWAS	Economic Community of West African States

EDE	The Ending Drought Emergencies Initiative
EPM	Economic policy management
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
FARA	Forum for Agricultural Research in Africa
FDI	Foreign direct investment
FSIN	Food Security Information Network
FS-TIP	Food Systems Transformative Integrated Policy
FTE	Full-time equivalent
FWG	Fortified whole grain
GAP	Good Agricultural Practices
GAAP	Generally Accepted Accounting Principles
GCF	Green Climate Fund
GCRG	Global Crisis Response Group on Food, Energy and Finance
GDP	Gross domestic product
GEF	Global Environment Facility
GIRSAL	Ghana Incentive-based Risk Sharing System for Agricultural Lending
IAA	Institutional Architecture Assessment for Food Security Policy Change
IAPRI	Indaba Agricultural Policy Research Institute
ICA	Institutional capacity assessment
ICT	Information and communication technology
IFAD	International Fund for Agriculture Development
IFI	International finance institution
IGAD	Intergovernmental Authority on Development
IDDRSI	IGAD Drought Disaster Resilience and Sustainability Initiative
IITA	International Institute of Tropical Agriculture
ILO	International Labour Organization
ILRI	International Livestock Research Institute
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
KEPSA	Kenya Private Sector Alliance
KPI	Key performance indicators
M&E	Monitoring and evaluation
MDB	Multilateral development bank
MFI	Micro-finance institution
NAIPs	National Agriculture Investment Plans
NAIS	National agricultural innovation systems
NAROs	National agricultural research organizations
NARS	National agricultural research systems
NDC	Nationally determined contribution
NDMA	National Drought and Management Authority
NEPAD	New Partnership for Africa's Development
NGI	New Growth International

NGO	Non-governmental organization
NIRSAL	Nigeria Incentive-based Risk Sharing System for Agricultural Lending
OCA	Organizational Capacity Assessment
PDB	Public development bank
PPP	Public-private partnership
PWDs	Persons with disabilities
R&D	Research and development
REC	Regional Economic Community
RCT	Randomized control trial
RD&E	Research, development, and extension
ReNAPRI	Regional Network of Agricultural Policy Research Institutes
RSF	Risk-sharing facility
RUFORUM	Regional Universities Forum
SADC	Southern Africa Development Cooperation
SCTP	Social Cash Transfer Programme
SDG	Sustainable Development Goal
SIA	System investing assessment
SMEs	Small and medium enterprises
SOC	Soil organic carbon
SSA	Sub-Saharan Africa
SSC	South-South Cooperation
STEM	Science, technology, engineering, mathematics
TAP	Tropical Agriculture Platform
TCA	True cost accounting
TIFS	Transformational Investing in Food Systems Initiative
TIMPs	Technologies, innovations, and management practices
TVA	True value accounting
UN	United Nations
UNCCD	United Nations Convention for Combating Desertification
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNFCCC	United Nations Framework Convention on Climate Change
UNFSS	United Nations Food Systems Summit
UNHCR	United Nations High Commission for Refugees
USAID	United States Agency for International Development
USD	United States Dollar
USG	United States Government
VAT	Value-added tax
VC	Value chain
WACCI	West African Center for Crop Improvement
WEF	World Economic Forum
WFP	World Food Programme
WHO	World Health Organization
WUA	Women's University in Africa
YALI	Young African Leaders Initiative

1 African Food Systems Transformation: Megatrends and Priorities for Action

Robert B. Richardson[1], Edward Mabaya[2], Thomas Jayne[3], Daniel Njiwa[4]

Key messages

1. Food systems play a vital role in nourishing human life, supporting well-being, and sustaining livelihoods. Transforming African food systems is crucial to meeting the Sustainable Development Goals (SDGs), particularly SDG 2: Zero Hunger, but also for other goals, including SDG 3: Good Health and Well-Being, SDG 5: Gender Equality, SDG 10: Reduced Inequalities, and SDG 15: Life on Land.

2. What is at stake? Because Africa's food systems are highly vulnerable to climate change, conflict, and other external shocks, and they impose high costs on the environment and biodiversity, the status quo is unsustainable. Without transformative change, African food systems will retard the pace of income and livelihood improvement for most Africans, and further entrench the continent's over-reliance on area expansion as the main source of food production growth, thus exacerbating deforestation, environmental destruction, loss of biodiversity, and a precarious over-dependence on imports as a source of food rather than regional trade and national self-reliance.

3. Bottom line: there is a great deal at stake. African governments can simultaneously achieve many of the SDGs by devoting sufficient funding and demanding better performance and accountability from the ministries and agencies charged with transforming national and regional food systems.

4. To achieve these goals, African governments must anticipate and proactively respond to major demographic, economic, environmental, and social megatrends that are shaping Africa's food systems. These include:
   a. Rural population growth and associated rising land scarcity
   b. Rising urban populations and increasing demand for food
   c. Economic transformation, including rising wage rates and per capita incomes
   d. Climate change and increasing incidence of extreme weather events
   e. Ongoing global health crises, civil conflict, and economic disruptions; and
   f. Accelerated pace of technical innovation in digital agriculture

5. Interacting with these megatrends is a growing recognition of the need to develop pathways for transformation that are inclusive of women and youth and other vulnerable groups. The development of inclusive pathways has implications for the cost and availability of labor and will require investments in social protection systems to build the long-term resilience of vulnerable communities.

6. Finally, there is critical need for technical innovations and behavioral change by farmers and traders to achieve inclusive transformation and address the widening yield gaps in cereals and oilseeds. Technical innovation will require national governments to increase their investments in agricultural research and development (R&D); investments in technical innovation that would lead to inclusive transformation have previously been insufficient. A transformation of Africa's food systems will require coordinated leadership, substantial investment by both governments and the private sector, and enhanced capacity for change and adaptation. The Consultative Group on International Agricultural Research (CGIAR) system also needs to shift from leading technical innovation itself in Africa to building the capacity of national agricultural research, development, and extension systems to take the lead in research prioritization and carry out its own R&D activities in accordance with national, regional, and continental priorities.

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Text Box 1.1

Definition of key terms

Food Systems

Food systems are defined as the sum of actors and interactions along the food value chain—from input supply and production of crops, livestock, fish, and other agricultural commodities to transportation, processing, retailing, wholesaling, preparation of foods, consumption and disposal. Food systems also include the enabling policy environments and cultural norms around food (IFPRI, 2022). Recent attention has focused on transforming food systems for greater sustainability, resilience, and inclusion. The agrifood system encompasses the generation and distribution of farming inputs and services, production at farm level, post-farm marketing, processing, packaging, distribution, and retail, as well as the policy and regulatory environment in which these activities take place. At every stage, food systems rely on natural resources, many of which are non-renewable, such as petroleum. There is a growing awareness that food systems must use these resources sustainably and avoid destabilizing the ecosystems upon which such systems depend.

Sustainability

Sustainability is defined as the capacity of a system to preserve and increase the welfare of current and future generations of humans and ecosystems. In the context of food systems, sustainability emphasizes the conservation of the natural resources needed to maintain the functional integrity of food systems. Investments and policies to ensure systems sustainability may impose short-term costs on society, but there is growing evidence that the costs of unsustainable development are much greater (World Bank, 2020). This is evident for agriculture, where lack of attention to sustainability can result in catastrophic losses in terms of income, social capital, and common-pool resources such as water and animal habitat. In general, food systems that use technologies that destabilize the natural environment (e.g., through excessive greenhouse gas emissions, water pollution, soil erosion, soil nutrient depletion, deforestation, habitat loss, fossil fuel-dependent processing, and transportation, etc.) are not sustainable. Sustainable food systems can provide safe, healthy, and affordable food for all without compromising human health or the welfare of future generations.

Resilience

Resilience refers to the capacity of a system to recover from shocks and adapt to the impact of stressors. The term is used to describe the extent to which social or ecological systems can (i) maintain, (ii) recover, and (iii) improve their integrity and functionality when subject to disturbance (IFAD, 2015). In the context of food systems, resilience emphasizes the ability of African food systems to withstand major shocks and stressors emanating from extreme weather events, conflict, disease, economic shocks outside the region, and other sources which, if not prevented or mitigated, would delay or limit economic progress, transformation, prosperity, and self-reliance. Food systems incur shocks and are influenced by stressors. Shocks are external short-term deviations from long-term trends that have substantial negative effects on people's current state of well-being, level of assets, livelihoods, and safety (Choularton et al., 2015). Floods, droughts, pests and diseases, violent conflicts, and rapid changes in important economic conditions such as fuel prices, exchange rates, or inflation, are examples of shocks. On the other hand, stressors are "long-term trends or pressures that undermine the stability of a system and increase vulnerability within it (Zseleczky and Yosef, 2014). Climate change, population pressures, and protracted political instability are examples of stressors.

Food Systems Transformation

Food systems transformation involves paradigm shifts at all stages towards the objectives of food systems to become (i) healthy and nutritious, providing nutritious and affordable diets for good health; (ii) inclusive, enabling sustainable livelihoods for all stakeholders in the food system; (iii) environmentally sustainable, thereby consuming and producing food respecting planetary boundaries; and (iv) resilient, ensuring that people can access food and protect their livelihoods when food systems are hit by extreme events or market shocks and political instability or conflicts (Ruben et al., 2021). Transformation of food systems has the potential to deliver systemic benefits for people and the environment. There is widespread recognition that food systems are not sufficiently meeting the needs of people, and their environmental costs are contributing to global climate change and biodiversity loss. Food systems transformation aims to enhance human nutrition, advance inclusion, protect biodiversity, and contribute to a more sustainable and resilient food system.

Megatrends

The Organisation for Economic Co-operation and Development (OECD, 2016) defines megatrends as 'large-scale social, economic, political, environmental, or technological changes that are slow to form but which, once they have taken root, exercise a profound and lasting influence on many if not most human activities, processes, and perceptions'. Maggio et al., 2019 define megatrends as slow yet overarching changes that fundamentally affect conditions, outcomes, and behavior of systems. While slow-moving, some of these trends are inevitable and some may activate both positive and negative immediate effects. For the purpose of this publication, some of the key megatrends shaping Africa's food system include: rapid rural population growth and associated rising land scarcity; rising urban populations and increasing demand for food; economic transformation, including rising wage rates and per capita incomes; climate change and increasing incidence of extreme weather events; ongoing global health crises, regional conflict, and economic disruptions; and the accelerated pace of technical innovation in digital agriculture. It is worth noting that the magnitude of the drivers may vary from one context to another but there is general convergence in the manner in which they influence food environments.

Background

Food systems[5] have tremendous potential to support healthy diets and nutrition while also supporting livelihoods, protecting ecosystems, and mitigating the impacts of global climate change. However, this potential is often left largely unexploited (Nyaku et al., 2022). Existing food systems, shaped in part by an uncoordinated array of partial measures and even contradictory policies, have resulted in widespread food insecurity, malnutrition, poverty, and environmental degradation. Furthermore, these piecemeal measures and policies have contributed to greenhouse gas emissions that are a primary driver of global climate change. By taking a food systems approach to policymaking, national governments across Africa could harness the power of food systems to benefit people and the environment.

Food systems are central to many of the major global challenges of our time (Nyaku et al., 2022). They play a critical role not only in shaping human diets and health outcomes, but also the sustainability of the environment in which food is produced, processed, distributed, sold, and consumed. Food systems support the livelihoods of people who depend on these activities, and they are an important driver of economic development and stability. The elements of food systems are interconnected; thus, policies that influence one part of the food system are likely to have ripple effects across other parts with implications beyond their immediate policy objectives. However, policies are typically made in isolation, ignoring the potential for leveraging these interconnections to accelerate transformative change through the convergence of efforts across national governments, regional bodies, agricultural research institutions, and the private sector. Furthermore, many of the challenges

5 See Text Box 1.1 for definitions of key terms including food systems, sustainability, resilience, food systems transformation, and megatrends.

and opportunities facing African food systems lie outside the domain of food systems, per se.

The United Nations 2021 Food System Summit (UNFSS) provided a renewed vision for strategic action pathways needed to build sustainable food systems. UNFSS, and particularly the national and independent dialogues leading up to the Summit, offered opportunities for African nations to examine and identify context-specific solutions to the challenges hindering achievement of food systems-related goals and targets in various development frameworks, including the SDGs, the African Union's (AU) Agenda 2063, and the CAADP[6] Malabo Decision (AU UNFSS Paper). In the *Africa Common Position on Food Systems*, there are many proposed actions which, if implemented, would help countries to develop sustainable food systems.

The 2021 Africa Agriculture Status Report (AASR21), *A Decade of Action: Building Sustainable and Resilient Food Systems in Africa,* provided a framework for sustainable and resilient food systems. AASR21 concluded that sustainable and resilient food systems in Africa will increase the pace of the region's overall economic transformation and raise living standards. Furthermore, the report concluded that investing in resilient and sustainable food systems today will spare African governments from incurring considerably greater losses in the future. However, there is considerable uncertainty about the kind of leadership, resources, and capacity required for a food systems transformation in Africa.

The challenge at hand, therefore, is how can countries be supported to transform pathways into strategies and to design and operationalize investment plans to support the food systems transformative agenda in a multi-stakeholder and multi-sectoral collaborative fashion? This report—the Africa Agriculture Status Report 2022 (AASR22)—will discuss the challenges facing the transition to sustainable and resilient food systems and address the following questions: (i) what are the megatrends shaping Africa's food systems landscape, including major economic, environmental, and social trends? (ii) what is at stake for Africa if the challenges faced are not addressed?; (iii) what kind of leadership and coordination is required to address the challenges?; (iv) what financial and human resources are required?; and (v) what coalition of partners can effectively build capacity among stakeholders and food systems actors for sustainable and resilient food systems?

Several national, continental, and global megatrends are currently shaping the evolution of food systems in Africa. These include: i) a growing middle-income class in many African countries; ii) rapid urbanization and related shifts in food demand, household diets, and downstream modernization of food systems; iii) a shift in the labor force from farming to non-farm jobs; and iv) a growing scarcity of farmland (AUDA, 2021). Other megatrends include climate change, technological advances (particularly, digital technologies), and the recent COVID-19 pandemic (Ujunwa et al, 2021; IPCC, 2022; Porciello et al., 2022). The African Continental Free Trade Agreement (AfCFTA) and other AU continental development frameworks will certainly also be a factor in influencing the continued evolution of African food systems over the coming decades (Haile-Gabriel, 2021).

There are increased calls to incorporate accounting mechanisms (e.g., True Cost Accounting) that help us better understand the true value of food and hence rally efforts towards addressing the environmental, social, and health costs as well as the unintended consequences associated with the production, distribution, and processing of food. Several case studies related to true cost accounting are included in this chapter. The True Cost Accounting Accelerator is an initiative of the Global Alliance for the Future of Food, and an overview of the initiative is presented in Box 1.2. An overview of an initiative led by UNEP and The Economics of Ecosystems and Biodiversity for Agriculture and Food (TEEBAgriFood) for Business initiative is presented in Box 1.3. An overview of true cost accounting and investors is presented in Box 1.4, including a discussion of risk and opportunities. Finally, Box 1.5 includes an overview of a project aimed at estimating the true value of fortified whole grain in school feeding programs in Rwanda.

AASR22 is organized as follows. This overview chapter describes the status of food systems in Africa and the megatrends shaping the food systems landscape. Chapter 2 describes the kind of leadership and coordination required to address the challenges facing African food systems and explores the challenges and emerging opportunities in building independent African research institutions. Chapter 3 describes the resources required for Africa to achieve a food systems transformation including the true cost of

6 The Comprehensive Africa Agriculture Development Programme - an Agenda 2063 continental initiative that aims to help African countries eliminate hunger and reduce poverty by raising economic growth through agriculture-led development.

Text Box 1.2

TCA Accelerator: advancing true cost accounting in food systems

Food that supports the health of people and the planet should be both affordable and readily available. However, the dominant industrial food system guiding worldwide food production and access is not structured toward these goals. The consequences of this approach, ranging from pollution and inequality to diet-related disease and biodiversity loss, are not typically factored into food costs. As a result, significant impacts are not properly accounted for.

In recent years, global conflicts, climate change, and the COVID-19 pandemic have exacerbated these issues. Urgent action is needed from policy and business leaders to address the root causes of these systemic challenges. Making more informed decisions about food production and consumption will enable a positive transformation for the environment, health, and prosperity of communities and nations.

True Cost Accounting (TCA) provides the roadmap to realize a food system that benefits people and nature by integrating awareness of the system's true costs and benefits on natural, social, human, and produced (financial) capital.

Driven by a wealth of thought leaders, and global cooperation, TCA has emerged as a robust and multifaceted tool to transform food systems. TCA helps decision-makers anticipate existential threats, tackle systemic challenges with greater awareness of trade-offs, mitigate risks, reduce externalized costs, and ultimately increase resilience to global food system shocks. Case studies being collected from around the globe illustrate how TCA can be applied in diverse regions and contexts and establish effective paths forward.

The results from early adopters have been clear; by using TCA to inform decisions, it is possible to create healthy, equitable, and sustainable food systems for future generations. Yet barriers to widespread adoption persisted.

In 2020, the community of global TCA advocates galvanized around the formation of the TCA Accelerator, a central entity aimed at demonstrating TCA's value and feasibility, dismantling real and perceived barriers to implementation, and making sense of TCA tools, research, and concepts for government and business leaders.

By participating in the TCA Accelerator, stakeholders can connect to share information that bolsters their respective efforts while co-creating projects that strengthen the field writ large. To date, participants have joined hands on efforts aimed at influencing policy development in strategic locales, events featuring the latest case studies and research, and analysis on the strengths, weaknesses, and gaps between existing and emerging TCA frameworks, tools, and methodologies.

True Cost Accounting charts a path to a more sustainable, healthy and equitable future. In assessing food systems' quantitative and qualitative impacts, TCA is creating a body of evidence that bolsters related movements — including agroecology, indigenous knowledge, and regenerative agriculture — that seek to mitigate externalized costs and build value for people and nature.

Learn more at https://tcaaccelerator.org/.

Lucia Stephen
Outreach and Communications Coordinator
True Cost Accounting Accelerator

this transition, the scale of investment required, and the investment pathways to fund the food systems transformation. Chapter 4 proposes building and/or enhancing existing platforms for transformation, policy development, capacity building, innovation, and investment in successful government-led food systems transformation. Finally, Chapter 5 provides a summary of emerging key points from the Report and offers conclusions in terms of practical priority actions for African governments, African and international financial institutions, international development partners, the private sector, and other stakeholders.

Characteristics of resilient and sustainable African food systems

Agriculture in Africa faces tremendous pressure to supply both growing and wealthier populations with more food, feed, fiber, and fuel while recognizing the limits of agricultural ecosystems. Low agricultural productivity is also a major driver of food insecurity in most African countries (Richardson et al., 2021). Sustainable intensification has been promoted as a way of increasing food security, conserving natural resources, and slowing deforestation and land degradation. Sustainable intensification has been defined as the production of more food using sustainable practices while avoiding expansion and clearing of additional land.

In most countries in sub-Saharan Africa (SSA), smallholder farming systems are predominantly grain-based and subject to erratic climatic conditions. Climate vulnerability further threatens agricultural productivity compounding existing conditions that are associated with low agricultural potential (Abegunde et al., 2019).

The problem also works in reverse; agriculture is a major part of the climate problem currently generating roughly a quarter of total greenhouse gas emissions globally. Between 1994 and 2014, greenhouse gas (GHG) emissions from agriculture in Africa increased at an average annual rate of between 2.9 percent and 3.1 percent and emissions continue to increase rapidly (Tongwane & Moeletsi, 2018). The rates of emissions are not homogeneous in all regions of the continent. East and Southern Africa are the largest producers of emissions from agriculture on the continent with 34 percent and 27 percent respectively. The role of agriculture in climate change highlights the importance of sequestering atmospheric carbon in topsoil by promoting farming and land management practices that build soil rather than deplete it.

Therefore, climate-resilient agriculture must achieve the aims of sustainable intensification. That is, increasing productivity on the existing agricultural footprint while adapting to climate-related shocks, and sequestering atmospheric carbon that contributes to reducing the negative effects of climate change. These are the triple benefits of climate-smart agriculture: increased productivity, enhanced resilience (adaptation), and reduced/removed GHG emissions (mitigation) where possible.

Text Box 1.3

The Economics of Ecosystems and Biodiversity for Agriculture and Food (TEEBAgriFood) for business

There has been growing recognition that a food systems transformation lies at the center of achieving the SDGs. Bringing the value provided by nature, people, and society to the forefront of decision-making to transform food systems is critical in successfully addressing the interconnected crises of climate change, biodiversity loss, social inequities, and human wellbeing. The term True Cost Accounting (TCA) – see Text Box 1.3 – emerged as a central priority in UNFSS preparatory discussions in 2021.

TCA is an evolving, holistic, and systemic approach to measure and value positive and negative environmental, social, health and economic costs and benefits. The term TCA is not exclusive; True Value Accounting (TVA) is also used while the Capitals Coalition[1] and non-food sector actors use the term 'capitals approach' to represent a similar approach.

The capitals[2]—natural capital, social capital, human capital and produced capital—form the foundation of food systems. By understanding how food systems impact and depend on the capitals, policymakers, civil society, consumers, and businesses can make holistic decisions that redefine the value provided by nature, people, and society.

Since 2020, the Capitals Coalition has been leading on The Economics of Ecosystems and Biodiversity for Agriculture and Food (TEEBAgriFood) for Business Work Package, as part of the larger UNEP-TEEB-led project, Promoting a Sustainable Agriculture and Food Sector, funded by the EU. The project

1 The Capitals Coalition is a global collaboration redefining value to transform decision making in relation to the capitals—natural capital, social capital, human capital and produced capital—which form the foundation of human wellbeing and economic success.
2 Definitions of the capitals that we most commonly refer to are to be found at https://capitalscoalition.org/capitals-approach/why-a-capitals-approach/.

targets seven countries, Brazil, China, India, Indonesia, Malaysia, Mexico, and Thailand. The TEEBAgriFood for Business work develops guidance to enable the sector to adopt a capitals approach to build resilience, mainstream best practice, protect biodiversity, and contribute to a more sustainable food system.

The Capitals Coalition has drafted the TEEBAgriFood Operational Guidelines for Business to equip businesses and other stakeholders in conducting a capitals assessment and growing their understanding of their impacts and dependencies on the capitals. Next to these Guidelines, TEEBAgrifood works with in-country partners to build a network of frontrunners, train businesses, and support organizations in conducting a capitals assessment via one-to-one support calls. All these activities aim to support organisations to apply this information in decision-making in ways that deliver benefits across the system and show evidence of the benefits of the approach. Several businesses have already successfully developed pilot applications, more are being developed now. The Project will run until October 2023.

Several lessons in terms of business roll-out and accelerating the uptake of this approach beyond its current scope are already emerging.

In terms of engagement, businesses are often doubtful about assigning resources to conduct a capitals assessment. It is crucial to understand that through measurement and valuation, a capitals assessment informs any business on the impacts and dependencies it has on the capitals. Once a valuation is complete, the outputs can be used for decision-making and to inform business strategy, sustainability reporting, and external disclosure.

This valuation can be monetary, but often a qualitative or quantitative valuation is sufficient or the only one possible depending on the context. For instance, better understanding and management of the impacts and dependencies on soil health can deliver cascading benefits to a business and the society in which it operates. Improved soil fertility (a natural capital) could inform an improved long-term strategy for crop management but should also lead to cascading benefits for the entire system such as improved worker health (social capital) due to a decrease in the use of fertilizer, and/or improved pollination (a natural capital) as species' richness might increase on site. These benefits provide value to the business and an entire system beyond monetary terms or a balance sheet.

The knowledge about how to conduct a capitals assessment is still limited and lack of data and evidence is often perceived as a barrier to commencing a capitals approach. Next to the TEEBAgriFood for Business Training Course, which provides guidance on how to conduct a capitals assessment, the Capitals Coalition has also launched a free online course, Valuing Nature and People to Inform Business Decision-Making, on the Coursera platform to fill the knowledge gap. Many initiatives to gain better data on food systems and make this data more readily available are ongoing.

Once a business understands its impacts and dependencies on the capitals better and has more insight on the associated risks and opportunities, application of the results becomes vital. Based on one such assessment, a business in Brazil decided to work directly with organic farmers resulting in costs savings from its value chain. This measure was implemented by the food start-up but sometimes funding is needed to support the transition.

The TEEBAgriFood Guidelines are categorical that given its impact on the agrifood chain, the financial sector is an integral part of the value chain. A bank in Mexico has conducted a capitals assessment and is now using its pilot application to assess its portfolio and offer financial products and services that benefit clients that incorporate the best sustainability practices. Also, the Transformational Investing in Food Systems (TIFS) Initiative is working to increase transformational investing in global food systems based on capitals thinking.

It is important to keep in mind that the capitals, as well as the agrifood value chain, interact as a system. The food system is one of many actors—no actor can singlehandedly transform the system. Although organizations can conduct a capitals assessment on an individual basis, in the end, it they examine upstream and downstream impacts and dependencies on the capitals. Other stakeholders must be engaged to successfully

implement measures to incorporate the value of nature and people in decision-making along the chain. While stakeholder engagement takes time, a well-conducted capitals assessment can support the capacity-building process to deliver change.

In Africa, as an outcome of the Valuing Natural Capital and Local Communities for Business in Eastern and Southern Africa webinar series organized in partnership with the International Union for Conservation of Nature (IUCN), Capitals Coalition is partnering with conservation students from the African Leadership University and GIST Advisory[3] to support seven African SMEs through natural capital assessments of their direct operations. The target sectors are coffee and tourism with business from Kenya, Sierra Leone, Rwanda, Tanzania, and Uganda participating. Findings will be shared in October 2022.

The perception that capitals assessments are time-consuming and difficult is often a barrier to embarking on them. When working with businesses globally, TEEBAgriFood stresses that an assessment can be done in a lean and mean manner with some easy to anticipate findings, for example, that global food systems are dependent on the greater-than-the-sum-value of services provided by nature and people.

Martine van Weelden
Director, Capitals Coalition

3 GIST is a pioneering data and analytics company that brings together world-renowned sustainability expertise in technology and big data to help investors and companies measure, value, and benchmark company impacts across the four capitals.

Despite the apparent benefits of sustainable intensification and climate-resilient agriculture, the implementation of sustainable intensification policies can be complicated by divergent understanding of goals, the challenges associated with the adoption of sustainable intensification practices by farmers, temporal delays in positive returns or yield increases from adoption of sustainable practices and limited supportive policy frameworks for sustainable agriculture.

Often, agricultural development interventions and policies directed at sustainable intensification do not sufficiently consider farmers' perceptions, beliefs, priorities, or interests. Appreciating the plurality of farmers' perceptions and their contextual knowledge and perspectives of the functioning and performance of their agroecosystems is central for sustainable intensification and climate-resilient production systems. The challenges associated with sustainable intensification practices vary widely in terms of specific practices.

Text Box 1.4

True cost accounting and investors: mitigating risk and identifying opportunities

The rapidly growing sustainable investing market is at a crossroads. While assets increased by 55 percent to $35.3 trillion from 2016-2020, according to the Global Sustainable Investment Alliance, companies and asset managers are coming under scrutiny from regulators for "greenwashing"—enticing consumers and investors with misleading or unrealistic claims about a company's products being environmentally friendly.

At issue is the lack of a global set of standards to quantify the positive non-financial impacts of an investment. While initiatives like the SDGs provided a framework for evaluation of investments and were enthusiastically adopted by investors, they failed to provide guidance on what data sets are valid and standardized.

Similarly, efforts to modify the Generally Accepted Accounting Principles (GAAP) have fallen short. Under pressure from investors and associations such as the Sustainability Accounting Standards Board, GAAP has begun implementing revisions that allow previously undervalued accounting items to be included in formal reporting requirements. But these steps don't go far enough.

Opportunities for true value investing in aligned food enterprises

Some food system investors see a better path forward by aligning TCA with investing strategies and objectives. Doing so enables investors, asset managers, farmers, and other stakeholders to accurately account for underlying material costs that are not currently captured in GAAP with the result that this holistic valuation tool will enable investors to better connect front-end investment decisions with reporting of outcomes.

Investors are increasingly being asked to prove the impact of their investments beyond financial returns. Social entrepreneurs are learning how to demonstrate the social and environmental value of their business to investors and donors. These needs require harmonizing multiple priorities, risk mitigation, and return expectations with metrics to show positive outcomes for food producers, food workers and natural systems as well as consumer and community health.

The much-needed innovations in investment practices face numerous hurdles, the biggest of which involve redefining risk, reward, efficiency, and scale to become more systems-focused, internalizing those considerations into decision-making structures, and agreeing on missing impact metrics. These innovations must overcome the current biased metrics for food systems investors that primarily reward two dimensions—increasing productivity and profit and a reductionist approach to food production.

TCA assessments

Developed to apply whole systems thinking to the economics of agriculture, the UN Environment Programme's (UNEP's) TEEBAgriFood initiative breaks down costs and values across four types of capital: natural, human, social, and produced (financial) capital. In the long run, these efforts can assist investors in identifying companies that are performing well financially and creating better environmental and social benefits than their peers.

Adopting this approach, TIFS recently piloted a system investing assessment (SIA) that shows an investment fund's ability to deliver system-level impact. The SIA maps the fund's impact areas against the holistic systems approach of the TEEBAgrifood framework, the SDGs, the 13 principles of agroecology, and TIFS guiding principles of recognizing the full value of good farming including increasing soil health, biodiversity, community resilience, and healthy people.

For investors and impact funds, the tool has helped open conversations about their systemic impacts. For investors—including foundations, impact investors, donors, and global companies—the tool fills a gap by providing a holistic approach to considering the impact intentions of their investees. Despite a wide range of motivations, investors commented that they need the holistic approach to better grapple with the complex issues that affect their portfolios. For impact fund managers, the assessment generated a race to the top. Upon seeing the draft assessment, most funds aimed to improve their score by providing additional information or specific justification for issues that were implicit in their investment process. The funds recognized the complexity of the assessment and engaged to refine them, as they strive to arrive at an accurate representation and continuously improve the outcomes of their investments.

Conclusion

TCA broadens the "what gets measured gets managed" mantra to include non-financial attributes that do not yet have standardized and accepted measurements for return. In the future, tools such as integrated profit and loss statements can create standard approaches to measure companies' performance across the four capitals. This is slow and deliberate work that requires different voices and competing interests to work together. However, investors and entrepreneurs need better tools now to make informed decisions—tools that advise on how to place investments, demonstrate the value of businesses that simultaneously address multiple outcomes, and drive towards the transformation required for our food system to meet the synergistic needs of humans and the environment.

Rex Raimond
Director
The Transformational Investing in Food Systems (TIFS) Initiative

Megatrends shaping African food systems

Rapidly-rising demand for food driven largely by a burgeoning population and rising incomes will provide major opportunities for a transformation of African food systems along with a transformation of African economies more broadly (Jayne et al., 2017). The transformation to sustainable and resilient food systems will require African agriculture to become more inclusive, productive, and profitable.

To paraphrase a sports analogy, a good football player plays where the ball *is*, but a great football player plays where the ball is *going* to be. Policymakers can be game changers too (or, to put it differently, policymakers can become more impactful) by anticipating and proactively moving to where the economic ball will be. As the global economy becomes more complex and dynamic, African governments and development partners can be more effective by better anticipating future opportunities and emerging challenges to proactively prepare for them rather than merely reacting to them. For these reasons, AASR22 highlights six megatrends shaping the development of agrifood systems in Africa that warrant greater attention by stakeholders both in terms of anticipating and adapting to these megatrends. In these cases, the challenge for African policymakers is to institute policies and programmes that can mitigate the resulting shocks and adverse effects, i.e., become more resilient and build on their positive impacts to increase the pace of food systems development. In still other cases, African policymakers may "bend the curve" so that adverse effects that will occur in the absence of proactive government action are mitigated or avoided entirely through appropriate pre-emptive action.

The six "megatrends" highlighted in the Report are affecting the trajectory of agricultural transformation in Africa (Olwande et al., 2022). They comprise: (1) rural population growth and associated rising land scarcity; (2) rapidly-rising urban populations fueling a rapid rise in local demand for food, and improved market access conditions for farmers in areas formerly considered remote; (3) economic transformation whose main features include rising wage rates and per capita incomes; (4) climate change and increasing incidence of extreme weather events; (5) increasingly common global pandemics, civil conflicts, and economic disruptions; and (6) accelerated pace of technical innovation in communications, information, and supply chains. A summary of each of these megatrends, their consequences, and priorities for governments, donors, and other stakeholders is provided in the rest of this chapter..

Megatrend #1: Rural population growth and associated rising land scarcity

Africa continues to experience high rates of population growth (Figure 1). Between 2017 and 2050, the populations of 26 African countries are projected to expand to at least double their current size. Over this same period, SSA's rural population is expected to rise by 53 percent (UN DESA, 2019). Rapid rural population growth implies continued growth in demand for agricultural land. Moreover, a growing class of middle- and high-income urban-based Africans with an interest in commercialized farming has further intensified the demand for agricultural land. Meanwhile, there has been a rising global interest in African farmland (Schoneveld, 2014). These forces have combined to create conditions of land scarcity, and with it, explosive increases in land values (Abay et al., 2021). Land scarcity is leading to institutional changes paving the way for land transfers (Jayne et al., 2021). For example, national governments are enacting land laws to extend state power into customary lands. Chimhowu (2019) reports that between 1990 and 2017, 32 new land laws were enacted in SSA with most of them designed to wrest control of land allocation from customary authorities. In countries such as Kenya and Zimbabwe, the state gained control of most customary lands decades ago.

Rising population pressure and land scarcity is also leading to (i) a decline in the size of most smallholder farms over time; (ii) more continuous cultivation of fields, which contributes to land degradation and un-sustainable forms of agricultural intensification; (iii) the rise of land rental and purchase markets and changes in land allocation institutions, which are rapidly alter-ing farm structure; and (iv) current SSA challenges in achieving broad-based and inclusive forms of farm income growth.

There is surplus land in SSA, but as much as 90 percent of the region's unutilized arable land is in relatively few countries, leaving many African countries with limited potential for agricultural area expansion (Jayne et al., 2014). This puts the emphasis on raising yields and productivity squarely on tens of millions of smallholder African farms, especially in areas where expansion of cultivated area is no longer feasible. Figure 2 illustrates trends in cereal and vegetable yields which have been stagnant in most regions of the continent.

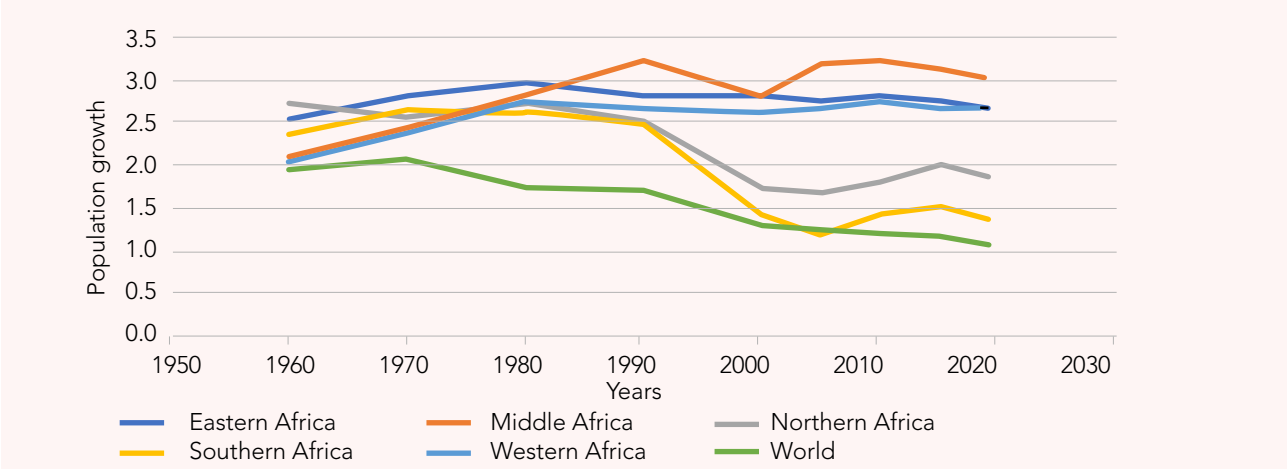

Figure 1. Population growth rates between 1960-2020 by regions in Africa

Source: World Bank Indicators

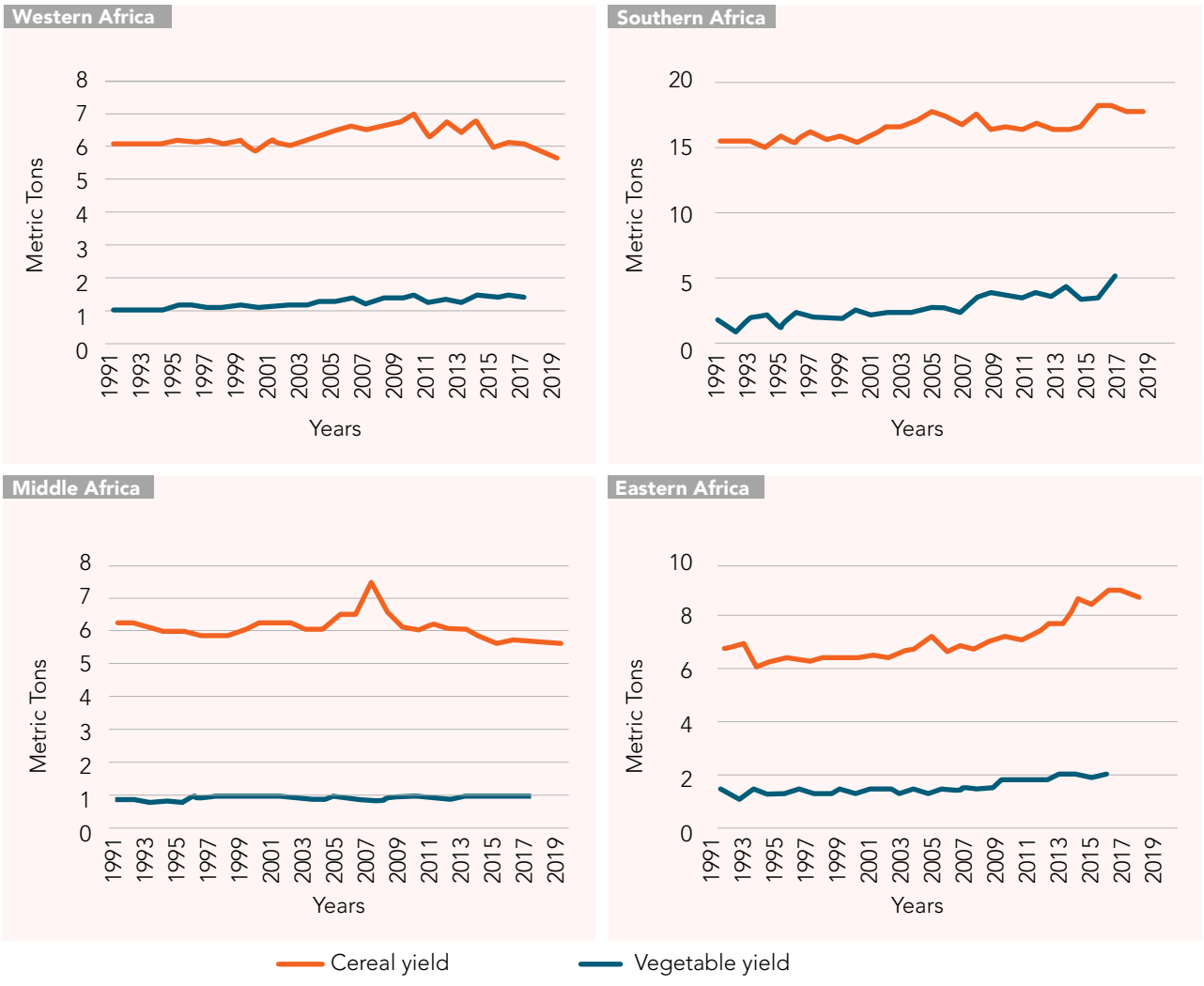

Figure 2. Cereal and Vegetable Yields' Trends between 1991-2019 by Region in Africa

Source: FAOSTAT, WDI, FSD

By proactively anticipating and responding to these trends, African governments may successfully achieve sustainable transformation processes that impose less painful adjustments on rural people (especially the youth) who will not be able to inherit land or enter farming as previous generations have.

Priority response actions

Among the priority responses will be (i) promoting access to quality education to enable rural youth to succeed in off-farm and non-farm pursuits; (ii) promoting the performance of national agricultural research, development, and extension (RD&E) systems to accelerate technical innovation and productivity growth on existing agricultural land; and (iii) supporting land tenure arrangements that protect the rights of local communities while simultaneously supporting equitable land transfers that enable productive and entrepreneurial farmers to acquire land and thereby accelerate structural transformation processes. Regarding priority action (ii) on promoting the performance of national agricultural RD&E systems, increasing land scarcity can guide agricultural research systems to emphasize land-saving forms of agricultural technical innovation, including ways to raise crop yield response to fertilizers, develop technologies for producing and supplying organic inputs economically to smallholder farmers, and promote agricultural technologies that effectively address land degradation and promote ecosystem services (i.e., land health including hydrology, diversity, heterogeneity). In some cases, agricultural RD&E systems may support productivity growth by increasing funding for adaptive RD&E systems that support higher value crops (e.g., fruits and vegetables) and animal products. This would entail major changes in how RD&E efforts in SSA are currently organized to expand well beyond a small number of staple crops and industrial cash crops.

Megatrend #2: Rapidly-rising urban populations, fueling a stable and constantly increasing demand for food

Africa's urban populations are also rising rapidly – even faster than in rural areas. Real per capita incomes are also rising in most parts of the continent. The combination of high population growth and rising incomes is creating explosive growth in food demand for food on the continent, which is in turn generating a downstream modernization of food systems (Ogwu, 2019). Africa faces a dilemma: if it is not able to raise yields sufficiently to satisfy this burgeoning demand from existing farmland, it will need to convert much of its remaining forests and natural grasslands into farmland – with associated high costs to the continent's environment, biodiversity, and the ecosystems services that they provide – and/or become much more dependent on the global market for its food supplies (van Ittersum et al., 2016). The transformation of Africa's food systems will require structural changes to reduce waste and food losses, improve nutritional status, create renewable energy uses, and the promotion of circular economy initiatives to optimize the function of food systems. According to the African Union, Africa currently imports about 40 percent of its food (AUDA, 2021, p.3). Recent global shocks have brought the costs and risks of heavy dependence on global markets into sharper focus (see Megatrends #4 and #5); moreover, there are rising concerns that the multiplier effects of local agricultural growth are diminished if a growing share of the region's food supply is produced, processed, and distributed outside the region (Yeboah & Jayne, 2018).

Raising productivity and yields on existing farmland to meet the rising demand is thus a strategic priority for Africa. But that is not the only priority stemming from Africa's rapidly-rising demand for food. Intensification of African agriculture must be carried out in ways that enable continuous and productive cultivation into the future (i.e., sustainably), mitigate various shocks and their effects on food systems (i.e., resilience), promote equitable participation for women, youth, and other disadvantaged groups (i.e., inclusivity), and promote human health (i.e., nutrition). Africa's changing conditions with respect to household incomes, dietary patterns, education, and female participation in the workforce require proactive policies and public investments to achieve stated food and nutrition security objectives (Djurfeldt, 2015).

Priority response actions

African development organizations such as The African Union Commission (AUC), AfDB, and AGRA can promote sustainable, resilient, inclusive, and nutritious food systems in Africa by highlighting the priority actions identified through extensive research evidence. These include: (i) focus on increasing funding for and performance and accountability of African national agricultural RD&E systems in delivering technical innovation and productivity growth for tens of millions of African smallholder farmers; (ii) encourage the international Consultative Group on International Agricultural Research (CGIAR) system to more

effectively build the capacities of national, regional and continentally-led systems and assist these systems in delivering on their own priorities rather than developing separate priorities that may dilute CGIAR efforts to assist African RD&E systems to achieve their own objectives; and (iii) assist national RD&E systems to expand the range of crops and animal products for which services are offered according to their priorities and objectives. Examples include high-value fruits and vegetables, other crops, livestock, and aquaculture with expanding commercial potential. Achieving this will require African governments to expand their support for and reorganize their national agriculture research systems (NARS) and public extension systems. Doing so would also help most African countries comply with their own commitments under the CAADP Maputo Declaration. Lastly, while policies to promote private extension services can also play an important role in particular areas, the public RD&E system will be required to meet the needs of less-favored farming communities where household willingness to pay for extension services remains low.

Megatrend #3: Economic transformation, whose main features include rising wage rates and per capita incomes

Economic development in Africa is creating a rising middle class (Tschirley et al., 2015a) and a rapid shift in the labor force from farming to non-farm jobs (Tschirley et al. 2015b). Rising average incomes for a growing proportion of the population coupled with rapid urban population growth is creating challenges and opportunities for African food systems in at least three ways. First, rising wages and incomes are triggering demand for more processed and livestock-based foods than before. Rising per capita incomes inducing dietary change as per Bennet's Law leading to increased demand for meat, fish, processed foods, cooking oil, and foods prepared away from home. This will continue to fuel private investment and growth in the cereal and oilseed sectors because of their role as animal feed, but also the processing industry and human nutrition in general. Ever-growing demand for cooking oil in urban and rural areas is precipitating an expansion in the production of oilseeds crops in the region (Byerlee et al., 2017). As non-farm wages rise and business opportunities expand, more labor is pulled out of farming putting upward pressure on farm wage rates and encouraging operators to move to labor-saving farm technologies and practices (mechanization, herbicides, etc.). Mounting evidence shows that the number of labor days applied per hectare cultivated is declining in areas where economic growth has been relatively strong (Michler, 2020). There is also evidence that the share of the national labor force in off-farm employment is strongly correlated with the rate of agricultural growth (Yeboah and Jayne, 2018). Third, the swelling numbers of relatively affluent Africans with an interest in farming has intensified the demand for farmland close to urban areas, changing the characteristics of farmers in such areas (Jayne et al., 2022).

Priority policy responses

The economic transformation presents both opportunities and threats to Africa's food system transformation. To address the challenge associated with rising wages, African governments must ask and empower regional and national agricultural research and development and extension (RD&E) and policy research systems to generate and deliver labor-saving practices and technologies. These include innovative forms of mechanization appropriate to smallholder agriculture to support farmers' aims of reducing labor input per hectare cultivated. The decline in labor intensity observed in many data sets implies that rural Africans are seeking to make farming activities less labor intensive so that they can also diversify into off-farm employment, which generally provides higher returns to labor than farming. Therefore, promoting employment and investment in upstream and downstream agri-food value chains is one of the ways of absorbing labor being released from farming, and an important part of the rural transformation process in most African countries.

Governments can also promote mechanization rental markets by reducing tariff rates on spare parts, irrigation equipment, and other labor-saving technologies. Borrowing from approaches in China and India, investors should promote innovation for local production of labor-saving small-scale production and processing technologies such as hand-held tractors and solar dryers. Land tenure policies must protect the land rights of local communities while also enabling the equitable transfer of land to productive and entrepreneurial users. To meet the growing demand for value-added foods in such as cooking oil, RD&E systems should expand beyond the current emphasis on staple cereals. There is a need to promote technical innovations and sound management practices for production and value addition of livestock, fish, fruits, vegetables, oilseed crops, etc. Lastly, it will be

crucial to adopt enabling policies and regulations that promote employment and private investment in upstream and downstream stages (including cross-border trade) of agri-food value chains.

Megatrend #4: Climate change and increasing incidence of extreme weather events

Climate change is the single most systemic global environmental problem that affects all regions and socioeconomic divides. The inexorable increase in global atmospheric temperatures driven by a steady increase in GHG emissions has increasingly wrought a host of environmental and physiological challenges for life on earth in general and agriculture in particular over the past two decades. Figure 3 illustrates the growth in GHG emissions by region since 1990, including land-use change and forestry. The Intergovernmental Panel on Climate Change (IPCC) reported that global climate change models predict with a high level of confidence that all of Africa is likely to warm during this century, with the drier subtropical regions warming more than the moist tropics by mid- to end-21st century relative to pre-industrial levels. The IPCC fact-sheet summarizes the manifestations and impacts of climate change for the African region as: (1) high mean temperatures and hot extremes above the trend explained by natural climate variability in all land regions of Africa; (2) more rapid rate of increases in surface temperatures in Africa than other regions of the world; (3) observed increases in the frequency of heat waves relative to cold-extremes expected to increase throughout the 21st century in the business-as-usual scenario; (4) increased frequency of marine heat-waves, which have implications for onshore and off-shore wind directions, droughts, and frequency of severe tropical storms; and (5) a heightened frequency and intensity of extreme rainfall events including droughts, heavy rains and floods (IPCC, 2022). For example, at the time of writing this report, Ethiopia, Kenya, and Somalia are experiencing severe multi-season drought conditions (with the lowest March to May rains recorded in 70 years) that bring the threat of starvation to millions (FEWS NET, 2022). When combined with chronically low public expenditure on agricultural RD&E, climate change in Africa is already slowing the pace of farm technical innovation and agricultural productivity growth compared to other regions. Consequently, much of SSA continues to rely on expansion and extensification as the primary sources of agricultural growth.

West and Southern Africa were designated climate change hotspots, that is, areas where large adverse physical impacts of climate change coincide with a preponderance of poor people that are least able to cope with these effects. The Sahel region of West Africa will be most affected by global climate change, which will be exacerbated by a highly degraded and diminishing natural resource base and very high population growth (Sissoko et al., 2011). Climate change and the diminishing natural resource base is widely believed to be fueling conflicts for scarce productive land, water, and pasture (Mildner et al., 2011). For example, farmer-herder violence has increased in the past 10 years due to growing land pressure with geographic concentrations in Nigeria, central Mali, and northern Burkina Faso (Brottem, 2021).

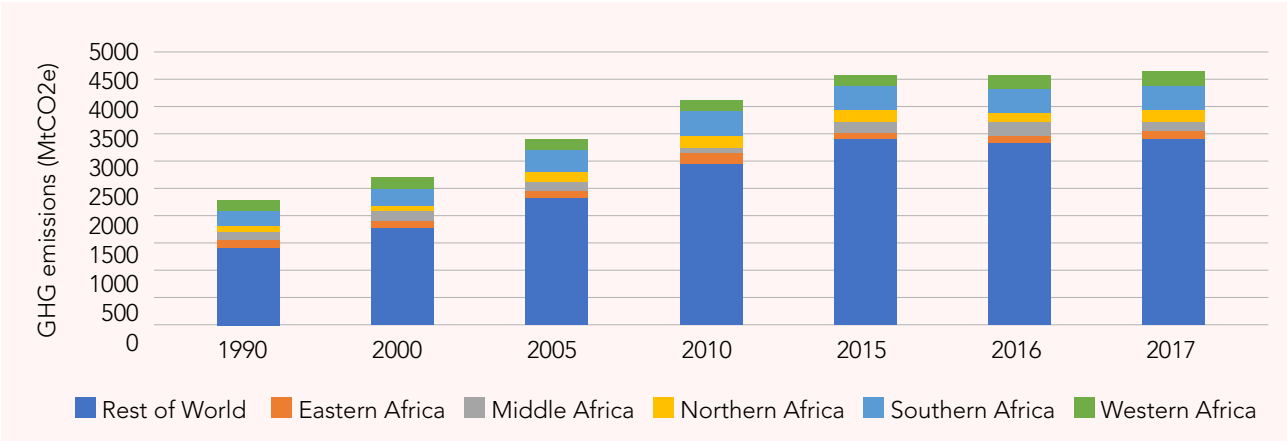

Figure 3. Total GHG Emissions including Land-use Change and Forestry

Source: FAOSTAT & FSD

For a region with a large share of rain-fed, smallholder subsistence-dominated agricultural production systems that account for a large share of economic growth, the macroeconomic and poverty implications of global climate change are more readily appreciated. Namely, reduced potential for economic growth, diminished capacity for poverty alleviation and resilience, and increased exposure to global food supply chain shocks (Calzadilla et al, 2013). The microeconomic impact of climate change is more insidious. Research evidence across Africa (and Latin America) reinforces the link between climate shocks and the incidence of extreme poverty. Climate change will lower the productivity of agricultural production in many areas possibly driving agricultural expansion into natural areas with associated loss of habitat and ecosystem services (Bastien-Olvera & Moore, 2022). With a possible exception of livestock herds, subsistence households tend to keep their meager savings in the form of food stocks for consumption rather than investments in technologies that could increase families' living standards and decrease their vulnerability to poverty. Climate change therefore reinforces a vicious cycle of shocks, risks, and poverty trap (Carter, 2022).

In view of the foregoing, nearly all African countries have signed up to the United Nations Framework Convention on Climate Change (UNFCCC) and its attendant protocols most notably the Paris Agreement on Climate Change, the United Nations Convention on Biodiversity, and the United Nations Convention for Combating Desertification (UNCCD). These international compacts seek to strengthen the interdependence of productive agriculture on sound ecosystems and the natural resource base and in the process, help contribute to the global goal of reducing GHG emissions to levels required for limiting the rise of global temperatures to below 2 degrees Celsius above pre-industrial levels by 2050 and to pursue efforts to limit the rise in temperatures to below 1.5 degrees Celsius. Africa's inordinately high exposure to climate change risk relative to her relatively low contribution to global GHG emissions perforce requires a balance in focus between climate change mitigation and adaptation. Meanwhile, global multilateral and Paris Club lenders to Africa have committed to aligning financing flows to Africa to accelerate climate action. Adaptation of adverse effects from climate change needs urgent priority as a first-order issue for Africa's food systems.

Priority action responses

Given the risks outlined above, policymakers must elevate the development of a more resilient and sustainable food system, including efficient production, to an urgent national priority together with diversity of inputs that are adapted to the evolution of local agro-climatic conditions. Such measures for climate change adaptation in agriculture should include development and promotion of drought-tolerant crops and hardy livestock breeds and species, conversion of marginal land to silvi-pastoral systems, investment in smallholder irrigation and rainwater-harvesting, improved animal feeding systems, and enhanced agricultural market integration and performance. Countries too will have to reduce agricultural GHG emissions as one of the key sectors driving global climate change. Key strategies in this respect include conversion to no-till and minimum tillage practices to enhance carbon sequestration, inclusion of legumes in crop rotations to fix soil nitrogen, and reduced application of inorganic nitrogen with commensurate reductions in nitrous oxide, which is 300 percent more potent as a GHG than carbon dioxide. Improved livestock feeding practices such as a transition from grain- to pasture-fed beef could reduce emissions from gastro-enteric fermentation, which would reduce enteric fermentation while enhancing soil carbon sequestration in Africa's rangelands.

An IFPRI[7] report presents the results of a comparison of estimates of the Annual Public Investments to offset climate change effects on hunger between (i) a Reference scenario (no climate change) and (ii) a Comprehensive scenario reflecting annual incremental costs to offset the effects of climate change on food security in SSA through investments in agricultural research and development (R&D), water management, and infrastructure (Sulser et al., 2021). For SSA, the Comprehensive scenario was estimated to require annual incremental cost for investment to offset the climate change effects on hunger of $6.18 billion for the 2015-2020 period, more than double the costs in the Reference scenario.

Given their critical role in forging the agenda to build climate resilience for African agriculture, governments in each country will need to increase support for the NARS. Stronger collaboration between national R&D systems and International Agricultural Research Systems in adaptive research and deployment of technologies, innovations, and management practices (TIMPs) is needed to understand Africa's soils and breeds to fine-tune the

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design of technologies for promoting climate resilience. This will require actions from both development partners (to ensure that CGIAR funding is actually effective in supporting NARS and public extension services) and African governments (to achieve greater accountability from their NARS and extension systems). There should be greater focus on building local capacity and organizational effectiveness of local R&D. The strategy must also identify effective strategies to reorganize the NARS and extension systems to overcome the incentive and performance problems that have inhibited them from contributing to sustainable agricultural productivity growth and resilience. Governments should also invest more in strengthening public-private partnerships (PPPs) in RD&E including synergies between national agricultural universities and NARS. Investors must prioritize innovations for the circular economy as well as solutions for de-risking smallholder production systems while promoting climate-smart technologies across the entire food system. Examples of this include solar technologies for value addition, weather insurance products, water recycling systems, climate information services, and digital agricultural services. nformation services, and digital agricultural services.

Megatrend #5: Ongoing global health crises, regional conflicts, and economic disruptions

The high incidence of acute food insecurity and malnutrition in numerous countries across Africa starkly exposes the fragility of regional food systems that are under mounting pressure from the increased frequency and severity of weather extremes, ongoing impacts of the COVID-19 pandemic, increasing conflict and insecurity, and rising global food prices. Rapid globalization, especially over the past four decades, has increased African countries' vulnerability to regional as well as global economic shocks. The interconnectedness of these drivers is further revealed by the unfolding war in Ukraine, which compounds existing challenges faced by millions of acutely food-insecure people across Africa and globally. The Russia-Ukraine crisis unambiguously demonstrated how the Baltic Sea region accounted for 25 percent of the world's wheat exports, 40 percent sunflower oil, 15 percent barley and 15 percent of corn exports (The Economist, 2022). The past two-odd years have served as a difficult reminder of the risks that abound with Africa's excessive reliance on global supply chains for key agricultural commodities notably wheat, corn, and cooking oil to meet the food security needs of its rapidly growing and urbanizing population.

The 2022 outlook for acute food insecurity is expected to deteriorate further relative to 2021 in many parts of Africa because of ongoing civil unrest, intercommunal conflict, and other drivers of insecurity. Organized violence and armed conflict are key drivers of acute food insecurity in eastern Democratic Republic of the Congo (DRC), Ethiopia, northern Nigeria, northern Mozambique, central Sahel, Somalia, and South Sudan (WFP & FAO, 2022). In addition, the unfolding war in Ukraine is likely to exacerbate the already severe 2022 acute food insecurity forecasts reported by the World Food Programme (WFP), given that the implications of the war for global food, energy, and agricultural input prices and supplies have not yet been factored into most country-level projection analyses (WFP, 2022).

Civil unrest and violent conflict often lead to displacement and migration, which are associated with hunger and malnutrition (Holleman et al., 2017). Violence and conflict often impede the delivery and distribution of humanitarian assistance, which can escalate deteriorating conditions of food insecurity that can lead to famine. The Integrated Food Security Phase Classification (IPC) defines famine as an extreme deprivation of food (IPC, 2022). In famine-like conditions, starvation, death, destitution, and extremely critical levels of acute malnutrition are or will likely be evident. A Famine classification (IPC Phase 5) is the highest phase of the IPC Acute Food Insecurity Scale and is attributed when an area has (i) at least 20 percent of households facing an extreme lack of food, (ii) at least 30 percent of children suffering from acute malnutrition, and (iii) two people for every 10,000 dying each day due to outright starvation or to the interaction of malnutrition and disease.

According to the UN, there are nine situations of medium or high risk of famine in 2022. Two are in Asia - Afghanistan and Yemen, and seven are in Africa - Ethiopia, South Sudan, Somalia, Nigeria, the DRC, Madagascar, and the West African Sahel (WFP & FAO, 2022). In almost all these situations, the immediate reason for mass hunger is armed conflict.

These global agricultural trade disruptions take on added importance for the African agricultural landscape when overlaid with the shocks from climate change articulated in Megatrend #4 summarized earlier. In response, governments are increasingly looking for alternative sources of raw materials and food in the vicinity of the market (Ujunwa et al, 2021). Similarly, investments in food production and processing will now be more localized or placed in

areas exhibiting low risk to supply chain disruptions. For imported foods, there is a renewed interest by governments to strike bilateral and multilateral economic cooperation agreements to secure sources of food and the markets.

The unpredictability of global supply chains considering recent pandemics, ongoing conflict, and economic downturns will persist. African governments and businesses are now increasingly aware of the importance of regional or short supply chains in ensuring a sustainable and stable flow of key food and essential commodities to the continent. The ratification and eventual implementation of regional integration agendas such as AfCFTA will likely gain momentum triggering more investments in production, trade, and logistics including digitalization on agrifood value chains.

Priority response actions

Governments can support food systems by prioritizing investments in local wet markets and opening new trade corridors that are connected to major sources of raw materials. The professionalization of commodity value chains within countries and sub-regions will be crucial. Investment in rural infrastructure and logistics as well as backbone intraregional trade infrastructure linking production, processing and consumption regions or markets will be important for reducing post-harvest food waste and building resilience to supply-chain and non-covariate shocks. Purposive institutional investments will be required for the development of formal agricultural commodity markets at the country and regional levels complete with more sophisticated futures and options markets that facilitate inter-temporal price risk management, supply-chain disruptions and the systematic monitoring of regional and international markets. The steady development of information and communication technology (ICT) infrastructure and skills across the continent will aid supply chain coordination and commodity market development through technologies such as digital tracking of shipments, quality monitoring, and the integrity of commodity contracts. Most importantly, governments should work closely with the private sector to build effective emergency response mechanisms to anticipate and manage disruptions to the food system.

Megatrend #6: Accelerated pace of technical innovation in communications, information, and supply chains

While the pace of technical innovation across the agrifood value chain is lower in Africa compared to global trends, the continent is experiencing leapfrogging in digital agriculture[8]. In most African countries, the rapid adoption of mobile phones and internet connectivity have accelerated the deployment of agricultural services for farmers and other value chain actors resulting in enhanced access to information, knowledge, financial services, markets, and farm tools (Mabaya & Porciello, 2022). According to a recent report by CTA[9] and Dalberg, there were at least 390 ICT and digital solutions actively operating in the African agriculture space in 2018 (Tsan, 2019). By the end of 2019, that number had gone up to 437 just for SSA (Phatty-Jobe et al., 2020). The digital agricultural innovations that are currently in use across Africa can be classified into the following categories and examples:

- ***Digital advisory and extension:*** Customized extensions services, market information systems, early warning tools for weather/climate advisory and pest/disease control, predictive analytics.
- ***Financial access:*** E-wallet, mobile payments, commitment savings systems, warehouse receipt systems, index-based insurance products, credit risk profiling, crowdfunding platforms.
- ***Digital farm tools:*** Farm management software, precision agriculture tools, drones, robotics, remote sensing, shared economy for mechanization, pay-as-you-go irrigation, internet of things.
- ***Market linkage solutions:*** Online agri-inputs and output markets, service provider linkages, e-commerce, supply chain management, traceability solutions certification, traceability systems.

8 Digital agriculture refers collectively to agricultural practices that digitally collect, store, analyze, and share electronic data and information along agrifood systems to improve efficiency (Tsan et al, 2019).

9 Technical Centre for Agricultural and Rural Co-operation (CTA)

Collectively, these services reach an estimated 33 million agrifood value chain actors, most of whom are smallholder farmers (Tsan et al, 2019). Increased digitization of Africa's food systems has the potential to increase resilience through better coordination between actors as well as increased use of big data to predict and mitigate against shocks. It is worth noting that the COVID-19 pandemic has provided a unique opportunity to fast-track the deployment of contact-free digital solutions across all sectors including agriculture.

A clear winner from this disruptive innovation is digital agricultural advisory services or extension. Historically, the challenge of enhancing agricultural productivity among smallholder farmers has been hampered by thin (low ratios of extension officers to farmers) and under-resourced public extension. Digital platforms have unlocked the ability to deliver real-time advice to farmers through intuitive multimedia formats and often in local languages. For a small fraction of the cost of traditional extension services, many smallholder farmers now have unprecedented access to critical information such as weather forecasting, pest and disease surveillance, latest animal and crop husbandry techniques and market intelligence. While farmer advisory services only account for an estimated 35 percent of unique digital solutions across Africa, they account for 68 percent of all subscriptions (Tsan, 2019).

Priority response actions

The digital agricultural revolution shows great potential to enhance productivity, lower transaction costs, and reduce information asymmetries across Africa's food systems. However, full potential can only be achieved from deliberate creation and maintenance of an enabling environment that will accelerate the pace of investment in communications infrastructure in rural areas. Increased public investment in national agriculture RD&E is required to strengthen their capacity to adapt digital innovations to local contexts. With advances in the ability to reach farmers in remote areas through digital platforms, a new role for extension services is to increase availability of locally- and evidence-based guidance that is truly useful to farmers. Public extension services could collaborate with content moderators on digital platforms to ensure greater oversight over the content targeted at smallholder farmers and safeguard farmer privacy. Governments and development partners can also play a key role in minimizing the growing "digital divide", so as not to leave behind underprivileged members of society especially the poor, rural dwellers, the elderly, women, and persons with disabilities (PWDs) who may lack access to information and communication technologies.

Text Box 1.5

School feeding and fortified whole grain in Rwanda[1]

Among the plausible interventions to improve school feeding in Rwanda, replacing refined grain flour with fortified whole grain (FWG) flour has been identified as one of the highest impact and most economically-feasible options. An 18-month pilot effort in Rwanda demonstrated the feasibility of producing high-quality FWG maize flour at the same cost as refined flours and shifting consumer preferences towards FWG.[2,3] This transition has the potential to impact approximately 3.5 million students (more than a quarter of Rwanda's total population) under the country's universal school feeding program and have spillover effects onto students' families, consumer markets, and future generations.

Transitioning to FWG presents two main benefits with impactful ripple effects. First, FWGs are five times more nutrient-dense than unfortified refined grains.[4] Moreover, given the 20-30 percent higher extraction rate, the same amount of food can be produced with fewer resources significantly reducing environmental and biodiversity impacts. These will in turn have a ripple effect of improving overall food system resilience and boosting local economic opportunities.

Building on the True Cost of Food Methodology developed in the US last year, the same True Value lens was adopted to assess the broader social and economic benefits of a potential transition to FWG in school meals in Rwanda. The preliminary total value (base case scenario) associated with this shift in Rwanda is estimated to be

1 All impact numbers are highly preliminary and still subject to changes
2 The Rockefeller Foundation (RF) supported a pilot in Rwanda between August 2020 and December 2021 to replace refined maize flour with FWG flour in school meals in a budget-neutral way. The pilot reached nearly 14,000 children and has since been expanded to 41,000 children.
3 World Food Programme and Rockefeller Foundation, 2022, "Igniting an institutional shift to fortified wholegrains (FWG) in Rwanda".
4 USDA FoodData Central, WFP Fortified Whole Maize Meal – Eastern Africa Community (EAC) Technical Specification

approximately US$50 million across health, environmental, and economic benefits, with health and environment accounting for over 90 percent of the total benefits.

- The preliminary annual health benefit for the 3.5 million children, which are fully realized later in life, was estimated to be roughly US$10 million. A bottom-up approach was used to understand the present value of disability-adjusted life years (DALYs) averted for diseases and risk factors directly associated with fortified whole grains and monetized through Value of Statistical Life Years. [5,6,7,8,9,10]
- In addition, given the higher yield rate of whole grains, there was an anticipated US$35 million environmental and biodiversity benefit including approximately US$30 million in land use savings, and US$5 million in GHG emission reduction and water savings. Importantly, the more efficient use of land, with approximately 8,000 hectares of land saved (equivalent to 11 percent of the area of Kigali), highlights the potential of broader consumer adoption of FWG to help alleviate the land scarcity challenge in Rwanda. A bottom-up approach was used to estimate the impact of the transition based on the differences in environmental impacts between refined and FWG for school meals,[11,12] and monetized through monetization factors from True Price.[13]
- Similarly, local millers and processors could also benefit from this transition as more grains could be sold for human consumption at higher prices than for other purposes. A top-down approach was adopted and a US$1-3 million topline improvement is projected for mid-sized and small millers, the primary suppliers to school feeding programs.

Although the enormous benefits of FWG are well-recognized, there are several barriers to implementation. Investment in new equipment, social marketing, and technical assistance to millers would be required to unlock the change. Based on a highly preliminary estimation, approximately 12 millers would be required to meet the total needs of 3.5 million students in the long run amounting to a US$3-5 million[14] investment in total.

This transition will not happen overnight. Over the next one to two years, the focus should be on putting in place the building blocks for more sustainable and tangible change in the future—building on processes that are already advanced in Rwanda and taking them to scale. This implementation will require partnership and support from a range of stakeholders at the global and national levels including key ministries in Rwanda such as education, health, agriculture, industry, and local government.

Reinforcing this effort will be the global School Meals Coalition, an initiative launched by the governments of France and Finland at the 2021 UNFSS, which now includes 67 member countries. The Coalition has created political momentum that is expected to accelerate policy uptake and change in this area.

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5 Verguet et al. (2020) Public Health. The broader economic value of school feeding programs in low- and middle-income countries;" and Institute for Health Metrics and Evaluation (IHME)
6 Rosettie et al., "Comparative risk assessment of school food environment policies and childhood diets, childhood obesity, and future cardiometabolic mortality in the United States," Plos One, July 16, 2018, DOI: https://doi.org/10.1371/journal.pone.0200378; and WFP School Feeding Program
7 World Bank Data Indicators, www.data.worldbank.org/indicator
8 Institute for Health Metrics Evaluation. Used with permission
9 Patenaude et al. (2019), Value in Health. "The value of a statistical life-year in Sub-Saharan Africa: evidence from a large population-based survey in Tanzania."
10 Trautmann et al. "Value of statistical life year in extreme poverty: a randomized experiment of measurement methods in rural Burkina Faso," Population Health Metrics, Volume 19, P19-45, DOI: https://doi.org/10.1186/s12963-021-00275-y
11 Poore et al., "Reducing food's environmental impacts through producers and consumers," Science Vol. 360, No. 6392, pp. 987-992, 1 Jun 2018, DOI: 10.1126/science.aaq0216
12 WWF (2020). Bending the Curve: The Restorative Power of Planet-Based Diets. Loken, B. et al. WWF, Gland, Switzerland
13 True Price provides global and/or country-specific monetization factors for environment and biodiversity metrics such as GHG emission, land use and water use. For impact metrics where country-specific data is not available, global monetization factors were used as an alternative to estimate the impacts.
14 Implementation costs are highly preliminary. The Rockefeller Foundation, WFP and other development partners are on the ground working with various stakeholders (e.g., mid-size millers) to gain a better understanding of the investments required.

Towards a plan for action

SSA's share in the world's population will rise from one-seventh today to more than one-fifth by 2050. Just eight countries globally will account for more than half the rise in global population expected by 2050 with five of these in Africa (the DRC, Egypt, Ethiopia, Nigeria, and Tanzania). In most countries, the urban population is growing at a faster rate than the rural population. Against the backdrop of these trends in population growth, African food systems are undergoing a transformation, the path of which is so far uncharted, in part, because of increasing uncertainty. AASR22 highlights the need to accelerate action for the transformation of African food systems.

A food systems approach to policymaking can be defined as the process of formulating policies to transform the whole food system toward a stated policy objective while leveraging the benefits and managing the risks for multiple food system objectives (Nyaku et al., 2022). In addition, a food systems approach maximizes the ability to achieve multiple food system objectives by increasing the potential of finding the most effective solutions, and the efficiency of policy in attaining multiple objectives, reducing the risk of unintended consequences, helping identify who needs to be involved in policymaking, and providing an inclusive framework for coordinating policy mechanisms.

The transformation of African food systems will occur against the backdrop of several megatrends that are currently the primary drivers of change in food systems on the continent. Rural population growth is leading to more acute land scarcity facing most rural Africans, altering young peoples' livelihood options, and requiring productivity growth on existing cropland as the main source of sustainable agricultural growth. At the same time, rapidly-growing urban areas are creating a stable source of demand for African food producers and for small, medium, and large agribusiness firms in agrifood systems. A broader economic transformation, whose main features include rising wage rates and per capita incomes, is increasing demand for food and shifting diets. Changing climate conditions are altering best practices on African farms and requiring modifications to the organization of food systems and supply chains. Potentially more common global health crises and ongoing regional conflicts will lead to further economic disruptions and deterioration of food insecurity. Finally, economic development has accelerated the pace of technical innovation in digital agriculture with changes in farm factor prices, per capita incomes, and the composition of food demand.

Sustained technical innovation on tens of millions of African farms will be required to adapt production systems to changing climates, ensure soil health, and the sustainability of food production and distribution systems in Africa. Chronically low public expenditures on agricultural RD&E continue to slow the pace of farm technical innovation and agricultural productivity growth compared to other regions forcing much of the continent to further rely on extensification as the primary source of agricultural growth. There is a critical need for improved performance of African RD&E systems to eliminate the ever-widening yield gaps in cereals and oilseeds and power inclusive agrifood systems transformation. Technical innovation required for inclusive transformation has been insufficient in the past. The CGIAR must evolve from leading R&D activities to elevating the NARS and Forum for Agricultural Research in Africa (FARA) to lead on their own, with the CGIAR system transitioning to a support role, not a dominant role. This implies a much greater emphasis on capacity development, sharing funding and other resources that the CGIAR receives from donors and foundations more equitably with the NARS and continental African R&D organizations.

There are increased calls to incorporate accounting mechanisms (e.g., True Cost Accounting) that help us better understand the true value of food and hence rally efforts towards addressing the environmental, social, and health costs as well as the unintended consequences associated with the production, distribution, and processing of food.

In his May 2022 remarks to the Global Food Security Call to Action Ministerial, UN Secretary-General António Guterres offered five urgent actions for governments, international financial institutions, and others, to solve the short-term crisis and prevent long-term catastrophe (UN, 2022). These were:

1. Urgently reduce the pressure on markets by increasing supplies of food and fertilizers.
2. Ensure social protection systems cover everyone in need with the right combinations of food, cash, and support for water, sanitation, nutrition, and livelihoods.

3. Ensure the essential availability of finance. Developing countries must have access to liquidity so that they can provide social protection to everyone in need.
4. Governments must bolster agricultural production and invest in resilient food systems that protect smallholder food producers.
5. Humanitarian operations must be fully funded to prevent famine and reduce hunger.

The central theme and key messages of this year's AASR are well aligned with the UN Secretary-General's remarks. The CGIAR system, which is relatively well financed, can contribute to achieving these objectives by expanding its role of leading global agricultural technical innovation to building the capacity of African research, development and extension organizations to assume the leadership in prioritizing and delivering on technical innovation in African countries. A transformation of Africa's food systems will require coordinated leadership, substantial investment by both governments and the private sector, and enhanced capacity for change and adaptation. Accelerating action toward this transformation will be critical for Africa to meet present challenges facing food systems across the continent.

References

Abay, K. A., Chamberlin, J., & Berhane, G. (2021). Are land rental markets responding to rising population pressures and land scarcity in sub-Saharan Africa?. *Land Use Policy*, 101, 105139.

Abegunde, V. O., Sibanda, M., & Obi, A. (2019). The dynamics of climate change adaptation in Sub-Saharan Africa: A review of climate-smart agriculture among small-scale farmers. *Climate*, 7(11), 132. https://doi.org/10.3390/cli7110132

AUDA (African Union Development Agency). (2021). *Africa Common Position on Food Systems: Regional Submission to the UN Food Systems Summit*. Johannesburg: African Union Development Agency.

Bastien-Olvera, B. A., & Moore, F. C. (2021). Climate Impacts on Natural Capital: Consequences for the Social Cost of Carbon. *Annual Review of Resource Economics*, Forthcoming, Available at SSRN: http://dx.doi.org/10.2139/ssrn.3945184

Brottem, L. (2021). The Growing Complexity of Farmer-Herder Conflict in West and Central Africa in African Security Brief 39, African Center for Strategic Studies Available at: https://africacenter.org/publication/growing-complexity-farmer-herder-conflict-west-central-africa/

Byerlee, D., Falcon, W. P., & Naylor, R. L. (2017). *The Tropical Oil Crop Revolution: Food, Feed, Fuel, and Forests*. New York: Oxford University Press.

Calzadilla, A., Zhu, T., Rehdanz, K., Tol, R. S., & Ringler, C. (2013). Economywide impacts of climate change on agriculture in Sub-Saharan Africa. *Ecological Economics*, *93*, 150-165.

Chimhowu, A. (2019). The 'new' African customary land tenure. Characteristic, features and policy implications of a new paradigm. *Land Use Policy*, 81, 897-903.

Choularton, R., Frankenberger, T., Kurtz J. & Nelson, S. (2015). Measuring Shocks and Stressors as Part of Resilience Measurement. Resilience Measurement Technical Working Group. Technical Series No. 5. Rome: Food Security Information Network. Available at: http://www.fsincop.net/fileadmin/user_upload/fsin/docs/resources/FSIN_TechnicalSeries_5.pdf

Djurfeldt, A. A. (2015). Urbanization and linkages to smallholder farming in sub-Saharan Africa: Implications for food security. *Global Food Security*, 4, 1-7.

FEWS NET (Famine Early Warning Systems Network). (2022), Unprecedented drought brings threat of starvation to millions in Ethiopia, Kenya, and Somalia. Issue Date: 9 June 2022

Holleman, C., Jackson, J., Sánchez, M.V. and Vos, R. (2017). Sowing the seeds of peace for food security - Disentangling the nexus between conflict, food security and peace. FAO Agricultural Development Economics Technical Study 2. Rome: Food and Agriculture Organization of the United Nations. 95 pp.

IFAD (International Fund for Agricultural Development). (2015). Measuring climate resilience. Rome: International Fund for Agricultural Development, Environment and Climate Division.

IFPRI (International Food Policy Research Institute). (2022). Food systems. Available at https://www.ifpri.org/topic/food-systems

IPCC (Intergovernmental Panel on Climate Change). (2022) Sixth Assessment Report - Regional Fact Sheet - Africa, Available at https://www.ipcc.ch/report/ar6/wg1/downloads/factsheets/IPCC_AR6_WGI_Regional_Fact_Sheet_Africa.pdf

Jayne, T. S., Chamberlin, J., & Headey, D. D. (2014). Land pressures, the evolution of farming systems, and development strategies in Africa: a synthesis. *Food Policy*, 48, 1-17.

Jayne, T. S., Chamberlin, J., Holden, S., Ghebru, H., Ricker-Gilbert, J., & Place, F. (2021). Rising land commodification in sub-Saharan Africa: Reconciling the diverse narratives. *Global Food Security*, *30* (September), 100565.

Jayne, T. S., Wineman, A., Chamberlin, J., Muyanga, M., & Yeboah, F. K. (2022). Changing farm size distributions and agricultural transformation in sub-Saharan Africa. *Annual Review of Resource Economics*, Forthcoming. http://dx.doi.org/10.2139/ssrn.3958495

Mabaya, E., & Porciello, J. (2022). Can digital solutions transform agrifood systems in Africa?. Agrekon, 61(1), 67-79.

Maggio, A., Scapolo, F., van Criekinge, T., & Serraj, R. (2019). Global drivers and megatrends in agrifood systems. In Serraj, R. & Pingali, P. (eds.), *Agriculture & Food Systems to 2050: Global Trends, Challenges and Opportunities* (pp. 47-83). Singapore: World Scientific Publishing Co. Pte. Ltd.

Michler, J. D. (2020). Agriculture in the process of development: A micro-perspective. *World Development*, 129, 104888.

Mildner, S. A., Lauster, G., & Wodni, W. (2011). Scarcity and abundance revisited: A literature review on natural resources and conflict. *International Journal of Conflict and Violence*, 5(1), 155-172.

Nyaku, A., Flory, A., Ledlie, N., Andridge, C., Fletcher, E. K., Huestis, A., Detwiler, B., Hawkes, C., & Trübswasser, U. (2022). *Taking a Food Systems Approach to Policymaking: A Resource for Policymakers*. Washington: Results for Development.

OECD (Organisation for Economic Co-operation and Development). (2016). OECD Science, Technology and Innovation Outlook 2016: Megatrends affecting science, technology and innovation. Paris: Organisation for Economic Co-operation and Development.

Olwande, J., Jayne, T.S., Zingore, S., Ngoma, H., Mungai, N., Tiemann, L., Sanchez, P., Palm, C. 2022. Megatrends Shaping African Agriculture: Challenges and Opportunities. Report 1.4 under the Project to Support the Africa Union Commission Africa Fertilizer and Soil Health Initiative, International Fertilizer Development Centre/Regional Network of Agricultural Policy Research Institutes in Eastern and Southern Africa/Alliance for African Partnership.

Phatty-Jobe, A., Seth, A., & Norton, K. (2020). Digital agriculture maps 2020 state of the sector in low and middle-income countries. GSMA AgriTech and IDH Farmfit. https://www.gsma.com/r/wp-content/uploads/2020/10/GSMA-Agritech-Digital-Agriculture-Maps-2020-1.pdf (accessed June 14, 2021).

Porciello, J., Coggins, S., Mabaya, E., & Otunba-Payne, G. (2022). Digital agriculture services in low-and middle-income countries: A systematic scoping review. *Global Food Security*, 34, 100640.

Richardson, R. B., Olabisi, L. S., Waldman, K. B., Sakana, N., & Brugnone, N. G. (2021). Modeling interventions to reduce deforestation in Zambia. *Agricultural Systems*, 194, 103263.

Ruben, R., Cavatassi, R., Lipper, L., Smaling, E., & Winters, P. (2021). Towards food systems transformation—five paradigm shifts for healthy, inclusive and sustainable food systems. *Food Security* 13, 1423–1430 https://doi.org/10.1007/s12571-021-01221-4

Sulser, T., Wiebe, K. D., Dunston, S., Cenacchi, N., Nin-Pratt, A., Mason-D'Croz, D., Robertson, R., Willenbockel, D., & Rosegrant, M. W. (2021). *Climate change and Hunger: Estimating Costs of Adaptation in the Agrifood System*. Washington, DC: International Food Policy Research Institute.

The Economist (2022). The coming food catastrophe: War is tipping a fragile world towards mass hunger. *The Economist*, May 19, 2022 (Updated May 21, 2022). Available at https://www.economist.com/leaders/2022/05/19/the-coming-food-catastrophe

Tongwane, M. I., & Moeletsi, M. E. (2018). A review of greenhouse gas emissions from the agriculture sector in Africa. *Agricultural Systems*, 166, 124-134.

Tsan, M., Totapally, S., Hailu, M. and Addom, B.K., 2019. The Digitalisation of African Agriculture Report 2018–2019. CTA.

Sissoko, K., van Keulen, H., Verhagen, J., Tekken, V., & Battaglini, A. (2011). Agriculture, livelihoods and climate change in the West African Sahel. *Regional Environmental Change*, *11*(1), 119-125.

Schoneveld, G (2014) The geographic and sectoral patterns of large-scale farmland investments in sub-Saharan Africa. *Food Policy*, *48*, 34-50. https://doi.org/10.1016/j.foodpol.2014.03.007

Tschirley, D., Reardon, T., Dolislager, M., & Snyder, J. (2015a). The rise of a middle class in East and Southern Africa: Implications for food system transformation. *Journal of International Development*, *27*(5), 628-646. https://doi.org/10.1002/jid.3107

Tschirley, D. L., Snyder, J., Dolislager, M., Reardon, T., Haggblade, S., Goeb, J., Traub, L., Ejobi, F., & Meyer, F. (2015). Africa's unfolding diet transformation: implications for agrifood system employment. *Journal of Agribusiness in Developing*

and Emerging Economies, *5*(2), 102-136. https://doi.org/10.1108/JADEE-01-2015-0003

United Nations. (2022). Secretary-General's remarks to the Global Food Security Call to Action Ministerial. 18 May 2022. https://www.un.org/sg/en/content/sg/speeches/2022-05-18/secretary-generals-remarks-the-global-food-security-call-action-ministerial%C2%A0

UN DESA (United Nations Department of Economic and Social Affairs). (2019). *World Urbanization Prospects: The 2018 Revision*. New York: United Nations.

Ujunwa, A. I., Ujunwa, A., & Okoyeuzu, C. R. (2021). Rethinking African globalisation agenda: Lessons from COVID-19. *Research in Globalization*, 3, 100055.

van Ittersum, M. K., Van Bussel, L. G., Wolf, J., Grassini, P., Van Wart, J., Guilpart, N., ... & Cassman, K. G. (2016). Can sub-Saharan Africa feed itself?. *Proceedings of the National Academy of Sciences*, *113*(52), 14964-14969.

WFP (World Food Programme). (2022). *Global Report on Food Crises - 2022*. 4 May 2022. Rome: World Food Programme. https://www.wfp.org/publications/global-report-food-crises-2022

WFP and FAO. (2022). *Hunger Hotspots. FAO-WFP early warnings on acute food insecurity: June to September 2022 Outlook*. Rome: Food and Agriculture Organization of the United Nations. https://www.wfp.org/publications/hunger-hotspots-fao-wfp-early-warnings-acute-food-insecurity-june-september-2022

World Bank, 2020. Scaling up Action for Transformative Change: Food Systems 2030. Washington, DC, the World Bank. https://thedocs.worldbank.org/en/doc/183211604418620533-0090022020/original/BrochureFS20306Oct2020.pdf

Yeboah, F. K., & Jayne, T. S. (2018). Africa's evolving employment trends. *The Journal of Development Studies*, 54(5), 803-832.

Zseleczky, L. & Yosef, S. (2014). Are shocks really increasing? A selective review of the global frequency, severity, scope, and impact of five types of shocks. 2020 conference paper Number 5. Washington, DC: International Food Policy Research Institute (IFPRI).

2 Catalyzing African Leadership and Coordination for Food Systems Transformation

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Key messages

1. The role of leadership in food systems transformation is to catalyze and coordinate interventions, policy and investment, coordinate implementation of interventions, set the agenda and lead a mindset change towards healthy and sustainable food systems.

2. Africa's political systems - governments and regional bodies—such as the AU, the Economic Community of West African States (ECOWAS), the East African Community (EAC), the Common Market for Eastern and Southern Africa (COMESA), and the Southern Africa Development Cooperation (SADC)—are at the center of leadership and coordination of food systems transformation interventions through political decision-making, allocation of resources to implement such decisions, and coordinating trading and movement of food products.

3. The AU's CAADP, Agenda 2063, and AfCFTA are examples of leadership at the continental level that can drive food systems transformation through setting a continental agenda and coordinating and measuring actions.

4. African governments should support more of the existing "bright spots" initiatives—AL for Agribusiness (ALAN), Young African Leaders Initiative (YALI), The Mandela Washington Fellowship for Young African Leaders, The African Food Fellowship, USAID's Africa Lead I & II program, and AGRA's Center for African Leaders in Agriculture (CALA)—that seek to build a pool of policymakers, leaders and champions of food systems transformation.

5. Leadership and coordination of food systems transformation should adopt a multi-stakeholder approach to enhance efficiency in resource use, effectiveness of interventions, buy-in by target communities, and better targeting of food systems transformation interventions. The 2021 UNFSS showcased the necessity of an inclusive food systems approach through wide scale dialogues at all levels including communities, youth, indigenous peoples' organizations, producer organizations, and national leaders.

6. African governments should coordinate their food systems by harmonizing national, regional, and continental agrifood systems frameworks for key sub-sectors such as trade, seeds, fertilizers, and strategic food reserves; coordinating aid and donor support to enhance aid effectiveness; and developing common positions on matters of common interest on global platforms.

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Introduction

This chapter discusses the role of leadership in transforming Africa's food systems and reviews the role that governments, continental bodies and other stakeholders are playing to strengthen African leadership in the food systems space. Food systems encompasses all the elements and activities related to food production, processing, distribution, preparation, consumption, and disposal—including the market and institutional networks for their governance, as well as the outcomes of these elements for health, livelihoods, and the environment (Ruben et al 2021).

From this definition, we deduce more broadly the roles and challenges of leadership in transforming a food system. The first implies the role of leadership in catalyzing and coordinating interventions, policy, and investment across several value chains, and coordinating implementation of interventions across a number of seemingly disparate fields including agricultural production, nutrition, marketing, finance and investment, trade, industry, logistics and infrastructure (IFAD 2021b). The second speaks to agenda setting and mindset change to highlight the importance of appropriate diets, changing food consumption patterns, and the obligation to measure food systems outcomes on health, wealth, and the environment (Steiner et al 2020).

The chapter discusses how African countries might align with and leverage existing institutions and processes at the continental level to harness collective efforts towards transforming food systems on the continent. Specifically, we discuss Africa's CAADP, which has shaped the continent's agricultural development for close to two decades. We also discuss how this framework might be repurposed to accelerate food systems transformation. At the national level we discuss the type of barriers that need to be dismantled and the practical tasks needed to catalyze inclusive and sustainable food systems. We note that achieving an inclusive food systems transformation will also require effective leadership from other key stakeholders including knowledge bodies such as institutions of higher learning and think tanks, the private sector, civil society, and other formations. To this end, we discuss the role of other actors including development institutions, research institutes, and tertiary institutions in producing knowledge and shaping the next generation of leaders to take forward Africa's food systems transformation.

Political economy of Africa's food and agricultural systems

Political economy is defined as the interaction of political and economic processes in a society: the distribution of power and wealth between different groups and individuals and the processes that create, sustain, and transform these relationships over time (Collinson, S. (ed.), 2003). The political economy is at the center of leadership and coordination of food systems transformation interventions at the political decision-making level and allocation of resources to implement such decisions. To understand the role of the political economy, one must evaluate how national political systems are intertwined with that of other African countries and international political systems.

African countries are party to the UN political system whose initiatives such as the Sustainable Development Agenda, the 17 SDGs, and the UNFSS set the global agenda for food systems transformation. All UN Member States (including African States) adopted the SDGs and have taken steps to align their national policies while the 2021 UNFSS encouraged countries to leverage the power of food systems to drive recovery from the COVID-19 pandemic and achievement of the sustainable development agenda (United Nations, 2021). The dialogues for Africa provided a coordination mechanism for countries to explore pathways for accelerating food systems transformation and to align and orient solutions to the African context. During the UNFSS, AU Member States came up with Africa's Common Position on Food Systems following which the AU has developed an overarching Food Systems Programme to support the goal of more inclusive, sustainable, healthy, and nutritious food systems in Africa.

In Africa, the AU and regional trade unions ECOWAS, EAC, SADC, and COMESA play a major role in setting the agenda and coordinating agricultural activities, especially in the trading and movement of agricultural products. These institutions provide platforms for discussions and agreement on emerging and priority issues and coordination of response actions in instances where an international or regional response is required. Beyond setting the agenda and coordination, some of the institutions provide platforms for sanctioning common rules of trade, which affects the movement of agricultural and food products. Some clear examples include CAADP and AfCFTA, which is a flagship project of Agenda 2063.

National and subnational governments can coordinate food systems transformation through a consultative policymaking process that brings together various ministries and stakeholders through organs such as inter-ministerial committees, sector working groups, and private sector desks (AASR, 2018). In countries with two levels of government such as Kenya (devolved) and Nigeria (federal), the responsibility of food systems transformations is shared between the national and state or county government. Implementation of interventions in such governments can be derailed if there is insufficient consultation between the two levels of government, which could lead to incoherence and lack of accountability on implementation of policies (Kimani, 2020).

The role of the private sector in shaping the political economy that affects food systems transformation cannot be overlooked. The private sector constitutes most food producers, transporters, processors, marketers, financial institutions, among other players in food systems. The private sector is organized and coordinated within the respective sector organs such as farmers' cooperatives and unions, business associations such as the Kenya Private Sector Alliance—KEPSA (Irwin and Githinji, 2015). These private sector organizations wield political power and regularly influence government policy and decisions through lobbying and representation on government boards and committees (Irwin and Kyande, 2022). Even more notably, through coordinating organs, the private sector can influence government policy towards creating a favorable political and economic environment for food systems transformation (Irwin and Githinji, 2015).

Coordination of aid has become a major subject of discussion in national and international political dialogues with a view to enhancing aid effectiveness (Bourguignon and Platteau, 2015). Donor Groups such as the Global Crisis Response Group on Food, Energy and Finance (GCRG) coordinate interventions of donors in various sectors by liaising closely with ministries to identify country priorities and funnel support accordingly (UN, 2022). Development partners are usually encouraged to consult and align their strategies and interventions with the policies of the government, thus harmonizing interventions in the country towards a particular goal. Despite the obvious advantages of aid coordination, political control and sovereignty of host countries and donors have derailed coordination efforts (Bourguignon and Platteau, 2015). More often than not, weak coordination has led to duplication of interventions, programs, and funding by development partners (Bourguignon and Platteau, 2015; Gehring et al., 2017). This duplication has resulted in poor utilization of the scarce funding available for agriculture.

Despite the successes enumerated, it is worth noting that the African voice in the global political economy is weak and its effect marginal (Sidiropoulos, 2022). African representation in most global platforms and UN affiliate bodies is disproportionate given that African Member States comprise nearly 28 percent of the UN's overall membership. Only South Africa is a member of the G-20, despite the organization's significant influence on matters affecting Africa such as industrialization and climate change. The same scenario is replicated in the International Monetary Fund (IMF), where only two executive directors represent the 46 African members, and the UN Security Council, where no African country has a permanent seat. While the Doha Declaration rules intended to promote development in poorer countries through trade, they did not yield much for African countries. The Declaration aimed to improve market access and reduce or phase out all forms of export subsidies and other trade-distorting domestic support for agriculture while removing tariff peaks for specific non-agricultural products that developing countries were producing competitively (International Monetary Fund, 2011). African countries have created institutions to coordinate Africa's voice in the global forums, but the effectiveness of these institutions is hampered by the lack of shared interests as well as geopolitical rivalries outside Africa (Sidiropoulos, 2022).

Transforming Africa's food systems: framing the leadership task

This section outlines what is at stake and provides a rationale for transforming Africa's food systems. It takes off from the point of acknowledging that Africa's food systems are not delivering on their mandate. To begin with, food insecurity, hunger and malnutrition are still rampant. Africa is a net food importer and importing about 85 percent of its food leading to an annual bill of US$35 billion (Akiwumi 2020), as many as 46 million Africans hungry, and 282 million undernourished (FAO 2021). Incomes in rural areas are still low. In Africa, 52 percent of the population lives in rural areas (The Global Economy n.d) and earns part of its livelihood by working in the food system. Recent data indicates that extreme poverty is concentrated

in rural areas, especially in SSA where 306.6 million people live in extreme poverty (IFAD 2021). A food systems approach is therefore key for tackling poverty and equitably distributing wealth and opportunity to all including rural dwellers, women, and youth. In general, current global food production systems—land use patterns, production practices, types of foods produced, logistics, consumption patterns and disposal of waste—have been linked to environmental degradation and climate change (Duku et al 2021).

Furthermore, it has been amply demonstrated that Africa's food systems are vulnerable and unable to cope with disruptions. Africa's food systems face risks from multiple shocks including drought, pests and diseases, and global price hikes (Demeke et al 2016). These risks are exacerbated by climate change (IPCC 2019). The Russo-Ukrainian war has shown how a crisis in one part of the world can disproportionately impact Africa's food systems (Sacko and Mayaki 2022). Poor people are highly vulnerable to food system shocks as they have fewer assets and savings to fall back on (Bené et al., 2021). Vulnerability to shocks impoverishes rural people and prevents them from moving out of poverty.

The foregoing demonstrates that Africa's food systems are not fit for purpose, and it is imperative that they be transformed. However, this transformation to solve the multiple but intricately linked problems of poverty, malnutrition, environmental degradation, and climate change cannot be accomplished through a single intervention. Rather, there is need for fundamental change in the dynamics of food systems (Giller, K., et al. 2021).

Addressing these complex challenges calls for effective and resolute leadership to initiate and sustain reforms and catalyze the necessary investments over lengthy periods of time. Food systems transformation also calls for leadership that is committed to changing the deep-rooted political economy factors that constrain the creation of healthy and sustainable food systems (Bené 2022). Most importantly, it will require engendering collaboration, and communication across sectors and across government, business, civil society, rural people organizations, and the scientific community (IFAD 2021).

Strategic leadership at continental level – CAADP as an example of African leadership

As discussed in earlier sections, Africa's food systems are part of the global food systems that are influenced by several factors including global and national politics, international trade regimes, and existing scientific know-how. Furthermore, multiple stakeholders including governments, global political systems such as the UN, continental and regional bodies, and local organizations interacted on food systems. Possibilities for transforming food systems at national and local levels are shaped by seemingly far-removed influences such as global markets and geopolitical considerations as well as local political dynamics. The following section discusses the role of leadership in shaping food systems at the continental and national level. It also discusses the role of leadership in other areas such as development and academic institutions in shaping food systems.

For nearly two decades, CAADP has informed Africa's policy framework for agricultural transformation, wealth creation, food security and nutrition, economic growth, and prosperity. In 2014, Heads of AU Member States re-committed to the CAADP principles through the Malabo Declaration committing to *"provide effective leadership for the attainment of CAADP goals by the year 2025"*.

Agenda 2063, Africa's development blueprint, is being implemented through ten-year implementation plans over a 50-year period. The Malabo Declaration committed to mutual accountability to actions and results by, among others, conducting a biennial review process that involves tracking, monitoring, and reporting on progress. The CAADP Framework set the national targets of 6 percent agricultural growth, allocation of 10 percent of public expenditure to agriculture, and allocation of 1 percent of agricultural GDP to agricultural R&D. Of these targets, allocation of 10 percent of public expenditure to agriculture is regarded as a proxy measure of a country's political will to develop its agricultural sector.

Over the years the Biennial Review process has established itself as a credible mechanism for helping national governments understand their progress towards targets under the Malabo Declaration. This tried and tested mechanism could be re-aligned to ensure that it considers interventions, investments, and outcomes related to sustainable food systems including indicators related to changing diets,

nutrition, the environment, and climate change. There is need for voices at the continental level to ensure that the CAADP framework is aimed at achieving sustainable food systems and not merely repurposed to include agricultural development.

Similarly, AfCFTA is an Agenda 2063 flagship project and is regarded as a game changer, especially for SMEs. Once fully operationalized, the agreement will reduce tariffs, cut red tape, and simplify customs procedures among member countries to reform markets and boost output in various sectors including agriculture and food. It is important that implementation of the Agreement be accompanied by investments in the digital skills and other critical capacities of SMEs which deal in nutritious food to enable them to scale their businesses.

All in all, Africa already has the continental institutions and frameworks that have been proven to work in shaping change in the agrifood sector. Through the AU's convening power, CAADP and related frameworks can be used to set the agenda for food systems transformation and to monitor implementation. The establishment of AfCFTA provides opportunities for growth for small producers who are key to the attainment of sustainable food systems transformation.

Impactful food systems leadership at country level

At the national level, the task of transforming non-performing and misaligned food systems to systems that promote healthy outcomes for humans and the environment, provide a decent living for all, and are resilient requires astute leadership at the highest political levels and at all levels of government. Food systems are nested in deep-rooted political, economic, cultural, and institutional structures that have locked in national policy and incentive systems that ultimately inhibit the creation of sustainable food systems (Bené 2022). In addition, literature on agrifood systems change notes that changing a food system entail navigating, among others, competing values, ideologies, and power interests from multiple stakeholders (Leeuwis et al 2021). Transforming food systems will therefore require astute leadership to navigate political, economic, and social barriers as well as all other competing elements. Literature on policy change in the agrifood sector outlines key tasks that leaders need to undertake to catalyze transformation of food systems. These are: (i) create and sell a national vision and engage stakeholders, (ii) develop robust and yet achievable plans to transform food systems, (iii) coordinate policy and investments, (iv) change consumer demand, and (v) use data to inform policy and actions.

i. Vision Setting and Stakeholder Engagement

Commentators on the role of leadership in food systems change note that the transformation of food systems will be led by politicians (Birner et al 2018). In this regard, leadership is about harnessing the mindsets of elites including bureaucrats, technocrats, Members of Parliament, civil society, and private sector into one collective effort (Said and Rukuni, 2018). To effect the required shift in agrifood systems, plans and interventions in the public and private sectors need to coalesce around a shared vision underpinned by societal understanding and political commitment for action (AGRA, 2018).

ii. Planning for Food Systems Transformation

Having cultivated and sold a vision to elites and the citizenry, good leadership sets out a strategy defined as "a well-defined plan that takes into account the country's political economy and institutional capacity to develop a feasible, prioritized, and adaptive plan to help the country navigate the biggest obstacles and problems it faces to achieve its agricultural potential" (Said and Rukuni 2018). In line with the CAADP framework, African countries are tasked with developing National Agricultural Investment Plans (NAIPs) to guide investments in the agricultural sector. In planning for transformed food systems, national leaders need to redefine the role of NAIPs to build sustainable food systems that deliver good nutrition for the health of the planet. This can be done through incorporating some of the global defined goals and targets optimized for specific country contexts. The EAT Lancet Commission Report (EAT Lancet Commission, n.d) outlines the global goal for the transformation of food systems which is *To Achieve Planetary Health Diets for Nearly 10 Billion People by 2050*. The goal is focused on two targets: healthy diets that provide optimal caloric intake from diversified plant foods and sustainable food production focused on improved production practices, reduced food waste, and reduced emissions. The Commission further outlines strategies towards this goal as:

Target #1: Seek international and national commitment to shift towards healthy diets

Target #2: Reorient agricultural priorities from producing high quantities of food to producing healthy food

Target #3: Sustainably intensify food production to increase high-quality output

Target #4: Strong and coordinated governance of land and oceans

Target #5: At least halve food losses and waste in line with the SDGs

Given the complexity of the task, food systems transformation requires governments to have the capacity to plan and implement evidence-based agricultural policies across sectors (World Bank 2020). This requires a great deal of political will, which is critical as leaders will more often than not be required to push through long-term and sometimes painful reform processes and allocate resources to projects with no immediately discernible benefits.

iii. Coordinate Policy and Investments

Leading for transformed food and agricultural systems requires a good understanding of current and future investments in the agrifood system to ensure that national investments are directed towards producing healthy and nutritious foods under environmentally- and climate-friendly production practices. In addition, there is need for coherent and well aligned policy and incentive frameworks to support businesses that produce nutritious foods in countries, especially SMEs (UNCTAD 2018). Governments support food and agriculture through various policies, including trade and market interventions that generate price incentives or disincentives, fiscal subsidies to producers and consumers, and general services support. These policies may impact all stakeholders or some part of the food environment and can affect the availability and affordability of healthy diets (FAO 2022). Currently, developed and developing countries spend $630 billion on support to agriculture and food sectors. This support largely goes to agricultural producers in forms that affect market prices and distort incentives for producers and consumers (FAO 2022, Vos, Martin and Resnick 2022). In addition, support coupled to output or input use increases output, thus increasing GHG emissions from agricultural production and land conversion for agriculture (Vos, Martin, and Resnick 2022). On the other hand, there is evidence that better nutrition and improved livelihoods are interlinked since demand for more diverse and nutrient-dense diets can create new business opportunities for small-scale agrifood entrepreneurs (GLOPAN, 2020). Support for SMEs therefore also supports creation of employment and enterprise options and decent livelihoods for rural people (Swinnen and Kuijper, 2020).

iv. Shape Consumer Demand

In addition to using policy to direct investments in the food system, leading for food systems transformation also calls for using policy to shape consumer demand in favor of healthier diets. In this regard, measures employed by countries to support agriculture must be aimed at ensuring the availability and accessibility of diversified and nutritious foods (Glopan 2020). Measures such as border controls may affect the availability of fruits, vegetables and other nutritious foods while price controls and subsidies have been used to support the production and importation of staples including maize and wheat flour and sugar. The result has been unhealthy diets caused by increased consumption of these foods.

v. Use Evidence to Inform Policy, Actions, and Investments

Now more than ever, African policymakers need evidence-based data analysis to provide the best policy options for transforming the agricultural and food sectors (Delgado et al 2019). Researchers, analysts, and development partners note that many African countries lack sufficient data and, where it is available, it is not properly segregated to give insights into trends in relation to livelihoods, poverty, nutrition, and natural resources (IFAD 2021). Food systems transformation leaders need to prioritize the strengthening of national data, statistical systems, and integrated analysis; leveraging the potential of big data and innovative digital technologies requires international collaboration and support (Badiane, Odjo and Ulimwengu 2010).

Leadership at the local level: developing agrifood systems champions

Changing food systems is a daunting task considering the people, processes, networks, entities, and resources that need to be involved (Glopan 2020). Besides, producers and consumers may not relate to the broader vision and benefits of diversified and sustainable food systems. Good policies and investments at the national level will not achieve much if farmers and communities are not on board (Reisch 2021). This is where agrifood systems champions come in. In this section, we highlight some of the initiatives that are creating and empowering these cadres of champions. Food and agriculture champions are diverse groups of people recognized in their fields of work, and include scholars, scientists, CSO activists, women and youth leaders, and even high-level political leaders. They work in various

segments of the agrifood system and can lend both their technical expertise and voice to the cause of Africa's agriculture (UN.org)

As practitioners, they bring a practical dimension to the agricultural transformation agenda and propose and even demonstrate practical innovative solutions. As advocates, they bring authenticity, and speak to the concerns of farmers and communities in ways that public policy pronouncements can never hope to achieve. Through their public appeal, they are strategically positioned to advocate for changes and initiate dialogue between farmers, communities and other stakeholders and policymakers. These champions can also create a movement for action. Establishments in the agricultural sector have long recognized the role of these champions as evidenced by the appeal of lead farmers and peer-based extension programs.

Several initiatives have made steps to nurture such leaders and equip them with skills to influence wider constituencies, these include ALAN, which focuses on young people in the agribusiness sector, and world-renowned leadership development programs such as YALI, and the Mandela Washington Fellowship, which have programs for young leaders in agribusiness. These and programs such as Cornell University's Alliance for Science Women Who Farm are beginning to bear fruit as we see cases of young women and women becoming champions for a youth-led agricultural transformation.

Other initiatives have focused on nurturing champions at higher levels including champions in agricultural establishments, policy-making champions, and even high-level politicians. The African Food Fellowship is one such example as is USAID Africa Lead, which built the capacity of Africa's professionals to develop, lead, and manage agricultural programs. Staff from agricultural establishments were trained in program design and management, strategic influencing, and decision-making, among others. At the continental level, CALA is a flagship program for developing agrifood champions. These "African bright spot" initiatives provide the possibility of renewing Africa's agrifood systems transformation.

The Centre for African Leaders in Agriculture

CALA is an initiative of AGRA in partnership with the African Management Institute (AMI) and USAID's Policy LINK with funding support from KfW Development Bank.

The program targets emerging and senior leaders working in and leading country-level priorities across government, the private sector, and civil society. The initiative aims to support sector leaders to deliver on top national priorities in African agriculture and nutrition security in line with the AU Malabo Declaration and the CAADP goals. CALA is aimed at resolving the implementation and institutional capacity challenges faced by sector leaders and AGRA in realizing an inclusive agriculture transformation. The Centre thus applies various case studies, networking, and coaching opportunities to support leaders to design and implement flagship or priority programmes based on country vision, strategies, and priorities.

The program's inaugural cohort in 2021 consisted of 80 participants from eight countries – Ethiopia, Ghana, Kenya, Malawi, Nigeria, Rwanda, Tanzania, and Uganda. CALA ensured a wide representation across the three sectors of government (44%), private sector (31%) and civil society (25%). Women leaders accounted for almost 50 percent of the cohort. Cohort members were provided with a rich learning experience that included knowledge sharing, learning events, leadership forums, online courses, and case studies of agriculture transformation, among others. The training programme taps harnesses the experience of sector leaders and applies on-the-job and group coaching techniques with an emphasis on local knowledge and individual learning styles to achieve African-led solutions and future impact on delivery of sector priorities on the continent.

"In these times of crisis, leadership has never been more important in mitigating crisis, and strengthening resilience. CALA will help leaders develop the skills they need to take the continent through tough times and work for prosperous food systems."

Dr. Agnes Kalibata,
AGRA President

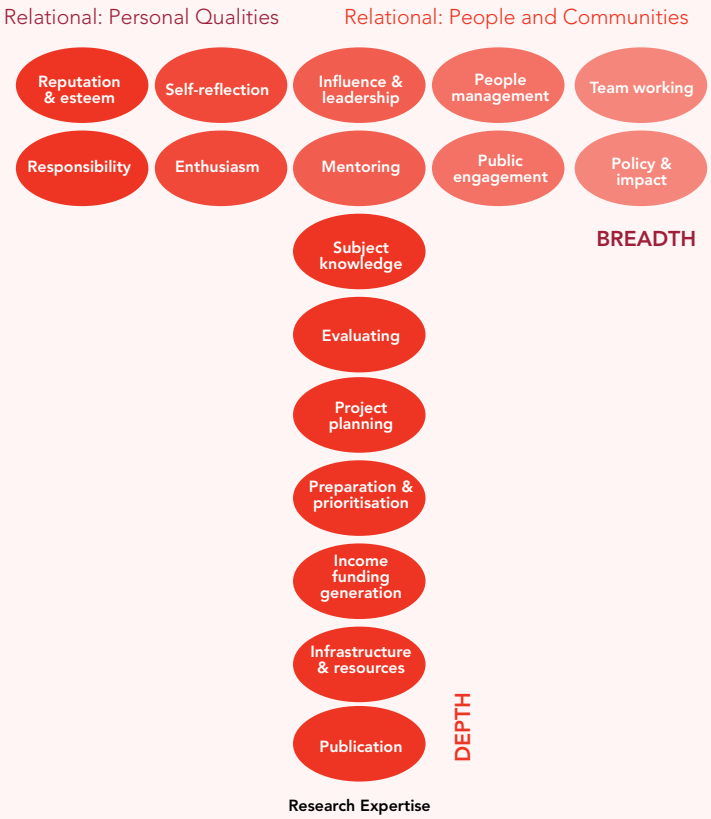
African leadership in research technology and innovation in support of african-defined development priorities

Scholars of development and economic history have long touted the importance of locally generated knowledge for any country's economic development (Zewde 2010, Ezeanya-Esiobu, 2019). Experiences from South-East Asia have shown that economic and social development in these countries was in no small measure attributable to pragmatic home-grown policies that were informed by knowledge generated by home-grown experts. Asian governments nurtured local knowledge-generating institutions which, through the support of their governments, multi-lateral institutions, and northern universities, attained world-class policy research capabilities (Litsareva 2016). In the same way, Africa needs to build independent research institutes with sufficient capacity to undertake research that can transform its food systems and define development priorities.

There is consensus that top agricultural research leaders are considered to be at the forefront of their field in terms of publication quality and number, attracting large research grants, supervising and mentoring graduate students and postdoctoral fellows, and successfully implementing large-scale research programs (Niemczyk, 2018; Owusu et al., 2017). They are also engaged in the agricultural ecosystem building linkages with policymakers and other science leaders, acting as ambassadors for agriculture, influencing research and its resourcing, and supporting the next generation (Niemczyk, 2018; Owusu et al., 2017). Research leaders are further distinguished by their ability to translate research findings into outputs that benefit communities and the development of policies as well as intellectual property. At the highest levels, agricultural research leaders play a central role in influencing, transforming, and strengthening institutional, national, and international research systems (Niemczyk, 2018; Owusu et al., 2017). These research leaders are sometimes referred to as "T-shaped" professionals (Box 1).

Box 1

"T-shaped" model of top African research leaders



Source: Adapted from Jackson et al, 2022

A recent mapping exercise of the current training provision broadly for African research leaders revealed that there were significant gaps in the availability of relevant research leadership training programs in Africa (Vitae, 2018). Most programs focused on only strengthening research expertise of early career researchers or on generic leadership/management skills rather than both. The African Futures Research Leadership Program, a relatively new program currently in the pilot phase, offers all the components for research leadership, including researcher development, researcher self-development, and leadership development. Established in 2019, the Program targets women researchers, including those with families. It is a collaborative mentorship program offered by both Michigan State University (MSU) and African consortium members of the Alliance for African Partnership[6].

6 https://aap.isp.msu.edu/current-programs/aap-african-futures-program/

What would leadership for agricultural transformation look like? Recommendations and call to action

Multistakeholder approach - inclusivity and engagement

Food systems are connected through forward and backward linkages to health systems, climate change and the environment, natural resources, and livelihoods[7]. The process of food agricultural systems transformation must be inclusive. The 2021 UNFSS showcased the necessity of an inclusive food systems approach through wide-scale dialogues at all levels ranging from communities to youth and national leaders eventually resulting in a global common position on food systems. The Summit dialogues were convened at four levels—global, regional, Member State, and independent dialogues[8]. A total of 148 collective or institutional commitments to action on the Summit's action areas were achieved from the process[9].

Inclusivity in coordination ensures efficiency in resource use, effectiveness of interventions, buy-in by target communities, and better targeting of actions targeting food systems transformation. An inclusive coordination mechanism requires the establishment of platforms and forums where stakeholders are linked and their actions coordinated towards a convergence. Leaders and agencies at global, regional, and national levels have a responsibility to ensure that all public and private sector stakeholders in food value chains are consulted and actively involved in developing and implementing policies and strategies.

Fast tracked ratification, operationalization, and implementation of protocols and agreements

Tariff and non-tariff barriers are a major bottleneck towards food systems transformation. They constrain trade and free movement of food products and cause market failures. Several regional and continental agreements intended to remove such barriers are yet to be fully operationalized, thus denying countries benefits in terms of improved production and trade conditions.

The second Continental Report on the Implementation of Agenda 2063 notes that "some AU Flagship Projects have registered slow progress due to the sluggish pace of signature and ratification of protocols for the various flagship projects, inadequate financial and human resources, and weak domestication of Agenda 2063 in AU Member States" (AU and AUDA-NEPAD, 2021). AfCFTA has the potential to increase food trade and ease distribution bottlenecks in Africa by substantially liberalizing trade and eliminating tariffs. The AU and AUDA-NEPAD (2021) note that not all AU Member States have submitted their tariff offers.

The AU leadership should therefore make a call to all countries to fast-track ratification of protocols and set aside resources to support the activities necessary for the full implementation of such protocols.

Harmonized priorities, financing, and policy frameworks on the continent

Food systems are integrated at all levels through trade. It therefore follows that food systems transformation efforts across countries and continents should be harmonized because a failure in one country or region weakens progress in another. For example, increased GHG emissions from food production or transport in any part of the world accelerates global warming for everyone in the rest of the world.

With the support of development partners, regional trade communities are working towards harmonizing regional policy frameworks for sub-sectors such as seeds, fertilizers, and strategic food reserves. For example, ECOWAS has adopted Regional Seed Regulation on Harmonization of Rules, that have been domesticated by nearly all its Member States. Other seed harmonization processes are completed or in various stages in the EAC, COMESA, and SADC (New Markets Lab and Sygenta Foundation (2022). Countries should align their internal policies with harmonized regional and continental policies, strategies, and regulations to accelerate transformation of food systems on the continent.

Development partners and technical assistance providers in Africa do not sufficiently integrate and coordinate their interventions in food systems (Balinieau et al, 2021). Often, the interventions are donor driven, with little input and control from host countries. This has led to duplication of effort and misapplication of resources. Country gaps and priorities for food systems transformation vary thus African countries should insist that donors finance projects that have been identified and prioritized.

7 https://www.gainhealth.org/media/news/what-does-food-system-transformation-mean
8 https://www.uneca.org/seventh-session-of-the-africa-regional-forum-on-sustainable-development/regional-dialogue-african
9 https://www.un.org/en/food-systems-summit/news/nearly-300-commitments-civil-society-farmers-youth-and-indigenous-peoples-and

Balinieau et al (2021) note that there has been excessive focus on production with little attention to other levels of food systems such as markets—including logistics, distribution, consumers, and market governance. Countries should develop a pipeline of projects which donors should plug in and support instead of the current model.

An amplified Africa voice on global food systems platforms through common positions

African food systems are linked with global food systems through markets for outputs and inputs. However, global market systems are biased against the food sector in Africa due to skewed trade rules. It is therefore imperative that African countries speak in one voice on global platforms. This is already happening albeit not yet on an effective scale. For example, the AU and AUDA-NEPAD[10] recently developed the Africa Common Position on Food Systems, which was submitted at the 2021 UNFSS[11] and the Common African Position on Post-2015 Development Agenda[12]. The African Group[13] at the WTO and the AU can do more on formulating common African positions on various trade-related policies that transform the market node of food systems. As the first African head of the WTO, the current Director General Ngozi Okonjo-Iweala can call the attention of developed countries and WTO Member States to the challenges of food systems in developing economies and highlight the trade barriers against agricultural products from African countries.

In addition, African countries should actively lobby for and seek space on global platforms such as the G20, IMF, WTO, among other platforms through the AUC to help raise the profile of Africa's economic development needs.

Leadership in food systems research, technology, and innovation

There is growing appreciation that the task of transforming African agriculture should shift to providing and expecting leadership from African experts and organizations even as both international and local players remain important supporting partners. It is not an either/or issue but one of achieving the appropriate balance with effective partnerships at different levels within the agrifood systems space (Omamo, 2003). The key message is that developing strong agricultural research leaders not only requires developing excellent research skills but also developing relational leadership through practical experience of leadership opportunities and mentoring and coaching balanced with career development planning. Furthermore, African governments must ensure that African research institutions are at the center of Pan African conversations on food systems. These institutions should find space in AGRF, FARA, CAADP, AUDA, and other continental agrifood systems conversations.

Additionally, and more importantly, there is need for greater commitment from both the local and international development community to invest directly in long-term capacity building of African institutions including universities, agricultural training colleges, vocational schools, national crop science research organizations, extension systems, and policy analysis institutes. It is the enhanced capacity of African institutions that will provide the foundation for African leadership in driving its agrifood systems.

10 African Union Development Agency-New Partnership for Africa's Development

11 Africa Common Position on Food Systems. Regional Submission to the UNFSS available at https://www.nepad.org/publication/african-common-position-food-systems

12 African Union (2014). Common Africa Position (CAP) on the Post 2015 Development Agenda

13 Several countries have formed coalitions in the WTO and speak with one voice using a single coordinator or negotiating team. The African Group is one of the most active WTO Groups and comprises African members (and Observers) of the WTO.

References

AGRA (2018). Africa Agriculture Status Report: Catalyzing Government Capacity to Drive Agricultural Transformation. Nairobi, AGRA.

AU and AUDA-NEPAD (2022). AUC & AUDA-NEPAD Second Continental Report on the Implementation of Agenda 2063. AUC & AUDA-NEPAD, Midrand, South Africa.

AUC and AUDA-NEPAD (2014). Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods. Malabo, Equatorial Guinea, June 26-27, 2014

Béné, Christophe. 2022. Why the Great Food Transformation may not happen – A deep-dive into our food systems' political economy, controversies and politics of evidence. World Development 154(2):105881

Balineau, Gaëlle, Arthur Bauer, Martin Kessler, and Nicole Madariaga (2021). Food Systems in Africa: Rethinking the Role of Markets. Africa Development Forum Series. A co-publication of the Agence française de développement and The World Bank, Paris/Washington DC.

Bourguignon, F. and Platteau, JP. (2015). The Hard Challenge of Aid Coordination. World Development,69(86-97).

Campbell B, Dinesh D, Huyer S, Jarvis A, Loboguerrero Rodriguez AM, Millan A, Thornton P, Wollenberg L, Zebiak S. (2020). Actions to transform food systems under climate change. Wageningen, The Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Collinson, S. (ed.), 2003, 'Introduction' in Power, Livelihoods and Conflict: Case Studies in Political Economy Analysis for Humanitarian Action, Report 13, Humanitarian Policy Group, Overseas Development Institute, London, ch. 1.

Delgado, Christopher; Brooks, Karen; Derlagen, Christian; Haggblade, Steven; Lawyer, Kate. 2019. Use of Evidence to Inform Agricultural Policy Decisions : What have We Learned from Experience in Africa?. World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/34337 License: CC BY 3.0 IGO."

Duku, C., Alho, C., Leemans, R. and Groot, A. (2021). Climate Change and Food Systems. Background paper for the Rural Development Report 2021. Rome: IFAD.

EAT Lancet Commission. n.d. EAT Lancet Commission Report. https://eatforum.org/content/uploads/2019/07/EAT-Lancet_Commission_Summary_Report.pdf. Accessed 16/08/2022

FAO, IFAD, UNICEF, WFP and WHO (2022). The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable. Rome, FAO.

Gehring, K., Michaelowa, K., Dreher, A., Spörri, F., (2017). Aid Fragmentation and Effectiveness: What Do We Really Know? World Development, Volume 99, 320-334.

Giller, K., Delaune, T., Vasco Silva, J., van Wijk, M., Hammond, J., Descheemaeker, K., van de Ven, G.,. Schut, A., Taulya, G., Chikowo, R., & Andersson, J. (2021). Small farms and development in sub-Saharan Africa: Farming for food, for income or for lack of better options? Food Security volume 13, 1431–1454

IFAD (2021). Transforming food systems for rural prosperity. Rural Development Report 2021. Rome, IFAD.

International Monetary Fund (IMF) (2011). The WTO Doha Trade Round—Unlocking the Negotiations and Beyond.

Irwin, D., Kyande, M. Interest group representation on government committees in Kenya. Int Groups Adv 11, 315–332 (2022). https://doi.org/10.1057/s41309-021-00149-6.

Irwin, David; Githinji, Mary (2016). Business associations in Kenya: the success factors. Journal of Public Affairs, 16(2), 162–180. doi:10.1002/pa.1573.

Jackson, J., Neba, A., Viney, C., Mtwisha, L., de-Graft Aikins, A., Mitchell, A., Kebirungi, H., & Outtara, K. 2022. Pathways to research leadership for early career researchers in Africa: A potential role for African and Global Funders. South African Journal of Higher Education, 36:2,151-172

Kimani, N. (2020). Meeting the Promise of the 2010 Constitution. Devolution, Gender and Equality in Kenya. Chatham House Research Paper.

New Markets Lab and Sygenta Foundation (2022). Seed Policy Harmonization in ECOWAS: The Case of Ghana. Working paper.

Niemczyk, E.K. 2018. Developing Globally Competent Researchers: An International Perspective. South African Journal of Higher Education 32, no. 4 Omamo, S.W. 2003. Policy Research on African Agriculture: Trends, Gaps, and Challenges. ISNAR Research Report 21. The Hague: International Service for National Agricultural Research.

Owusu, F., Kalipeni, E., Awortwi, N., & Mueni Maina Kiiru, J. 2017. Building Research Capacity for African Institutions: Confronting the Research Leadership Gap and Lessons from African Research Leaders. International Journal of Leadership in Education 20:2, 220–245

Mkandawire M. Richard, Thomas S. Jayne, and Isaac Minde: The Changing Landscape of Partnerships for Transformation of African Agrifood systems. Rethinking African Partnerships for Global Solutions , Alliance For African Partnership, Michigan State University, 2018.

Sacko, J and Mayaki, I. (2022). Conflict impacts Africa: An opportunity to build resilient, inclusive Food Systems in Africa. Africa Renewal Online April-May 2022. https://www.un.org/africarenewal/magazine/may-2022/how-russia-ukraine-conflict%C2%A0impacts-africa. Accessed 16/08/2022

Sidiropoulos, E (2022). Africa: Aspiring to Greater Global Agency. Carnegie Europe.

Steiner A, Aguilar G, Bomba K, Bonilla JP, Campbell A, Echeverria R, Gandhi R, Hedegaard C, Holdorf D, Ishii N, Quinn K, Ruter B, Sunga I, Sukhdev P, Verghese S, Voegele J, Winters P, Campbell B, Dinesh D, Huyer S, Jarvis A, Loboguerrero Rodriguez AM, Millan A, Thornton P, Wollenberg L, Zebiak S. 2020. Actions to transform food systems under climate change. Wageningen, The Netherlands: CGIAR Research Program on Climate Change,

Swinnen, J. and Kuijper, R. 2020. Inclusive value chains to accelerate poverty reduction in Africa. Jobs Working Paper no. 37. Washington, D.C.: World Bank.

UN (2022). Secretary-General's opening remarks to the Steering Committee of the Global Crisis Response Group on Food, Energy and Finance. UN Headquarters.

United Nations (2021). United Nations Food Systems Summit. Press release. United Nations Headquarters. Downloaded at https://www.un.org/en/food-systems-summit/news/nearly-300-commitments-civil-society-farmers-youth-and-indigenous-peoples-and.

Vitae (2018). The Path to Research Leadership in Africa, Wellcome Trust, UK.

World Bank (2020a). Doing Business 2020: Comparing Business Regulation in 190 Economies. Washington, D.C.: World Bank.

3 Mobilizing Financial Resources for African Food Systems Transformation

Martin Fregene[1], Andrew Mude[1], Sule Ochai[1] and Atsuko Toda[1]

Key Messages

1. While there is a divergence of the total magnitude of investment needed ranging from a conservative US$15 to US$77 billion per year from the public sector and up to US$180 billion from the private sector, the critical role of the private sector in driving the required scale of investment is a clear commonality across all methods of estimating the magnitude of investments needs.
2. Catalyzing private sector investments at scale will require targeted deployment of public sector funds specifically directed at incentivizing private sector capital into food systems.
3. On the private sector side, at the transaction level, the magnitude and type of financing required differs significantly by the three main groups, namely smallholder farmers, small-medium-enterprises, and large companies.
4. Donors and development finance institutions (DFIs) have a specific role of crowding in[2] and providing catalytic capital to fund agri-SME-focused financial service providers (including commercial banks, public development banks, microfinance institutions—MFIs—and cooperatives) critical to job creation, nutrition, youth and gender inclusion, and climate resilience.
5. Innovative financing mechanisms, e.g., blended finance, supply chain finance with digital solutions, credit guarantee schemes[3] for agriculture-sector loans, risk-sharing facilities, financial technology companies (fintechs) and crop receipts, are needed to catalyze growth in the African agriculture sector.
6. Expanding climate finance resources and creating an enabling environment for private sector investments is urgently needed to attain adequate levels of financing for transforming food systems in Africa.
7. Mobilizing financing at scale requires African governments to: (i) define priorities focused on comparative advantage and inclusive growth, (ii) provide strong political commitment to finance priority actions, (iii) enhance coordination between government and private sector and (iv) ensure good governance and accountability towards results.

Introduction

This chapter explores the scale of financial resources required to drive the transformation process and the range of key financial service providers and innovative financing mechanisms that can be deployed.

Africa has undeveloped arable land equivalent to 25 percent of the world's fertile land. With the removal of barriers to agricultural development, it is estimated that Africa's agricultural output would increase from US$280 billion per year to as much as US$1 trillion by the year 2030 (AfDB, 2022). This envisions and will require growth across the agrifood value chain triggering demand for upstream products including new demand for fertilizers, seeds, and pesticides. In addition, increased output can spur downstream development including logistics, trade, and more

1 African Development Bank
2 Crowding in occurs when higher government spending leads to an increase in private sector investment.
3 A credit guarantee scheme provides third-party credit risk mitigation to lenders through the absorption of a portion of the lender's losses on the loans made to SMEs in case of default, typically in return for a fee (World Bank, 2016)

agro-industry, which is likely to create more jobs. For the underlined potential to be realized, Africa's food systems must undergo a transformation in framing, financing, and execution at scale.

In recent years, African food systems have shown promising signs of progress with agricultural productivity increasing 2.1 percent on average every year between 2015 and 2020. This trend coincided with better trade with Africa's agricultural trade deficit falling by 26 percent during this period and some processed agricultural commodities gaining global market share. Despite these gains, agriculture in most African countries is still characterized by small-scale, low-technology, and rain-fed farming. This leaves subsistence farmers and food production systems highly vulnerable to climate, market, and other shocks.

Structural transformation is a process of agricultural and industrial upgrading, technological innovation, and continuous diversification that requires growth-enhancing investments. In many African countries, challenges to structural transformation include, among others: (i) lack of commercialisation in the agricultural sector, (ii) high cost of credit, (iii) low productivity and low investment, and (iv) lack of enabling environment by governments. Given the difficult macroeconomic environment following the COVID-19 period, governments are having to make careful decisions about directing human, capital, and financial resources from low to higher productivity.

To meet the SDGs by 2030, Africa must move quickly to mobilize the financial resources required for food systems transformation. Meeting SDG 2 on eradicating hunger, doubling the productivity of small-scale farmers, and scaling up sustainable agriculture is critical, as is achieving SDG 13, which calls for urgent action on climate change and its impacts. Increasing investment in African agrifood systems is a prerequisite for achieving AU Agenda 2063 and its intermediary goals as enshrined in the CAADP Malabo Declaration on "Accelerated Africa Agriculture Growth and Transformation for Shared Prosperity and Improved Livelihoods" and the Malabo Declaration on "Nutrition Security for Inclusive Economic Growth and Sustainable Development in Africa".

The challenge at hand is how countries can finance and operationalize investment plans aimed at supporting the food systems transformative agenda and do this in a multi-stakeholder and multi-sectoral collaborative fashion. Within the context of the megatrends shaping Africa's food systems outlined in the opening chapter, this chapter explores the scale of financial resources required to drive the transformation process of Africa's food systems. What degree of investment is required to build food systems that are resilient to climate change and other stressors and ensure sustainability of the natural systems that agriculture depends on while delivering nutritious food for healthy outcomes and providing inclusive and equality livelihood opportunities?

The scale of required investments

To transform Africa's food systems, significant financial resources need to be mobilized and structured to match constraints and risk profiles. Moreover, financing must be effectively targeted and tailored for the ecosystem of agents and entities—from producers, SMEs, financial institutions, and other entities necessary to undertake meaningful investment at scale. Essentially, mobilizing investment financing to support transformative adaptation must ensure that resources are adequate, appropriate, and accessible (Lipper et al, 2021). Estimating the scale of required investments for an entire continent is a complex and dynamic process. Different assumptions on the definition and current state of food systems, predictions on micro and macro-environmental conditions including megatrends, varying cost models, and targeted timelines for transformation all result in different budget estimates. This section explores several key estimates on financing needs for African food systems based on recent reports.

AfDB estimates the scale of resources required to transform a selection of 18 value chains at US$315-400 billion over the 10-year period from 2015-2025 (AfDB, 2016). According to AfDB's *Feed Africa Strategy*, this investment requirement exceeds the funds available from the public sector. The strategy documents conclude that transformation of CAADP goals and Malabo commitments will require a combination of resources from a broad set of public and private sector actors. Coordination, partnership, and developing innovative financial instruments are therefore essential to incentivize this partnership to achieve transformation (AfDB, 2016).

The Ceres2030 Initiative[4] estimates that in order to meet just three of the five SDG 2 goals (to end hunger

4 Ceres2030 is a partnership between Cornell IP-CALS, the International Food Policy Research Institute (IFPRI), and the International Institute of Sustainable Development (IISD) to provide evidence-based policy options for directing investments for sustainable food. https://ceres2030.iisd.org/

and double the incomes of small-scale producers while sticking to the climate commitments of the Paris Agreement) developing country governments will need to commit an additional US$19 billion per annum with donors and development partners required to increase annual support by US$14 billion (Laborde et al, 2020). This global estimate of US$33 billion from government and donor spending requires that these public resources crowd-in an extra US$52 billion of private investment annually. With Africa's agrifood system being the least developed, and demand for food in Africa expected to grow faster than in other regions, two-thirds of this global estimate, or about US$56 billion in additional annual spending, must be realized in Africa (Laborde et al, 2020). It must be noted that, focusing on realizing only a sub-set of SDG 2 goals, Ceres2020 represents a lower bound of the scale of financing required to secure Africa's agricultural transformation.

While continent-wide investment estimates are important, much of the needed transformation takes place at country level. To fill this information gap, recent analysis by New Growth International (NGI) provides country-level investment targets across Africa. Leveraging NGI's food system performance benchmarks, these values are derived from extrapolating the implicit per capita income gains that would accrue to countries from achieving the low hunger benchmarks by 2030. The report concludes that agrifood system transformation in Africa would require US$76.8 billion/year to 2030 (US$614 billion in total), which would comprise US$15.4 billion per year and US$61.4 billion per year from the public and private sectors respectively (Omamo and Mills, 2022a). National investment targets average roughly US$400 million/country/year with considerable variation in needs across countries as targets are driven by population size, current performance, and investment levels of the agrifood sector and more (See Annex 1 for NGI's investment targets for each country divided between public and private sector shares).

For all methods of estimating the magnitude of investment needs, the critical role of the private sector in driving the required scale is a clear commonality. From the perspective of private sector requirements, a recent 2018 study estimating the un-met demand for finance in agriculture sets the annual financing gap at US$180 billion against a total demand of US$240 billion (Dalberg and KFW, 2018) This spans the gamut from larger commercial agribusinesses to SMEs and producers. Catalyzing private sector investments at this scale will require targeted deployment of public sector funds specifically directed at de-risking and incentivizing private sector capital following into agriculture.

The silver lining is the dynamics driving food demand namely, population growth, per capita income growth, and the share of income used for food. Trends in these variables suggest that the growth in lucrative investment opportunities in the agrifood sector over the next half century and beyond will occur overwhelmingly in Africa (Barrett 2021).

Despite the variation in estimate on total required investments, the core messages from these reports are clear. First the magnitude of required additional investment is considerable ranging from a conservative US$15 to US$77 billion per year from the public sector and up to US$180 billion from the private sector. Second, and consequently, investment needs will require a systematic and purposeful alignment of investments from the public sector, private sector, and philanthropy. Third, with so many players involved, coordination is key to optimize resource allocation and ensure strategic sequencing of investment.

Demand side: who needs the financing?

On the private sector side, at the transaction level, the magnitude and type of financing required differs significantly by recipient. In ascending order of size of financing requirements, Table 2 summarizes the funding needs of different players and providers in the agricultural sector. The table also highlights the funding needs of three main groups namely, smallholder farmers, SMEs, and large companies.

Smallholder farmers

Estimates of direct demand from smallholder farmers indicate a need of US$33 billion a year, of which only US$4 billion is met by formal financial institutions and value chain actors, US$1 billion by informal sources such as local credit cooperatives and money lenders, and a remaining US$26 billion are met with resources from farmers and small- and medium-sized enterprises (SMEs) or not at all (AfDB, 2013). Despite some progress, current available options for finance for smallholder-dominated agriculture in SSA are limited. Financial service providers need to overcome numerous challenges related to low population density, small transaction sizes, high levels of informality, unmitigated exposure to climatic and other production risks, and poorly integrated value chains.

Table 2: Funding Needs and Providers at the Transaction Level

Ultimate Financing Recipient	Primary Financing Needs	Typical Financing Amount (USD)	Typical Providers
Smallholders	Working capital, CAPEX, and land acquisition.	50-10,000	MFIs and corporate value chains.
Agri-SMEs	Working capital and CAPEX.	10,000-1 million	MFIs, local banks, corporate value chains, few local non-bank financial intermediaries, international impact investors, fintechs, national development banks.
Cooperatives	Working capital, pre-, and post-harvest CAPEX, land acquisition for members.	100,000-5 million	Local banks, national development banks, specialized DFIs, corporate value chains.
Mid-caps and large companies	Working capital, CAPEX, expansion, land acquisition, financing smaller entities.	250,000-10 million	Few MFIs, local banks, national DFIs, capital markets, debt and equity funds and corporate value chains.
Agricultural commodity traders	Working capital, commodity financing, silos and warehouses and transport infrastructure.	>10 million	Cross-border banks, international DFIs, bigger local banks, debt and private funds, capital markets.
Sovereign and sub-sovereign	Programs, Large scale (National and Sub-national) CAPEX.	5 million – 100 million	Capital markets, national banks, DFIs, the World Bank, and international multilateral development banks (MDBs).

Source: SAFIN and Convergence, 2021.

Small-medium enterprises

SMEs servicing the agrifood value chain are the economic backbone of most economies across the globe and even more so in Africa where 70-90 percent of all food consumed is produced, processed, transported, and sold by local agri-SMEs (Sumba, Daudi 2019). They generate most of the new jobs created, help diversify a country's economic base, promote innovation, deliver goods and services to the bottom of the pyramid, and can be a powerful force for integrating women and youth into the economic mainstream (ILO 2020). Despite this, the annual financing gap for SMEs on the continent—defined as enterprises with financing needs between US$25,000 and US$5 million—is considerable. An estimated 130,000 agri-SMEs across SSA require an estimated US$90 billion annually to meet their financing needs. Of this, only US$15.5 billion is met, leaving an annual financing gap of US$74.5 billion (ISF Advisors, 2022). Access to financing and investment for SMEs is not only vital to realizing Africa's agricultural potential but also for income for majority of the population to buy food. With a study of East African lenders indicating that agri-SME lending is twice as risky and returns nearly 4.5 percent lower on average, considerable efforts to de-risk agricultural financing and shift the risk-return profile in favor of agri-SMEs will be critical to supporting this sector (Aceli Africa, 2019).

Mid-cap[5] to large companies

Mid-cap to large companies have significantly more capacity to innovate, export, and adopt international standards of quality. Mid-cap to large companies lower the costs of production through economies of scale and by their scope. Increasing financing for mid-cap to large agribusinesses in Africa, improving the policy and regulatory environment, and considering options for public investments to reduce transaction costs and risks, including blended finance solutions to support projects in early-stage agribusiness with a high potential for development impact, is important to attract investment (Ciani, A. et al, 2020).

Supply side: key investment partners for supporting food systems transformation

Switching to the supply side, investment resources required to achieve a food systems transformation include public sector spending, donors' contributions, and private sector investment. The section below explores the roles of key providers (governments, donors, DFIs, commercial banks, cooperatives, institutional investors, MFIs, and insurance companies) and makes recommendations for them to step up their investments.

5 Companies with a market cap (capitalization)—or market value—of between $2 billion and $10 billion

Public sector spending

While the bulk of the investment funding required for food systems transformation will have to come from the private sector, public sector resources are critical for financing the enabling environment of infrastructure, technology, R&D, and the institutions that underly agrifood systems. Governments have historically driven agriculture investments given the sector's contribution to job creation, food security, and general GDP growth. Governments have been involved in the sector via market price support and by funding R&D, infrastructure investments such as irrigation facilities, mechanized farming and warehousing, agricultural education, and advisory services.

Recognizing agriculture as a vital engine for jobs and economic growth, African governments first formally committed to spending 10 percent of national budgets on agriculture in the 2003 *Maputo Declaration on Agriculture and Food Security*. Following the 2008/09 global food price crisis which disproportionately affected African countries, the AU's 2014 *Malabo Declaration on Accelerated Agricultural Growth* further re-committed to this target among a range of additional commitments to zero hunger and increased food security and nutrition on the continent. In 2021, the 3rd CAADP Biennial Review, which tracks progress on the Malabo commitments, reported that only four AU member states (Burundi, DR Congo, Ethiopia, and Mali) had met the commitment to spend 10 percent of their national budgets on agriculture. On average, most African governments spend less than 5 percent of their annual budgets on agriculture against a minimum commitment of 10 percent (African Union, 2022).

Total public expenditure into agriculture and food systems is distributed across a range of investment needs that vary by country. Priorities emerging from a country-specific analysis of public expenditure suggest a broad distribution across four food systems levels of intervention (Omamo and Mills, 2022b). These intervention areas include: i) crop and livestock productivity; ii) rural transport infrastructure; iii) marketing, processing and services; and iv) direct food support (See Table 1).

While the authors rightly indicate that such highly-aggregated data must be interpreted with some modesty, the analysis suggests that a disproportionate level of investment in public investments is required to boost crop and livestock productivity and to develop the transport infrastructure needed to efficiently transport goods and services required and produced by the agrifood system. Missing in this analysis are the public investments required to ensure that food systems development is resilient, sustainable, and delivers on healthy food and good jobs. Along with this will be public sector expenditure in policy and complementary capital to attract the required sizable private sector investments into the agrifood sector and to ensure that these are consistent with broader SDG and Paris Agreement commitments around climate, gender, and health of people and planet.

Addressing the quality of public spending is perhaps even more important. There is evidence that returns to public investments in agricultural R&D and disseminating technological innovations can be enormous. For SSA, on average, each US$100 invested (a one-time expenditure) in agricultural research produces future benefits estimated at around US$35. Despite high returns for R&D investments,

Table 1: Estimated Distribution of Target Public Expenditures across Food System Interventions

Food system intervention areas in Africa	Investment Share (%)	Investment Target (USD bill)
Crop and livestock productivity (breeding, agronomy, pest and disease control, soil and water management, extension, etc)	35.5	5,450
Rural transport infrastructure (roads, bridges, culverts, canals, etc)	38.5	5,194
Rural marketing and processing infrastructure and services (storage, milling, rural marketplaces, market information, etc)	4.4	670
Direct food and nutrition support to vulnerable groups (cash and in-kind transfer, school meals, etc)	21.6	3.314
Total	100%	15,349

Source: Omamo and Mills 2022b.

Sub-Saharan countries tend to underinvest in them. Rebalancing the composition of public agricultural spending toward high-return investments in R&D could reap massive payoffs (Goyal and Nash, 2017). With the right short- and long-term investments, especially in agricultural productivity in the face of climate change and environmental degradation, the current food price crisis can serve as the impetus to "renovate the research agenda" (CGIAR, 2022).

Donor financing

Donor contributions are an integral source of finance in many African countries. Over the past decade, the proportion of food system expenditures allocated to emergency food aid and humanitarian assistance has increased significantly while measures and financing to improve resilience to shocks have not shown similar growth. To be effective, donor funding must focus on catalyzing systemic change, structural transformation, and climate adaptation. Some key donors investing in the agricultural space include the United States (US), through Feed the Future Africa, with priority countries including Ethiopia, Ghana, Kenya, Mali, Niger, Nigeria, Senegal, and Uganda; Germany, with overall bilateral development financing focusing on SSA and for whom hunger and malnutrition are top priorities. Canada is focused on women's economic empowerment and promoting green growth through agriculture. For the United Kingdom (UK), Italy, and Japan, agriculture is a recurring theme in their development assistance. France is currently pursuing a territorial approach of agricultural supply chains.

In May 2022, development ministers from the Group of Seven (G7) countries, Canada, France, Germany, Italy, Japan, the UK, and the US, met to discuss the challenges and multiple crises threatening the security and prosperity of people around the world. Food systems took center stage at the development ministers' meeting. Sustainable agriculture and food security are longstanding priorities of the G7 and the impacts of Russia's invasion of Ukraine have only served to highlight their continued relevance (Donor Tracker, 2022). Supply chain disruptions have created a sense of donor urgency to support countries in the most difficult situations, i.e., net importers of both energy and food, as external deficits are set to widen and their already-elevated debt levels will rise further—a trend that lower GDP growth will exacerbate. Ultimately, donor financing is important to leverage catalytic change at the national level and it is up to recipient countries to allocate and utilize these resources effectively.

Development finance institutions

Concessional funding is critical in helping to mitigate risks and address low or negative expected rates of return in fragile and conflict settings. DFIs such as the AfDB Group, the World Bank Group, the International Fund for Agriculture Development (IFAD) and others, play a critical role in providing concessional credit along with a range of technical support in partnership with African countries that help ensure greater impact, support the meeting of jointly-agreed targets, and support development of an enabling market to trigger increased private sector support in targeted areas of interest.

DFIs should collaborate more closely among themselves and with other development actors to speak with one voice on the need for business reform at the country level, and work together to accelerate the pipeline of investable projects and crowding in private sector investment. DFIs have relationships at sovereign and private sector levels in financing the African continent as well as an understanding of the contextual factors at regional and national levels. As DFIs source their capital from their Member States, borrow from the market, and funnel considerable donor and philanthropic resources, they are uniquely placed to leverage public and donor resources to catalyze the quantum of private sector investments needed to transform food systems in Africa.

DFIs need to step up to play the role of crowding in and providing catalytic capital to fund agri-SME-focused financial service providers supporting critical value chains or geographies that are traditionally neglected but crucial to job creation, nutrition, youth and gender inclusion, and climate resilience. Lowering the cost of capital enabling agri-SMEs that struggle to access capital would make a huge impact on transformation.

The May 2021 Summit on the Financing of African Economies, which convened African leaders, MDBs and donors in Paris- resolved to, "*…accelerate reforms, with the support of international financial institutions, international organizations and development agencies, to develop a more stable, transparent and reliable business environment and investment climate"*. Once again, specific emphasis was placed on the role and responsibility of multilateral and bilateral development Banks, including African national and regional public development banks, to play a leading role in implementing the necessary resources and deploying capital to incentive private sector investments (AUC, 2021).

Commercial banks

Lending to agriculture represents less than 6 percent of total lending by commercial banks in Africa (Sumba, 2019). A combination of perceived and actual high risk as well as modest returns compared to other sectors and the costs of extending banking infrastructure in rural areas has deterred many financial service providers. For example, loans to agricultural players accounted for 3 percent of total loan disbursements in Sierra Leone; 4 percent in Kenya, Ghana, and Nigeria; and 8 percent in Mozambique (Oxford Business Group, 2020). In general, commercial banks have limitations in allocating resources to understand agri-businesses, designing appropriate products, and offering the right support to ensure performance. This is evidenced by the high financing gap for agri-SMEs, estimated to be in the range of US$100-180 billion (CASA, 2020). Despite relatively poor past performance, commercial banks need to step up financing for the emerging agri-SME segment.

Agricultural development banks

Agricultural development banks, which are Public Development Banks (PDBs) specifically targeted towards investing in agriculture, typically have large retail networks in rural areas enhancing their access to rural clients and ability to offer loans and payment services at low transaction costs. Due to their size, agricultural development banks can diversify portfolio risks across regions while still offering specific loans for different agricultural enterprises and maintaining specialized staff. They tend to have access to a range of funding sources including long-term financing sources such as subordinated loans, bonds, and debentures. However, they are susceptible to political interference since they are heavily influenced by government policy. Looking at the broader playing field of PDBs (174) by region and sub-region, the majority are located in SSA (88) and within that agriculture and SMEs financing at the country level takes a large piece of the pie (Xu et al, 2021). There is an important role for PDBs in financing agriculture in the African region.

Microfinance institutions

Microfinance institutions (MFIs) in Africa are now established as pillars for sustainable development and accelerators of rural SMEs. According to an outdated source from the World Bank, there were more than 23,000 microfinance institutions across SSA in 2014, providing more than 90 million people with basic financial services such as small loans, savings accounts, and in some cases, crop failure insurance (World Bank, 2014). While recent data is unavailable, it is safe to assume that the numbers have increased significantly since then. However, many microfinance institutions do not have internal expertise in agriculture and thus struggle to structure loan products that would both meet the needs of agri-SMEs and mitigate relevant risks (World Bank, 2014).

Cooperatives

Cooperatives assist producers to increase their yields and incomes by pooling their resources to support collective service provisions and economic empowerment through the supply of agricultural inputs, joint production, and agricultural marketing (Sifa, n.d.). Cooperatives are used by governments and NGOs to deliver training and other capacity-building initiatives to producer groups. A few value chains have benefitted from cooperatives, for example, tea and dairy in Kenya and cotton in Mali. The challenges faced by agricultural cooperatives include poor management, lack of capital resources, inadequate training, ineffective extension and education programs, and unclear and inadequate government policies on the development of agricultural cooperatives. Some of the corrective measures to address these problems include re-assessment and improvement of policies, training of members, development of commercial partnerships, and joint ventures with private enterprises (Sifa, n.d.).

Institutional investors

Institutional investors in SSA hold about US $1.9 trillion in assets of which only a percentage is needed to meet the continent's development goals (Njoki, 2022). Beyond Africa, pension funds in Europe are starting to increase exposure to African agriculture. Currently, most of these assets are invested abroad or in government securities, not in SDG-related investments, and much less in investments such as agriculture and infrastructure. With institutional investors facing risks such as credit risk and the bulk of African economies facing rising inflation rates, domestic institutional investors are having a harder time hitting their return targets.

Insurance firms

Agricultural insurance is widely used in developed and emerging markets to mitigate agriculture value chain risks and stimulate agricultural lending while protecting farmers. However, only a marginal

proportion of smallholder farmers (roughly 2 million) have insurance cover across Africa (Making Finance Work for Africa, 2022). Few insurance firms in Africa have products targeting agri-SMEs, and those that are available tend to be priced out of reach. The situation is further exacerbated by the fact that insurance as a concept is yet to be embraced across SSA although microinsurance products in the private sector have started to make an impact. This is a sector that is bound to grow.

Exploring innovative financing mechanisms

Innovative financing mechanisms are needed to catalyze growth in the African agriculture sector by public and private sector actors. Key among these include blended finance, supply chain finance with digital solutions, partial credit guarantee schemes for agriculture-sector loans, risk-sharing facilities, fintechs, and crop receipts. We explore each of these mechanisms briefly below.

Blended finance

Defined as the "strategic use of development finance for the mobilization of additional finance towards sustainable development in developing countries" (OECD 2018), blended finance combines financing from different sources of private and public finance to achieve a broad development goal. Blended finance can be provided in the form of concessional capital, guarantee or insurance, technical assistance, or preparation funds**.** With respect to the role that public and donor resources can play in catalyzing private sector investments into agriculture, blended concessional finance has been recognized as one of the main tools that DFIs can use to incentivize and increase private sector financing into underinvested sectors. As such, a DFI Working Group on Blended Concessional Financing, consisting of over 20 DFIs, was set up to promote the adoption of blended finance principles and create a coordinated and standardized approach to ensure maximum impact of blended finance while ensuring that no market distortions are created. In 2020, DFI-financed projects with a total volume of more than US$11.2 billion were supported by blended concessional finance. Of this, SSA accounts for just under US$2.5 billion, second only to Latin America and the Caribbean's US$3.3 billion (Joint Report, December 2021 Update of the DFI Working Group on Blended Concessional Finance for Private Sector Projects).

Supply chain finance powered by digital solutions

In the context of well-integrated value chains with the presence of large and established 'anchor buyers' and effective contract enforcement mechanisms, fintech initiatives are "re-wiring" value chains to digitize supply chain finance. There has been a huge increase of digital solutions provided by entrepreneurs to help minimize the gap between suppliers and buyers. AGRA reviewed a supply chain solution in Kenya and deduced the elements of this "rewiring" to include: a) digital integration across buyers and suppliers to ensure automatic payments and record sharing; b) facilitating mobile money registration and enrolment processes for suppliers; c) enhancing mobile money and financial product knowledge at the smallholder and SME levels (financial education); d) improvements to the back office and inventory management systems of buyers; e) leveraging supply chain transactions data to offer credit and other products (Mastercard Foundation and AGRA, n.d.).

Partial credit guarantees

Guarantees are typically structured to address commercial bank concerns in making financing more widely available by addressing information asymmetries that lead to credit rationing as lenders seek to maintain a pool of less risky borrowers, locking out most SMEs. Partial Credit Guarantees can expand the flow of financing to SMEs diversifying or transferring risk by covering the default risk of the SMEs and reducing collateral requirements allowing SMEs with insufficient collateral to access lending. Where coupled with technical assistance facilities, guarantees help lenders to develop an understanding of the SME businesses and business cycles and develop capacity to tailor products for them. Although several guarantee programs and products target SMEs, more effort is required to design guarantee products targeting agri-SMEs.

Risk-sharing facilities

Governments can establish and fund risk-sharing facilities to incentivize private finance into agriculture. One such example is the Nigeria Incentive-based Risk Sharing System for Agricultural Lending (NIRSAL), which was established to 'de-risk' agricultural financing and incentivize commercial banks towards agricultural lending. NIRSAL aims to increase agricultural lending from 1.4 percent to 7 percent of total banking lending

in Nigeria (Abdulhameed, 2022). This initiative triggered interest from other countries such as Ghana, Rwanda, and Uganda, which have introduced their own risk-sharing facilities (RSFs). AGRA instituted credit guarantee and risk-sharing facilities with Equity Bank and Standard Bank in South Africa leveraging ten times their agricultural lending. AGRA with AfDB also supported the Government of Ghana to develop the Ghana Incentive-based Risk Sharing System for Agricultural Lending (GIRSAL).

Fintechs

Financial technology, aka fintech, refers to the integration of technology into offerings by financial services companies to improve their use and delivery to consumers. The fintech landscape in Africa has grown at an annual rate of approximately 24 percent over the past decade (Ernst and Young, 2019). They are part of a rapidly-growing digitalization of agricultural value chains across Africa that are fueled by rapid adoption of mobile phones, internet connectivity, and a growing demand for contact free services. Fintechs create an enabling environment for agri-SMEs by digitizing payments and providing increased transparency through a direct connection to other value chain players, promoting financial inclusion, and increasing business profitability. The online platforms offer flexible terms and access to services like credit, insurance, secure savings, and remittance of payments. Fintechs provide a feasible solution to the financial constraints and challenges associated with accessing insurance in the agricultural sector (Odonkor, 2020).

Crop receipts

While access to financial services is a frequent constraint at all segments of agricultural value chains, pre-harvest financing at the farm level is perhaps the biggest gap as evidenced by the low usage of agricultural inputs and equipment in Africa. Improved access to pre-harvest financing is critical for farmers to use high-quality inputs and equipment more quickly and on a larger scale. To date, only a small percentage of farmers in Africa have access to properly structured and priced pre-harvest finance. Crop Receipts (CRs), an innovative financing instrument developed in Brazil in the 1990s and being now implemented in Zambia and Uganda, enable smallholder farmers to mobilize the necessary funding from the market to finance crop production. They also facilitate the entry of new financiers, including the capital market.

Now, more than ever, there is a need for many more innovative financing mechanisms if African agriculture is to become more productive and contribute to global food security. The above list is far from exhaustive and new innovations keep emerging. Moreover, financing mechanisms such as warehouse receipts, outgrower schemes, and agricultural lease financing are constantly being recalibrated to meet evolving financial needs and circumstances.

A look at climate finance

As in most developing economies, climate change is impacting efforts and processes to transform and build a resilient agricultural and food systems in Africa; a situation that threatens the livelihoods of over 80 percent of rural people who depend on agriculture (IFAD, 2022). A set of unique conditions, exposures, and sensitivities combine to make Africa especially vulnerable to current and future climate change. Given the considerable impact of climate on the predominately rain-fed agricultural sector in Africa, accounting for and adapting to climate change is imperative for any effort to transform Africa's food systems. Recognizing this, all 54 African countries have signed the Paris Agreement and completed their nationally determined contributions (NDCs) each of which prioritizes food systems-related sectors across i) agriculture, ii) water, iii) health, and iv) forestry, land-use, and ecosystems (Global Center for Adaptation, 2021).

Appropriate investments in the agricultural sector can help food systems adapt by increasing productivity, minimizing risk, offering insurance against extremes, and optimizing resource-use efficiency. Estimates suggest an annual climate financing gap for agrifood systems in SSA in the range of US$15 billion. While significant, this requisite investment is trivial in comparison to the more than US$200 billion estimated cost of inaction (Global Center for Adaptation, 2021; Sulser 2021).

To bridge the climate financing gap, Africa will need between US$1.3 trillion and US$1.6 trillion between 2020 and 2030. This translates to between US$118.2 billion and US$145.5 billion needed annually to create a sizable financial window that would empower African countries with the needed resources to implement the continent's climate action commitments and NDCs. Despite this clear financing need, Africa has only received an average of US$73 billion per year in climate finance from 2016-2019, leaving a staggering US$99.9 billion to US$127 billion climate financing gap per year up to 2030.

Climate finance will inevitably be an increasingly important instrument of finance to ensure that Paris Agreement targets are met. The 2020 Joint Report on Multilateral Development Banks' Climate Finance estimated that US$66 billion was deployed by MDBs as climate finance, of which US$9 billion went to SSA. This includes the support provided by dedicated climate finance funds such as the Green Climate Fund (GCF), Climate Investment Funds (CIF) and climate-related funds under the Global Environment Facility (GEF), among others.

In its effort to bridge the continental climate financing gap, AfDB has doubled down on mobilizing more climate resources for the continent. The Bank devotes 67 percent of its climate finance to climate adaptation, which is the highest of all multilateral financial institutions globally (Adesina, 2022a, 2022b). In synergy with the Global Center on Adaptation, the Bank is implementing the African Adaptation Acceleration Programs to mobilize US$25 billion for climate adaptation.

Building blocks for investment at scale: A call to action

Enhanced investment to transform African agrifood systems and ensure zero hunger and inclusive and equitable economic development requires a call to action. The building blocks for investment at scale include the following at the national level.

Clear investment plans and defined priorities focused on comparative advantage, food security, food systems transformation and inclusive growth

National agendas designed for food systems transformation, that include tailored investment, implementation plans, target-setting, mandated roles, and strong accountability mechanisms are critical. Agriculture and food systems transformation require inter-ministerial coordination and identification of priority actions. Priority actions should include targeted investment in successful innovations such as high-quality inputs (improved seeds, fertilizers, crop protection chemicals, and veterinary supplies) bundled with extension/advisory services, small dams, irrigation, and private sector involvement in storage and processing. Ultimately, countries need to realize their prospects of expanded agricultural productivity, agro-processing, infrastructure development, agriculture, and food trade; new technologies and digitalization; social protection; and the emerging African science and research agenda.

UNFSS catalyzed a deliberate and systematic process among Member States to design, validate and begin to implement national pathways toward equitable and sustainable food systems by 2030. Many African countries developed and uploaded their pathway documents outlining their priority areas as well as their policies, investments, and capabilities. Take for example the case of Tanzania. After the UNFSS, the United Republic of Tanzania continued consultations on the draft national pathway with ministries, the private sector, and other stakeholder groups, with particular focus on the implementation plan and roles of the stakeholders. Next steps include the development of an action plan for the identified game-changing solutions, systematic analysis and mapping of food systems-related policies and projects supported by different organizations, and mapping of stakeholders at different levels to implement game-changing solutions. Furthermore, a results-based M&E framework will be developed together with a roadmap to 2023 (UNFSS, 2022).

Strong government ownership and political commitment to finance and operationalize the proposed plan and priority actions

In April 2021, AfDB and IFAD in partnership with the AUC, FARA, the Food and Agriculture Organization of the UN (FAO) and CGIAR held a high-level virtual dialogue with the participation of 20 Heads of States. The Heads of States and ministers reaffirmed their pledge to promote action-oriented commitments towards sustainable transformation of African food systems and build on successful innovations to enhance productivity. In addition, strong government demand was clear for the recently-approved Africa Emergency Food Production Facility financed by AfDB. A key building block for investment is strong ownership of the transformation agenda by Heads of State and relevant ministers including finance, trade and industry and agriculture.

Enhanced coordination between government and private sector

Coordination needs to bring together public expenditure and private investment. First, government policies and actions should be deliberately designed to harness private investment in the sector and prioritize their implementation. Second, at a very early planning stage, governments should involve and

engage the private sector in shaping public policies that impact their activities. Third, governments should provide, on transparent terms, space for the private sector to supply inputs on credit and recover the costs through delivery of output at harvest. Fourth, governments need to minimize the cost of regulations and increase their transparency and predictability to allow the private sector to plan and execute their business plans over time. Lastly, governments need to work with industry to chart an agenda for promoting increased productivity, agrifood SMEs, and agro-industralization in the medium term and ensure policy relevance (AfDB Institute, 2020).

Good governance and institutionalization of accountability towards results

While CAADP has been instrumental in focusing national efforts in transforming agricultural sectors, it is now time to adopt a more systemic view of food systems transformation and to go beyond the CAADP's current ambition of agricultural growth. According to the 2021 Malabo Montpellier Panel Report, additional indicators that better measure and reflect food systems' interconnectedness with the environment, social inclusion, nutrition and public health, youth employment, and income generation (Malabo Montpellier Panel, 2021) are needed. These indicators should help to measure progress and form the basis for better governance around results. Processes should be informed by data, science, and broad engagement with relevant parties having a real influence on key decisions (Guijt et al, 2021). Building accountability towards agreed upon results in an inclusive process towards food system transformation will be critical.

Conclusion

While the scale of financial resources required to drive the transformation process is huge, it can be mobilized by leveraging key financial service providers and deploying innovative financing mechanisms. As can be seen from the overall investment needs, every US$1 of public sector spending must mobilize at least US$4-5 of private sector investment to reach the required scale of investment. Catalyzing private sector investments at scale will require that public sector funds are targeted specifically at de-risking and incentivizing private sector capital into food systems.

Donors and DFIs must crowd-in and provide catalytic capital to fund agriculture, specifically agri-SMEs, as these actors play a huge role in driving job creation and strengthening value chains. Currently, where access to finance is difficult for agri-SMEs, financial service providers (including commercial banks, public development banks, MFIs, and cooperatives) must be supported to enhance job creation, nutrition, youth and gender inclusion, and climate resilience.

Innovative financing mechanisms, e.g., blended finance, supply chain finance with digital solutions, partial credit guarantee schemes for agriculture-sector loans, risk-sharing facilities, fintechs, and crop receipts, are needed to catalyze growth by smallholder farmers, small-medium-enterprises, and large companies. Expanding climate finance resources are an opportunity to attain adequate levels of financing for transformative programming in Africa.

At the national level, action is required by governments to provide: (i) clear investment plans and defined priorities focused on comparative advantage, food security, food systems transformation and inclusive growth, (ii) strong government ownership and political commitment to finance and operationalize the proposed plan and priority actions, (iii) enhanced coordination between government and private sector, and (iv) good governance and institutionalization of accountability towards results.

References

Abdulhammed, A. (2022), "CEO Today Global Award 2022: Interview with Aliyu Abdulhameed" conduiced by CEO Today Magazine, available at https://www.ceotodaymagazine.com/2022/04/ceo-today-global-awards-2022-interview-with-aliyu-abdulhameed/

Aceli Africa, (2021) *Bridging the Financing Gap: Unlocking the Impact Potential of Agriculture SMEs in Africa.*

Adesina, Akinwumi (2022a). *"Experiences and Lessons from the African Development Bank".* Speech by AfDB President Akinwumi Adesina, 52nd Annual Meetings of the Caribbean Development Bank, 14 June 2022.

Adesina, Akinwumi (2022b). *Speech* by Dr. Akinwumi Adesina, President, African Development Bank Group, at the 7th Africa-Ireland Economic Forum, Ireland.

AGRA (2017). *African Agriculture Status Report: The Business of Smallholder Agriculture in Sub-Saharan Africa (Issue 5).* Nairobi, Kenya: Alliance for a Green Revolution in Africa (AGRA).

African Development Bank Institute, Global Community of Practice. (2020) *Building Resilience in Food Systems and Agricultural Value Chains: Agricultural Policy Responses to COVID-19 in Africa.* African Development Bank Group.

AfDB. (2013). Agricultural Value Chain Financing (AVCF) and Development for Enhanced Export Competitiveness. African Development Bank Group, 2013.

AfDB. (2016). *Feed Africa: Strategy for Agricultural Transformation in Africa 2016-2025.* African Development Bank Group (AfDB).

African Union Commission. (2021*). Summit on the Financing of African Economies.* African Union Commission.

African Union (2022). 3rd Comprehensive Africa Agriculture Development Programme Biennial Review Report. Addis Ababa, Ethiopia

Barrett, Christopher (2021). Overcoming global food security challenges through science and solidarity. *American Journal of Agricultural Economics 103 (2): 422–447*

Bharali, Ipchita & Zoubek, Sarah & McDade, Kaci & Martinez, Sebastian & Brizzi, A & Yamey, Gavin & Brownell, Kelly & Schäferhoff, Marco. (2020). "The Financing Landscape for Agricultural Development: An Assessment of External Financing Flows to Low- and Middle-Income Countries and of the Global Aid Architecture", Duke World Food Policy Center.

CASA (Commercial Agriculture for Smallholders and Agribusinesses), (2020). The Underserved Middle: Defining Excluded Enterprises in Agricultural Value Chains Research Brief 02

CGIAR, (2022). *Seven Actions to Limit the Impact of War in Ukraine on Global Food Security*. CGIAR

CERES 2030. (2020). Ending Hunger, Increasing Incomes, and Protecting the Climate: What would it cost donors? CERES 2030 Sustainable Solutions to End Hunger. The International Institute for Sustainable Development.

Ciani, A., Caitriona Hyland, M., Karalashvili, N., Keller, J., Ragoussis, A. and Thu Tran, R. (2020*) Making it Big: Why Development Countries Need More Large Firms* The World Bank Group

Climate Policy Initiative and International Fund for Agricultural Development (2020). Examining the Climate Finance Gap for Small-Scale Agriculture.

Dalberg and KFW (2018) "*Africa Agricultural Finance Market Landscape.*"

Donor Tracker (2022). G7 Development Ministers' Meeting: Key commitments, https://donortracker.org/insights/g7-development-ministers-meeting-key-commitments (accessed, July 2022)

Ernst & Young. *(2019). FinTechs in Sub-Saharan Africa: An Overview of Market Developments and Investment Opportunities.*

Global Center for Adaptation (2021). *State and Trends in Adaptation Report 2021: How Adaptation Can Make Africa Safer, Greener and More Prosperous in a Warming World.*

Goyal, A., Nash, J. *(2017) Reaping Richer Returns: Public Spending Priorities for African Agriculture Productivity Growth.* World Bank and Agence Francaise de Developpement.

Guijt, J., Wigboldus, S., Brouwer, H., Roosendaal, L., Kelly, S., Garcia-Campos, P. (2021) *National Processes Shaping Food Transformations*. FAO.

IBRD/WBG. (2018). *Future of Food: Maximizing Finance for Development in Agriculture Value Chains.* International Bank for Reconstruction and Development/The World Bank Group, Washington DC.

IBRD/WBG. (2017). *Innovative Experiences in Access to Finance: Market-Friendly Tools for the Invisible Hand?* International Bank for Reconstruction and Development/The World Bank Group, Washington DC.

IFAD (2020). *Financing Climate Adaptation and Resilient Agriculture Livelihoods.* #85 IFAD Research Series.

ISF Advisors (2022). The state of the agri-SME sector – Bridging the Finance Gap.

ILO (2020) *World Employment and Social Outlook – Trends 2020*

Lipper, L., Cavatassi, R., Symons, R., Gordes, A., & Page, O. (2021). Financing adaptation for resilient livelihoods under food system transformation: the role of Multilateral Development Banks. *Food Security*, 1-16.

Laborde, D., Murphy, S., Parent, M., Porciello, J., & Smaller, C. (2020). Ceres2030: Sustainable Solutions to End Hunger—Summary Report. Cornell University, IFPRI and IISD: New York, NY, USA.

Making Finance Workd for Africa. (2022) Agricultural Finace, Available at https://www.mfw4a.org/our-work/agricultural-finance

Mastercard Foundation and AGRA. (n.d.) Supply Chain Finance: A digital solution from Kenya, available at https://agra.org/wp-content/uploads/2020/10/Supply-Chain-Finance-a-digital-solution-from-Kenya.pdf

Malabo Montpellier Panel Report. (2021) *Connecting the Dots: Policy Innovations for Food System Transformation in Africa.*

Njoki, C. (2022) How domestic investors can drive Africa's sustainable growth, Op-Ed published in The Africa Report, 12 April 2022 available online at https://www.theafricareport.com/193674/how-domestic-investors-can-drive-africas-sustainable-growth/.

von Braun, J., Afsana, K., Fresco, L., Hassan, M., & Torero, M. (2021). Food Systems–definition, concept and application for the UN food systems summit. *Sci. Innov*, *27*.

Odonkor, A. (2020). Fintech in Africa: Reshaping the Financial Sector. https://news.cgtn.com/news/2020-11-02/Fintech-in-Africa-Reshaping-the-financial-sector--V5MoEYCmpa/index.html

Omamo, S. W. and A. Mills (2022a) Investment Targets for Food System Transformation in Africa. NGI Technical Note. June 2022. Nairobi and Chicago: New Growth International

Omamo, S. W. and A. Mills (2022b) Thematic Priorities and Distributions of Public Investments for Food System Transformation in Africa. NGI Technical Note. July 2022. Nairobi and Chicago: New Growth International

Oxford Business Group. (2020). Private Equity and Venture Capital in Africa.

SAFIN and Convergence. (2021) *Deploying Blended Finance to Mobilize Investment at Scale in Food and Agriculture. Smallholder Finance Network and Convergence.*

Sifa, C. (n.d). Role of cooperatives in agriculture in Africa. https://www.un.org/esa/socdev/documents/2014/coopsegm/Sifa--Coops%20and%20agric%20dev.pdf

Sumba, Daudi (ed) .(2019). *The Hidden Middle: A Quiet Revolution in the Private Sector Driving Agricultural Transformation*, Alliance for a Green Revolution in Africa.

Sulser et al. (2021). Climate Change and hunger: Estimating costs of adaptation in the agrifood system. *International Food Policy Research Institute*, Washington D.C.

UNFSS (2022), Food Systems Dialogue: Member State Dialogues Synthesis Report 4, United Nations.

World Bank (2014): Jean-Loïc Guièze, Financial inclusion in sub-Saharan Africa; population growth extrapolated to 2020.

World Bank. (2016) Principles for public credit guarantee schemes for SMEs (English). Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/576961468197998372/Principles-for-public-credit-guarantee-schemes-for-SMEs

Xu, Jiajun, Régis Marodon, Xinshun Ru, Xiaomeng Ren, and Xinyue Wu. (2021)"What are Public Development Banks and Development Financing Institutions? Qualification Criteria, Stylized Facts and Development Trends" China Economic Quarterly International, volume 1, issue 4.

Appendix

Appendix 1: County-level Investment Targets

Rank	Country	Investment Target (US$ 000s/ year)	Public Sector Share (US$ 000s/year)	Private Sector Share (US$ 000s/year)
1	Ethiopia	7,951,700	1,590,300	6,361,300
2	Niger	6,412,500	1,282,500	5,130,000
3	Tanzania	6,095,600	1,219,100	4,876,500
4	Morocco	5,433,100	1,086,600	4,346,400
5	Mozambique	4,530,000	906,000	3,624,000
6	Mali	4,249,700	849,900	3,399,800
7	Uganda	4,125,900	825,200	3,300,800
8	Algeria	4,082,200	816,400	3,265,700
9	Nigeria	2,932,200	586,400	2,345,800
10	Congo, Dem. Rep	2,633,000	526,600	2,106,400
11	Kenya	2,481,800	496,400	1,985,400
12	Chad	2,401,800	480,400	1,921,400
13	Burkina Faso	2,263,400	452,700	1,810,800
14	Madagascar	2,231,100	446,200	1,784,900
15	Burundi	1,884,900	377,000	1,507,900
16	Rwanda	1,814,400	362,900	1,451,500
17	Senegal	1,389,200	277,800	1,111,300
18	Cameroon	1,278,800	255,800	1,023,000
19	Malawi	1,270,600	254,100	1,016,500
20	Egypt, Arab Rep.	1,195,800	239,200	956,600
21	Benin	1,127,600	225,500	902,100
22	Tunisia	1,024,300	204,900	819,400
23	Sierra Leone	992,100	198,400	793,700
24	South Africa	986,700	197,300	789,400
25	Togo	848,200	169,600	678,500
26	Cote d'Ivoire	767,400	153,500	613,900
27	Guinea	667,200	133,400	533,800
28	Eritrea	454,300	90,900	363,400
29	Somalia	358,700	71,700	287,000
30	Liberia	318,600	63,700	254,900
31	Central Africa Republic	286,300	57,300	229,100
32	Guinea-Bissau	265,900	53,200	212,800
33	Gambia, The	224,100	44,800	179,300
34	Namibia	208,700	41,700	167,000
35	Sudan	198,400	39,700	158,800
36	Zambia	172,300	34,500	137,800
37	Comoros	167,900	33,600	134,300
38	Ghana	153,500	30,700	122,800
39	Mauritania	131,800	26,400	105,500
40	Congo, Rep	129,700	25,900	103,800
41	Zimbabwe	117,000	23,400	93,600
42	Lesotho	107,600	21,500	86,100
43	Eswatini	94,600	18,900	75,700
44	South Sudan	92,400	18,500	73,900
45	Botswana	51,400	10,300	41,100
46	Angola	45,100	9,000	36,100
47	Mauritius	31,300	6,300	25,100
48	Gabon	30,700	6,100	24,600
49	Libya	22,400	4,500	17,900
50	Equatorial Guinea	5,700	1,100	4,600
51	Sao Tome and Principe	4,900	1,000	4,000
52	Djibouti	1,200	200	1,000
53	Cabo Verde	500	100	400
54	Seychelles	400	100	300
	Total	**76,746,700**	**15,349,300**	**61,397,300**
	Average	**400,600**	**80,100**	**320,500**

Source: Omamo and Mills, 2022.

4 Capacity and Capability for Resilient and Sustainable Food Systems

Boaz Blackie Keizire[1], Dorcas Mwakoi[2], & Lulama Traub[3]

Key Messages

1 **Successfully government-led food system transformation requires:** (1) high-level government support; (2) capable, independent, and respected champions to lead planning and delivery; (3) strong, multidisciplinary local teams with technical expertise to build capacity over time; (4) a governance and operating model that facilitates a high-performance culture; (5) a sufficient and sustainable funding model that blends public, development, and private sector investments; and (6) concerted and coordinated efforts by all actors.

2 **Capacity development efforts should be guided by seven core principles:** (1) country ownership and leadership; (2) alignment with national needs and priorities; (3) use of national systems and local expertise; (4) no 'one-size-fits-all' approach; (5) multi-level approach; (6) mutual accountability; and (7) harmonization of action and partnership. While there has been growth in SSA agricultural research capacity, declining public investments and chronic underfunding of national agricultural research systems constrain agricultural researchers' ability to develop localized technological solutions.

3 **SSA agricultural research capacity has increased by 90 percent between 2000 and 2016;** however, declining public investment in agricultural research systems threatens Africa's capacity to adapt 4th Industrial Revolution technologies to local conditions and thereby constrains the competitiveness of Africa's agrifood system.

Introduction

As the targets for attaining the SDGs by 2030 and CAADP by 2025 draw near, numerous challenges related to inadequate human, organizational, and systematic capacity to deliver these targets have been cited. The UN SDG Report indicates that most countries are not on track to meet the SDGs by 2030 and that, on average, most countries are less than halfway to achieving their goals by 2030 (UN, 2022). In its 2021 CAADP Biennial Review Report, the AU indicates that only one country, Rwanda, is on track to achieve the CAADP targets by 2025 (AU, 2022). These reports underscore the risks that Africa's food systems face and the need to further understand the binding constraints.

The 2021 UNFSS brought a paradigm shift in the way agriculture and food systems transformation was constituted. The research, analysis, and dialogues undertaken in the build up to the summit underscored fundamental elements of the food systems that have been either neglected or taken for granted but rarely brought upfront by the scientific and development community globally and in Africa. The Summit and its outcomes helped to re-examine four elements of the food systems; *first*, better production systems – ensuring sustainable consumption and production of food at all levels without disrupting the environmental and natural resource base; *second*, better environment – being cognizant of the changing climate and its implications to the food systems; *third*, better nutrition – underscoring the importance of nutrition in the pursuit to end hunger on the planet; and *fourth*, better life – promoting inclusive economic growth, fighting extreme poverty and eliminating inequality of all forms. With the end of the UNFSS, the challenge of translating and implementing food systems summit outcomes at the national level has brought to the fore the capacities needed to achieve transformation at scale.

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This chapter builds on the ongoing capacity development efforts for resilient and sustainable food systems and analyzes the human, organizational and institutional capacities needed to catapult the food systems interventions at country and sub-regional level. The chapter draws from a wide range of literature including the AASR 2018, which significantly reviewed and recommended, among others, options for the capacities needed to enhance country pathways for food systems transformation (AGRA, 2018). The chapter provides examples of African governments that have demonstrated courageous leadership, robust capacity development, and implementation of an ambitious food systems policy agenda. This chapter proposes building and/or enhancing existing platforms for transformation, policy development, capacity development, innovation, and investment. It argues that country-level capacities should be driven from locally-led, transformative and integrated action bringing in key sectors of the economy that are central to food systems – agriculture, environment, education, and health. Finally, the chapter proposes six key conditions for successful government-led food systems transformation, namely: (i) government support at the highest level–President or Prime Minister–to support a national agenda for food systems transformation and empower the governance structure with the necessary mandate (ii), highly-capable, independent, and respected champion(s) that can lead planning and delivery efforts, make tough decisions, identify and address vested interests, and inspire others to set and realize bold ambitions; (iii) Strong multidisciplinary local teams with the requisite local talent and technical expertise that can build capacity over time and "over-deliver". The teams should leverage digital technology to make and measure impact and be agile enough to scale up and scale down required capabilities as needed; (iv) a governance and operating model for a culture of high-performance and a well-designed set of performance indicators and evaluation mechanisms and scorecard/dashboard as the baseline coupled with structures that can adapt to changing realities and evolving insights; (v) sufficient and sustainable funding for intergenerational effort with a blend of public, development, and private sector finance and investments; and (vi) concerted and coordinated efforts by all actors. This will be crucial in taking forward the outcomes of the UNFSS. Donors have a unique role in supporting initiatives that can leverage change and provide the foundations for collaborative efforts across food systems. Optimizing and leveraging the catalytic potential of donor support is critical in responding to the outcomes of the Food Systems Summit. This calls for functional coordination systems across food systems actors and players. On the other hand, the private sector is central as an ally in global and national efforts to make agrifood systems more resilient, sustainable, efficient and inclusive. Governments can package opportunities that combine the expertise and capital investment of the private sector with needed public investments in transport, agricultural research, digital infrastructure, clean energy systems, and other essential elements of a fair and future-oriented food system.

There is a need to make Africa's food systems more innovative to harness the benefits of science and technology across the various dimensions of the system. This includes, among other things, defining a research agenda that focuses on smallholder farmers, investing in human capacity, enabling infrastructure for food systems, putting appropriate governance structures in place for agricultural innovation, and strengthening knowledge flows between farmers and scientists. The adoption and scaling up of this food systems innovation requires that appropriate incentives be put in place. Incentivizing food systems transformation to encourage stakeholders and food systems actors to embrace the transformative paths and the associated adaptation costs and achieve synergy and the desired impact is not an easy or straightforward process but rather one that requires substantial investments and efforts to manage complexities and trade-offs. Several mutually-reinforcing actions, sequenced appropriately, are required at the individual actor, country, regional, and global levels. In addition, incentive mechanisms in food systems will have a greater impact if they are complemented by incentives from other sectors. It will also be important to recognize that there is no one-size-fits-all approach for realigning food system incentives – what works in one country or sub-sector may not work in another

Defining capacity

Capacity is defined as the ability of people, organizations, and society as a whole to manage their affairs successfully (OECD/DAC GOVNET, 2010).

This includes the ability to create, understand, analyze, develop, and plan. It also encompasses the ability to budget resources, implement policies and plans, achieve set targets on outcomes of interventions,

move towards vision, change, and transform. *Capacity development* is the process through which individuals, organizations and society collectively unleash, strengthen, create, adapt, and maintain capacity over time (FAO, 2010). It is more about the quality of engagement with national and local actors than the quantity of outputs being produced; integrated long-term interventions than stand-alone training; and, in general, promoting learning and change "from within" than providing inputs from "outside", as is typical of most foreign technical assistance programs. Capacity development also entails national and regional actors developing and/or finding their own way to solve problems and adapt to change through regional research networks and professional communities of practice. FAO notes that "Until recently, capacity development was viewed mainly as a technical process involving the simple transfer of knowledge or organizational models from North to South" (OECD, 2010). On the other hand, South-South Cooperation (SSC) has become the expression of collaboration and partnership among countries from the South that are interested in sharing, learning, and exploring their complementary strengths to go beyond their traditional role as aid recipients. Knowledge sharing, one of the most dynamic dimensions of SSC, has developed into a third pillar of development cooperation, complementing financial and technical assistance. Although not a substitute, SSC has proved to be a valuable complement to North-South development cooperation, particularly when addressing emerging capacity development challenges such as climate change, food security, social protection and public security (OECD, 2010). Capacity development support can be defined as "efforts by individuals or organizations to reinforce, facilitate, and catalyze capacity development". On the other hand, capacity needs assessment is seen as "the identification of capacity assets and needs at national and local levels" equivalent to measuring baselines and the progress of (capacity) development indicators (UNDAF, 2017).

Several development partners such as the United Nations Development Programme (UNDP), UN-FAO, and the Tropical Agriculture Platform (TAP) recognize three dimensions of capacity development notably, individuals, organizations, and the enabling environment (institutions and systems) as shown in Figure 1. The dimensions must be viewed as interconnected and affecting each other in complex ways through push and pull factors. Capacity development should be regarded as an evolutionary process in which the strengthening of individual and organizational capacities influences each another and the enabling environment in a self-reinforcing loop. This is due to the fact that there is neither linearity nor predictability in the unfolding of capacity development processes because capacity development results from the interplay of several factors and their interaction with the context. Therefore, in the context of food systems, it is pertinent to stress the crucial importance of partnerships and networks in creating that interconnectedness and in bringing together the three dimensions to create new knowledge.

Figure 1: Capacity development elements

Capacity development at the **individual level** entails the core knowledge, skills, attitudes, and energies needed to work effectively. At the **organizational level,** it addresses how organizations coordinate and use individual competencies in such a way that organizations' collective potential is realized. This includes the 'collective' ability of a group or system to function as an effective organization and provide the space for organizational learning, adapt to changing circumstances, build effective partnerships and take risks, to act towards organizational goals and to also acquire and manage the necessary resources. Capacity development at the **enabling environment** level refers to the context in which individuals and organizations put their competencies and capabilities into action. It includes the institutional set-up of a country, its implicit and explicit rules, power structures, and the policy and legal environment in which individuals and organizations function (FAO, 2010).

Capacities across the three levels can be grouped into "hard" and "soft" areas. Hard capacities are tangible and visible, including organizational structures, systems, policies, and procedures. "Soft" capacities are intangible and invisible, social, and relational and include leadership, values, behaviors, commitment and accountability. Capacities can also be grouped into "technical" and "functional" types. Technical capacities are specific to a particular sector or area, e.g., agribusiness, farming and animal husbandry,

water and sanitation, forestry, etc., while functional capacities are relatively common across sectors or areas such as planning, budgeting, policymaking, financial analysis, strategy formulation and communications.

Past efforts on capacity development for agriculture and food systems

In the past three decades, development organizations have partnered with governments, universities, and think tanks through CAADP implementation to enhance capacity. This has focused on human, systemic, and institutional capacity to analyze, design, implement, monitor, and report agriculture and food systems development efforts in Africa. Some of the key initiatives that have shaped capacity development efforts on the continent are highlighted in this section.

The African Capacity Building Foundation (ACBF): Established in 1991, the ACBF serves as the AU's specialized agency for capacity development on the continent. Since its inception, the institution has spearheaded skills and institutional capacity development programs in 48 countries and in the continent's eight Regional Economic Communities (RECs) (https://www.acbf-pact.org/who-we-are). The objective is to address the skills shortage in science, technology, engineering, mathematics (STEM[4]) and agriculture[5]. In terms of individual capacity development, ACBF's programs have focused on enhancing technical skills in professions such as economics, public policy, public sector, and financial management. These programs include one on economic policy management (EPM) offered in seven universities on the continent, as well as support to Women's University in Africa (WUA) as a means of facilitating access to higher education for African women (ACBF, 2016). ACBF's programsTowards enhancing the capacity of systems include strengthening national parliaments legislative and executive oversight activities and establishing 35 policy research think tanks across Africa (ACBF, 2016).

Regional Universities Forum (RUFORUM) for capacity building in Agriculture responds to African development challenges with a particular focus on overcoming the challenges of engaging African universities in development processes. RUFORUM's strategy is to support member universities in contributing to the productivity of smallholder farmers through strengthening (quality and quantity) human resource capacity and subsequently agricultural research for development. RUFORUM's programs focus on two core areas – strengthening agricultural research and agricultural training – underpinned by monitoring and evaluation (M&E) and ICT as support functions that serve both the Secretariat's own functions as well as potential methodological and support services to RUFORUM member universities.

African Economic Research Consortium (AERC) is a capacity-building institution established to inform economic policies in SSA. With three primary components–research, training, and policy outreach–AERC integrates economic policy research, postgraduate training and policy outreach in a network of researchers, universities, and policymakers in Africa and worldwide.

The Forum for Agricultural Research in Africa (FARA), is the apex continental organization responsible for coordinating and advocating for agricultural research for development (AR4D). Established in 1997, FARA serves as the technical arm of the AUC on matters concerning agriculture science, technology, and innovation. FARA serves as the entry point for African agricultural research initiatives designed to have a continental or sub-continental reach and spanning more than one sub-region. Under its Capacity Development and Agri-preneurship (CDA) program, FARA supports strengthening of country capacities to address previous underachievements in AR4D and confront emerging challenges to deliver science- and innovation-based solutions that deal with existing institutional, market, and policy failures. The main objective is to strengthen human and institutional capacities for agricultural research and innovation targeting women, youth, agribusinesses, and smallholder farmers.

Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) comprises 14 member countries[6] and has capacity development as

4 Steve Haggblade et al (2014) analyzed the efforts African agricultural education and training (AET) institutions made in developing technical skills and institutional capacity required to modernize African food systems. They argued, among others, that preparing the young generation for successful agribusiness careers must start with training in key topics mainly sciences and mathematics with an emphasis on business management and entrepreneurship.

5 ACBF estimates a deficit of 1.6 million agricultural researchers and scientists on the Continent.

6 Burundi, Cameroun, Central African Republic, Democratic Republic of Congo, Eritrea, Ethiopia, Kenya, Madagascar, Republic of Congo, Rwanda, South Sudan, Sudan, Tanzania, and Uganda

its core business. ASARECA was established in 1994 as an association for strengthening the research capacity of the sub-regions' national agricultural research institutes and multiple stakeholders, The Association is undertaking a comprehensive and holistic approach to the identification and strengthening of different types of AR4D capacities and competencies at the systemic, organizational, and individual levels to support the attainment of inclusive and sustainable agricultural transformation in Eastern and Central Africa (ECA) member states. To be effective, this approach involves a process of consultation between NARS and all other relevant capacity strengthening stakeholders including universities, private sector actors, farmer organizations, and civil society, among others.

Regional Network of Agricultural Policy Research Institutes (ReNAPRI) was established in 2012 as an initiative of seven Africa-based national agricultural policy research institutes (https://www.renapri.org/about-us/). The Network's objective is to build national research institutions' capacity to deliver high-quality agricultural policy analysis using state-of-the-art analytical tools through collaboration. Comprising members representing eleven countries in SSA, The Network, through collaboration with IFPRI, has developed analytical tools to inform national governments' agricultural investment plans.

The Africa Leadership Training and Capacity Building Program was established in 2012, by the United States Agency for International Development (USAID) as a program under its Africa Lead initiative, which worked to develop a cadre of champions at various levels of government, civil society, and private sector across Africa. The overall goal was to grow champions' understanding of the importance of agriculture and food systems transformation for socio-economic development and build awareness on the important roles they must play. Between 2013 and 2019, the USAID Africa Lead Program trained a total of 6,725 (Africa Lead, 2013) mid- and senior-level professionals in leadership skills and approaches as well as CAADP principles. These experts are now embedded in public and private sectors influencing agriculture and agrifood systems in various ways.

Institutional Architecture Assessment for Food Security Policy Change (IAA): also a USAID project, IAA was started in 2013 to assess countries' capacity to undertake food security policy change. IAA assesses the performance and capacity of policy actors to function as a system, i.e., the set of institutions – including their relationships, interactions, and collective capacity – involved in policy formulation and implementation. The assessment is undertaken across six elements namely guiding policy framework, policy development and coordination, inclusivity and stakeholder engagement, evidence-informed policymaking, policy implementation, and mutual accountability. The food security policy capacity needs assessment was aimed at identifying opportunities to strengthen several Africa countries[7] capacity to manage their respective agriculture policy change process. The IAA was designed to provide a quick scan of the capacities fundamental to policy change with respect to the AU's CAADP. Africa Lead supported numerous countries, including Ethiopia, Kenya, and Malawi, in applying the IAA methodology.

A repeat of IAA demonstrated the approach's usefulness as a tool as well as a process to cultivate in stakeholders, as a shared understanding of the strengths and weaknesses of a country's institutional architecture and the key actions to strengthen its policymaking processes. Under the Africa Lead program, the number of milestones in improved institutional architecture for food security policy achieved with United States Government (USG) support exceeded the target by 48 percent (achieved 40 out of a target of 21). This assessment noted that a cross-sectoral policy coordination mechanism is vital to effective policy reform but that such a mechanism requires sufficient political power to wield enforcement power over line ministries. The assessments showed that the absence of administrative and technical capacity for policy implementation is the greatest constraint to policy reform in several countries. The analysis further showed that while both the private sector and civil society require considerable capacity-building support to meaningfully engage in policy advocacy, this was weak in many countries. Finally, the assessment showed that despite governments' political commitment to evidence-based analysis, the practice of evidence-based policymaking remains limited – an opportunity for purposeful investment.

The Centre for African Leaders in Agriculture (CALA) was established in 2021 by AGRA and partners as part of efforts towards delivering Africa's agriculture and food systems change, which has proven complex. This was also after recognizing that government leaders' ability to guide investment design, prioritization, and implementation and secure cross-sectoral partnerships

7 Ethiopia, Tanzania, Malawi, Zambia, Mozambique, Ghana, Senegal, DRC, Rwanda, Uganda, East African Community, Kenya, Malawi

and coordination are central to this change. Evidence has shown that leadership champions are instrumental in contributing to existing efforts across the continent, providing practical implementation support to enhance how sector leaders deliver on agriculture sector priorities, and meeting the succession challenge in the agriculture sector by supporting 'rising stars' in African Food Systems.

CALA meets its goals through its 16-month Advanced Leadership Programme for Food Security and Sustainability that targets leaders in both public and private agriculture and agribusiness in countries. The leadership coaching and mentoring provides adaptive leadership training through virtual learning labs, exposure to case studies of agriculture transformation, and delivery skills, which are critical in day-to-day project implementation and include goal setting, contract negotiation, strategic thinking, multi-sectoral partnership development, among others. Underscoring the importance of resilience and nature-positive production for Africa's food systems, CALA's curriculum also champions environmental sustainability and agroecological approaches. In addition, the Centre provides executive and team coaching, cross-sector collaboration on Action Learning Projects tied to national flagship initiatives, structured networking at Leadership Forums and AGRF, and delegates' own work.

CALA is working with two implementing partners, the African Management Institute and USAID's Policy LINK[8] to build the capacity of the inaugural cohort of eighty leaders drawn from government, private sector and civil society at both the executive (director generals, directors, and CEOs) and 'rising star' level (program managers, implementation leads, and head of departments) in eight AGRA focus countries. Now eleven months into the 16-month journey, CALA has successfully onboarded the second cohort of eighty leaders expanding the total CALA cohort to 160 delegates, executed 16 team and individual coaching sessions, and seven virtual learning labs. These have focused on various implementation topics such as performance management, change management, and collaborative leadership, among others. CALA has commissioned seven case studies on agriculture transformation including on Kenya's Food Security War Room, Ghana's Planting for Food and Jobs flagship, and the Value4HER platform[9], among others. CALA delegates successfully designed and rolled out 16 Action Learning Projects (ALPs) developed around country flagship priorities. These include 10 ALPs which have received seed funding to aid implementation. In early 2022, AGRA convened CALA's second virtual Leadership Forum under the theme *Collaborative Leadership for Environmental Sustainability in African Agriculture*. A baseline study and two pulse check surveys completed this year have provided feedback that the program is very practical in providing leadership tools and skills, which sector leaders have applied in their day-to-day implementation including in results management, influencing delivery, and improving team management. There is also a notable improvement in collaboration in strategic initiatives across the public, private and civil society sectors as they interact in the program.

An important takeaway from these capacity-building initiatives is that they were designed and executed by external partners and are for for the most part not homegrown. Evidence of the demand from countries and/or governments creating the demand for such good initiatives is therefore scanty and the initiatives thus risk being unsuitable once the funding and champions of the people who introduced them reprioritize their activities or are no longer in a position to continue funding.

In future, it will be important to co-create with governments in the region to ensure proper buy-in, ownership, and a lead role by governments. Development practitioners should play a facilitative role for governments, national actors, and players, rather than having supply-driven initiatives by development and/or technical partners. For example, after several IAAs across countries and having limited adoption and implementation of actions and recommendations, USAID took a different approach for the Kenya IAA in 2017. Here, given that the agricultural sector had already undergone significant structural changes following the introduction of a devolved system of government, USAID Africa Lead took a facilitative approach and provided relevance for IAA. The Government of Kenya, through the Ministry of Agriculture, Livestock, Fisheries and Cooperatives

8 USAID Policy LINK initiative focuses on leadership and collaboration for better policy systems and builds on the successes of the nearly decade-long USAID Africa Lead initiative.

9 A continental initiative aimed at strengthening women's agribusiness enterprises and enhancing voice and advocacy across Africa. The initiative aims to increase the performance of women entrepreneurs through access to markets and trade, access to finance and investments, through tailored online and offline match making activities, learning, networking, and global advocacy aimed at addressing some of the key barriers for women's business growth and market participation in agriculture

(MoALF&C), took the lead role while Africa Lead facilitated the process. This ensured the transition of knowledge and critical skills to the government officers.

As identified under the Paris Declaration and the Accra Agenda for Action on aid effectiveness, capacity development should be underpinned by seven key principles which include:

1. **Country ownership and leadership**: Partner countries own and manage their development processes. National actors therefore need to be in a position to commit to and engage in development activities, articulate clear capacity development targets within sector plans, and define strategies. This entails engagement from the initial idea guiding the intervention, responsibility for the process, execution through national actors, systems and processes, control over resources, and commitment to outcomes.

2. **Alignment with national needs and priorities**: National needs and priorities, rather than agency priorities, should guide capacity development interventions. In the context of increased policy dialogue between Member Countries and agencies, needs, gaps and obstacles to capacity development should be better defined; and existing assets and capacities, as well the vision of national actors for the development of capacities in their own country, discussed.

3. **Use of national systems and local expertise**: Use of country systems, at whatever stage of development they are in, is in and of itself a contribution to strengthening Member Countries' capacities. Conversely, setting up separate operational units to manage and implement capacity development interventions, importing technical inputs from external sources in the form of foreign consultants, developing special incentive schemes for national actors working on capacity development projects, and using parallel systems and procedures for auditing and procurement can not only be serious obstacles to the development of capacities, but can also significantly undermine existing capacities.

4. **No 'one size fits all' approach:** There are no blueprints for capacity developments. Customized responses to the needs of a specific development context are key contextual factors at the country, regional, and local levels. These include historical pathways and evolution, governance,. politics, and social texture, among others, and have been found to have clear operational implications for capacity development interventions.

5. **Multiple-level approach**: As highlighted earlier in this chapter, capacity development implies an endogenous strengthening of existing capacities and assets and takes place across three overlapping and interdependent levels: individual, organizational, and enabling environment. A multiple-level approach thus takes the relationships between these dimensions into account and allows for the possibility that the root cause of weak capacity at one level may be found at a different level.

6. **Mutual accountability**: Both donors and national governments are accountable to the ultimate beneficiaries for development results. Transparency is the foremost instrument of public accountability with respect to financial resources, institutional management practices, planning, and service delivery. As a primary tool for learning and adjusting to evolving conditions, M&E is also essential for accountability systems. The capacity for M&E must be allowed to emerge from national institutions and not be created in the form of parallel reporting systems.

7. **Harmonization of action and partnership:** Many development actors including from the UN, middle-income countries, global funds, the private sector, and CSOs have been increasing their contributions and bringing valuable experience to capacity development. More effective harmonization and inclusive partnerships are desirable so that efforts have a greater impact on reducing poverty.

Capacity of the individual in public and private research systems

Global labor markets and, by extension, the requisite skills[10] of the future workforce, are rapidly evolving[11]. While primary agriculture remains the biggest employer in the region, there is evidence of rapid job growth in the off-farm agrifood system (Yeboah and Jayne, 2018). However, the bulk of jobs are concentrated in largely informal downstream

10 See Appendix 1 for the 35-core work related skills and abilities identified by the World Economic Forum

11 According to the Institute for the Future (2019), 85% of jobs that will exist in 2030 have yet to be invented.

commerce and trading activities and less in agro-processing which is reflective of Africa's sluggish growth in manufacturing (Yeboah and Jayne, 2018). Over the next decade, despite the 4th Industrial Revolution (4IR) and its associated technologies, the rate of change to labor markets in SSA is expected to be relatively slow and dependent on policies and public investments that catalyze structural transformation and improves the competitiveness of the Africa's Agrifood system (BIFAD, 2021).

One strategy to transform and build the resilience[12] and the competitiveness of Africa's agrifood system is to invest in soft infrastructure: specifically, universities or educational systems and RD&E. While this strategy is not "new" in Africa, it bears repeating. An examination of the history of economic thought, particularly at the beginning of 18th Century, serves as a reminder that Malthus predicted that food production would not keep pace with population growth. What Malthus did not account for was the industrial revolution and the ability of technological change to rapidly increase the supply of food to meet the needs of growing populations. For developing economies, this process started in earnest with the Asian Green Revolution of the 1960s. To build Africa's capacity to develop localized innovative solutions that allow the sector to compete globally will require sustained public investment in NARS.

The good news is that there has been rapid growth in SSA agricultural research capacity. Between 2000 and 2016, the full-time equivalent[13] (FTEs) of researchers employed in government, NGOs, and higher-education institutions increased by approximately 90 percent totalling 16,043 FTE researchers (ASTI, 2022). However, despite this growth, there is significant variation in capacity across the region and many national agricultural research systems remain small. For example, 10 of the 40 countries tracked by the Agricultural Science and Technology Indicators (ASTI) employed less than 100 FTEs in their NARS (see Figure 2) and as many as 14 countries experienced near-zero or negative annual growth rates in research capacity between 2010 and 2016 (ASTI, 2022).

The bad news is there is evidence of declining public investments in agricultural research systems in SSA. Between 2014 and 2016, overall spending on agricultural research fell by USD 0.1 billion in real terms for the region (ASTI, 2022). While there is variation across the region, the annual average growth rate of agricultural RD&E spending between 2010 and 2016 were near-zero or negative for 12 of the 36 countries tracked by ASTI.

Overall, to build the individual African's capacity to adapt the 4IR e-commerce and blockchain technologies to local conditions will require sustained public investment in NARs. National public sector budgets do not prioritize agriculture research. Rather, ongoing research programs are almost entirely funded (up to 90% of funding) by development partners and meager government resources are left to finance basic salaries of few key staff and operational costs of research infrastructure. This is a potential threat to Africa's food systems change.

In view of limited resources, it is important to strengthen linkages among national agricultural research institutes, public universities, and CGIAR. Funding mechanisms such as competitive grant schemes that reward partnerships could be devised, including those involving "weaker" partners, such as smaller NARs. NARs could also review university undergraduate curricula to ensure that students understand the constraints and opportunities in smallholder agricultural farming systems. Graduate students could be posted at NARs to undertake their postgraduate or dissertation research and universities could engage more directly in supporting national priorities.

On the other hand, the CGIAR has a strong system-wide and center-wide commitment to capacity building in the NARS. It is therefore important to leverage on this and establish collaboration with national and regional partners for a regional approach to research planning, priority-setting, and implementation. NARS and CGIARs have an advantage in pursuing a regional approach as a component of their respective activities. For NARS in the region, this means seeking advantages at the regional level that they could not derive solely from a national level approach, thus complementing and supplementing the national approach. For CGIAR, this means seeking complementary gains that it could not achieve exclusively through a global or ecoregional approach. These mutual advantages open the door for partnerships in regional research between NARS and their regional organizations, and CGIAR.

12 In the AASR 2021, resilience is defined as the capacity of the system to absorb, recover and adapt to disruptive shocks and/or persistent stressors (AGRA, 2021).

13 FTE calculations include the proportion of time scientists spent on actual research as opposed to administrative and/or other non-research tasks. See ASTI Methodology for detailed description of the FTE calculation.

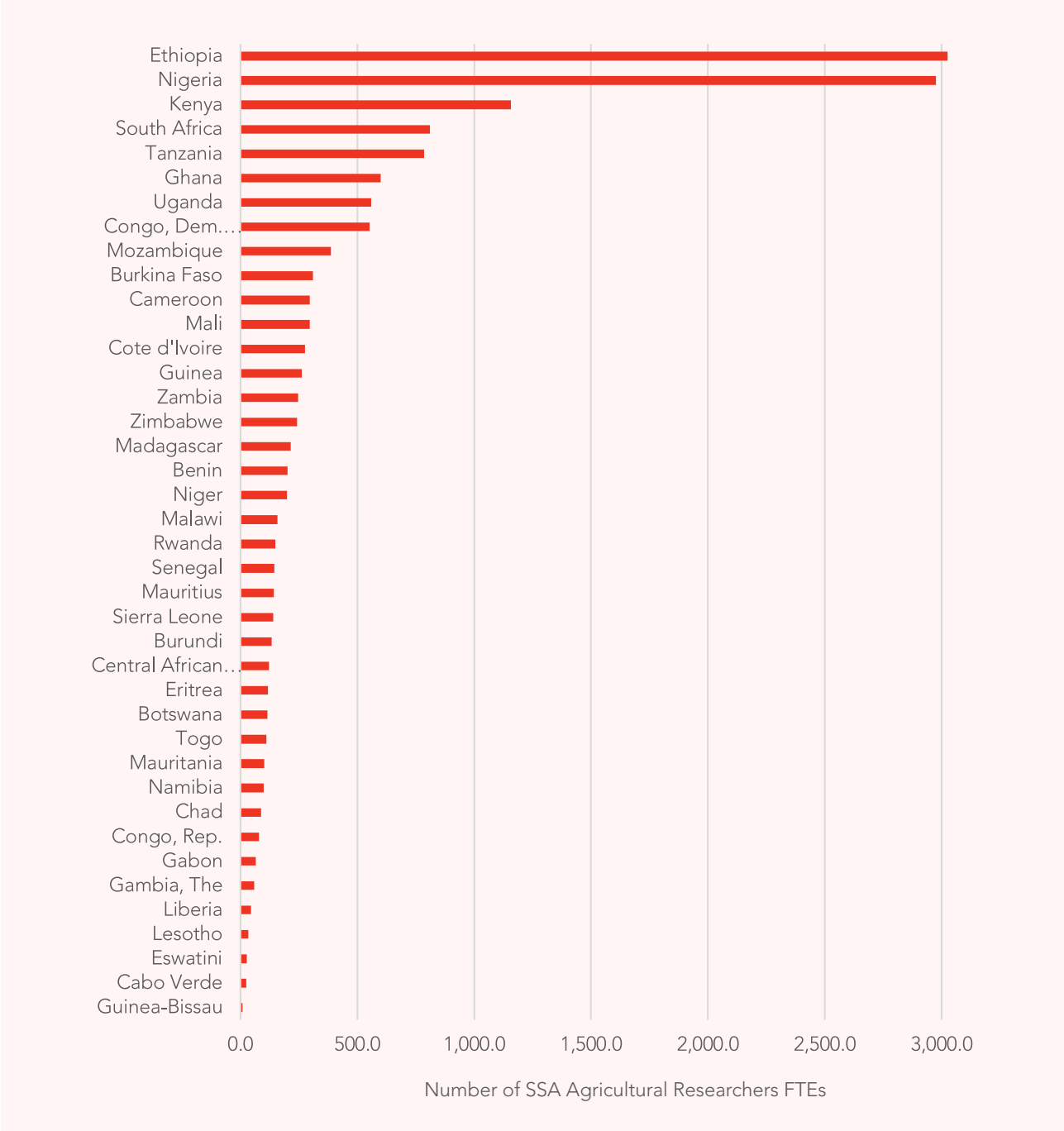

Figure 2: SSA Agricultural Researchers FTEs by Country[14]

Source: ASTI database by IFPRI (accessed 2022).

14 All values are for 2016; values for the Central African Republic, Eritrea, Guinea-Bissau, and Liberia are for 2011 and for Burkina Faso, Malawi, Namibia, Nigeria, and Zambia are for 2014.

Capacity of the organization

Food systems are complex and require multiple stakeholders and strong organizations to design and execute food system strategies and plans. The entire ecosystem of actors drawn from environmental, social-political, economic and farming constitute these complex systems. For example, smallholder farmers are part and parcel of these complicated food systems; some 33 million hardworking individuals, who typically farm on less than a hectare of land make up smallholders. Given the significance of Africa's food systems, it is critical that all actors (governments, private sector, development partners and other non-state actors) each adequately play their respective roles effectively and in a timely manner to avoid a food systems crisis.

Recent pandemics and shocks such as the 2019 locust invasion in East Africa and the Horn of Africa, the 2020 COVID-19 pandemic, climate change shocks and variabilities such as the 2018 El Niño-induced floods in southern Africa, among others all exposed the fragility of Africa's agriculture and food systems. Further, while tracking the establishment of a functional multi-sectoral and multi-stakeholder coordination bodies at country level, the 2021 CAADP Biennial Report noted that out of 51 AU Member States that reported, only 10 Member States[15] achieved the target of 100 percent Another six Member States[16] had a score of less than 50 percent. The Report noted that more effort is needed to strengthen the capacity of institutions to deliver on agriculture and food system strategies on this indicator.

This, among others, calls for adequate capacities across all levels to ensure functionality of food systems in Africa. This includes capacities at the individual, organizational and at systems level. Investments related to capacity strengthening are limited and there is therefore need to have targeted interventions guided by country level assessments.

15 Central African Republic (CAR), Comoros, Equatorial Guinea, Eritrea, Ethiopia, Namibia, Rwanda, Tanzania, Zambia, and Zimbabwe

16 Algeria, Benin, Libya, Niger, Seychelles, and Sudan

Organizational capacity assessment

Various governments have also sought to strengthen their capacities by undertaking organizational capacity assessments (OCAs). In Kenya, the National Drought and Management Authority (NDMA), which is charged with coordinating government resilience programs and activities at both the national and county levels undertook an OCA in 2017. In 2015, Kenya launched its flagship strategy document, "Ending Drought Emergency (EDE) Common Programme Framework", which aims to end drought emergencies in Kenya by 2022. This strategy is closely aligned with the Intergovernmental Authority on Development (IGAD) Drought Disaster Resilience and Sustainability Initiative (IDDRSI) strategy developed after the 2011 Heads of State Summit. Based on this, the NDMA was established through the enactment of the NDMA Act 2016. The OCA was conducted on NDMA and all the Ending Drought Emergencies (EDE)[17] structures at both the national and county level, which included developing a customized capacity development plan for EDE rollout. Furthermore, following Kenya's 2013 transition to a devolved system of government and the associated establishment of 47 counties, critical capacity gaps needed to be addressed to ensure effective implementation of devolved functions including agriculture. In this regard, similar OCAs were undertaken in 2017 for two county governments - Taita Taveta and Bomet County. The capacity development plans and roadmaps developed after these OCAs have become key resource tools for prioritizing capacity interventions and also provide a framework for coordination of all investments in the ecosystem.

The approach in each of these OCAs was to undertake a review of the respective organizational, technical and functional capacities, in relation to vision/mission or institutional strategy implementation; assess the degree to which the existing capacities, structures, and departments are aligned to deliver the mandate of the institution; assess the capacity of the institution to implement the functions under each of its core function areas; identify key structural gaps in functions, capacities and structures and propose ways of addressing them; make proposals for how the institution and related agencies and partners

17 The Ending Drought Emergencies (EDE) strategy is a product of the IGAD Summit of Heads of State and Government of the Horn and East Africa region held in Nairobi in September 2011. The Summit recognized that droughts are slow-onset phenomena which need not and should not lead to emergencies if they are properly monitored and managed. The Nairobi Summit resolved to embark on the IDDRSI to end drought emergencies.

can be effective and efficient in delivering the overall goals; and develop a capacity development plan and roadmap for the institution based on recommendations from the assessment and the identified priority needs. The plan should focus on individual, organizational and institutional capacity needs.

Specifically, the OCAs reviewed the technical capacity, governance and management structures, as well as the financial, administrative, and operational policies and systems. The technical capacity assessment focused on organizational culture for accountability and commitment to delivery of results; assessment of existing mechanisms/structures of coordination and reaching out to key implementers and stakeholders; assessment of existing professional staff in terms of numbers, qualifications, experience, skills, competencies, placements/deployment and attitudes; and analysis of capacity strengths and gaps within the institutions operational capacity taking into consideration its mandate and strategic direction.

The governance and management structures review was concerned with the effectiveness of existing governance structure/s in facilitating the organization's work, i.e., whether key decisions e.g., those affecting strategy, programs, finance and procurement, business decisions etc., are subject to review by a committee or boards.

The financial, administrative and operational policies and systems review sought to assess the organization's internal programmatic, administrative, and financial processes including internal controls by external auditors; monitoring and improvement mechanisms to ensure delivery of quality, and timely project results; capacities in terms of procedures and systems for effective delivery and execution mandate; adequacy of financial, administrative, infrastructural, and technological resources; and effectiveness of financing mechanisms and resource management structures in facilitating the Authority's operations and performance. This review also sought to explore options for sustainability of the institution's program and financing streams; identify gaps in budgets and processes to deliver its mandate; review the effectiveness, efficiency, relevance, and appropriateness of existing operational policies and procedures for technical delivery of mandate/services; and the clarity of operational policies and procedures to internal and external clients across the board.

Capacity of the system (institution)

In the quest to advance agriculture and food systems transformation, the adequacy of capacities to effectively implement the actions and recommendations made at various levels have come into question. For instance, the Institutional Capacity Assessment (ICA) analysis by AGRA (2018) and other partners, across all its 11 countries[18] checked the capacities of public sector institutions and identified several institutional capacity challenges to leading the respective agriculture and food systems. The assessment added value to similar studies carried out earlier by IFPRI/ ReSAKSS, USAID Africa Lead, and others. Key variables captured in the ICA include: i) Component 1: aligned strategies; ii) Component 2: optimized enabling environment; iii) Component 3: sustainable implementation capacity; iv) Component 4: coordinated investment and action and v) Component 5: mutual accountability for results. Figure 3 summarizes the status and improvements of institutional capacity support in selected countries at various levels.

The summary of the outcome of this analysis indicated that considerable investment in strengthening institutional delivery capacity of the agriculture sector must be made to lead and deliver agricultural and food systems for results. This will require a coordinated, integrated, and systematic approach that incorporates institutions, systems, and individuals at both the national and local government levels. Piecemeal investments in capacity strengthening have not been proven effective.

Capacity solutions for transforming Africa's food systems

The 2021 National Food Systems Dialogues and the Africa Common Position on Food Systems clearly testified that African governments are increasingly demonstrating courageous leadership and robust capacity in the development and implementation of an ambitious food systems policy agenda. Country food systems analytics helped to shape and build a fact-based foundation that is user-centric in its design, developing a much-needed multi-sectoral and tailored food systems transformation strategy, coordination mechanism, and implementation support. Countries clearly demonstrated that they need to build or

18 Kenya, Tanzania, Rwanda, Uganda, Ethiopia, Malawi, Mozambique, Ghana, Nigeria, Mali and Burkina Faso

	Country	Rating in 2016 (%)	Rating in May 2020 (%)	Change 2016-2020 (%)
Vision, Strategy, Investment Plan and Flagships (alignment)	Burkina Faso	20	60	▲ 40
	Ethiopia	20	60	▲ 40
	Kenya	40	60	▲ 20
	Mali	40	60	▲ 20
	Mozambique	40	60	▲ 20
	Nigeria	40	60	▲ 20
	Tanzania	20	60	▲ 40
Implementation Capacity and Delivery	Burkina Faso	40	60	▲ 20
	Ethiopia	40	60	▲ 20
	Kenya	60	60	— 0
	Mali	40	40	— 0
	Mozambique	60	60	— 0
	Nigeria	40	60	▲ 20
	Tanzania	20	40	▲ 20
Sector Coordination	Burkina Faso	40	60	▲ 20
	Ethiopia	40	60	▲ 20
	Kenya	40	60	▲ 40
	Mali	40	60	▲ 20
	Mozambique	40	70	▲ 30
	Nigeria	40	60	▲ 20
	Tanzania	40	60	▲ 20
M&E, mutual accountability and evidence-based planning	Burkina Faso	40	60	▲ 20
	Ethiopia	40	70	▲ 30
	Kenya	20	40	▲ 20
	Mali	20	70	▲ 50
	Mozambique	20	40	▲ 20
	Nigeria	20	40	▲ 20
	Tanzania	40	60	▲ 20

Figure 3: Status and Changes of Institutional Capacities to Drive Agriculture and Food System (AGRA, 2019).

strengthen existing agriculture and food systems delivery mechanisms and platforms for transformation, policy development, capacity building, innovation, and investment.

Evidence from the Food Systems Transformative Integrated Policy (FS-TIP, 2021)'s work in Rwanda, Ghana, and Malawi provided some of the practical, albeit radical, pointers on the kind of capacities needed to advance agriculture and food systems change for Africa. Countries are increasingly realizing the need for an integrated and multi-sectoral approach to manage complex agriculture and food systems governance structures that build from current systems, but incline to what is needed while addressing functional gaps.

The complexity and multi-sectoral nature of food systems governance requires in-country governance structures that allow multi-sectoral linkages of line ministries particularly of agriculture, trade, environment, health, infrastructure, and finance, among others. To harness the momentum created by the UNFSS, national governments must be ready to embrace the following critical conditions.

1. Agriculture and food systems will require government support at the highest level. The President or Prime Minister will need to embrace a national agenda that integrates existing mechanisms with food systems transformation and empower the governance structure with the necessary mandate. Business-as-usual will not deliver the desired change.

2. Complex agriculture and food systems change will require highly capable, independent and respected leadership and champion(s) that can lead and/or guide planning and delivery efforts, make tough decisions, identify and address vested interests, and inspire others to set and realize bold ambitions.

3. There may be structural challenges in redesigning the agriculture public service system and governments will require strong multidisciplinary local teams similar to Ethiopia's Agricultural Transformation Institute (ATI - formerly ATA) with strong local team(s), that have technical expertise, can build capacity over time, and that can "over-deliver". Such agility and robustness should help accelerate the delivery of programs at scale and leverage digital technology to make and measure impact.

4. There is need for a governance and operating model for a high-performance culture that is well designed, i.e., includes a set of performance indicators and evaluation mechanisms leverages scorecards such as the AU Biennial Review dashboard as means of tracking; and has structures that can adapt to changing realities and evolving insights.

5. Undoubtedly, such radical capacity shifts will require sufficient and sustainable funding for intergenerational effort with a blend of public, development, and private sector finance and investment to realize ambition over a 10-year period.

Conclusions and key recommendations

Agriculture and food systems in Africa and globally are complex and require effective capacity to design, implement, and track. The 2021 UNFSS ushered in anew era that saw many more countries and stakeholders engaged in discussions on food systems but also demonstrated that business-as-usual will not deliver the goals and targets agreed by leaders both at the UN Summit and in the 2030 SDGs and CAADP Malabo Goal 2025. The biggest challenge is capacity including capacity to design, execute, and implement policies and strategies.

From a scan of various records, capacity can be assessed at the individual, organizational, and systemic level. The analysis of capacity at various levels shows that all types of capacities are required to deliver agriculture and food systems in Africa.

Various technical and development partners have attempted to create institutions such as ASARECA, ACBF, AERC, and FARA, among others, to design and implement capacity development programs and initiatives. However, while valuable, these initiatives are largely driven by technical and development partners. Without governments and national stakeholders being part of the demand for such efforts, their sustainability is not certain. Africa will continue to experience challenges of human, individual, organizational and systemic capacity to design and implement agriculture development programs putting Africa's agriculture and food systems at risk and compromising the attainment of the SDGs and the CAADP goals.

In terms of recommendations, governments and Africa leaders must act differently. The following constitute key recommendations.

1. To address challenges of multi-sectoral and multi-institutional coordination, governments will need to be deliberate in bringing together different ministries and government agencies that are part of the food systems policy environment. Governments must enhance capacities for designing national agriculture and food systems plans and set the priorities and ambitions for transformation while continuously developing the capacities of local experts and teams that rely on external technical assistance instead of building systemic capacity.

2. Enhancing capacity at the government level will require a deliberate, albeit difficult, decision by governments to overhaul public service systems to create and incentivize highly-performing local experts who can deliver and report agriculture and food systems.

3. While skills training will build capacity, on its own, it will not deliver the needed capacity that overhauling both organizational and software structures will. Governments will need to take a lead role in identifying and reforming various institutional and systemic structures including an in-depth functional analysis to effectively establish functional structures with people who can deliver agriculture and food system challenges.

4. Governments will need to have a long-term focus of 10 or more years to design agriculture and food systems visions and strategies. Public sector leaders must be empowered and given sufficient

mandates to make tough decisions and deliver on these ambitions within the requisite time frames and irrespective of government transitions.

5. As part of building capacity, governments will need to convene public and private sector players, civil society and the media to develop a national ambition and priorities for action. In this way, these actors will be well positioned to enhance their internal individual capacities and shifting mindsets while addressing interdependencies, synergies and trade-offs.

References

AGRA (Alliance for a Green Revolution in Africa). (2018). *Africa Agriculture Status Report: Catalyzing Government Capacity to Drive Agricultural Transformation*. Nairobi: Alliance for a Green Revolution in Africa.

AGRA (Alliance for a Green Revolution in Africa). (2021). *Agriculture Status Report. A Decade of Action: Building Sustainable and Resilient Food Systems in* Africa. Nairobi: Alliance for a Green Revolution in Africa.

African Capacity Building Foundation (ACBF). (2016). ACBF in Action: 25 Years of Capacity Development impact across Africa. https://www.acbf-pact.org/key-documents

Africa Lead (2013): Africa Leadership Training and Capacity Building Program. Developing a cadre of African leaders who will design and implement food security strategies and investment plans April 16, 2013 EDH-I-00-05-00004 Washington, DC.

African Union (2022). The Biennial Review Report of the African Union Commission on the Implementation of the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods. Assembly Decision (Assembly/AU/2[XXIII]) of June 2014

AGRA. (2018). Africa Agriculture Status Report. Catalyzing Government Capacity to Drive Agricultural Transformation. https://agra.org/wp-content/uploads/2018/10/AASR-2018.pdf

AGRA. (2021). Africa Agriculture Status Report. A Decade of Action: Building Sustainable and Resilient Food Systems in Africa. https://agra.org/resource-library/africa-agriculture-status-report/

ASTI. (2022). Country Benchmarking: Africa South of the Sahara. Electronic Database. ASTI Facilitated by IFPRI. Accessed in July 2022 at: https://www.asti.cgiar.org/benchmarking/ssa

Haggblade, S.; Chapoto, A.; Hendriks, S.; Kabwe, S.; Minde, I.; Mugisha, J; Terblanche, F.; and Yaye. A. (2014) Capacity Development for Modernizing African Food Systems (MAFS) Working Paper 7.

FAO (2010). FAO Approaches to Capacity Development in Programming: Processes and Tools ISBN 978-92-5-000000-

FS-TIP (2020). Food Systems Transformative Integrated Policy (FS-TIP, Analysis of Food Systems in Ghana, Malawi and Rwanda - Boston Consulting Group (BCG), AGRA, Tony Blair Institute, IDRC IFPRI and Rockefeller Foundation.

Institute for the Future. (2019). Future of Work: Forecasting emerging technologies' impact on work in the next era of human-machine partnerships. Dell Technologies. URL: https://www.dell.com/en-us/dt/perspectives/future-of-work.htm#pdf-overlay=//www.delltechnologies.com/asset/en-us/solutions/business-solutions/industry-market/realizing_2030_future_of_work_report_dell_technologies.pdf

Jayne, T.S.; Fox, L.; Fuglie, K.; and Adelaja, A. (2021). Agricultural Productivity Growth, Resilience, and Economic Transformation in Sub-Saharan Africa: Implications for USAID. BIFA Report. https://www.usaid.gov/sites/default/files/documents/BIFAD_Agricultural_Productivity_Growth_Resilience_and_Economic_Transformation_in_SSA_Final_Report_4.20.21_2_2.pdf

OECD (2010). Capacity Development: A DAC Priority. November 2010.

United Nations.(2022). *The Sustainable Development Goals Report 2022*. New York: United Nations Department of Economic and Social Affairs. Available at https://unstats.un.org/sdgs/report/2022/

Van den Hove, S. (2007). The Rationale for science-policy interfaces. Futures. Volume 39 (7), Pg 807-826. DOI: https://doi.org/10.1016/j.futures.2006.12.004

World Economic Forum (WEF). 2016. Future of Jobs: Employment, skills and workforce strategy for the fourth industrial revolution. Global Challenge Insight Report. URL: https://reports.weforum.org/future-of-jobs-2016/

Yeboah, F.K. and Jayne, T.S. (2018). Africa's Evolving Employment Trends. *Journal of Development Studies* 54(4):1-30. DOI: 10.1080/00220388.2018.1430767

Appendices

Appendix 1: Core skills and abilities for future workforce

Based on the adaptation of the 0*NET Content Model; the WEF *Future of Jobs Report* identified 35 core work related skills and abilities that companies across all sectors require of their workforce (see Table A.1). As we enter the 4IR the relative importance of these skills will change. For example, within the consumer goods sector (which includes the agrifood system) resource management and complex problem-solving skill sets were predicted to become increasingly important by 2020 (WEF, 2016).

Table A.1 Core Competencies Demanded by Employers

ABILITIES		BASIC SKILLS		CROSS FUNCTIONAL SKILLS				
Cognitive	**Physical**	**Content**	**Process**	**Social**	**Systems**	**Resource Management**	**Technical**	**Complex Problem Solving**
Flexibility	Strength	Active learning	Active listening	Coordinating with others	Judgement & decision-making	Financial resources	Equipment maintenance & repair	Complex problem solving
Creativity	Manual Dexterity & Precision	Oral Expression	Critical thinking	Emotional intelligence	Systems analysis	Material resources	Equipment operation & control	
Logical Reasoning		Reading comprehension	Monitoring self & others	Negotiation		Human resources	Programming	
Problem Sensitivity		Written expression		Persuasion		Time management	Quality control	
Mathematical Reasoning		ICT Literacy		Service orientation			Technology & user experience design	
Visualization				Training & teaching others			Trouble shooting	

Source: World Economic Forum, based on O*NET Content Model.

Appendix 2: The state of food systems in Africa

To contextualize the capacity needs for the continent, it is important to understand where the continent is at, in terms of agriculture and food systems. The recent State of Food Security and Nutrition Report (2022)[19], paints a gloomy picture of Africa's agriculture and food systems transformation efforts. Despite unprecedented efforts, the report indicates that 35 million more people were affected by hunger in 2020 compared with 2019, prior to the outbreak of the COVID-19 pandemic, with an additional 15 million in 2021, for a total of 50 million more people in two years. The report further shows that one in five people in Africa (20% of the population) was facing hunger in 2021, compared to 9.1% percent in Asia, 8.6% in Latin America and the Caribbean. It is in Africa where the proportion of the population affected by hunger has increased the most. The trends in the prevalence of undernourishment (PoU) h increased from 2019 to 2020 and continued to rise in 2021 across Africa, Asia and Latin America, with the rise more pronounced in Africa (FAO et. al., 2022).

This phenomenon is evidently clearer at country level. For instance, and according to the Food System Transformative Integrated Policy (FS-TIP, 2021)[20] initiative, 70% of Malawians cannot afford a healthy diet, and consume infrequent meals mainly from cheaper and less nutritious cereals, resulting in high rates of undernourishment. A nutrient adequate diet costs 102% of household food expenditure, beyond the affordability of 71% of the population; while a healthy diet costs 219% of household food expenditure, beyond the financial reach of most Malawians. There is limited farming of nutritious legumes and livestock, which reduces their supply and increases the cost of nutrient adequate/healthy diet. These factors result in diets dominated by readily available, cheaper, non-nutritious carbohydrates and low-quality protein such as maize and fatty meat.

In Ghana, the population is characterized by low diet quality and nutrition security, low production levels, affordability, and low demand for nutrient-dense foods among the population. A healthy diet is unaffordable for 65% of people. An adequate nutrient diet costs 126% of household food expenditure and is unaffordable for 27% of the population. From the nutrition perspective, 6.5% of Ghanaians are undernourished compared to an Africa average of 21.6% and this relatively good performance is attributed to school feeding programs that the country has implemented over the years. Up to 30% of Ghanaians are overweight compared to an Africa average of 27.7%. Although Ghana's obesity rates are lower than global rates, both adult and child obesity are rising.

In Rwanda, 35% of the population are undernourished and 21% are overweight or obese and a healthy diet is unaffordable for 90% of people, which argues for price-lowering strategies to be put in place. A healthy diet costs 245% of household food expenditure, which is unaffordable for 90% of the population. An adequate nutrient diet costs 87% of household food expenditure and is unaffordable for 49% of the population. An energy-sufficient diet costs 30% of household food expenditure and is unaffordable for 3% of the population.

The governments of Malawi, Ghana, Rwanda and many others on the continent, are aware of the problem. The challenge, however, is the needed capacities to translate these to define future efforts within a food systems lens to design business cases and bankable investments.

Capacity is required to translate such challenges into solutions such as strengthening guidelines on food marketing & messaging and or making the benefits of affordable healthy food visible and revealing the costs of damage to the environment and human health. Governments need to put in place and implement policies that make healthy foods more affordable and attractive as well as measures to ensure true pricing of food.

19 FAO, IFAD, UNICEF, WFP and WHO. 2022. The State of Food Security and Nutrition in the World 2022.Repurposing food and agricultural policies to make healthy diets more affordable. Rome, FAO. https://doi.org/10.4060/cc0639en

20 led by IFPRI, Boston Consulting Group (BCG), AGRA, Tony Blair Institute in partnership with IDRC and Rockefeller Foundation, the Food Systems Transformative Integrated Policy (FS-TIP) is an initiative that undertook analytics in 2021 to inform the UN Food Systems Summit to inform National Dialogues and initially to support governments of Malawi, Ghana and Rwanda to demonstrate robust integrative leadership and capacity, in the development and implementation of an ambitious policy agenda aimed at achieving sustainable, healthy diets for all their citizens. Support by FS-TIP included fact base foundation, tailored food system transformation strategy development, and implementation,

5 Conclusions and Recommendations

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Introduction

The 2022 Africa Agriculture Status Report (AASR22) is aptly titled: *Accelerating African Food Systems Transformation* to project the urgent need for the agricultural sector to achieve inclusive, equitable, sustainable, and resilient growth while simultaneously responding to multiple crises such as climate change, rising global energy, food, and fertilizer prices, and ever-present food insecurity. The timing could not have been more appropriate.

UNFSS commitments made in September 2021, and COP26[6] commitments made in November 2021, set the scene for a deeper introspection on the policy implications for SSA countries. With the after-effects of COVID-19 pandemic and the Russo-Ukraine conflict, both of which have ushered in an era of elevated food prices that continue to exacerbate food insecurity throughout the continent, AASR22 highlights the key priority actions required to achieve inclusive, equitable, sustainable, and resilient food systems in Africa.

The central theme and contents of AASR22 draw significantly from the UNFSS, particularly the Secretary-General's Chair Summary and Statement of Action and crucial next steps required to achieve food systems transformation. The report answers the following questions: (a) what are major megatrends shaping Africa's food systems and what challenges do they present to African governments? (b) what is at stake for Africa if the challenges faced are not addressed? (c) what is required of African leaders and international partners to address the challenges? (d) what resources are required, both financial and human? (e) what coalition of partners is required to effectively build capacity among stakeholders and food systems actors for sustainable and resilient food systems? AASR22 dissects these fundamental questions through four chapters. The ensuing section contains brief overviews of these analyses.

The Report concludes that achieving inclusive, equitable, sustainable and resilient food systems will require (a) proactive policy responses to critical megatrends impacting African economies and markets; (b) bold and accountable leadership that will ensure the effective execution of specific priority actions, policies, and programmes; (c) significant public and private investments in support of farm technical innovation and productivity growth, policy support for private investment in upstream and downstream agrifood systems, and climate financing; and (d) strengthened state capability and capacity to operationalize all of the foregoing.

The complexity of food systems, combined by the need for a more holistic and integrated approach to policy and programme development and execution is a daunting task, particularly in the face of an unprecedented set of challenges facing SSA's agricultural sector. Against this background, the Report identifies priority response actions that can be considered by governments, private sector, development institutions, and other non-state actors for SSA to increase momentum towards the transformation of food systems. This brief overview of AASR22's findings and policy recommendations follows the order of the four chapters set in this Report.

Chapter summaries and key highlights

Chapter 1 examined the key megatrends shaping agrifood systems in Africa and discussed the priority areas to achieve transformative change. The chapter discusses six megatrends affecting the development of agrifood systems in Africa which warrant greater attention by stakeholders in African

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food systems. These include rapid rural population growth and the associated rising land scarcity; rising urban populations and increasing demand for food; economic transformation, including rising wage rates and per capita incomes; climate change and increasing incidence of extreme weather events; ongoing global health crises, regional conflict, and economic disruptions; and the accelerated pace of technical innovation in digital agriculture.

For instance, SSA's rural population is projected to rise by 53 percent between 2017 and 2050 creating conditions of land scarcity and, with it, explosive increases in land values. Africa's urban populations are also rising rapidly—even faster than in rural areas. The combination of high population growth and rising incomes is creating explosive growth in the demand for food in Africa. Economic transformation, whose main features include rising wage rates and per capita incomes, is also triggering an unprecedented demand for more processed and livestock-based foods. On the shocks side, climate change and the increasing incidence of extreme weather events, as well as ongoing global health crises, regional conflicts, and economic disruptions, are further exacerbating vulnerabilities in Africa's food systems. The character of the food system continues to evolve in response to these drivers and therefore so too should food policies and strategies.

There is urgent need to repurpose food policies to address the emergent challenges affecting the conditions, outcomes, and behavior of Africa's food systems. Interacting with the megatrends is a growing recognition of the need to develop pathways for food systems transformation that are technically and allocatively efficient; inclusive of women, youth and other vulnerable groups; promote resilience to exogenous shocks; and enhance nutrition outcomes while fostering sustainability across key dimensions.

Chapter 2 examined the role of leadership in harnessing collective effort, shared responsibility, greater stakeholder engagement, and rallying political will to achieve food systems transformation in Africa. The multi-dimensional and complex nature of Africa's food systems requires that key actors and stakeholders, including national governments, international agencies, civil society, farmer organizations, and the private sector, work together towards improving people's economic access to a healthy diet and achieving long-standing goals for global food security and good nutrition. Food systems are multi-sectoral, and cut across various government and non-state institutions, hence central leadership can play a crucial role in orchestrating inter- and multi-sectoral dialogues and effective coordination mechanisms. African governments must assume a leadership role in food systems transformation and reduce reliance on donors who have been directing the flows of international assistance for decades. Coordination mechanisms will also be important at regional and continental levels. Continental bodies such as AUDA-NEPAD can play a leading role in supporting countries to review existing in-country coordination mechanisms across sectors and design country-tailored coordination mechanisms with clear accountability systems. This process will help further define and clarify mandates and lead actors for each priority area and reaffirm the responsible institutions and people for convening and with a clear mandate.

Chapter 3 discussed the investment gap that is required to trigger and/or sustain Africa's agrifood transformation. Different analytical approaches arrive at various estimates of Africa's investment needs, which range from US$ 40 and USD$ 77 billion per year in public sector investment, and up to US$ 180 billion in private sector funding. With the private sector expected to play a critical role in filling the financing gap, public sector funding is expected to play the role of de-risking and incentivizing private sector capital into agriculture. The Chapter chronicles the various players that demand capital (i.e., smallholder farmers, SMEs, medium-capital to large companies, etc.), and also profiles actors that supply funding (i.e., donors, public sector, commercial and development banks, MFIs, cooperatives, institutional investors, and insurance firms, etc.). The Chapter makes a case for innovative finance mechanisms with specific illustrations of blended finance, supply chain financing through digital solutions, partial credit guarantees, risk-sharing facilities, fintechs, and crop receipts as key examples. The Chapter acknowledges warehouse receipts, outgrower schemes, and agricultural lease financing as important financing mechanisms that require continuous recalibration to meet evolving financial needs and circumstances. With climate financing as an emergent source of important funding, the Chapter notes that there is still a critical lack of resourcing for key levers that can unlock food system transformation.

Chapter 4 reflected on the human, institutional and systemic capacities and capabilities required to achieve agrifood system transformation at scale. The Chapter proposed building and/or enhancing existing platforms that promote innovations, and investments that develop policies and build institutional capacity. The Chapter also suggests that country-level capacities be driven from locally-led transformative and integrated action bringing in key sectors of the economy that are central to food systems, namely, health, environment, agriculture, and education. Regarding developing the requisite capacity and capabilities to sustain agrifood transformation, the Chapter put forward five key conditions namely, (i) government support at the highest level to support a national agenda for food systems transformation and empower the governance structure with the necessary mandate; (ii) highly-capable, independent, bold, and respected champion(s) who can lead planning and delivery efforts and inspire others to action; (iii) strong multidisciplinary teams consisting of local technical expertise, which, if inadequate, can be built over time; (iv) a dynamic performance-driven governance and operating model designed to meet a set of key performance indicators (KPIs) under an evaluation framework with transparent accountability mechanisms (i.e., a scorecard dashboard), and finally, (v) sufficient and sustainable funding under a PPP framework that blends investments across public, development, and private sector finance. The Chapter recommends that the development of capacities and capabilities be led, driven, and owned by countries, and aligned with national needs and priorities. It also notes that the models of the capacity development process will differ by country and will be adapted to local conditions.

What are the key next steps for accelerating food systems transformation in Africa?

Accelerating Africa's food systems transformation is a complex task. Achieving the needed transformation especially responding effectively to current crises will require a coordinated approach from all stakeholders including national governments, private sector, development partners, and NGOs, among others. The following discussion lays out key recommendations and priorities for food systems stakeholders following discussions in the AASR22 chapters.

Priorities for African national governments

1. **Prioritize investments in food systems transformation as a national security, poverty alleviation, and rural development agenda.** Economic growth, human development, and poverty alleviation all depend on investments in agrifood systems. Improved nutritional outcomes also rely on strong farm technical innovation to raise the productivity of a diverse set of food commodities. Investments in the transformation of African food systems toward greater sustainability and resilience will improve food security, conserve natural resources, and reduce GHG emissions, which contribute to climate change.

2. **Expand access to climate financing resources to build resilience in food systems.** African countries are currently receiving less than half of the resources they need to implement the continent's climate action commitments and NDCs. Governments should double down on efforts to access climate financing resources and make them available to smallholder farmers and other food value chain actors.

3. **Reduce reliance on international partners for funding, capacity building, and policy influence regarding agricultural RD&E.** National governments must assume the leadership roles of integrating principles of sustainability, resilience, community empowerment, and inclusion into the performance measures of national agricultural institutions and international research partners working in African countries. Ultimately, it is the responsibility of African governments to take charge of the agendas and mold the programs of international development partners to align with national agendas.

4. **Commit to national agricultural action plans that specify how countries will transition from agricultural area expansion to productivity growth on existing farmland as the primary source of future agricultural production growth.** Achieving higher levels of agricultural productivity growth requires strengthening national agricultural RD&E systems, supporting more efficient use of funds, and implementing stronger accountability frameworks to achieve performance targets. Achieving productivity growth on existing farmland will allow for the conservation of existing areas of forests and grasslands to generate sustainable

revenue streams for African citizens and national governments. Raising farm productivity depends on technical innovation, which originates from: (i) strong regional and/or national adaptive crop science; (ii) animal science; (iii) and policy programmes for improved seeds and agronomic management practices as well as appropriate policies and public investments for a wide range of crops tailored to the respective agroecological and market contexts. The international research system, and specifically the CG system, can play an instrumental role by expanding and concentrating its activities on building the capacity of African agricultural RD&E and policy organizations so that these African organizations are capable of effectively leading and prioritizing African agricultural research and knowledge generation on the continent. Policy implementation will certainly benefit from stronger locally-led agricultural R&D and policy organizations. With concerted efforts from international development partners and foundations and with capacity building support from the international research community, African-led agricultural R&D and policy institutions can increasingly lead in the development of technical innovation and policy support on the continent and international partners can increasingly be called upon to support these African-led processes.

5. **Remove the constraints and barriers facing the private sector to provide storage, transport, and aggregation facilities to support the transformation of African food systems.** National governments can accelerate this transformation by creating and maintaining an enabling environment including investments in public infrastructure and policy to amplify the role of the private sector in driving agricultural productivity, opening up markets, and facilitating increased private investment in the sector. The rapid development of African-led agricultural policy and research institutes will support this aim while achieving it will require greater financial support from African governments and African development organizations such as the AU, AfDB, and AGRA as well as from international partners.

Priorities for development partners

To support African leaders, farmers, entrepreneurs, investors, and consumers to play a more effective role in developing a sustainable and resilient African food system, development partners including Pan-African organizations, international organizations, and bilateral and multilateral development partners should prioritize the following actions:

1. **Lead and coordinate with African governments to strengthen the international frameworks for agricultural research and development in Africa.** The UNFSS highlighted opportunities for Africa and the world to examine and identify context-specific solutions to the challenges hindering the achievement of food systems-related goals and targets in various development frameworks including the UN SDGs, AU's Agenda 2063, the Maputo Declaration, the Malabo Declaration, and the AfDB's Feed Africa Strategy, many of which are already integrated. For example, the ten years of the CAADP Malabo Declaration and targets were aligned with the ten-year implementation plan of Africa's Agenda 2063 and to the SDGs. These frameworks provide opportunities to position food systems at the center of driving inclusive growth and economic development to ensure wealth creation, food and nutrition security, and economic opportunities for poverty alleviation and prosperity. Strengthening these frameworks will accelerate the transformation of African food systems toward greater sustainability and resilience.

2. **Increase concessional lending and grants to support investments that strengthen key bottlenecks along agrifood value chains**. DFIs such as the AfDB Group, the World Bank Group, IFAD, and others play a critical role in providing concessional credit along with a range of technical support in partnership with African countries that helps to ensure greater impact. Through funding and technical assistance, they must continue to support the public sector in developing and maintaining enabling environments in which the private sector can thrive.

3. **Lead and support the development and implementation of true cost accounting frameworks in food systems across Africa.** TCA principles provide a framework to expand beyond narrow measures of performance such as crop yield by accounting for the true costs and benefits of food systems on natural, social, human, and physical capital. Pan-African organizations have a unique opportunity to develop and implement TCA frameworks in food systems in ways that allow for consistent targets, comparisons, and tracking over time.

4. **Encourage and permit African governments to formulate their own agendas for a food system transformation toward greater sustainability and resilience.** Encouraging an African-led transformation will require supporting national governments as they formulate and implement their respective agendas, including through technical assistance. Development partners should follow the lead of African governments and regional institutions in creating their own support programs. Organizations should avoid overloading African national governments with their own demands and requirements and instead support African governments to build the necessary state capacity to manage and develop their respective food systems at their own pace.

5. **Focus funding models to benefit long-term institutional capacity development and agricultural knowledge and technology transfer in African food systems.** Supporting national, regional, and international institutions through scaled agricultural RD&E investments would leverage development funding for food system transformation and enhance the multiplier effects. Current funding models often crowd out critical opportunities for long-term institutional capacity in agricultural research, technology, and innovation. Such capacity is the very foundation for food systems transformation toward greater sustainability and resilience. Funding large-scale inter-disciplinary research involving national, regional, and international universities and research organizations will foster greater regional collaboration, knowledge integration, and technology diffusion. CGIAR must evolve from leading R&D activities to elevating NARS and FARA to lead on their own with the CGIAR system transitioning to a support rather than a lead or dominant role. This implies a much greater emphasis on capacity development and sharing the massive resources that CGIAR receives from donors and foundations more equitably with NARS and continental R&D organizations.

6. **Donors and Development Finance Institutions (DFIs) to crowd in and provide catalytic capital to fund agri-SMEs.** Donors and DFIs can de-risk agricultural financing by providing first loss guarantees to financial service providers including commercial banks, public development banks, MFIs, and cooperatives. Moreover, greater coordination is needed among donors and DFIs to speak with one voice on the need for policy reform at the country level and to accelerate the design and implementation of investable projects.

Priorities for the private sector

At present, most investment in African food systems comes from the private sector, which includes millions of smallholder farmers and informal traders along with increasing investment from corporations. The private sector invests in productive capacity, imports and adapts new technologies, and innovates to respond to the African context and customer needs. Actors in the private sector should prioritize the following actions to support African leaders, farmers, entrepreneurs, investors, and consumers to play a more effective role in the development of a sustainable and resilient African food system:

1. **Invest in productive capacity to facilitate the adaptation of new technologies and innovations to respond to rapidly-evolving customer demands.** As food systems in Africa evolve to meet internal and external factors, the private sector should double down in adaptation and scaling-up of appropriate innovations that maximize efficiency, resilience, and sustainability of food value chains. Key among these innovations are digital agricultural services, post-harvest handling, value addition, and productivity-enhancing inputs such as improved seed, mechanization, agro-chemicals, and irrigation.

2. **Commercial banks must increase lending to agri-SMEs**. SME are the workhorses driving commerce and arbitrage in African food systems from input supply to output processing and waste management. Due to perceived risks in agriculture and lack of collateral among farmers and agri-SMEs, commercial bank lending to agriculture is relatively low in most countries. This funding gap can be reduced significantly through use of innovative financing mechanisms such as blended finance, credit guarantee schemes for agriculture-sector loans, risk-sharing facilities, fintechs, and crop receipts.

3. **Lead the transformation of food systems through comprehensive analysis of the true costs and benefits of producing, distributing, and consuming food.** Private agribusiness firms should interact with other stakeholders to develop solution-driven approaches to reduce the adverse effects that food systems impose on human health, social values, and the environment. Many private firms, especially those investing in food systems in developing countries, have realized that a focus on short-term profits is not sufficient to ensure their own sustainability and resilience or the sustainability of the food systems in which they operate. Some firms are increasingly focused on the "triple bottom line"—that is, economic, social, and environmental effects of their operations. Like the deficiencies of national accounts systems in measuring the true costs and values of food systems policies and practices, companies are also realizing that financial balance sheets do not measure the true value of doing business.

4. **Align principles of true cost accounting with investing strategies and objectives.** Such an alignment enables investors, asset managers, lenders, farmers, and other stakeholders to accurately account for underlying material costs not currently captured in current accounting principles and practices. The result will be a more comprehensive and holistic valuation tool that will enable investors to better connect investment decisions with the reporting of outcomes.

Towards an action plan for accelerating agrifood transformation

In the overview of the AASR 2022 findings and policy recommendations presented in this Chapter, the conclusion is broadly formed into two sets or parts. The first focuses on priority actions set out in Chapter 1 to manage exogenous factors (i.e., megatrends) that continue to influence and reshape agrifood systems. The second focuses on priority actions outlined from Chapters 2-4, which manage endogenous prerequisites namely, leadership, financing, and capacity (human and technical) that are needed to trigger and/or sustain agrifood transformation.

In relation to the first part, Chapter 1 outlined six key megatrends affecting SSA economies in a fundamental way as outlined earlier. Table 5.1 outlines the policy actions required for governments to respond to and manage these megatrends.

With respect to the second part on Chapters 2 to 4, the mix of policy responses leans towards innovations that unlock the potential for accelerating agrifood systems transformation. First, leadership as an expression of not just policy and vision for food system transformation, but also in terms of the efficient execution and effective implementation of commitments that were made at the UNFSS. This involves the wherewithal of leaders and champions to galvanize and coordinate various stakeholders and sectors through various mechanisms and platforms and garner the needed support and momentum that unifies countries behind a common message around agrifood transformation.

Secondly, in terms of financing, the investment gap requires governments to mobilize both public and private sector resources to support climate-smart agricultural practices and create the necessary incentive systems to ensure sustainable production of food. An enabling policy and operational environment—including the use of public financing to de-risk agriculture—is part of the requisite policy responses to generate the investments needed to fill the financing gap required to support agrifood transformation. Third, it will be critical for governments to implement policies supporting skills training and capacity building, investments in extension, and RD&E—ideally through expansive PPPs that can generate deeper and broader impact at scale.

Table 5.1: Towards an Action Plan for Accelerating Agrifood Transformation

Megatrend		Policy response actions
Exogenous driver	**Consequences**	
Population growth	- Land scarcity, rising land prices	(i) Promote access to quality education to enable rural youth to succeed in off-farm and non-farm pursuits; (ii) Promote the performance of national agricultural RD&E to accelerate technical innovation and productivity growth on existing agricultural land; and (iii) Support land tenure arrangements that protect the rights of local communities while simultaneously supporting equitable land transfers that enable productive and entrepreneurial farmers to acquire land and thereby accelerate structural transformation processes.
	- Land sub-division	
	- Elimination of fallowing; failure to restore nutrients and organic matter; land degradation	
	- Rapid urbanization and rapid increases in the demand for marketed food	(iv) Focus on increasing funding for, and performance and accountability of, African national agricultural RD&E systems in delivering on technical innovation and productivity growth for tens of millions of African smallholder farmers; (v) Encourage the international CG system to more effectively build the capacities of national, regional, and continentally-led systems and assist these systems in carrying out their own priorities rather than developing separate priorities that may dilute CG efforts to assist African RD&E systems to achieve their own objectives; and (vi) Assist national RD&E systems in expanding the range of crops and animal products for which services are offered, according to their priorities and objectives, e.g., to include high-value fruits and vegetables and other crops with expanding commercial potential.
Economic transformation	- Rising wage rates and per capita incomes in select countries	(i) Ask and empower regional and national agricultural RD&E and policy research systems to generate and deliver labor-saving practices and technologies including innovative forms of mechanization appropriate for smallholder agriculture to support farmers' aims of reducing labor input per hectare cultivated. (ii) Promote mechanization of rental markets by reducing tariff rates on spare parts, irrigation equipment, and other labor-saving technologies.
	- Increased share of the labor force moving from farm to off-farm employment	(iii) Adopt enabling policies and regulations that promote employment and private investment in upstream and downstream stages (including cross-border trade) of agrifood value chains.
	- Rising per capita incomes leading to dietary change and, in turn, increased demand for meat/fish and processed foods (e.g., cooking oil)	(iv) Promote technical innovations and sound management practices for production and value addition of livestock, fish, fruits and vegetables, oilseed crops, etc.

Megatrend		Policy response actions
Exogenous driver	**Consequences**	
Climate change and variability	- More extreme weather leading to downward pressure on yield growth, increased variability and risk in agricultural production, deforestation and less resilient and sustainable food system	(i) Elevate to an urgent national priority the development of a more resilient and sustainable food system including efficient production and diversity of inputs that are adapted to the evolution of local agro-climatic conditions. (ii) Regulate the reduction of agricultural GHG emissions as one of the key sectors driving global climate change. (iii) Promote the conversion to no-till and minimum tillage practices to enhance carbon sequestration, inclusion of legumes in crop rotations to fix soil nitrogen, and reduce inorganic nitrogen application and commensurate reductions in nitrous oxide (which is 300 percent more potent as a GHG than carbon dioxide). (iv) Improve livestock feeding practices to potentially reduce emissions from gastro-enteric fermentation; this could involve a transition from grain- to pasture-fed beef, which reduces enteric fermentation while enhancing soil carbon sequestration in Africa's rangelands.
Continued reliance on land extensification as the main source of agricultural production growth	- Land degradation and deforestation	(i) Shift to intensification and promote the concept of soil health. This includes putting more focus on the subsoil and soil protection through year-round vegetation, deep root system
Chronically low government investments in agricultural RD&E	- Slow rate of agricultural yield and productivity growth - Over-reliance on extensification rather than intensification	(i) Raise public investment in national agriculture RD&E (ii) Build local capacity and organizational effectiveness of local RD&E (including synergies between national agriculture universities and NARS)
Rapid advancement and rollout of new technologies especially digital agricultural products and services	- Increased connectivity through mobile phones and internet access - Increased use of ICTs to provide advisory services and lower transaction costs.	(i) Increase public investment in national agriculture RD&E to strengthen the capacity of food systems to adapt digital innovations (ii) Ensure the collaboration of public extension services with content moderators on digital platforms to ensure greater oversight over content targeted at smallholder farmers and safeguard farmer privacy

Megatrend		Policy response actions
Exogenous driver	**Consequences**	
Increased prevalence of global pandemics and disruptions	- Increased sense of global community and need for coordinated responses - Perceptions that countries need to become more self-sufficient in food and agro-input production - Volatility in agricultural inputs and commodity prices. Changing relative importance of major crops	(i) Support food systems by prioritizing investments in local wet markets and opening new trade corridors that are connected to major sources of raw materials. (ii) Invest in rural infrastructure and logistics and backbone intraregional trade infrastructure linking production, processing, and consumption regions or markets to reduce post-harvest food waste and build resilience to supply-chain and non-covariate shocks.

Conclusion

The African continent is at an important juncture - it is faced with important and urgent policy decisions to avert an unprecedented set of challenges including the COVID-19 pandemic, climate change, the food price crisis, and elevated levels of food insecurity, all of which are occurring in the context of a rapidly-evolving agrifood system that is being continuously shaped by a complex set of megatrends. Accelerating agrifood transformation in a sustainable and inclusive way is an extremely complex task. It requires an integrated approach, which draws heavily on the cooperation of all system actors, with African governments driving the processes that facilitate required change. That said, the AASR22 argues that Africa's agrifood transformation can be accelerated if governments play the role of leading and coordinating both domestic and external actors effectively.

African governments need to invest in measures to enhance data generation and evidence to proactively and effectively respond to exogenous shocks and trends that are shaping Africa's food environments. The AASR22 has unpacked megatrends that not only alter the structure of incentives in the agrifood system, but also exert enormous pressure for food systems change. There is need to enhance policy responsiveness to emergent threats and repurpose food policies and strategies to ensure that the continent's food systems continue to deliver healthy diets for both current and future populations without compromising the economic, social, and environmental fundamentals.

Following the UNFSS in 2021, much of the continent's focus has been on developing food systems strategies and investment plans that reflect the commitments made during the Summit. The goal is to ensure that these food systems strategies do not only align with countries' existing development visions, sector strategies, and policy priorities, but that they are tailored to specific country contexts and reflect the localized megatrends shaping the countries' food systems landscape. To a large extent, the success of these food systems transformation efforts will depend on how coordination, accountability, and financing are designed at a local level.

Given the ever-changing micro- and macro-environment around food systems in Africa, the dialogue among key stakeholders must continue. In November this year, Africa will host the UN Climate Change Conference 2022 (UNFCCC COP27) in Egypt. This is another opportunity to press on the interconnectedness between food systems and climate change. Specifically, climate financing will be high on the COP27 agenda and key recommendations from this Report can be used to make the case for increasing climate financing for African countries.

Accelerating food system transformation in Africa will require all hands on deck. It is time to put into action all of the carefully-designed strategies, policy reforms, and investment plans. The future of nearly 1.5 billion Africans affected by food systems depends on the actions and decisions we make today.

Agricultural Data

Technical Notes

The following conventions are used in the Tables:
0 or 0.0 = nil or negligible
.. or () data not available or missing

Sources of data as follows:

- Population, total (millions)
  Source: World Development Indicators, World Bank
- Urban Population (% of Total Population)
  Source: World Development Indicators, World Bank
- Rural Population (% of Total Population)
  Source: World Development Indicators, World Bank
- Population Growth (Annual %)
  Source: World Development Indicators, World Bank
- GDP growth (annual %)
  Source: World Development Indicators, World Bank
- Adjusted savings: Net Forest Depletion (% of GNI)
  Source: World Development Indicators, World Bank
- Adjusted Savings: Net Forest Depletion (current US$)
  Source: World Development Indicators, World Bank
- Agricultural Land (% of Land Area)
  Source: World Development Indicators, World Bank
- Food Production Index (2014-2016 = 100)
  Source: World Development Indicators, World Bank
- Forest Area (% of Land Area)
  Source: World Development Indicators, World Bank
- Country Level Investment Targets
  Source: Chicago: New Growth International
- National and Rural Per Capita Investment Targets
  Source: Chicago: New Growth International
- Country-specific thematic targets for public expenditures (US$ mill) for food system transformation in Africa
  - Crop and Livestock Productivity
    Source: Chicago: New Growth International
  - Rural Transport Infrastructure
    Source: Chicago: New Growth International
  - Rural Marketing and Processing Infrastructure and Services.
    Source: Chicago: New Growth International
  - Direct Food and Nutrition Support to Vulnerable Groups
    Source: Chicago: New Growth International
  - Total Target
    Source: Chicago: New Growth International
  - Ratio of Transfers to Investments
    Source: Chicago: New Growth International

Population, Total

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Angola	24.2	25.1	26.0	26.9	27.9	28.8	29.8	30.8	31.8	32.9	33.9
Benin	9.5	9.7	10.0	10.3	10.6	10.9	11.2	11.5	11.8	12.1	12.5
Botswana	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.4
Burkina Faso	16.1	16.6	17.1	17.6	18.1	18.6	19.2	19.8	20.3	20.9	21.5
Burundi	9.0	9.2	9.5	9.8	10.2	10.5	10.8	11.2	11.5	11.9	12.3
Cabo Verde	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6
Cameroon	20.9	21.5	22.1	22.7	23.3	23.9	24.6	25.2	25.9	26.5	27.2
Cent. African Rep.	4.4	4.4	4.4	4.5	4.5	4.5	4.6	4.7	4.7	4.8	4.9
Chad	12.4	12.8	13.2	13.7	14.1	14.6	15.0	15.5	15.9	16.4	16.9
Comoros	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9
Congo, Dem. Rep.	66.8	69.0	71.4	73.8	76.2	78.8	81.4	84.1	86.8	89.6	92.4
Congo, Rep.	4.4	4.5	4.6	4.7	4.9	5.0	5.1	5.2	5.4	5.5	5.7
Cote d'Ivoire	21.0	21.5	22.1	22.6	23.2	23.8	24.4	25.1	25.7	26.4	27.1
Equatorial Guinea	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.4
Eswatini	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2
Ethiopia	90.1	92.7	95.4	98.1	100.8	103.6	106.4	109.2	112.1	115.0	117.9
Gabon	1.7	1.7	1.8	1.9	1.9	2.0	2.1	2.1	2.2	2.2	2.3
Gambia, The	1.8	1.9	2.0	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.5
Ghana	25.4	26.0	26.6	27.2	27.8	28.5	29.1	29.8	30.4	31.1	31.7
Guinea	10.4	10.7	10.9	11.2	11.4	11.7	12.1	12.4	12.8	13.1	13.5
Guinea-Bissau	1.6	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.9	2.0	2.0
Kenya	43.2	44.3	45.5	46.7	47.9	49.1	50.2	51.4	52.6	53.8	55.0
Lesotho	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2
Liberia	4.0	4.1	4.2	4.4	4.5	4.6	4.7	4.8	4.9	5.1	5.2
Madagascar	21.7	22.3	23.0	23.6	24.2	24.9	25.6	26.3	27.0	27.7	28.4
Malawi	15.0	15.4	15.8	16.3	16.7	17.2	17.7	18.1	18.6	19.1	19.6
Mali	15.5	16.0	16.4	16.9	17.4	18.0	18.5	19.1	19.7	20.3	20.9
Mauritania	3.6	3.7	3.8	3.9	4.0	4.2	4.3	4.4	4.5	4.6	4.8
Mauritius	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Mozambique	24.2	24.9	25.6	26.3	27.0	27.8	28.6	29.5	30.4	31.3	32.2
Namibia	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.6
Niger	17.1	17.8	18.5	19.2	20.0	20.8	21.6	22.4	23.3	24.2	25.1
Nigeria	162.8	167.2	171.8	176.4	181.1	186.0	190.9	195.9	201.0	206.1	211.4

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Rwanda	10.3	10.5	10.8	11.1	11.4	11.7	12.0	12.3	12.6	13.0	13.3
Sao Tome & Principe	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Senegal	13.0	13.4	13.8	14.2	14.6	15.0	15.4	15.9	16.3	16.7	17.2
Seychelles	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sierra Leone	6.6	6.7	6.9	7.0	7.2	7.3	7.5	7.7	7.8	8.0	8.1
Somalia	12.4	12.7	13.1	13.4	13.8	14.2	14.6	15.0	15.4	15.9	16.4
South Africa	52.0	52.8	53.7	54.5	55.4	56.2	57.0	57.8	58.6	59.3	60.0
South Sudan	9.8	10.1	10.4	10.6	10.7	10.8	10.9	11.0	11.1	11.2	11.4
Sudan	35.3	36.2	37.1	38.0	38.9	39.8	40.8	41.8	42.8	43.8	44.9
Tanzania	45.7	47.1	48.5	50.0	51.5	53.0	54.7	56.3	58.0	59.7	61.5
Togo	6.6	6.8	7.0	7.1	7.3	7.5	7.7	7.9	8.1	8.3	8.5
Uganda	33.5	34.6	35.7	36.9	38.2	39.6	41.2	42.7	44.3	45.7	47.1
Zambia	14.0	14.5	14.9	15.4	15.9	16.4	16.9	17.4	17.9	18.4	18.9
Zimbabwe	12.9	13.1	13.4	13.6	13.8	14.0	14.2	14.4	14.6	14.9	15.1

Source: World Development Indicators
https://databank.worldbank.org/source/world-development-indicators

Urban population (% of total population)

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Angola	60.5	61.3	62.0	62.7	63.4	64.1	64.8	65.5	66.2	66.8	67.5
Benin	43.6	44.1	44.6	45.2	45.7	46.2	46.8	47.3	47.9	48.4	49.0
Botswana	63.9	64.8	65.6	66.4	67.2	67.9	68.7	69.4	70.2	70.9	71.6
Burkina Faso	25.2	25.8	26.3	26.9	27.5	28.1	28.7	29.4	30.0	30.6	31.2
Burundi	10.9	11.2	11.5	11.8	12.1	12.4	12.7	13.0	13.4	13.7	14.1
Cabo Verde	62.3	62.8	63.3	63.8	64.3	64.8	65.3	65.7	66.2	66.7	67.1
Cameroon	52.2	52.8	53.4	54.0	54.6	55.2	55.8	56.4	57.0	57.6	58.1
Cent.African Rep.	39.1	39.4	39.7	40.0	40.3	40.6	41.0	41.4	41.8	42.2	42.6
Chad	22.1	22.1	22.2	22.4	22.5	22.7	22.9	23.1	23.3	23.5	23.8
Comoros	28.0	28.1	28.2	28.3	28.5	28.6	28.8	29.0	29.2	29.4	29.6
Congo, Dem. Rep.	40.5	41.1	41.6	42.2	42.7	43.3	43.9	44.5	45.0	45.6	46.2
Congo, Rep.	63.7	64.2	64.6	65.1	65.5	66.0	66.5	66.9	67.4	67.8	68.3
Cote d'Ivoire	47.8	48.2	48.6	49.0	49.4	49.9	50.3	50.8	51.2	51.7	52.2
Equatorial Guinea	67.5	69.0	69.5	70.1	70.6	71.1	71.6	72.1	72.6	73.1	73.6
Eswatini	22.7	22.8	23.0	23.1	23.3	23.5	23.6	23.8	24.0	24.2	24.4
Ethiopia	17.7	18.2	18.6	19.0	19.4	19.9	20.3	20.8	21.2	21.7	22.2
Gabon	86.1	86.6	87.2	87.7	88.1	88.6	89.0	89.4	89.7	90.1	90.4
Gambia, The	56.4	57.1	57.8	58.5	59.2	59.9	60.6	61.3	61.9	62.6	63.2
Ghana	51.4	52.1	52.7	53.4	54.1	54.7	55.4	56.1	56.7	57.3	58.0
Guinea	34.0	34.3	34.5	34.8	35.1	35.5	35.8	36.1	36.5	36.9	37.3
Guinea-Bissau	40.5	40.9	41.3	41.7	42.1	42.5	42.9	43.4	43.8	44.2	44.6
Kenya	24.0	24.4	24.8	25.2	25.7	26.1	26.6	27.0	27.5	28.0	28.5
Lesotho	25.3	25.7	26.1	26.5	26.9	27.3	27.7	28.2	28.6	29.0	29.5
Liberia	48.2	48.6	49.0	49.4	49.8	50.3	50.7	51.2	51.6	52.1	52.6
Madagascar	32.6	33.2	33.9	34.5	35.2	35.9	36.5	37.2	37.9	38.5	39.2
Malawi	15.7	15.8	16.0	16.1	16.3	16.5	16.7	16.9	17.2	17.4	17.7
Mali	36.8	37.6	38.4	39.2	40.0	40.8	41.6	42.4	43.1	43.9	44.7
Mauritania	47.5	48.4	49.3	50.2	51.1	52.0	52.8	53.7	54.5	55.3	56.1
Mauritius	41.4	41.3	41.2	41.1	41.0	40.9	40.8	40.8	40.8	40.8	40.8
Mozambique	32.3	32.8	33.4	33.9	34.4	34.9	35.5	36.0	36.5	37.1	37.6
Namibia	42.6	43.7	44.8	45.8	46.9	48.0	49.0	50.0	51.0	52.0	53.0
Niger	16.2	16.2	16.2	16.2	16.2	16.3	16.4	16.4	16.5	16.6	16.8
Nigeria	44.4	45.2	46.1	47.0	47.8	48.7	49.5	50.3	51.2	52.0	52.7
Rwanda	16.9	16.9	16.9	17.0	17.0	17.1	17.1	17.2	17.3	17.4	17.6

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Sao Tome & Principe	66.1	67.2	68.2	69.2	70.2	71.1	72.0	72.8	73.6	74.4	75.1
Senegal	44.2	44.6	45.0	45.4	45.9	46.3	46.7	47.2	47.7	48.1	48.6
Seychelles	53.7	54.1	54.5	55.0	55.4	55.8	56.3	56.7	57.1	57.5	58.0
Sierra Leone	39.2	39.6	40.0	40.4	40.8	41.2	41.6	42.1	42.5	42.9	43.4
Somalia	41.0	41.6	42.1	42.7	43.2	43.8	44.4	45.0	45.6	46.1	46.7
South Africa	62.7	63.3	63.8	64.3	64.8	65.3	65.9	66.4	66.9	67.4	67.8
South Sudan	18.0	18.2	18.4	18.6	18.9	19.1	19.3	19.6	19.9	20.2	20.5
Sudan	33.2	33.3	33.5	33.7	33.9	34.1	34.4	34.6	34.9	35.3	35.6
Tanzania	28.8	29.5	30.2	30.9	31.6	32.3	33.1	33.8	34.5	35.2	36.0
Togo	38.0	38.5	39.1	39.6	40.1	40.6	41.2	41.7	42.2	42.8	43.4
Uganda	19.9	20.4	21.0	21.5	22.1	22.6	23.2	23.8	24.4	25.0	25.6
Zambia	39.9	40.4	40.9	41.4	41.9	42.4	43.0	43.5	44.1	44.6	45.2
Zimbabwe	33.0	32.8	32.7	32.5	32.4	32.3	32.2	32.2	32.2	32.2	32.3

Source: World Development Indicators
https://databank.worldbank.org/source/world-development-indicators

Rural population (% of total population)

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Angola	39.5	38.7	38.0	37.3	36.6	35.9	35.2	34.5	33.8	33.2	32.5
Benin	56.4	55.9	55.4	54.8	54.3	53.8	53.2	52.7	52.1	51.6	51.0
Botswana	36.1	35.2	34.4	33.6	32.8	32.1	31.3	30.6	29.8	29.1	28.4
Burkina Faso	74.8	74.2	73.7	73.1	72.5	71.9	71.3	70.6	70.0	69.4	68.8
Burundi	89.1	88.8	88.5	88.2	87.9	87.6	87.3	87.0	86.6	86.3	85.9
Cabo Verde	37.7	37.2	36.7	36.2	35.7	35.2	34.7	34.3	33.8	33.3	32.9
Cameroon	47.8	47.2	46.6	46.0	45.4	44.8	44.2	43.6	43.0	42.4	41.9
Cent. African Rep.	60.9	60.6	60.3	60.0	59.7	59.4	59.0	58.6	58.2	57.8	57.4
Chad	77.9	77.9	77.8	77.6	77.5	77.3	77.1	76.9	76.7	76.5	76.2
Comoros	72.0	71.9	71.8	71.7	71.5	71.4	71.2	71.0	70.8	70.6	70.4
Congo, Dem. Rep.	59.5	58.9	58.4	57.8	57.3	56.7	56.1	55.5	55.0	54.4	53.8
Congo, Rep.	36.3	35.8	35.4	34.9	34.5	34.0	33.5	33.1	32.6	32.2	31.7
Cote d'Ivoire	52.2	51.8	51.4	51.0	50.6	50.1	49.7	49.2	48.8	48.3	47.8
Equatorial Guinea	32.5	31.0	30.5	29.9	29.4	28.9	28.4	27.9	27.4	26.9	26.4
Eswatini	77.3	77.2	77.0	76.9	76.7	76.5	76.4	76.2	76.0	75.8	75.6
Ethiopia	82.3	81.8	81.4	81.0	80.6	80.1	79.7	79.2	78.8	78.3	77.8
Gabon	13.9	13.4	12.8	12.3	11.9	11.4	11.0	10.6	10.3	9.9	9.6
Gambia, The	43.6	42.9	42.2	41.5	40.8	40.1	39.4	38.7	38.1	37.4	36.8
Ghana	48.6	47.9	47.3	46.6	45.9	45.3	44.6	43.9	43.3	42.7	42.0
Guinea	66.0	65.7	65.5	65.2	64.9	64.5	64.2	63.9	63.5	63.1	62.7
Guinea-Bissau	59.5	59.1	58.7	58.3	57.9	57.5	57.1	56.6	56.2	55.8	55.4
Kenya	76.0	75.6	75.2	74.8	74.3	73.9	73.4	73.0	72.5	72.0	71.5
Lesotho	74.7	74.3	73.9	73.5	73.1	72.7	72.3	71.8	71.4	71.0	70.5
Liberia	51.8	51.4	51.0	50.6	50.2	49.7	49.3	48.8	48.4	47.9	47.4
Madagascar	67.4	66.8	66.1	65.5	64.8	64.1	63.5	62.8	62.1	61.5	60.8
Malawi	84.3	84.2	84.0	83.9	83.7	83.5	83.3	83.1	82.8	82.6	82.3
Mali	63.2	62.4	61.6	60.8	60.0	59.2	58.4	57.6	56.9	56.1	55.3
Mauritania	52.5	51.6	50.7	49.8	48.9	48.0	47.2	46.3	45.5	44.7	43.9
Mauritius	58.6	58.7	58.8	58.9	59.0	59.1	59.2	59.2	59.2	59.2	59.2
Mozambique	67.7	67.2	66.6	66.1	65.6	65.1	64.5	64.0	63.5	62.9	62.4
Namibia	57.4	56.3	55.2	54.2	53.1	52.0	51.0	50.0	49.0	48.0	47.0
Niger	83.8	83.8	83.8	83.8	83.8	83.7	83.7	83.6	83.5	83.4	83.2

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Nigeria	55.6	54.8	53.9	53.0	52.2	51.3	50.5	49.7	48.8	48.0	47.3
Rwanda	83.1	83.1	83.1	83.0	83.0	82.9	82.9	82.8	82.7	82.6	82.4
Sao Tome & Principe	33.9	32.8	31.8	30.8	29.8	28.9	28.0	27.2	26.4	25.6	24.9
Senegal	55.8	55.4	55.0	54.6	54.1	53.7	53.3	52.8	52.3	51.9	51.4
Seychelles	46.3	45.9	45.5	45.0	44.6	44.2	43.7	43.3	42.9	42.5	42.0
Sierra Leone	60.8	60.4	60.0	59.6	59.2	58.8	58.4	57.9	57.5	57.1	56.6
Somalia	59.0	58.4	57.9	57.3	56.8	56.2	55.6	55.0	54.4	53.9	53.3
South Africa	37.3	36.7	36.2	35.7	35.2	34.7	34.2	33.6	33.1	32.6	32.2
South Sudan	82.0	81.8	81.6	81.4	81.1	80.9	80.7	80.4	80.1	79.8	79.5
Sudan	66.8	66.7	66.5	66.3	66.1	65.9	65.6	65.4	65.1	64.7	64.4
Tanzania	71.2	70.5	69.8	69.1	68.4	67.7	66.9	66.2	65.5	64.8	64.0
Togo	62.0	61.5	60.9	60.4	59.9	59.4	58.8	58.3	57.8	57.2	56.6
Uganda	80.1	79.6	79.0	78.5	77.9	77.4	76.8	76.2	75.6	75.0	74.4
Zambia	60.1	59.6	59.1	58.6	58.1	57.6	57.0	56.5	55.9	55.4	54.8
Zimbabwe	67.0	67.2	67.3	67.5	67.6	67.7	67.8	67.8	67.8	67.8	67.7

Source: World Development Indicators
https://databank.worldbank.org/source/world-development-indicators

Population ages 15-64 (% of total population)

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Angola	50.5	50.5	50.5	50.5	50.6	50.7	50.8	51.0	51.2	51.4	51.6
Benin	53.0	53.2	53.3	53.5	53.7	53.9	54.1	54.3	54.5	54.8	55.0
Botswana	61.7	61.6	61.5	61.3	61.2	61.3	61.5	61.7	61.9	62.1	62.3
Burkina Faso	51.4	51.5	51.6	51.8	52.0	52.2	52.4	52.6	52.9	53.2	53.5
Burundi	52.7	52.6	52.6	52.5	52.4	52.3	52.3	52.3	52.3	52.4	52.5
Cabo Verde	63.3	64.0	64.6	65.1	65.5	65.9	66.3	66.6	66.9	67.1	67.4
Cameroon	53.5	53.6	53.7	53.9	54.1	54.2	54.4	54.6	54.9	55.2	55.5
Cent. African Rep.	52.6	52.3	52.1	52.0	52.0	52.2	52.5	52.9	53.3	53.7	54.1
Chad	48.8	49.0	49.2	49.4	49.7	49.9	50.1	50.4	50.7	51.0	51.3
Comoros	56.2	56.4	56.6	56.8	57.0	57.1	57.3	57.5	57.7	57.9	58.1
Congo, Dem. Rep.	50.7	50.6	50.6	50.6	50.6	50.6	50.7	50.8	51.0	51.2	51.4
Congo, Rep.	55.6	55.5	55.4	55.3	55.3	55.3	55.4	55.6	55.7	56.0	56.2
Cote d'Ivoire	53.7	53.9	54.1	54.4	54.6	54.8	55.0	55.2	55.4	55.6	55.7
Equatorial Guinea	58.8	59.1	59.4	59.7	59.9	60.0	60.2	60.4	60.6	60.8	60.8
Eswatini	56.2	56.4	56.6	56.8	56.9	57.4	57.6	57.9	58.2	58.5	59.0
Ethiopia	52.3	52.8	53.3	53.8	54.4	54.8	55.3	55.7	56.1	56.5	56.9
Gabon	58.9	59.3	59.6	59.8	60.0	59.8	59.6	59.4	59.3	59.2	59.1
Gambia, The	52.3	52.4	52.5	52.7	52.8	52.9	53.0	53.1	53.3	53.5	53.7
Ghana	58.0	58.2	58.4	58.6	58.8	58.9	59.1	59.3	59.5	59.7	59.9
Guinea	51.0	51.2	51.5	51.8	52.1	52.5	52.8	53.2	53.6	54.0	54.3
Guinea-Bissau	54.2	54.3	54.4	54.5	54.7	54.7	54.7	54.8	55.0	55.2	55.4
Kenya	54.8	55.2	55.6	56.0	56.5	56.9	57.4	57.9	58.4	58.9	59.4
Lesotho	60.6	60.8	61.1	61.4	61.8	61.9	62.1	62.4	62.6	62.8	62.8
Liberia	53.7	53.9	54.1	54.4	54.7	55.0	55.3	55.6	56.0	56.3	56.6
Madagascar	54.0	54.4	54.8	55.2	55.5	55.8	56.1	56.3	56.6	56.8	57.0
Malawi	51.1	51.3	51.6	51.9	52.3	52.7	53.1	53.5	53.9	54.4	54.8
Mali	49.6	49.5	49.4	49.5	49.5	49.6	49.8	49.9	50.2	50.5	50.8
Mauritania	55.7	55.9	56.0	56.2	56.4	56.5	56.6	56.8	57.0	57.1	57.3
Mauritius	70.7	70.8	70.8	70.7	70.6	70.7	70.7	70.7	70.7	70.7	70.6
Mozambique	51.3	51.3	51.4	51.5	51.7	51.9	52.1	52.4	52.8	53.1	53.3
Namibia	58.6	58.8	59.1	59.3	59.4	59.4	59.4	59.5	59.5	59.6	59.7
Niger	47.3	47.2	47.2	47.2	47.3	47.3	47.3	47.4	47.6	47.7	47.9
Nigeria	53.1	53.1	53.0	53.1	53.1	53.1	53.2	53.4	53.6	53.8	53.9

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Rwanda	56.0	56.2	56.4	56.6	56.7	56.9	57.0	57.1	57.2	57.4	57.5
Sao Tome & Principe	53.6	53.6	53.6	53.6	53.8	54.0	54.2	54.6	54.9	55.2	55.6
Senegal	53.3	53.3	53.4	53.4	53.5	53.6	53.7	53.9	54.1	54.3	54.6
Seychelles	69.7	69.7	69.8	69.7	69.6	69.4	69.1	68.8	68.5	68.2	67.9
Sierra Leone	54.0	54.2	54.5	54.8	55.1	55.4	55.7	56.0	56.3	56.7	57.1
Somalia	49.2	49.3	49.5	49.8	50.0	50.2	50.4	50.6	50.7	50.9	51.1
South Africa	65.6	65.6	65.7	65.7	65.7	65.7	65.6	65.6	65.6	65.7	65.8
South Sudan	53.2	53.4	53.6	53.8	54.1	54.3	54.5	54.8	55.1	55.3	55.6
Sudan	53.9	54.2	54.5	54.7	55.1	55.3	55.6	55.9	56.2	56.5	56.8
Tanzania	52.6	52.6	52.6	52.7	52.8	52.9	53.1	53.3	53.5	53.8	54.0
Togo	54.5	54.6	54.7	54.9	55.1	55.3	55.5	55.8	56.1	56.5	56.8
Uganda	49.2	49.4	49.6	49.9	50.1	50.4	50.8	51.1	51.5	52.0	52.4
Zambia	50.8	51.0	51.2	51.4	51.8	52.1	52.5	53.0	53.4	53.9	54.3
Zimbabwe	55.2	55.0	54.8	54.7	54.6	54.5	54.5	54.7	54.9	55.1	55.6

Source: World Development Indicators
https://databank.worldbank.org/source/world-development-indicators

Population growth (annual %)

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Angola	3.6	3.6	3.6	3.5	3.4	3.4	3.3	3.3	3.2	3.2	3.2
Benin	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7	2.7	2.7	2.7
Botswana	1.4	1.2	1.1	1.3	1.5	1.8	2.1	2.2	2.2	2.1	1.9
Burkina Faso	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.8	2.8	2.8
Burundi	3.2	3.2	3.1	3.1	3.2	3.2	3.2	3.2	3.1	3.1	3.0
Cabo Verde	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1
Cameroon	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.5
Cent. African Rep.	0.7	0.4	0.3	0.4	0.6	1.0	1.3	1.5	1.7	1.8	1.9
Chad	3.4	3.4	3.4	3.3	3.2	3.1	3.1	3.0	3.0	3.0	2.9
Comoros	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.1
Congo, Dem. Rep.	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.2	3.2	3.1	3.1
Congo, Rep.	2.8	2.6	2.5	2.4	2.5	2.5	2.6	2.6	2.6	2.5	2.5
Cote d'Ivoire	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.6	2.5	2.5	2.5
Equatorial Guinea	4.5	4.4	4.3	4.2	4.0	3.9	3.8	3.7	3.5	3.4	3.3
Eswatini	0.7	0.7	0.7	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0
Ethiopia	2.8	2.8	2.8	2.8	2.8	2.7	2.7	2.6	2.6	2.5	2.5
Gabon	3.7	3.8	3.8	3.6	3.3	3.0	2.8	2.6	2.5	2.4	2.4
Gambia, The	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9
Ghana	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1
Guinea	2.2	2.2	2.2	2.3	2.5	2.6	2.8	2.8	2.8	2.8	2.7
Guinea-Bissau	2.6	2.7	2.7	2.6	2.6	2.6	2.5	2.5	2.5	2.4	2.4
Kenya	2.7	2.7	2.6	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.2
Lesotho	0.4	0.6	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Liberia	3.2	2.9	2.7	2.6	2.6	2.5	2.5	2.5	2.4	2.4	2.4
Madagascar	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.6
Malawi	2.9	2.9	2.8	2.8	2.8	2.7	2.7	2.6	2.6	2.7	2.7
Mali	3.0	3.0	2.9	2.9	2.9	3.0	3.0	3.0	3.0	3.0	2.9
Mauritania	2.9	3.0	2.9	2.9	2.9	2.9	2.8	2.8	2.7	2.7	2.7
Mauritius	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0
Mozambique	2.7	2.8	2.8	2.8	2.8	2.9	2.9	2.9	2.9	2.9	2.9
Namibia	1.8	1.8	1.7	1.8	1.8	1.8	1.9	1.9	1.9	1.8	1.8
Niger	3.9	3.9	3.9	3.9	3.9	3.9	3.8	3.8	3.8	3.8	3.7
Nigeria	2.7	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.5	2.5

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Rwanda	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.5	2.5
Sao Tome & Principe	2.3	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Senegal	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7	2.7
Seychelles	-2.6	1.0	1.8	1.6	2.2	1.3	1.2	1.0	0.9	0.9	0.7
Sierra Leone	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0
Somalia	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.9	2.9	2.9
South Africa	1.5	1.6	1.6	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.2
South Sudan	3.3	2.8	2.4	1.9	1.5	1.1	0.7	0.6	0.8	1.2	1.7
Sudan	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Tanzania	2.9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.9	2.9
Togo	2.7	2.7	2.6	2.6	2.6	2.5	2.5	2.4	2.4	2.4	2.4
Uganda	3.2	3.2	3.2	3.4	3.5	3.7	3.8	3.7	3.5	3.3	3.0
Zambia	3.0	3.1	3.1	3.1	3.1	3.0	3.0	2.9	2.9	2.9	2.9
Zimbabwe	1.5	1.7	1.8	1.8	1.7	1.5	1.5	1.4	1.4	1.5	1.5

Source: World Development Indicators
https://databank.worldbank.org/source/world-development-indicators

Food exports (% of merchandise exports)

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Angola	0.0	0.1	0.1	0.1	0.3	0.6	0.4	0.3	0.3	..	..
Benin	38.1	40.3	36.9	29.9	31.8	33.4	33.6	37.3	29.0	25.1	19.9
Botswana	2.4	2.1	2.3	1.9	2.3	1.7	1.8	1.9	1.7	2.0	..
Burkina Faso	8.7	8.1	12.5	11.8	16.8	12.9	13.5	14.5	9.9	6.8	6.7
Burundi	50.2	37.5	26.6	59.1	63.6	66.2	60.0	55.0	44.6	49.9	..
Cabo Verde	83.7	87.1	86.1	86.1	86.1	83.6	77.3	83.5	80.9	67.6	..
Cameroon	40.1	17.1	16.6	17.5	26.0	45.1	21.9	19.6	..	..	..
Cent. African Rep.	1.2	0.4	0.1	0.1	0.5	0.4	1.4	0.2	..	..	..
Comoros	78.0	84.7	72.0	62.6	72.3	85.0	79.6	63.8	43.5	65.4	..
Congo, Dem. Rep.	..	..	..	..	0.7	0.9	0.6	0.4	0.7	0.8	..
Congo, Rep.	0.1	0.2	0.1	0.2	0.2	0.3	0.3	0.2	0.4	0.4	..
Cote d'Ivoire	48.0	44.0	38.2	47.8	53.3	58.7	55.3	56.5	52.9	..	..
Eswatini	24.7	32.8	33.4	28.7	29.7	28.1	24.4	26.0	28.7	30.8	..
Ethiopia	74.7	76.3	73.1	79.4	77.5	83.7	84.9	88.5	73.1	77.6	..
Gambia, The	83.2	54.1	91.9	49.4	82.5	86.9	73.4	86.2	44.1	88.3	..
Ghana	20.2	16.7	18.4	27.0	34.8	30.0	23.9	26.1	22.0	..	..
Guinea	..	..	1.8	3.4	4.5	4.3	..	..	..	..	..
Kenya	..	..	45.5	..	43.5	44.9	51.3	51.2	43.7	48.2	47.5
Lesotho	14.2	14.3	26.7	9.0	9.5	4.2	3.8	1.6	3.0	3.6	..
Madagascar	33.2	32.9	25.7	25.1	30.1	39.1	44.9	42.8	36.5	44.9	..
Malawi	75.7	75.0	76.0	69.2	77.2	83.7	89.7	91.5	91.8	92.2	..
Mali	5.7	6.2	..	..	..	9.9	13.1	7.1	8.7	..	..
Mauritania	17.6	23.5	18.8	31.6	38.5	38.8	42.8	53.7	50.4	29.1	..
Mauritius	34.3	37.0	40.3	36.6	33.2	37.7	39.1	36.2	36.3	39.6	40.3
Mozambique	20.5	16.5	16.7	15.0	19.8	15.5	10.8	12.1	16.4	17.1	..
Namibia	24.4	27.1	23.8	19.4	26.7	30.1	31.8	29.6	29.1	27.8	..
Niger	12.6	16.1	7.9	11.5	14.1	37.3	60.0	47.2	21.0	5.8	..
Nigeria	1.8	5.4	5.1	1.9	2.9	2.0	1.8	2.0	1.8	3.0	3.3
Rwanda	43.7	48.0	36.7	36.2	46.6	44.9	35.6	38.0	34.7	..	..
Sao Tome & Principe	96.0	87.2	85.3	97.0	93.3	88.4	85.4	74.3	87.8	88.8	94.8
Senegal	30.5	26.8	34.0	34.8	31.4	32.2	34.2	32.3	32.9	31.3	30.3
Seychelles	36.9	88.6	96.0	95.7	79.6	89.5	80.9	79.0	78.1	79.0	..
Sierra Leone	..	..	..	4.0	87.8	78.0	73.3	45.6	..	..	..

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
South Africa	8.3	8.9	9.8	10.3	10.7	11.2	10.9	11.1	11.0	11.8	..
Tanzania	20.5	25.5	29.3	44.4	40.6	36.9	40.0	21.9	31.7	27.8	31.3
Togo	14.7	17.0	20.1	19.3	23.7	22.5	19.7	16.2	17.5	25.6	25.1
Uganda	53.9	46.3	66.1	65.5	66.3	54.5	59.7	55.5	41.8	37.5	..
Zambia	7.0	10.9	10.5	7.3	9.4	9.1	7.3	6.1	7.3	7.5	..
Zimbabwe	27.3	25.0	27.9	28.4	32.5	31.9	28.2	25.8	23.5	22.0	..

Source: World Development Indicators
https://databank.worldbank.org/source/world-development-indicators

Food imports (% of merchandise imports)

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Angola	18.6	20.1	17.8	17.0	13.2	13.7	17.7	20.4	19.3	..	..
Benin	33.9	37.9	40.3	45.8	40.2	50.5	52.3	47.0	38.1	32.8	37.6
Botswana	9.8	8.8	8.2	7.8	8.7	11.0	12.5	12.0	12.7	12.7	..
Burkina Faso	16.6	13.1	12.1	12.7	14.0	13.7	12.2	12.2	10.7	11.6	11.7
Burundi	24.7	30.1	14.0	13.1	12.6	16.6	19.0	16.7	15.6	14.6	..
Cabo Verde	25.4	27.9	32.2	28.4	32.5	30.9	30.1	30.2	30.9	14.4	..
Cameroon	25.1	19.4	22.3	17.4	19.9	21.9	22.8	20.0	..	..	..
Cent. African Rep.	31.2	29.6	36.0	26.4	15.2	15.9	21.1	20.6	..	..	..
Comoros	40.8	42.0	36.1	41.5	44.9	41.5	40.4	38.3	42.9	44.3	..
Congo, Dem. Rep.	..	..	..	..	14.1	15.2	13.4	8.6	7.7	9.4	..
Congo, Rep.	5.7	6.1	6.9	6.2	5.1	4.0	13.8	15.5	25.0	31.3	..
Cote d'Ivoire	25.1	20.0	14.5	16.8	17.6	21.5	20.9	21.1	21.4	..	..
Eswatini	17.1	19.1	15.4	17.2	17.7	18.7	18.5	18.8	18.3	20.4	..
Ethiopia	14.4	10.9	12.5	9.0	9.8	13.1	12.4	15.1	12.2	18.4	..
Gambia, The	32.8	33.2	37.3	41.0	37.3	43.0	33.0	32.2	33.2	28.8	..
Ghana	15.4	13.9	16.8	20.7	15.2	14.6	18.3	20.1	17.4	..	..
Guinea	..	..	21.7	25.4	23.4	26.6	..	..	..	..	..
Kenya	..	..	10.7	..	11.3	12.4	18.9	14.0	14.6	16.8	16.0
Lesotho	23.5	20.8	18.1	20.5	20.0	24.0	18.3	18.5	24.7	28.1	..
Madagascar	17.8	15.6	17.2	16.0	14.0	15.4	20.1	17.1	14.6	20.2	..
Malawi	13.2	7.5	11.4	9.7	11.4	18.7	12.5	10.3	11.0	14.8	..
Mali	13.7	13.7	..	..	..	16.1	16.9	14.6	13.9	..	..
Mauritania	14.5	15.2	11.0	12.0	14.3	18.2	13.8	18.2	18.0	29.7	..
Mauritius	21.2	21.5	22.0	21.2	22.0	24.2	24.0	21.0	20.8	24.7	21.6
Mozambique	12.3	13.0	10.7	12.5	11.9	15.0	14.8	15.9	16.1	19.7	..
Namibia	14.1	13.0	13.1	11.4	12.3	12.8	13.5	11.3	12.5	12.6	..
Niger	15.8	31.7	32.9	24.8	21.0	25.1	33.1	28.2	27.7	29.8	..
Nigeria	30.6	22.7	17.8	17.0	16.9	12.9	16.3	10.9	9.9	14.6	14.2
Rwanda	15.7	15.7	17.5	17.1	15.4	17.1	22.6	20.6	17.0	..	..
Sao Tome & Principe	32.4	30.4	30.6	32.4	31.0	32.3	29.7	29.2	30.9	33.5	34.8
Senegal	22.9	24.1	24.2	22.8	21.7	23.4	24.0	21.0	19.6	24.0	21.4
Seychelles	14.9	20.9	27.7	23.9	24.5	18.4	24.7	27.6	19.0	18.6	..
Sierra Leone	..	..	..	11.0	20.7	28.5	32.6	32.3	..	..	..

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
South Africa	6.8	7.2	6.6	6.3	7.0	8.4	7.9	7.1	7.2	8.4	..
Tanzania	9.9	8.8	7.9	9.5	5.6	10.8	10.3	7.2	5.7	8.2	8.5
Togo	13.3	14.7	12.4	13.9	15.1	14.5	19.4	17.4	17.8	17.6	14.9
Uganda	13.5	10.8	11.5	13.6	12.1	13.3	14.9	11.8	10.7	11.5	..
Zambia	5.0	5.6	4.2	4.7	6.0	6.1	6.1	5.3	7.2	8.7	..
Zimbabwe	14.7	18.4	14.6	15.4	17.0	19.9	14.9	11.9	8.1	19.5	..

Source: World Development Indicators
https://databank.worldbank.org/source/world-development-indicators

Food production index (2014-2016 = 100)

Country Name	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Angola	90	99	81	111	97	100	102	103	107	110
Benin	81	85	92	99	103	95	102	105	110	109
Botswana	124	128	126	115	99	104	98	95	100	98
Burkina Faso	94	87	98	103	103	96	101	93	107	111
Burundi	91	90	80	114	101	95	104	112	152	159
Cabo Verde	113	97	101	105	100	101	100	92	81	80
Cameroon	81	84	89	92	96	100	104	103	105	107
Cent. African Rep.	95	100	101	101	99	99	102	104	106	106
Chad	89	75	99	94	98	97	105	108	114	118
Comoros	100	100	99	102	100	99	101	99	100	100
Congo, Dem. Rep.	57	58	88	93	99	100	100	106	108	110
Congo, Rep.	89	92	96	97	97	101	102	104	106	107
Cote d'Ivoire	76	79	84	86	95	104	101	111	114	113
Equatorial Guinea	90	92	93	93	95	101	104	106	109	111
Eritrea	96	101	102	101	100	99	100	101	102	102
Eswatini	96	98	101	103	102	101	97	99	101	101
Ethiopia	82	83	91	91	93	101	105	106	105	108
Gabon	88	92	92	96	99	100	102	104	105	107
Gambia, The	139	94	113	104	92	107	101	95	93	92
Ghana	84	87	92	95	99	100	101	108	114	118
Guinea	82	86	89	93	96	100	104	111	115	126
Guinea-Bissau	91	89	95	100	96	102	101	101	104	107
Kenya	96	92	96	98	98	101	100	100	101	112
Lesotho	104	108	105	111	107	100	92	113	103	96
Liberia	88	91	93	90	92	96	112	98	98	92
Madagascar	103	103	108	98	101	99	100	98	102	104
Malawi	76	81	86	99	103	99	98	117	124	132
Mali	83	90	93	93	92	97	111	109	118	121
Mauritania	86	87	93	94	98	100	101	103	106	109
Mauritius	106	105	102	100	103	100	97	98	89	94
Mozambique	114	120	121	111	104	98	98	113	130	127
Namibia	99	100	103	100	102	99	99	106	105	101
Niger	85	75	85	84	90	101	109	111	121	120

Country Name	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Nigeria	86	80	88	85	97	99	105	106	105	107
Rwanda	118	117	124	128	98	101	101	114	116	123
Sao Tome & Principe	101	99	100	110	101	85	115	122	102	108
Senegal	99	70	84	84	86	112	102	137	158	155
Seychelles	99	109	94	88	96	99	105	92	94	93
Sierra Leone	90	96	99	104	105	99	96	99	101	106
Somalia	108	106	110	110	101	102	97	97	97	97
South Africa	91	90	93	98	103	101	96	105	104	102
South Sudan	..	..	92	96	101	99	100	103	102	107
Sudan	100	107	81	95	103	92	105	102	118	115
Tanzania	72	79	84	95	101	105	94	97	105	106
Togo	93	101	98	92	102	99	100	104	107	109
Uganda	99	100	98	100	103	103	94	98	100	98
Zambia	91	95	94	98	105	92	102	125	120	111
Zimbabwe	107	104	110	109	103	99	98	112	114	102

Source: World Development Indicators
https://databank.worldbank.org/source/world-development-indicators

Forest area (% of land area)

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Angola	57.4	57.0	56.5	56.1	55.7	55.2	54.8	54.3	53.9	53.4
Benin	31.8	31.4	30.9	30.5	30.0	29.6	29.1	28.7	28.2	27.8
Botswana	28.8	28.6	28.4	28.2	28.0	27.8	27.5	27.3	27.1	26.9
Burkina Faso	24.4	24.2	24.0	23.8	23.6	23.5	23.3	23.1	22.9	22.7
Burundi	8.2	8.9	9.6	10.2	10.9	10.9	10.9	10.9	10.9	10.9
Cabo Verde	10.7	10.7	10.8	10.9	11.0	11.0	11.1	11.2	11.3	11.3
Cameroon	44.1	44.0	43.9	43.7	43.6	43.5	43.4	43.3	43.1	43.0
Cent. African Rep.	36.2	36.2	36.1	36.1	36.0	36.0	35.9	35.9	35.8	35.8
Chad	4.3	4.2	4.1	4.0	3.9	3.8	3.7	3.6	3.5	3.4
Comoros	19.8	19.6	19.3	19.1	18.9	18.6	18.4	18.2	17.9	17.7
Congo, Dem. Rep.	60.0	59.5	59.0	58.6	58.1	57.6	57.1	56.6	56.1	55.6
Congo, Rep.	64.6	64.6	64.5	64.5	64.5	64.4	64.4	64.4	64.3	64.3
Cote d'Ivoire	12.1	11.8	11.4	11.1	10.7	10.3	10.0	9.6	9.3	8.9
Equatorial Guinea	90.0	89.7	89.4	89.1	88.8	88.5	88.2	87.9	87.6	87.3
Eritrea	10.7	10.7	10.7	10.6	10.6	10.6	10.5	10.5	10.5	10.4
Eswatini	28.3	28.4	28.4	28.5	28.6	28.6	28.7	28.8	28.9	28.9
Ethiopia	15.7	15.6	15.6	15.5	15.4	15.4	15.3	15.2	15.2	15.1
Gabon	91.7	91.7	91.6	91.6	91.6	91.5	91.5	91.4	91.4	91.3
Gambia, The	29.1	28.5	27.9	27.4	26.8	26.2	25.7	25.1	24.5	24.0
Ghana	34.9	34.8	34.7	34.7	34.6	34.8	35.0	35.0	35.1	35.1
Guinea	26.6	26.4	26.3	26.1	26.0	25.8	25.7	25.5	25.3	25.2
Guinea-Bissau	73.1	72.8	72.5	72.2	71.9	71.6	71.3	71.0	70.7	70.4
Kenya	6.3	6.3	6.3	6.2	6.2	6.2	6.3	6.3	6.3	6.3
Lesotho	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Liberia	81.9	81.6	81.3	81.0	80.7	80.3	80.0	79.7	79.4	79.1
Madagascar	21.6	21.5	21.5	21.5	21.5	21.5	21.4	21.4	21.4	21.4
Malawi	27.8	27.3	26.9	26.4	26.0	25.6	25.1	24.7	24.2	23.8
Mali	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
Mauritania	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Mauritius	18.9	18.9	18.9	18.9	18.9	18.9	19.0	19.1	19.1	19.1
Mozambique	49.3	49.0	48.8	48.5	48.2	47.9	47.6	47.3	47.0	46.7
Namibia	8.8	8.8	8.7	8.6	8.5	8.4	8.3	8.2	8.2	8.1
Niger	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9

Country Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Nigeria	25.4	25.2	25.0	24.8	24.6	24.5	24.3	24.1	23.9	23.7
Rwanda	10.8	10.8	10.9	10.9	10.9	11.0	11.1	11.1	11.1	11.2
Sao Tome & Principe	59.9	59.2	58.6	57.9	57.3	56.6	56.0	55.4	54.7	54.1
Senegal	43.8	43.6	43.4	43.2	42.9	42.7	42.5	42.3	42.1	41.9
Seychelles	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3	73.3
Sierra Leone	37.6	37.3	37.0	36.8	36.5	36.2	35.9	35.7	35.4	35.1
Somalia	10.6	10.5	10.4	10.3	10.1	10.0	9.9	9.8	9.7	9.5
South Africa	14.3	14.3	14.3	14.2	14.2	14.2	14.1	14.1	14.1	14.1
South Sudan	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3
Sudan	10.8	10.7	10.6	10.5	10.4	10.3	10.2	10.1	10.0	9.9
Tanzania	56.0	55.5	55.1	54.7	54.3	53.8	53.2	52.7	52.2	51.6
Togo	22.7	22.7	22.6	22.6	22.5	22.5	22.4	22.3	22.3	22.2
Uganda	13.5	13.3	13.1	12.9	12.7	12.5	12.3	12.1	11.9	11.7
Zambia	62.6	62.3	62.1	61.8	61.5	61.3	61.0	60.8	60.5	60.3
Zimbabwe	46.2	46.0	45.9	45.8	45.7	45.6	45.5	45.3	45.2	45.1

Source: World Development Indicators
https://databank.worldbank.org/source/world-development-indicators

Country level investment targets

Rank	Country	Investment Target (US$ 000s/ year)	Public Sector Share (US$ 000s/ year)	Private Sector Share (US$ 000s/ year)
1	Ethiopia	7,951,700	1,590,300	6,361,300
2	Niger	6,412,500	1,282,500	5,130,000
3	Tanzania	6,095,600	1,219,100	4,876,500
4	Morocco	5,433,100	1,086,600	4,346,400
5	Mozambique	4,530,000	906,000	3,624,000
6	Mali	4,249,700	849,900	3,399,800
7	Uganda	4,125,900	825,200	3,300,800
8	Algeria	4,082,200	816,400	3,265,700
9	Nigeria	2,932,200	586,400	2,345,800
10	Congo, Dem. Rep	2,633,000	526,600	2,106,400
11	Kenya	2,481,800	496,400	1,985,400
12	Chad	2,401,800	480,400	1,921,400
13	Burkina Faso	2,263,400	452,700	1,810,800
14	Madagascar	2,231,100	446,200	1,784,900
15	Burundi	1,884,900	377,000	1,507,900
16	Rwanda	1,814,400	362,900	1,451,500
17	Senegal	1,389,200	277,800	1,111,300
18	Cameroon	1,278,800	255,800	1,023,000
19	Malawi	1,270,600	254,100	1,016,500
20	Egypt, Arab Rep.	1,195,800	239,200	956,600
21	Benin	1,127,600	225,500	902,100
22	Tunisia	1,024,300	204,900	819,400
23	Sierra Leone	992,100	198,400	793,700
24	South Africa	986,700	197,300	789,400
25	Togo	848,200	169,600	678,500
26	Cote d'Ivoire	767,400	153,500	613,900
27	Guinea	667,200	133,400	533,800
28	Eritrea	454,300	90,900	363,400
29	Somalia	358,700	71,700	287,000
30	Liberia	318,600	63,700	254,900
31	Central Africa Republic	286,300	57,300	229,100
32	Guinea-Bissau	265,900	53,200	212,800

Rank	Country	Investment Target (US$ 000s/ year)	Public Sector Share (US$ 000s/ year)	Private Sector Share (US$ 000s/ year)
33	Gambia, The	224,100	44,800	179,300
34	Namibia	208,700	41,700	167,000
35	Sudan	198,400	39,700	158,800
36	Zambia	172,300	34,500	137,800
37	Comoros	167,900	33,600	134,300
38	Ghana	153,500	30,700	122,800
39	Mauritania	131,800	26,400	105,500
40	Congo, Rep	129,700	25,900	103,800
41	Zimbabwe	117,000	23,400	93,600
42	Lesotho	107,600	21,500	86,100
43	Eswatini	94,600	18,900	75,700
44	South Sudan	92,400	18,500	73,900
45	Botswana	51,400	10,300	41,100
46	Angola	45,100	9,000	36,100
47	Mauritius	31,300	6,300	25,100
48	Gabon	30,700	6,100	24,600
49	Libya	22,400	4,500	17,900
50	Equatorial Guinea	5,700	1,100	4,600
51	Sao Tome and Principe	4,900	1,000	4,000
52	Djibouti	1,200	200	1,000
53	Cabo Verde	500	100	400
54	Seychelles	400	100	300
	Total	76,746,700	15,349,300	61,397,300
	Average	400,600	80,100	320,500

Source: Omamo, S. W. and A. Mills. 2022. Investment Targets for Food System Transformation in Africa. NGI Technical Note. June 2022 https://newgrowthint.com/wp-content/uploads/2022/06/Africa-Food-System-Investment-Targets.pdf

National and rural per capita investment targets

Rank	Country	National Per Capita Investment Target (US$/year)	Rank	Country	Rural Per Capita Investment Target (US$/year)
1	Niger	264.9	1	Morocco	403.6
2	Mali	209.9	2	Mali	374.1
3	Comoros	193.0	3	Algeria	354.4
4	Burundi	158.5	4	Niger	317.7
5	Morocco	147.2	5	Tunisia	284.8
6	Chad	146.2	6	Comoros	273.4
7	Mozambique	144.9	7	Gambia, The	247.9
8	Rwanda	140.1	8	Guinea-Bissau	242.2
9	Guinea-Bissau	135.1	9	Mozambique	230.3
10	Sierra Leone	124.4	10	Sierra Leone	217.9
11	Burkina Faso	108.3	11	Chad	191.2
12	Togo	102.5	12	Burundi	183.7
13	Tanzania	102.0	13	Benin	180.3
14	Eritrea	93.1	14	Togo	179.1
15	Algeria	93.0	15	Namibia	171.3
16	Benin	92.7	16	Eritrea	170.0
17	Gambia, The	90.2	17	Rwanda	169.7
18	Uganda	86.7	18	Senegal	159.9
19	Tunisia	83.0	19	Tanzania	157.5
20	Senegal	82.2	20	Burkina Faso	156.0
21	Namibia	81.5	21	Liberia	148.0
22	Eswatini	80.6	22	Gabon	139.3
23	Madagascar	70.9	23	Madagascar	131.1
24	Liberia	69.2	24	Uganda	120.2
25	Ethiopia	66.4	25	Cameroon	113.5
26	Malawi	59.3	26	Eswatini	107.5
27	Central Africa Republic	52.4	27	Cent. Africa Rep.	102.6
28	Guinea	50.8	28	Ethiopia	88.3
29	Lesotho	50.2	29	Sao Tome & Principe	87.9
30	Cameroon	48.2	30	Guinea	80.5
31	Kenya	46.2	31	Malawi	80.4
32	Congo, Dem. Rep	29.4	32	Botswana	75.0

Rank	Country	National Per Capita Investment Target (US$/year)	Rank	Country	Rural Per Capita Investment Target (US$/year)
33	Cote d'Ivoire	29.1	33	Congo, Rep	73.1
34	Somalia	28.6	34	Lesotho	70.7
35	Mauritania	28.4	35	Kenya	64.1
36	Mauritius	24.7	36	Mauritania	63.5
37	Congo, Rep	23.5	37	Cote d'Ivoire	60.2
38	Sao Tome and Principe	22.5	38	Congo, Dem. Rep	54.1
39	Botswana	21.9	39	Somalia	53.1
40	South Africa	16.6	40	South Africa	51.0
41	Nigeria	14.2	41	Mauritius	41.8
42	Gabon	13.8	42	Nigeria	29.6
43	Egypt, Arab Rep.	11.7	43	Egypt, Arab Rep.	20.4
44	Zambia	9.4	44	Zambia	16.9
45	South Sudan	8.3	45	Libya	16.9
46	Zimbabwe	7.9	46	Equatorial Guinea	15.1
47	Ghana	4.9	47	Zimbabwe	11.6
48	Sudan	4.5	48	Ghana	11.6
49	Seychelles	4.1	49	South Sudan	10.3
50	Equatorial Guinea	4.1	50	Seychelles	9.6
51	Libya	3.3	51	Sudan	7.0
52	Angola	1.4	52	Angola	4.1
53	Djibouti	1.2	53	Cabo Verde	2.6
54	Cabo Verde	0.9	54	Djibouti	1.6
	Average	66.4		Average	122.7

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National and rural per capita investment targets

Rank	Country	National Per Capita Investment Target (US$/year)
1	Niger	264.9
2	Mali	209.9
3	Comoros	193.0
4	Burundi	158.5
5	Morocco	147.2
6	Chad	146.2
7	Mozambique	144.9
8	Rwanda	140.1
9	Guinea-Bissau	135.1
10	Sierra Leone	124.4
11	Burkina Faso	108.3
12	Togo	102.5
13	Tanzania	102.0
14	Eritrea	93.1
15	Algeria	93.0
16	Benin	92.7
17	Gambia, The	90.2
18	Uganda	86.7
19	Tunisia	83.0
20	Senegal	82.2
21	Namibia	81.5
22	Eswatini	80.6
23	Madagascar	70.9
24	Liberia	69.2
25	Ethiopia	66.4
26	Malawi	59.3
27	Central Africa Republic	52.4
28	Guinea	50.8
29	Lesotho	50.2
30	Cameroon	48.2
31	Kenya	46.2
32	Congo, Dem. Rep	29.4

Rank	Country	Rural Per Capita Investment Target (US$/year)
1	Morocco	403.6
2	Mali	374.1
3	Algeria	354.4
4	Niger	317.7
5	Tunisia	284.8
6	Comoros	273.4
7	Gambia, The	247.9
8	Guinea-Bissau	242.2
9	Mozambique	230.3
10	Sierra Leone	217.9
11	Chad	191.2
12	Burundi	183.7
13	Benin	180.3
14	Togo	179.1
15	Namibia	171.3
16	Eritrea	170.0
17	Rwanda	169.7
18	Senegal	159.9
19	Tanzania	157.5
20	Burkina Faso	156.0
21	Liberia	148.0
22	Gabon	139.3
23	Madagascar	131.1
24	Uganda	120.2
25	Cameroon	113.5
26	Eswatini	107.5
27	Cent. Africa Republic	102.6
28	Ethiopia	88.3
29	Sao Tome & Principe	87.9
30	Guinea	80.5
31	Malawi	80.4
32	Botswana	75.0

Rank	Country	National Per Capita Investment Target (US$/year)	Rank	Country	Rural Per Capita Investment Target (US$/year)
33	Cote d'Ivoire	29.1	33	Congo, Rep	73.1
34	Somalia	28.6	34	Lesotho	70.7
35	Mauritania	28.4	35	Kenya	64.1
36	Mauritius	24.7	36	Mauritania	63.5
37	Congo, Rep	23.5	37	Cote d'Ivoire	60.2
38	Sao Tome and Principe	22.5	38	Congo, Dem. Rep	54.1
39	Botswana	21.9	39	Somalia	53.1
40	South Africa	16.6	40	South Africa	51.0
41	Nigeria	14.2	41	Mauritius	41.8
42	Gabon	13.8	42	Nigeria	29.6
43	Egypt, Arab Rep.	11.7	43	Egypt, Arab Rep.	20.4
44	Zambia	9.4	44	Zambia	16.9
45	South Sudan	8.3	45	Libya	16.9
46	Zimbabwe	7.9	46	Equatorial Guinea	15.1
47	Ghana	4.9	47	Zimbabwe	11.6
48	Sudan	4.5	48	Ghana	11.6
49	Seychelles	4.1	49	South Sudan	10.3
50	Equatorial Guinea	4.1	50	Seychelles	9.6
51	Libya	3.3	51	Sudan	7.0
52	Angola	1.4	52	Angola	4.1
53	Djibouti	1.2	53	Cabo Verde	2.6
54	Cabo Verde	0.9	54	Djibouti	1.6
	Average	66.4		Average	122.7

Source: Omamo, S. W. and A. Mills. 2022. Investment Targets for Food System Transformation in Africa. NGI Technical Note. June 2022 https://newgrowthint.com/wp-content/uploads/2022/06/Africa-Food-System-Investment-Targets.pdf

Country-specific thematic targets for public expenditures (US$ million) for food system transformation in Africa

Country	Crop and Livestock Productivity	Rural Transport Infrastructure	Rural Marketing and Processing Infrastructure and Services	Direct Food and Nutrition Support to Vulnerable Groups	Total Target	Ratio of Transfers to Investments
Algeria	365.07	197.17	58.31	195.88	816.43	32%
Angola	4.18	2.78	1.16	0.90	9.02	11%
Benin	78.84	92.31	0.00	54.38	225.53	32%
Botswana	5.93	3.81	0.00	0.54	10.28	6%
Burkina Faso	168.28	212.96	0.00	71.45	452.69	19%
Burundi	129.23	154.98	46.66	46.10	376.97	14%
Cabo Verde	0.08	0.02	0.00	0.00	0.10	2%
Cameroon	122.74	109.33	0.00	23.70	255.76	10%
Cent. Africa Rep.	22.49	28.54	5.58	0.67	57.27	1%
Chad	258.69	72.18	22.27	127.21	480.35	36%
Comoros	13.12	17.30	0.10	3.05	33.57	10%
Congo, Dem. Rep	230.77	140.65	17.40	137.78	526.60	35%
Congo, Rep	19.59	0.00	0.87	5.48	25.94	27%
Cote d'Ivoire	38.53	0.00	42.90	72.06	153.49	88%
Djibouti	0.09	0.07	0.00	0.07	0.24	45%
Egypt, Arab Rep.	191.45	23.93	0.00	23.77	239.15	11%
Equatorial Guinea	0.46	0.36	0.11	0.21	1.14	23%
Eritrea	28.68	20.68	7.01	7.35	63.73	13%
Eswatini	15.66	0.00	1.15	2.11	18.92	13%
Ethiopia	154.26	774.87	83.74	577.46	1590.34	57%
Gabon	4.32	0.00	1.63	0.20	6.15	3%
Gambia, The	21.54	15.18	2.05	6.06	44.83	16%
Ghana	16.70	0.00	0.00	14.00	30.69	84%
Guinea	73.21	14.19	18.43	27.61	133.44	26%
Guinea-Bissau	25.10	12.61	3.34	12.15	53.19	30%
Kenya	355.73	0.00	0.00	140.63	496.36	40%
Lesotho	11.85	1.76	1.84	6.07	21.51	39%
Liberia	32.00	16.32	6.95	16.48	71.74	30%
Libya	2.66	0.69	0.44	0.69	4.48	18%

Country	Crop and Livestock Productivity	Rural Transport Infrastructure	Rural Marketing and Processing Infrastructure and Services	Direct Food and Nutrition Support to Vulnerable Groups	Total Target	Ratio of Transfers to Investments
Madagascar	117.50	165.03	18.52	145.16	446.21	48%
Malawi	80.26	131.67	0.00	42.19	254.12	20%
Mali	210.92	462.90	0.00	176.12	849.94	26%
Mauritania	14.62	6.94	2.61	2.19	26.37	9%
Mauritius	3.98	1.58	0.27	0.43	6.27	7%
Morocco	315.49	339.78	93.78	337.56	1086.61	45%
Mozambique	367.28	353.20	0.00	185.52	906.01	26%
Namibia	27.15	12.00	0.00	2.60	41.75	7%
Niger	525.44	487.57	127.80	141.69	1282.50	12%
Nigeria	178.58	271.11	6.10	130.65	586.45	29%
Rwanda	127.02	230.73	0.00	5.14	362.88	1%
Sao Tome and Principe	0.19	0.67	0.00	0.13	0.99	15%
Senegal	91.10	114.81	21.39	50.52	277.83	22%
Seychelles	0.05	0.00	0.01	0.02	0.08	42%
Sierra Leone	69.73	61.63	22.70	44.36	198.42	29%
Somalia	36.89	36.28	7.37	10.32	90.85	13%
South Africa	0.00	0.00	0.00	197.34	197.34	100%
South Sudan	7.25	7.29	2.00	1.94	18.47	12%
Sudan	16.73	20.82	1.25	0.90	39.69	2%
Tanzania	512.68	613.84	0.00	92.60	1219.12	8%
Togo	64.50	59.05	5.13	40.96	169.63	32%
Tunisia	93.56	38.11	35.32	37.86	204.85	23%
Uganda	174.23	572.32	0.00	78.64	825.19	11%
Zambia	7.56	14.33	0.53	12.04	34.46	54%
Zimbabwe	16.49	0.00	3.65	3.27	23.41	16%
Total	5450.42	5914.33	670.35	3314.23	15349.33	28%
Mean	198.20	109.52	12.41	61.37	284.25	19%
Share	0.36	0.39	0.04	0.22		

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