

ADVANCING THE CLIMATE AND BIOECONOMY AGENDA IN AFRICA FOR RESILIENT AND SUSTAINABLE AGRIFOOD SYSTEMS



ReSAKSS

Annual
Trends
and
Outlook
Report

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Abbreviations

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| AATS | Africa Agriculture Transformation Scorecard | IFPRI | International Food Policy Research Institute |
| ACCF | Africa Climate Change Fund | IGAD | Intergovernmental Authority on Development |
| ACFTA | African Continental Free Trade Agreement | IPCC | Intergovernmental Panel on Climate Change |
| AfDB | African Development Bank | JSR | Joint Sector Review |
| AFOLU | Agriculture, forestry, and other land use | LST | Land surface temperature |
| APEC | Asia-Pacific Economic Cooperation | MODIS | Moderate-Resolution Imaging Spectroradiometer |
| ATOR | Annual Trends and Outlook Report | MRV | Measuring, reporting, and verification |
| AU | African Union | MVWSI | Modified vegetation water supply index |
| AUC | African Union Commission | NAIP | national agriculture investment plan |
| AUDA-NEPAD | African Union Development Agency—New Partnership for Africa’s Development | NAPs | National adaptation plans |
| BR | Biennial Review | NARO | National Agricultural Research Organization |
| CAADP | Comprehensive African Agriculture Development Programme | NDCs | Nationally determined contributions |
| CEN-SAD | Community of Sahel-Saharan States | NDVI | Normalized difference vegetation index |
| COMESA | Common Market for Eastern and Southern Africa | OECD | Organisation for Economic Co-operation and Development |
| COP | Conference of Parties | REC | Regional economic community |
| CPA | Consolidated Plan of Action | ReSAKSS | Regional Strategic Analysis and Knowledge Support System |
| CPI | Climate Policy Initiative | SADC | Southern African Development Community |
| CSA | Climate-smart agriculture | SDGs | Sustainable Development Goals |
| EAC | East African Community | SMEs | Small and medium enterprises |
| ECCAS | Economic Community of Central African States | SSA | Africa south of the Sahara |
| ECOWAS | Economic Community of West African States | STI | Science, technology, and innovation |
| ESA | European Space Agency | TPRI | Tropical Pesticides Research Institute |
| EU | European Union | TVET | Technical and Vocational Education and Training |
| FAO | Food and Agriculture Organization of the United Nations | TWG | Technical Working Groups |
| FOLU | Food and Land Use Coalition | UMA | Arab Maghreb Union |
| GCF | Green Climate Fund | UNCTAD | United Nations Conference on Trade and Development |
| GDP | gross domestic product | UNDP | United Nations Development Programme |
| GHGs | Greenhouse gases | UNECA | United Nations Economic Commission for Africa |
| GPG | Good Practice Guidance | UNEP | United Nations Environment Programme |
| IEA | International Energy Agency | UNIDO | United Nations Industrial Development Organization |
| IFAD | International Fund for Agricultural Development | USAID | United States Agency for International Development |
| | | WEF | World Economic Forum |
| | | WHO | World Health Organization |

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Foreword

Africa stands at a pivotal moment in its development trajectory. Climate change is compounding existing and emerging challenges and threatens food security and nutrition, livelihoods, and sustainable development. The continent, rich in biodiversity and natural resources, is increasingly recognizing the potential of the bioeconomy as a driver of sustainable growth, economic diversification, social transformation, and resilience against the impacts of climate change. The concept of a bioeconomy, which integrates the sustainable use of biological resources into economic systems, offers a unique opportunity to harness Africa's ecological wealth for the benefit of its people and the planet. However, realizing this potential requires a concerted effort to build and sustain political momentum.

The political landscape in Africa is evolving in response to the urgent need for sustainable development. Across the continent, leaders are beginning to embrace the bioeconomy as a strategic priority, recognizing its alignment with continental and global development goals and agendas, including climate change, poverty alleviation, food and nutrition security, environmental sustainability, and resilience to climate change. The African Union's Agenda 2063 provides a framework to leverage the opportunities of a bioeconomy. However, translating this vision into tangible action requires robust political commitment, innovative policy frameworks, regional collaboration, and South-South exchange.

The political momentum for Africa's converging climate change and bioeconomy agenda is being fueled by several key factors. First, the growing recognition of the continent's vulnerability to climate change has underscored the need for sustainable and resilient economic models. As climate impacts become more severe, there is an increasing urgency to shift away from extractive and unsustainable practices. The bioeconomy offers a pathway to do this by promoting the use of renewable biological resources and fostering innovation in areas such as biotechnology, sustainable agriculture, and renewable energy.

Second, Africa's demographic dynamics are driving the need for economic transformation. With a rapidly growing population, there is a pressing need to create jobs, especially for youth, and to ensure food and nutrition security

for all. The bioeconomy, with its potential to create new industries and value chains, offers a promising avenue for job creation and economic diversification. Political leaders across the continent are beginning to see the bioeconomy as a way to leverage Africa's comparative advantages in agriculture, forestry, and biodiversity to build a more inclusive and resilient economy.

Third, the global shift toward sustainability and the green economy is creating new opportunities for Africa to position itself as a leader in the bioeconomy. International partnerships, investment flows, and technology transfers are increasingly directed toward sustainable development pathways. This international engagement is helping to build the political momentum needed to drive bioeconomy strategies at the national and regional levels.

While political momentum for Africa's bioeconomy is undoubtedly growing, and countries are beginning to identify their own bioeconomy entry points and pathways, challenges need to be addressed. These efforts should include more coordinated policy frameworks, greater investment in research and development, and stronger institutional capacities. Additionally, there is a need to ensure that the benefits of the bioeconomy are equitably distributed, particularly among rural communities and marginalized groups.

Africa's political leaders, the private sector, and other key stakeholders need to unite to sustain and amplify the momentum for Africa's resilience and green growth agendas. The African Union climate change and resilience development strategy, the post-Malabo Comprehensive Africa Agriculture Development Programme (CAADP) agenda that will set Africa's development agenda for the coming 10 years, the implementation of countries' United Nations Food Systems Summit national pathways, and the development of the third generation of countries' nationally determined contributions (NDC 3.0), which are due to be submitted next year, all present an opportune moment for a radical shift in how the agendas for agrifood systems, climate change, and economic development are aligned. The bioeconomy offers a natural pathway for greater convergence.

However, transitioning to a resilient agrifood system and a bioeconomy will require a step-change from current economic growth approaches

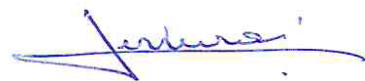
and political leadership, with a clear vision and the will to embrace new approaches to addressing current and emerging challenges.

The 2024 Regional Strategic Analysis and Knowledge Support System (ReSAKSS) 2024 Annual Trends and Outlook Report (ATOR), the official monitoring and evaluation report for the CAADP, recognizes the high-priority status of climate change on Africa's development agenda.

In addition to high-level political commitment, regional collaboration, South-South learning, and collaboration with partners in Europe and the United States will be crucial to enable countries to leverage their unique contexts and competitive advantages and build a more sustainable and prosperous future for all. This report presents evidence-based recommendations to harmonize and advance the food and climate change agendas. The research should be leveraged as a policy tool for decision-makers to promote dialogue on pathways toward a more comprehensive post-Malabo CAADP agenda that integrates the priorities for a successful food systems transformation toward an agriculture-led, broad-based economic transformation across Africa.



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Executive Summary

Africa is facing the brunt of the global climate crisis. Many of the continent's regions are seeing decreased agricultural productivity due to climate stresses and shifting rainfall patterns, and its coastal nations are confronting rising sea levels that threaten livelihoods and critical infrastructure. The torrential rains in Libya in September that caused the collapse of two dams and several thousand deaths, the recent floods in Kenya, and the El Niño-induced droughts in Southern Africa impacting more than 30 million people are just a few examples of how extreme weather events are becoming more frequent and more intense. Without immediate action to both mitigate greenhouse gas (GHG) emissions and adapt to climate change, there is a serious risk that millions of people across the continent will be pushed into acute hunger and lose their livelihoods, putting the economic development progress achieved over the past decades in jeopardy.

Yet, at the same time, innovations in developing a sustainable bioeconomy in Africa offer real opportunities to address multiple challenges simultaneously. The bioeconomy—the application of science, technology, and innovation to the sustainable production and use of biological resources to create innovative products, processes, and services for all economic sectors—is set to play a crucial role in fostering sustainable development by utilizing biological resources, such as plants, animals, and microorganisms, to produce food, energy, and materials. The bioeconomy promotes the shift away from fossil fuel dependency, helping to mitigate climate change while supporting biodiversity and ecosystems. By harnessing innovations in biotechnology and circular economy principles, the bioeconomy also creates new industries and jobs, fostering economic growth. It encourages efficient resource use, reduces waste, and contributes to food security, making it essential for addressing both environmental and socioeconomic challenges.

The 2024 edition of the Annual Trends and Outlook Report (ATOR) explores the challenges that the climate crisis poses for agrifood systems, and the opportunities offered by a transition to a bioeconomy to mitigate and adapt to the adverse impacts of climate change. This ATOR seeks to support the ongoing development and the subsequent implementation of a new 10-year Comprehensive Africa Agriculture Development Programme

(CAADP) strategy by the African Union (AU). The chapters of this report highlight priority areas for action, ranging from developing an integrated policy approach to mitigate and reverse the negative effects of climate change to expanding investment in bioeconomy to leverage biotechnology, agricultural waste, and renewable resources and to enhance value addition and diversify income streams for farmers and rural communities. More importantly, the report highlights the win-win relationship between climate actions and expanding the bioeconomy, with lessons from the continent and beyond. It also stresses the urgency of accelerating the implementation of national, continental, and regional climate change initiatives.

The 12 substantive chapters and two featured issues of the 2024 ATOR seek to bridge the knowledge gap around climate change and bioeconomy agendas by generating new evidence and compiling existing knowledge. The chapters cover specific topics related to climate change and bioeconomy within the context of Africa's agrifood systems transformation and address a variety of issues ranging from climate change impacts and responses to the opportunities offered by the bioeconomy in African agrifood systems. Below is a summary of key findings.

Agricultural Emissions and Vulnerability to Climate Risk

The concentration of methane associated with different land uses was assessed in order to track progress in meeting commitments to reducing GHG emissions made under nationally determined contributions (NDCs) and also to support strategizing around mitigation interventions in African agrifood systems. The estimates show that methane emissions vary significantly among countries, land uses, and seasons. The results also reaffirm the significant contribution of agriculture to methane emissions in Africa and the significant variation of atmospheric methane levels across the sowing, growing, and harvesting seasons, with more pronounced methane emissions during the harvesting season.

Analysis of the agrifood system's spatial distribution of environmental risks and vulnerability to climate change reveals significant and varied

incidences and exposures across the continent, highlighting several critical areas requiring immediate attention and strategic intervention. The evaluation indicates a notable increase in temperatures in some regions, particularly in southern, eastern, and parts of western Africa. This analysis also uses case studies from Rwanda and Senegal to shed light on vulnerability to climate change. The two case studies reveal that household vulnerability is largely attributable to the inability of households to adapt to climate shocks.

Economic Impacts of Climate Change

Climate change poses several threats to agrifood systems, including intensified socioeconomic crises caused by extreme weather events and a slow-down of long-term growth and less sustainability of the macroeconomy through reduced agricultural productivity, among other factors. At the macro level, climate change reduces economic growth, reportedly by about 2 to 8 percentage points; increases unemployment, mainly for unskilled labor; and exacerbates poverty and food insecurity. However, the ability of countries to prevent, anticipate, absorb, adapt, and transform rapidly in the face of climate shocks and stresses depends on their stage of agrifood systems transformation. The three types or stages of agrifood systems—traditional, transitional, and modern—are affected differently by climate change and hence require different strategies to adapt to and mitigate the adverse effects.

Similarly, the sensitivity to climate stress in terms of reduction in productivity is significantly different across agricultural commodities, indicating that redirecting agricultural development efforts toward crops that are less sensitive to shocks could be beneficial. Some crops—including maize, sorghum, and soybeans—will see either a greater productivity boost or a smaller loss in Africa than in the rest of the world. However, groundnuts and rice will fare slightly worse in Africa than in the rest of the world, and wheat and potatoes will suffer large losses that far exceed those seen at the global level.

Policy Responses to Climate Change

Almost all African countries have responded to the global call for mitigating and adapting to climate change impacts by developing strategies and action plans, including NDCs and national adaptation plans. However, these responses are not enough to reverse the adverse effects or mitigate their causes. Despite noteworthy advancements in developing climate change initiatives, African agriculture

remains susceptible and insufficiently resilient to climate shocks. Moreover, climate-smart interventions such as irrigation, sustainable land management, and agricultural insurance, which have long been advocated to enhance climate adaptation, cover only a fraction of arable lands and farmers. These interventions have not yet reached the scale needed to build resilience, largely due to challenges related to insufficient climate finance, the inability to scale best practices, and ineffective climate governance systems that show little or no integration and alignment with countries' agrifood system transformation ambitions.

The energy transition has been an important instrument to mitigate climate change and enhance the resilience of rural communities. However, the transition to renewable energy as a critical strategy for addressing climate change and ensuring sustainable development is best achieved through a “just transition” that not only addresses the issue of sustainability but also ensures that affordable energy options are widely accessible and create new job opportunities. Mini-grids and other decentralized energy solutions are found to be important technical pathways for achieving a just energy transition, particularly in remote and underserved regions.

A major challenge to the effective implementation of countries' climate commitments and ambitions is a lack of climate finance, in particular the limited funds dedicated to adaptation projects and interventions. The current climate finance flows to agrifood systems fall significantly short of meeting Africa's requirements. The adaptation finance gap is particularly large when looking specifically at small-scale agrifood systems. Moreover, current climate finance flows inadequately address gender inequality and social exclusion. Given the structural, institutional, and technical barriers currently constraining the effective mobilization and deployment of climate finance for agrifood systems, it is critical to focus on the application of blended finance instruments and their potential to catalyze private investment at scale by de-risking agrifood transactions or creating more attractive risk-adjusted returns that also deliver environmental and social benefits.

Bioeconomy and New Opportunities

As a pathway to sustainable economic growth and resilience-building, the 2024 ATOR explores the opportunity afforded by integrating the bioeconomy into countries' agrifood system transformation processes and climate agendas. By fostering efficient resource use and waste reduction, a circular bioeconomy offers

a promising strategy to address the complex challenges of economic growth, food security and nutrition, and sustainability in Africa.

The experiences of expanding the bioeconomy in selected African, Asian, and Latin American countries (Ghana, Namibia, Uganda, Thailand, and Brazil), as documented in this report, demonstrate the importance of elevating the bioeconomy to a top policy priority and working across sectors and in continuous dialogue with all stakeholders. These experiences suggest the importance of linking bioeconomy initiatives with entrepreneurship and innovations in bio-based sectors, partnering in international platforms and sharing knowledge with other countries and regions, and improving coherence in the bioeconomy's sustainability objectives through multilateral agreements on climate and biodiversity, among other issues. The countries studied tend to harness their natural resources and bioeconomy sustainably, albeit with different entry points aligned with their unique environmental challenges and economic structures.

There are also significant business opportunities linked to the bioeconomy, ranging from large-scale insect farming to aquaponics. However, realizing this potential fully will require concerted efforts to overcome existing barriers, particularly in terms of policy, community engagement, and technological innovation.

There are also opportunities for regional integration within the remit of regional economic communities (RECs) and also by leveraging the African Continental Free Trade Area. Given its distributive nature, a bioeconomy will incentivize micro, small, and medium enterprises and the informal sector, which together make up a large part of the African economy. However, to fully exploit the business potential of a bioeconomy, African countries need to develop bioeconomy clusters of innovation and entrepreneurial activities based on renewable biological resources and their unique needs and natural advantages.

Converging and Mainstreaming Climate Change and Bioeconomy Agendas

Opportunities associated with the expansion of the bioeconomy can help African countries build resilience against climate change and other environmental risks. However, transitioning to a bioeconomy and promoting its convergence with climate change targets and priorities requires scaling up investments in new technologies; creating a conducive environment that enables emerging companies to

innovate; providing the training and education needed to drive a bioeconomy transition; and cooperation across borders, between regions, and with other continents, all while adapting to climate change.

Mainstreaming the bioeconomy in the post-Malabo CAADP agenda is a critical challenge at the continental, regional, and national levels. The continent's RECs could play a key role in advancing this integrated agenda, and the East African Community has set a good example by developing a dedicated regional bioeconomy strategy. Other regional economic blocs should do the same, with the ultimate aim of developing a continental bioeconomy strategy. Africa should harness opportunities for collaboration and partnerships globally in the advancement of its bioeconomy while considering the continent's unique needs, values, and competitive advantages.

A new global trend of environmental reporting is emerging as an additional layer of complexity, with food supply chains moving toward greater reporting of quantified environmental impacts, such as carbon footprints. The key risks to this monitoring approach include fragmented landscapes with different initiatives and reporting requirements, and a disproportionate impact on producers in low- and middle-income countries due to a lack of adequate conformity in assessment and verification. African countries need to prepare to adapt, calibrate, and institutionalize emerging environmental reporting systems that are now widely used across the globe.

Concluding Remarks

Africa is facing a set of intertwined challenges and opportunities that will shape its progress in achieving sustainable development and reaching its potential for economic growth. The 2024 ATOR calls for a systematic and well-designed strategic approach to address the challenges while tapping into the opportunities. The ongoing efforts to equip Africa with a new 10-year CAADP strategy (2026–2035) to implement the post-Malabo agenda present an opportune moment for African leaders to align the CAADP goals and ambitions with emerging initiatives such as the implementation of countries' United Nations Food Systems Summit national pathways, revision of existing NDCs in 2025, and the Global Bioeconomy Summit in October 2024, hosted for the first time in Africa.

Crucially, the continent must build capacities to translate strategic choices and agendas into actions. The ATOR tracks the progress made by African countries against CAADP indicators, finding that, of the 49 AU Member States

that participated in the fourth Biennial Review in 2023, not one is on track to achieve the Malabo commitments by 2025. Concerted efforts, and a doubling down on commitments, coupled with dedicated and visionary leadership are urgently required if African countries are to meet continental and global sustainable development and climate change targets. To meet these targets, CAADP implementation capacities at the country and regional levels must be further strengthened, including through embedding national agriculture investment plans in country planning and budgeting cycles and enhancing interministerial and intercountry coordination.