RESEARCH PROGRAM ON
Climate Change, Agriculture and Food Security

CGIAR

CCAFS

POLICY BRIEF 14

November 2020

Building transformative change in Africa's smallholder food systems:

Contributions from climate-smart agriculture and agroecology

Helena Shilomboleni, Maren Radeny, Teferi Demissie, Joab Osumba, John Recha and Dawit Solomon.

Key messages

- Transforming food systems under a changing climate entails amplifying solutions that build sustainability along multiple interconnected principles—i.e., diversity, resilience, equity, economic viability, health and renewability.
- Two different approaches are engaged in this transformational work in Africa: climate-smart agriculture (promotes participatory multi-stakeholder collaborations and climate-informed sustainable agriculture innovations) and agroecology (prioritizes co-created diversified livelihood strategies).
- Together, their contributions highlight the urgency of reconfigurations that balance technology transfer with realigning human values to support inclusive processes and principles of transformation.
- Taking to scale this critical work will require significant support: donors and policy makers can help by diversifying their investments to create a balance between projects focused on technological solutions and those implementing more agroecological components.
- Agricultural research for development organizations can help to build the evidence base for agroecology and climate-smart agriculture based on data metrics associated with yields, income, and socioeconomic performance, and on the significance of their holistic approaches to tackling climate change adaptation and mitigation by ensuring strong, resilient social foundations.

Photos: S. Kilungu / CCAFS


Photo: V. Ntiadu / CCAFS


Photo: Neil Palmer / CIAT

Introduction

There is a widespread consensus—within research, policy, and business arenas—that transformative change is needed in current global food systems. Although global food production has become enormously efficient in supplying large volumes of food, an estimated 2 billion people do not have regular access to nutritious and sufficient food (FAO et al. 2020). The global food system is also a major driver of climate change, contributing to 21–37 percent of total anthropogenic greenhouse gas (GHG) emissions (IPCC 2019). Multiple other pressures define our food systems, spanning biodiversity loss, poor-quality diets, and inequitable livelihoods, all of which indicate that a global crisis is in effect.

These adverse shocks emanating from our global food systems are especially pronounced in Africa, where observed climate change patterns are already affecting food security through rising temperatures, unreliable or erratic seasonal rainfall and a higher frequency and intensity of extreme weather events such as water stress, droughts, and floods. Many regions on the continent are fast becoming climate hotspots, with temperatures rising 1.5 times faster than global averages. This is projected to drive millions of people into further poverty and food insecurity due to unpredictable agricultural productivity, loss of biodiversity, as well as socioeconomic and political instability (IPES-Food 2020). In 2018 alone, 680 million people (over half of Africa's population) were experiencing moderate or severe levels of food insecurity (FAO et al. 2019). These numbers are expected to worsen in the wake of the current COVID-19 pandemic (FAO et al. 2020). Further, rural communities across the Greater Horn of Africa are facing the worst locust outbreak in decades, causing substantial destruction to both food crops and natural vegetation, including livestock forage, which is exacerbating the impacts on livelihood security.

Food systems will therefore have to change profoundly to become more resilient in the face of climate change as well as other crises (e.g., the COVID-19 pandemic or regional pest outbreaks) and to meet the world's food needs in a manner that is both sustainable and equitable. Food

[1] These systems are dominated by resource-limited smallholder producers whose farming is characterized by the following key factors: the size of the land they occupy is considered small for their production and region; their use of mechanization is fairly limited; and they mainly rely on family labour for production. These producers meet at least 70% of Africa's food needs.

system transformation is particularly warranted in Africa where this is fundamentally a matter of survival— and must foster action towards radical paradigm shifts rather than incremental changes. Yet, there are divergent views amongst experts about what types of agricultural initiatives can effectively address hunger, low productivity, inequality, and ecological resilience at a large scale, and how research priorities must be re-oriented towards these objectives.

Two different but synergistic approaches that seek transformational change in Africa's smallholder food systems[1] have become increasingly popular. One is rooted in climate-smart agriculture and sustainable intensification, and seeks to take to scale new technologies and innovations that can deliver food and nutrition security and improve livelihoods, particularly for the benefit of rural producers vulnerable to climate change (Solomon et al. 2018). The other is grounded in agroecology, which prioritizes diversified and context-specific livelihood activities to stabilize food supply against climatic variability and seasonal shortages, while focusing on human and social values, such as dignity, equity, inclusion and justice (IPES-Food 2016).

Both approaches offer valuable insights and complementary aspects from each can be adopted to help transform Africa's smallholder food systems to become more sustainable and resilient in the face of climate change and other shocks. However, achieving transformational change at scale will require significant resource allocations, institutional changes and enabling policy environments. African governments, agricultural research for development organizations and donors can do their part to support this critical work. This policy brief sheds a light on some important transformative food systems change initiatives taking place in Africa's smallholder food systems and offers insights on priority concerns that these various actors will need to consider as they invest resources towards this agenda.

What does food systems transformation entail?

The Biovision Foundation for Ecological Development and the Global Alliance for the Future of Food (2019) are among those setting an important agenda for a global food systems transformation.[2] This agenda is focused on amplifying initiatives and solutions that build sustainability along multiple interconnected elements and principles—i.e., diversity, resilience, equity, economic viability, health and renewability. The two organizations developed a Food Systems Transformation Framework (Figure 1) based on these elements, informed by 21 "Beacon of Hope" case studies of food system initiatives from around the world engaged in transformative change to build sustainable food systems. The Framework provides guiding action on the process of transformation, which must leverage and work to align dynamic interactions across initiatives in the global and local contexts, confront established policies and practices, and build legitimacy for and anchor new initiatives to replace existing rules and behaviors.

[2] Various other actors are also engaged in similar work, such as the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) (Steiner et al. 2020).

Seven out of the 21 Beacon of Hope case studies that informed the Transforming Food Systems Framework are being implemented in sub-Saharan Africa, and an additional one in North Africa. These and various other Africa-based initiatives demonstrate evidence that transformative change efforts to build more sustainable food systems are already taking place on the ground, even as some face significant structural constraints and struggle to gain the necessary political and financial support to effectively scale up their activities.

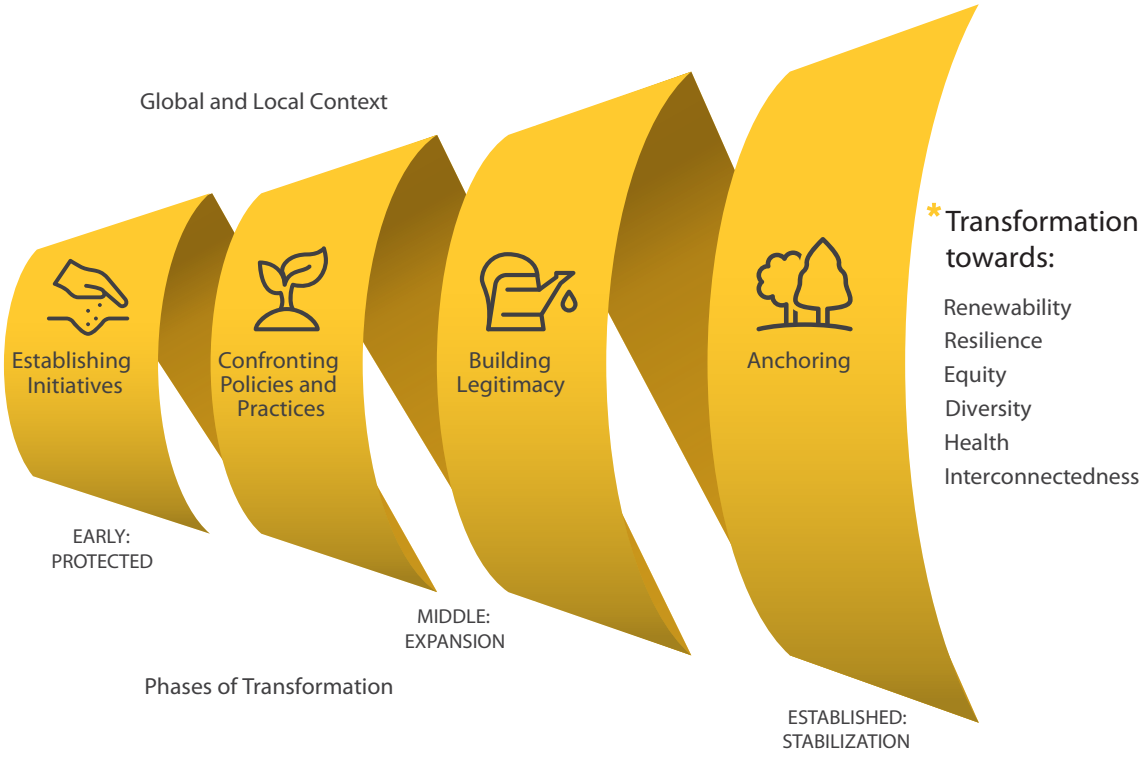

Figure 1 – Elements of food systems transformation. (Biovision Foundation for Ecological Development and the Global Alliance for the Future of Food 2019).


Photo: Georgina Smith / CIAT.


Photo: Georgina Smith / CIAT.

Climate-Smart Agriculture (CSA) for food systems transformation

CSA seeks to transform and re-orient food systems to support food security in the face of climate change through three interlinked objectives:

- Sustainably increase agricultural productivity, to ensure equitable increases in incomes, food security and development;
- Build the adaptive capacity and resilience of agricultural systems at multiple levels (farm, landscape, regional levels);
- Reduce greenhouse gas emissions from agriculture, where possible, and increase carbon sinks through sustainable and climate-friendly approaches.

CSA activities being implemented in Africa put greater emphasis on increasing productivity and building smallholder farmers' resilience and adaptive capacity to climate-related hazards and other shocks. As such, CSA largely promotes yield-enhancing technologies and intensification approaches that can deliver food and nutrition security and increase rural incomes (Campbell et al. 2014, Solomon et al. 2018). One such initiative is the Rwanda Climate Services for Agriculture project (2016-2019), which was implemented by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), and aimed to transform smallholder farming activities and the national economy through improved climate risk management. The project enabled Rwanda's National Meteorological Agency to enhance the accuracy of climate information by merging satellite data with its in-station observations. This data was translated into site-specific climate informed agro-advisories that were incorporated into the national agricultural extension system, known as "Twigira Muhenzi", and disseminated to 112,000 farmers across Rwanda's 30 districts using interactive information and communications technology (ICT) tools (i.e., interactive radio broadcasts, Short Message Services (SMS), Unstructured Supplementary Service Data (USSD) and Interactive Voice Response (IVR) in combination with other interventions (Hansen et al. 2020).

The expansion of contextualized climate services to reach large numbers of farmers and other agricultural decision makers is a response aimed at de-risking rural livelihoods through inclusive early warning systems, adaptive safety nets, and climate-informed advisories and other services (Steiner et al. 2020). De-risking

"Advocates for a global food system transformation place a strong emphasis on the critical role that new and emerging technologies will have to play in de-risking agriculture from climate-related constraints in the process of transforming food systems."

livelihoods is one of four interlinked priority action areas identified by a new initiative of CCAFS: Transforming Food Systems Under a Changing Climate. The three other action areas are: rerouting farming and rural livelihoods to new trajectories that reduce emissions and are climate resilient; reducing emissions from diets and value chains, targeting health and climate outcomes; and realigning policies, finance, support to social movements, and innovation to facilitate action in the above areas (Steiner et al. 2020). Together, these action areas are the basis of the systemic transformation that is needed in food systems to adapt and mitigate the impacts of climate change.

Advocates for this agenda place a strong emphasis on the critical role that new and emerging technologies will have to play in de-risking agriculture from climate-related constraints in the process of transforming food systems (Herrero Acosta et al. 2019, AfDB 2020). Among such technological innovations are those in the domains of big data analytics for disease and pest detection and early warning systems, seasonal and sub-seasonal weather forecasts, drought and disease tolerant seeds, and digital agro-advisories, among others. Proponents foresee these innovations to be funded through public-private business cases, and call for enabling policy environments to attract billions of dollars in private sector investments as well as targeted public subsidies in credit, insurance, and capacity building training for both producers and other value chain actors.

Photo: V. Meadu / CCAFS

"Among such technological innovations are those in the domains of big data analytics for disease and pest detection and early warning systems, seasonal and sub-seasonal weather forecasts, drought and disease tolerant seeds, and digital agro-advisories, among others."

Agroecology for food systems transformation

At the same time, a growing number of Africa-based farmer organizations call for increased diversification and inclusiveness in Africa's food systems, in which marginalized voices and knowledge systems that are rehabilitating and (re)building agroecological systems are recognized and supported through enabling policy and other relevant processes (ACB 2020). Although the definition and application of agroecology has evolved over time, today it is largely understood simultaneously as a transdisciplinary science, a social movement, and a set of context-appropriate agricultural practices (Wezel et al. 2009). Agroecology's transformational approach to food and agricultural systems is based on bottom-up and territorial processes that foster the co-creation of knowledge and socioecological diversity to address the root causes of problems in an integrated way, rather than making incremental tweaks to unsustainable practices (FAO 2019). This includes an explicit focus on human and social values of equity, autonomy, inclusion, and justice (Biovision Foundation for Ecological Development and IPES-Food 2020).

Among the Beacon of Hope case studies from Africa is a collection of 33 Agroecology Case Studies from across the continent that demonstrate the potential of agroecological methods to sustain productivity, raise incomes, improve livelihoods, and adapt to climate change (Biovision Foundation for Ecological Development and Global Alliance for the Future of Food 2019, p. 22). One such initiative is the Rural Women's Associations and Sustainable Agriculture in Casamance, Senegal, which awarded community grants to 116 women's groups between 2006-2012 to rebuild their food systems using agroecological practices (Oakland Institute n.d.). A focus on knowledge development and community empowerment at the local level in this initiative saw several changes, including the safeguarding of local traditional varieties,

creating seed production gardens and traditional seed banks and promoting seed exchanges (FAO 2016). The process has also contributed to women gaining more influential roles in their communities and beyond as they articulate their needs and priorities for farming and food security more effectively, including attracting additional funding for their groups (FAO 2016).

Advocates of agroecology in Africa's smallholder food systems see it as a more holistic approach which reconciles the climatic, agronomic, environmental, and socioeconomic challenges facing the continent, compared to singular innovations that focus on yield maximization at all costs (IPES-Food 2020). Agroecology is also considered well-adapted to the structures and small scale of family farms that dominate Africa's food systems, and matches their economic realities because it requires modest financial investments that deliver cost savings over time (e.g., lower reliance on external inputs, use of reproducible seeds, compost and manure for fertilization, nitrogen-fixing trees, etc.) (IPES-Food 2020). However, agroecological responses in Africa are often left to their own devices with little recognition or public sector support (both investment and policy) to build and strengthen their efforts (Biovision and IPES-Food 2020).

Policy recommendations

Biovision's and the Global Alliance for the Future of Food's Framework for Transforming Food Systems (2019) offers a compelling guidepost for action towards processes of change that can bring about greater sustainable and equitable outcomes. In the context of Africa, this process will require reconfigurations that balance technology transfer (associated with intensification) with realigning societal values, institutional arrangements, and policy decision-making to support inclusive processes of transformation (diversity, resilience, equity, health, etc.) (see also Hall and Dijkman 2019). Whereas agroecology's bottom-up approach to food systems sustainability brings an explicit focus on these human and social values, it faces major challenges in bringing to bear the evidence of its performance (and ability) to feed Africa's growing population. Moreover, agroecology initiatives have not until recently engaged substantively with institutions and policy processes that support change in agricultural systems. Proponents, however, argue that agroecology faces numerous mutually reinforcing obstacles and systemic lock-ins that limit its efficacy and hence appeal to farmers and policy makers (IPES-Food 2020). Among them is that funding flows towards agroecology remains marginal especially


Photo: Neil Palmer / CIAT


Photo: Stefanie Nero / CIAT

from dominant donor-driven agricultural development endeavors that dedicate a vast share of their resources to Green Revolution approaches in sub-Saharan Africa (Biovision Foundation for Ecological Development and IPES-Food 2020). [3]

Meanwhile, CSA puts much emphasis on technological innovations and subsequent transfer but pays relatively limited attention to the social resilience, including inclusivity values, of the rural communities that manage agroecosystems (Andrieu and Kebede 2020). Where principles of resilience and diversity are considered, these are largely confined to ecological components at the plot or farm level. There tends to be limited systems thinking on synergies between various food systems challenges, e.g., biodiversity, health, climate. Among one of CSA's most important strengths is its engagement with policy processes across scales and sectors to tackle the synergies and trade-offs between climate change adaptation, mitigation, and agriculture and food security (Andrieu and Kebede 2020). These efforts are evident through CSA actors' involvement with, and support to, developing countries' Nationally Determined Contributions under the United Nations Framework Convention on Climate Change (UNFCCC) (e.g., through science-policy dialogues and multi-stakeholder platforms) as well as through the co-creation of agroclimatic information services as evident in the Rwanda Climate Services for Agriculture project outline above.

A potential area of complementarity between CSA and agroecology is alleviating the negative impacts of climate change on agriculture and food security using climate information services built from combining scientific forecasting (a strong suit of the former) with traditional knowledge (an important principle of the latter). Bringing co-creation to the development and dissemination of climate information, involving climatologist professionals, local extension workers and farmers and their organizations, can help to improve its utility when it fits within farmers' everyday vocabulary and traditional knowledge for coping with the climate (Ndiaye et al. 2013). Such co-created climate information can be taken to scale, i.e., to reach large numbers

[3] This report found that as many as 85% of projects funded by the Bill and Melinda Gates Foundation (BMGF) and more than 70% of projects carried out by Kenyan research institutes were limited to supporting industrial agriculture and/or increasing its efficiency via targeted approaches such as improved pesticide practices, livestock vaccines or reductions in post-harvest losses. Meanwhile, only 3% of BMGF projects were agroecological, i.e. they included elements of agroecosystem redesign.

of end-users, using ICT tools and platforms (e.g., mobile phones and interactive radio). At the same time, climate-informed agro-advisories can help to guide the implementation of agroecological practices, e.g., to determine the level of farm diversification more effectively according to the seasonal climate forecasts (Andrieu and Kebede 2020).

African governments together with bilateral, multilateral, and philanthropic donors who fund the bulk of agricultural research for development programs and innovations on the continent can better support these transformational efforts by diversifying their investments to create a balance between projects focused on technological solutions and those implementing more agroecological components. Such an approach would also require a shift upon which the performance basis of agricultural projects and research programs are evaluated, to encompass the interconnected values of food systems transformation (e.g. diversity, equity, health, etc.). To date, most donor priorities (and funding allocation) have largely been premised upon projects' ability to demonstrate impact on targeted indicators such as yield and income outputs as well to elaborate targets, identify quick wins, and meet delivery schedules (Andersson and Sumberg 2017). Achieving lasting and meaningful food systems transformation, however, is often more complex and usually demands effecting systemwide change on a wide range of agronomic, environmental, and sociocultural dimensions in a concurrent manner.

At the same time, agricultural research for development organizations can help to build the evidence base for agroecology by reporting data on its contributions to yields, income, and socioeconomic performance as these indicators are still the overarching priorities for policy makers on efforts to reduce food insecurity and poverty. This research can do so while articulating the significance of agroecology's holistic approach to tackling the complexity of climate change adaptation and mitigation (which are also critical goals for African policy makers) by ensuring strong, resilient social foundations. Adaptation and mitigation measures are unlikely going to be successful without effectively harnessing human values that promote equitable solutions based on local needs, resources, and capacities (Andrieu and Kebede 2020). The synergies that agroecological approaches foster need to be translated into accessible policy language to show that the benefits they bring to environment and human welfare are both economically viable and can sustainably feed a growing population.

References

ACB. 2020. Towards Building Consensus to Democratise Africa's Food Systems During COVID-19 and Beyond: A Webinar. African Centre for Biodiversity. Available at: https://www.acbio.org.za/en/towards-building-consensus-democratise-africas-food-systems-during-covid-19-and-beyond-webinar

AfDB African Development Bank. 2020. REPORT: African Development Institute (ADI) seminar on Agricultural Policy response to COVID-19. Available at: https://www.afdb.org/sites/default/files/news_documents/press_briefing-post_seminar.pdf

Andersson J, Sumberg J. 2017. Knowledge Politics in Development-Oriented Agronomy. In: Sumberg J, ed. *Agronomy for Development: The Politics of Knowledge in Agricultural Research.* Abingdon, Oxon: Routledge.

Andrieu N, Kebede Y. 2020. Agroecology and Climate Change: *A case study of the CCAFS Research Program.* CCAFS Working Paper no. 313. Wageningen, the Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available at: https://cgspace.cgiar.org/bitstream/handle/10568/108779/CCAFS%20WP%20313%20FINAL.pdf

Biovision Foundation for Ecological Development, IPES-Food. 2020. *Money Flows: What is holding back investment in agroecological research for Africa?* Biovision Foundation for Ecological Development & International Panel of Experts on Sustainable Food Systems (IPES-Food). Available at: http://www.ipes-food.org/_img/upload/files/Money%20Flows_Full%20report.pdf

Biovision Foundation for Ecological Development, Global Alliance for the Future of Food. 2019. *Beacons of Hope: Accelerating Transformations to Sustainable Food Systems.* Global Alliance for the Future of Food. Available at: https://foodsystemstransformations.org/wp-content/uploads/2019/08/BeaconsOfHope_Report_082019.pdf

Campbell BM, Thornton P, Zougmore R, van Asten P, Lipper L. 2014. Sustainable intensification: What is its role in climate smart agriculture? *Current Opinion in Environmental Sustainability* 8:39-43. Available at: https://doi.org/10.1016/j.cosust.2014.07.002

FAO. 2016. *Report of the Regional Meeting of Agroecology in Sub-Saharan Africa.* Dakar, Senegal, 5-6 November 2015. Rome: Food and Agriculture Organization of the United Nations (FAO). Available at: http://www.fao.org/3/a-i6364e.pdf

FAO. 2019. *The Ten Elements of Agroecology.* Session 163 of the FAO Council, 2-6 December, 2019. CL 163/13 Rev.1. Rome: Food and Agriculture Organization of the United Nations (FAO). Available at: http://www.fao.org/3/ca7173en/ca7173en.pdf

FAO, IFAD, UNICEF, WFP and WHO. 2019. *The State of Food Security and Nutrition in the World 2019.* Safeguarding against economic slowdowns and downturns. Rome: Food and Agriculture Organization of the United Nations (FAO). Available at: http://www.fao.org/3/ca5162en/ca5162en.pdf

FAO, IFAD, UNICEF, WFP and WHO. 2020. *The State of Food Security and Nutrition in the World 2020.* Transforming food systems for affordable healthy diets. Rome, FAO. https://doi.org/10.4060/ca9692en

Hall A, Dijkman J. 2019. *Public Agricultural Research in an Era of Transformation: The Challenge of Agri-Food System Innovation*. Rome and Canberra: CGIAR Independent Science and Partnership Council (ISPC) Secretariat and Commonwealth Scientific and Industrial Research Organisation (CSIRO). Available at: https://cas.cgiar.org/sites/default/files/pdf/syntetic-study-web-def.pdf

Hansen J, Kagabo D, Byandaga L, McGill K, Nyamwasa JD, Jones H and Ferguson K. 2020. *Strengthening the Capacity of Agriculture in Rwanda to Adapt to a Variable and Changing Climate.* Available at: https://ccafs.cgiar.org/blog/strengthening-capacity-agriculture-rwanda-adapt-variable-and-changing-climate#.X3AlcWgzaUk

Herrero Acosta M, Thornton P, Mason-D'Croz D, Palmer J. 2019. *Transforming Food Systems Under a Changing Climate. Future technologies and food systems innovation for accelerating progress towards the SDGs: key messages.* CCAFS Brief. Wageningen, the Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available at: https://cgspace.cgiar.org/handle/10568/104050

IPCC. 2019. *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* [Shukla PR, Skea J, Calvo Buendia E, Masson-Delmotte V, Pörtner HO, Roberts DC, Zhai P, Slade R, Connors S, van Diemen R, Ferrat M, Haughey E, Luz S, Neogi S, Pathak M, Petzold J, Portugal Pereira J, Vyas P, Huntley E, Kissick K, Belkacemi M, Malley J, eds]. Available at: https://www.ipcc.ch/srccl/

IPES-Food. 2016. F*rom Uniformity to Diversity: a Paradigm Shift from Industrial Agriculture to Diversified Agroecological Systems.* International Panel of Experts on Sustainable Food Systems (IPES-Food). Available at: http://www.ipes-food.org/_img/upload/files/UniformityToDiversity_ExecSummary.pdf

IPES-Food. 2020. *The added value(s) of agroecology: Unlocking the potential for transition in West Africa.* International Panel of Experts on Sustainable Food systems. Available at: http://www.ipes-food.org/_img/upload/files/IPES-Food_ExecSummary_WA_EN.pdf

Ndiaye O, Moussa A, Seck M, Zougmoré R and Hansen J. 2013. Communicating seasonal forecasts to farmers in Kaffrine, Senegal for better agricultural management. In: Hunger – Nutrition – Climate Justice 2013. A New Dialogue: Putting People at the Heart of Global Development. Conference Papers. Dublin: Irish Aid. Available at: https://cgspace.cgiar.org/bitstream/handle/10568/27888/http://Senegal.pdf

Oakland Institute (n.d.). Rural Women's Associations and Sustainable Agriculture in Casamance. Available at: https://www.oaklandinstitute.org/agroecology-case-studies.

Solomon D, Radeny M, Mungai C, Recha J, Schuetz T, Gadeberg M. 2018. CCAFS East Africa 2019–2021: Summary. Strategy for Supporting Agricultural Transformation, Food and Nutrition Security under Climate Change. Addis Ababa: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available at: https://cgspace.cgiar.org/bitstream/handle/10568/97850/CCAFS%20-%20East%20Africa%20Strategy%20-%20Executive%20Summary%20-%20ONLINE.pdf

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, Agriculture and Food Security (CCAFS). Available at: https://cgspace.cgiar.org/bitstream/handle/10568/108489/Actions%20to%20Transform%20Food%20Systems%20Under%20Climate%20Change.pdf

Wezel A, Bellon S, Doré T, Francis C, Vallod D, David C. 2009. Agroecology as a science, a movement and a practice. A review. Agronomy for Sustainable Development. 29(4):503-515. Available at: https://www.researchgate.net/publication/41699743_Agroecology_as_a_Science_a_Movement_and_a_Practice

Acknowledgements:
The authors would like to thank three anonymous reviewers and the editorial team for very useful feedback on earlier versions of this policy brief.

Contact information
CCAFS Program Management Unit
Wageningen University & Research
Lumen building
Droevendaalsesteeg 3a
6708 PB Wageningen
the Netherlands.
Email: ccafs@cgiar.org

ISSN: 1904-903X

Correct citation
Shilomboleni H, Radeny M, Demissie T, Osumba J, Recha J, Solomon D. 2020. *Building transformative change in Africa's smallholder food systems: Contributions from climate-smart agriculture and agroecology.* CCAFS Policy Brief no. 14. Wageningen, the Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org

Research supported by: