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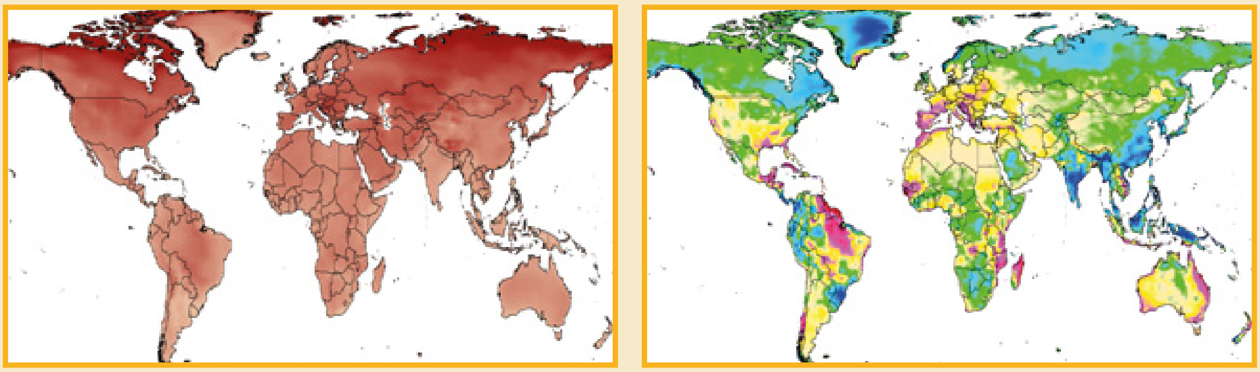
Meeting Malabo Declaration Goals through Climate-Smart Agriculture

The 2016 Annual Trends and Outlook Report (ATOR) examines the contribution of CSA to meeting Malabo Declaration goals by taking stock of current knowledge on the effects of climate change, reviewing existing evidence of the effectiveness of various CSA strategies, and discussing examples of CSA-based practices and tools for developing evidence-based policies and programs. In this brief, we summarize key findings and related policy recommendations.

1. Extreme weather variations

Evidence continues to mount that climate change will play an increasingly important role in Africa, especially in agriculture. Indeed, rising temperatures and increased frequency of extreme dry and wet years are expected to slow progress toward increasing the productivity of crop and livestock systems and improving food security, particularly in Africa south of the Sahara (SSA). As shown in Figure 1, the combination of rising temperatures and changing precipitation patterns is projected to result in a wide range of impacts, including increases in weather volatility and extreme events, rising sea levels, changes in glacial meltwater flows (initially increasing and ultimately declining), changes in the incidence of agricultural pests and diseases, and direct effects on crop productivity.



2. Projected impacts of climate change in Africa

Compared to the continuation of current trends, recent food production projections show that climate change will have a negative impact on production, although effects will vary by crop (Sulser et al. 2015); negative effects are likely to be felt in roots and tubers production but more strongly for cereals, which are expected to see reductions in production of 2.9 percent by 2030 and 5.1 percent by 2050. Based on the combined effects of changes in population, income, climate, and productivity, the number of people at risk of hunger in Africa south of the Sahara is projected to decline from 209.5 million in 2010 to 188.7 million in 2050 (Table 1).

	Aggregate Food Production (index, 2010 = 1.00)					Per Capita Food Consumption (KCAL per capita per day)					Hunger (millions of people at risk)				
		Without climate change		With climate change			Without climate change		With climate change			Without climate change		With climate change	
	2010	2030	2050	2030	2050	2010	2030	2050	2030	2050	2010	2030	2050	2030	2050
World	1.00	1.37	1.69	1.33	1.60	2795	3032	3191	2982	3079	838.1	528.2	405.8	592.3	476.9
Africa	1.00	1.63	2.32	1.55	2.12	2505	2709	2947	2642	2810	215.5	202.2	157.4	229.7	196.0
West	1.00	1.65	2.36	1.59	2.19	2637	2853	3056	2778	2909	30.1	28.0	29.0	32.5	33.5
Central	1.00	1.66	2.33	1.56	2.07	2101	2432	2843	2366	2701	52.3	36.5	21.2	43.2	25.4
East	1.00	1.68	2.50	1.59	2.28	2110	2345	2629	2273	2488	112.1	115.6	89.2	130.6	116.3
Southern	1.00	1.50	1.87	1.49	1.81	2881	3134	3308	3059	3165	3.8	3.0	2.3	3.3	2.8
Northern	1.00	1.56	2.14	1.43	1.85	3029	3182	3360	3137	3254	17.2	19.1	15.9	20.2	18.0

Source: Wiebe et al. 2017
Projected improvements are greatest in central Africa, with slight increases in the number at risk in eastern and western Africa. Climate change reduces the improvement that would be projected in the absence of climate change, leaving 38 million more people at risk of hunger in Africa south of the Sahara in 2050 than would otherwise be the case, most of them in eastern Africa.

***Note:** The color gradient in panel (a) shows increases in maximum temperature in 2050 relative to 2000, from < 0˚C (white) to > 6˚C (dark red). The color gradient in (b) shows changes in annual precipitation in 2050 relative to 2000, from < -400 mm (dark red) to > 400 mm (dark blue).*

3. Role of climate-smart agriculture (CSA)

Given its heavy reliance on rainfed agriculture and projected climatic and weather changes, SSA faces multidimensional challenges in ensuring food and nutrition security as well as preserving its ecosystems. In this regard, climate-smart agriculture (CSA) can play an important role in addressing the interlinked challenges of food security and climate change.

CSA is an umbrella term that includes many approaches built upon geographically specific solutions contribute to three objectives: (1) sustainable and equitable increases in agricultural productivity and incomes; (2) greater resilience of food systems and farming livelihoods; and (3) reduction, removal, or both of greenhouse gas emissions associated with agriculture (including the relationship between agriculture and ecosystems), where possible.

CSA practices include integrated soil fertility management (ISFM), agroforestry, drought-tolerant crops and improved crop varieties, conservation agriculture, integrated crop-livestock management, improved water management, improved pasture and grazing land and water management, restoration of degraded lands, weather early warning systems, and risk insurance.

The CSA objectives directly contribute to achieving the 2014 Malabo Declaration goals, which include commitments to (1) end hunger in Africa by 2025, (2) halve poverty by 2025 through inclusive agricultural growth and transformation, and (3) enhance the resilience of livelihoods and production systems to climate variability and other related risks.

These linkages underscore the importance of including CSA in country and regional plans to achieve overarching development objectives in Africa, in particular food security and poverty reduction.

- Climate-smart agriculture (CSA), with its multi-pronged approach, offers an opportunity to address the challenges of meeting future food security demands under a changing climate.

- Widespread adoption of CSA practices has a positive effect on production and total agricultural output, with a consequent reduction in prices and decrease in the number of people at risk of hunger and the number of children, younger than five years, at risk of malnutrition.

- Adoption of CSA practices is also expected to increase soil organic carbon content, or at least reduce soil organic carbon losses, indicating that they can increase productivity in a more sustainable manner than current practices.

- CSA practices have on-farm and off-farm benefits that often far outweigh their investment costs. However, off-farm benefits can represent a significant fraction of the total benefits generated by CSA practices and benefits might accrue with a time lag while the necessary investments must be made up front.

- CSA is more than just a set of agricultural practices. Evidence suggests that CSA should be interpreted broadly and not reduced to a list of acceptable agricultural practices.

- CSA significantly increases both yields and agricultural trade flows, suggesting a potential role for CSA in improving resilience and spreading agricultural production risks.

- Gender and nutritional status affect people's ability to respond to climate change and their response choices. Changes in gender equity, nutritional status, and environmental sustainability are also outcomes of decisions on climate change and adaptation.

- Risk management is an important component of CSA, and formal insurance instruments complete farmers' tool kit to cope with weather shocks.

- To increase adoption of CSA practices in SSA, there is a need to increase allocation of agriculture budget to extension and market, provide short-term training to extension agents and improvement of storage facilities and other market value chain investments.

- "Blind farming," that is, farming without soil knowledge, is highly inefficient and exacerbates the challenges of addressing climate change.

4. Framework for action

Good Agricultural Policy	What it means for climate change
Increased investment in agricultural R&D	Increased proportion on nitrogen use efficiency, drought tolerance, livestock efficiency and greenhouse gas (GHG) reduction
Increased investments in irrigation	Some investments in large dams due to increased variability; but greater emphasis in small-scale irrigation for flexibility
Smart fertilizer, water, and energy subsidies	Same policy: double dividend from increased production efficiency and reduced GHG
Agricultural insurance	Benefits likely higher due to increased risk; but is insurance subsidy greater value than other investments?
Removal of agricultural trade and macroeconomic distortions	Higher benefits due to increased risk of imports under climate change
Promotion of healthy diets	Increased importance due to GHG emission reductions benefit

Source: Rosegrant (2017)

5. Key policy actions

- **Design and implement CSA-related training programs for extension agents** to provide advisory services on integrated soil fertility management (ISFM), organic soil fertility, and other new paradigms for sustainable soil fertility management practices is low.

- **Upscale storage facilities and other market value-chain investments to** create incentives for farmers to adopt CSA practices. These include the implementation of risk-coping mechanisms, namely ISFM, improved seeds, storage, processing equipment, and enhanced access to markets, crop insurance, and other mechanisms.

- **Establish payment for ecosystem services (PES) to** reward farmers who adopt CSA practices. By internalizing positive externalities, PES would help farmers defray initial investments and take on additional risks associated with CSA practices.

- **Promote agriculture risk management including formal insurance mechanisms to** cope with risks induced by changing climate conditions. Furthermore, farmers should be able to take advantage of the upside risk of investments without the danger of catastrophic consequences.

- **Encourage widespread adoption of CSA practices:** Policies that allow for more public-private partnerships are needed to facilitate the required investments and the adoption of CSA practices and technologies. It is also critical for governments to improve vital institutions that facilitate access to CSA technologies.

- **Encourage full inclusion of the interlinkages across gender, climate change, agriculture, and nutrition when designing CSA policies and programs.** The gender, climate change, and nutrition (GCAN) framework outlined in the report can be used to identify gender differences as they relate to capacities to address climate variability and shocks, preferences for climate change response options, and the effect of climate change responses on nutrition, health, and gender equality as well as other development outcomes.

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