Rising risk of failed seasons as climate change puts pressure on Africa's farmers

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Small-scale family farmers across Africa— already struggling to adapt to rapidly rising temperatures and more erratic rains—risk being overwhelmed by the pace and severity of climate change, according to the 2014 African Agriculture Status Report (AASR).The analysis, prepared by the Alliance for a Green Revolution in Africa (AGRA), with contributions from several African scholars, provides the most comprehensive review to date of how climate change will affect Africa's smallholder farmers and highlights the most promising paths to producing more food, even in the midst of very challenging growing environments.

"Smallholder farmers are the mainstay of food production across sub-Saharan Africa," said Ms. Jane Karuku, president of AGRA. "As climate change turns up the heat, the continent's food security and its ability to generate economic growth that benefits poor Africans—most of whom are farmers—depends on our ability to adapt to more stressful conditions."

AGRA released the report at the African Green Revolution Forum (AGRF), which has attracted nearly 1,000 scientists and representatives of businesses, governments, farmers' organizations and civil society. The report details both the immediate ramifications and longer-term trends of Africa's changing climate.

Farmers across all regions of sub-Saharan Africa (SSA) already are contending with an increase in average temperatures. Further increases

of between 1.5°C and 2.5°C are expected by 2050. Scientists predict severe drying across southern Africa, while other parts of SSA are likely to become wetter, but with farmers facing more violent storms and frequent flooding.

The report notes that climate change could increase the number of malnourished people in SSA by nearly 40 percent over the next 35 years—from 223 million today to 355 million by 2050. In addition, shifting climate conditions can lower the concentration of mineral nutrients like iron and zinc in the edible parts of plants, which could intensify the already acute problem of micronutrient deficiency in SSA.

Growing risk of "failed seasons," impacts on yield

Climate change will affect both the average length of the growing season and rainfall variability. Altered growing conditions can also lower yields and, in certain areas, they could make it very difficult to grow basic food crops as climate shifts exceed what the crop can tolerate. For example, in East and Central Africa, the area suitable for growing common beans, valued as a source of protein and now cultivated on 7 million hectares, could decline by 25 to 80 percent. Land suitable for cultivating banana could fall by 25 percent in the Sahel and 8 percent in West Africa.

Such changes are already underway. Parts of Angola, for example, became un-farmable following three years of poor rainfall and drought. Increasing dryness and droughts will also affect livestock, as happened in the 1980s and 90s, when protracted drought killed up to 60 percent of cattle herds in Niger, Botswana and Ethiopia.

New research reported in the AASR also maps the regions at highest risk for more "failed seasons" as rains become more erratic. At greatest risk are the countries of southern Africa. But also threatened are Southern Sudan and a belt of farmland running from southern Côte d'Ivoire,

across Ghana to Nigeria.

Adoption of climate smart agriculture

It will be critical for smallholder farmers across Africa to adopt a range of practices and crop varieties that scientists increasingly refer to as "climate-smart agriculture" or CSA. CSA strategies seek to sustainably increase agricultural productivity and incomes by helping farmers adapt to climate change—and thus increase the resilience of their rural communities. CSA also aims to reduce agriculture's greenhouse gas emissions.

Farmers across Africa are already utilizing innovations that help them cope with climate risks. They are planting drought-resistant seed varieties; participating in innovative crop and livestock insurance programs that pay out when weather conditions deteriorate; and adopting soil management techniques that help their fields retain water and mitigate runoff and erosion.

Adaptation strategies also encompass strengthening land rights, particularly for women; conserving biodiversity; improving information delivery systems; mechanizing farm labor; strengthening market and weather information systems; investing in agricultural research and education; integrating formal and informal knowledge systems; and building agricultural infrastructure, such as rural roads and irrigation.

"Helping smallholders adapt to climate challenges today will prepare them for even more serious challenges in the future," said Dr. David Sarfo Ameyaw, the managing editor of the report and AGRA's director for strategy monitoring and evaluation. "When farmers are able to employ climate-smart techniques, it makes a huge difference. Despite climate change, there is enormous potential for smallholder-led agricultural growth. But there is an urgent need to increase investments

to expand climate-smart agriculture in sub-Saharan Africa."

Some of the most important climate-smart investments highlighted in the AASR follow:

- **Improved soil management:** For example, three AGRA projects to improve soil fertility, including its ability to retain and use water, together benefitted 126,000 farmers in Tanzania, Ghana and Malawi. Using Integrated Soil Fertility Management techniques, the projects increased yield for maize, soybeans and pigeon pea. The return on each US dollar invested ranged from between US$5 to US$17. (Click here to download AGRA's recent report on its Soil Health Program.)
- **New crop varieties.** Identifying and breeding seeds that are suitable for planting in a particular region or environment can lessen farmers' reliance on manufactured fertilizer by making more efficient use of limited soil nutrients. There are also crop varieties that have a higher tolerance for drought or salty soils and varieties that can resist a rising tide of plant diseases and pests. In addition, plant breeders are working to boost the productivity and nutritional value of crops. Over the last ten years, almost 500 new crop varieties have been released to smallholder farmers that are adapted to particular conditions and challenges. (Click here to download AGRA's recent report on its Program for Africa's Seed Systems.)
- **Improved water management.** Only 4 percent of African crop land is irrigated—the rest depends on increasingly erratic rainfall. But water management can mean much more than irrigation. For example, collecting rain in ponds or barrels, and other "rain harvesting" techniques, offer a simple but underused low-technology approach to climate change. The AASR notes that harvesting only 15 percent of the region's rain would more than meet the water needs of the continent.

- **Climate-smart mechanization.** In sub-Saharan Africa, motorized equipment contributes only 10 percent of farm energy, compared to 50 percent in other regions. Mechanization can improve productivity and nutrient use efficiency, reduce waste and add value to food products. But progress in this area, scientists note, should be based on energy efficient innovations, including the use of alternative energy like solar powered irrigation pumps, and supported by better training and repair service and by strong farmers' organizations.

In addition to climate change, the AASR calls attention to other major trends influencing food security and agriculture production, including rapid population growth, urbanization, unsustainable land use, and gender disparity. These forces are affecting household income, food costs, poverty levels, health, conflict over natural resources and growing social inequality.

"More productive, resilient and low-carbon agriculture requires a major shift in the way we manage land, water, nutrients and genetic resources," said Dr. Ademola Braimoh of the World Bank. "This publication highlights changes in policies, institutions and financial mechanisms for an effective transition to climate-smart agriculture."

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