©WFP/Tom Haskell

A Positive Path for Food Security in Sub-Saharan Africa

Options and Challenges

Stacey Rosen
slrosen@ers.usda.gov

Shahla Shapouri
shapouri@ers.usda.gov

- African Governments and international donors are focused on improving the region's ability to grow food to mitigate projected long-term deterioration in food security.
- An ERS study shows that improving grain yields is the key to reducing food insecurity in Sub-Saharan Africa.
- Investment and technology adoption in Sub-Saharan Africa will be a challenge.

Global food security improved between 2009 and 2010, as the effects of food price spikes and the global economic downturn moderated. The ERS annual report, *Food Security Assessment, 2010-20*, indicates that the number of food-insecure people decreased an estimated 7.5 percent from 2009 levels to 882 million in 2010.

Although the short-term situation has improved, ERS projections point to deteriorating food security over the next 10 years, especially in Sub-Saharan Africa. These projections assume that current trends will continue in agricultural productivity, foreign exchange availability, and other factors affecting food security (see box, "How Food Security Is Assessed").

In an effort to change trends, however, potential gains could be achieved by introducing yield-enhancing or efficiency-enhancing production practices or technologies. Country governments and international donors are increasingly focusing on investments aimed at increasing food availability through greater agricultural productivity.

People Remain Vulnerable to Production Shortfalls…

Food production variability from extreme weather events often leaves populations vulnerable to food insecurity. Domestic production shocks strongly affect the food security of poor countries because they often lack the foreign exchange necessary to increase food imports to offset smaller harvests.

Resource-poor countries like those in Sub-Saharan Africa are particularly vulnerable to production shortfalls and subsequent rises in food insecurity. Since 1990, grain production losses in Sub-Saharan Africa due to weather-related events and political disruptions averaged 16 percent annually from trend production levels. The highest shortfall, 78 percent below trend, was in Zimbabwe. Cape Verde, Eritrea, Lesotho, Liberia, Malawi, Mozambique, Sierra Leone, and Zimbabwe had 1-year production shortfalls exceeding 50 percent below trend, on average.

In addition to those shortfalls, the region's slow production growth is also an issue. Per capita grain production has remained stagnant since 1980, in part because of the region's high population growth. Population growth in Sub-Saharan Africa exceeded 3 percent per year during the last three decades, compared with roughly 2 percent in other lower income regions.

…and Long-Term Projections Point to Deterioration

Food security improved even in Sub-Saharan Africa as the number of food-insecure people in the region fell nearly 11 percent from 2009 to an estimated 390 million in 2010. Despite the improvement, however, nearly half of Sub-Saharan Africa's population remains food insecure in 2010. In addition, although the region accounts for a quarter of the population of the 70 lower income countries included in ERS's food security baseline model, it is home to an estimated 44 percent of the food-insecure people.

In 2010, the most vulnerable countries—those where an estimated 80-100 percent of the population is food insecure—are clustered in Central and Eastern Africa. In many cases, these countries, including the Democratic Republic of Congo, Eritrea, Kenya, and Somalia, have been or are currently involved in some kind of civil strife.

Without significant changes in historic trends, ERS projects that by 2020, the number of food-insecure people in Sub-Saharan Africa will exceed 500 million. In other words, more than half of the region's population will consume less than the nutritional target. Sub-Saharan Africa's food security position will also deteriorate relative to the other regions included in the ERS baseline food security assessment model. In 2020, Sub-Saharan Africa will account for 27 percent of the population of the 70 countries and 59 percent of the total number of food-insecure people.

The projections assume that current trends will continue in several key factors that affect long-term food security—agricultural productivity, foreign exchange availability, and population growth. The baseline projections also assume a constant flow of capital to the region to finance imports over the next decade.

However, these factors could change. A recent International Monetary Fund (IMF) study shows that before the recent financial crisis, the inflow of capital (including credit, foreign direct investment, financial assistance, and remittances) to developing countries was on the rise, increasing fourfold during 1980-2006. The study also shows that the pattern was uniform across different income groups.

An increased focus on agriculture by the African Governments and the international donor community may lead to significant productivity growth. At the G-8 Summit in Italy in July 2009, participants pledged $20 billion over 3 years to reduce hunger and poverty by improving food security, nutrition, and sustainable agriculture. As part of this effort, the Obama Administration launched the Feed the Future program in 2009, with a pledge of $3.5 billion over 3 years.

ERS Analysis Finds Modest Benefits From Increased Capital Inflows

Since longer term food security depends on increased agricultural productivity, foreign exchange availability, and other factors, ERS developed two simulation

Grain production shortfalls added to vulnerability in 1990-2008

	Range of shortfall		Average shortfall	Prevalence
	Low	High		
	Percent from trend production			*% of years*
Cape Verde	0.7	70.6	27.4	73.7
Eritrea	15.5	78.1	41.1	63.2
Lesotho	4.9	63.2	31.8	52.6
Liberia	2.4	56.7	28.2	57.9
Malawi	6.1	51.4	27.6	42.1
Mozambique	0.4	68.4	13.3	57.9
Sierra Leone	7.3	64.7	31.9	57.9
Zimbabwe	0.4	78.3	32.1	47.4
Regional average	2.2	34.0	15.7	50.5

Source: USDA, Economic Research Service.

©WFP/Marcus Prior

scenarios to investigate how changes in these variables might affect food security.

The first scenario assumes that capital inflows to Sub-Saharan Africa would double by 2020 to enhance the region's import capacity. Since 1980, Sub-Saharan Africa has faced deteriorating terms of trade (measured as an index of the relative prices of a country's exports to imports), meaning that the region's ability to purchase food imports from its export earnings decreased. The terms of trade declined from a peak of 189 (index of 2005=100) in 1992 to 129 in 2008.

Increases in capital inflows can directly expand import capacity of countries and support growing foreign exchange needs to finance food imports. Indirectly, increased capital inflows would augment limited investment from domestic sources. The IMF reports that the growth in capital inflows as well as grants and remittances to low-income countries grew from about 4 percent of gross domestic product in the 1980s to more than 10 percent by 2006.

In most Sub-Saharan African countries, food security highly depends on the performance of the agricultural sector. Food import dependency in the region is low, with more than 80 percent of grain supplies coming from domestic production. This means that a doubling of capital inflows over the next decade could reduce the number of food-insecure people in Sub-Saharan Africa by about 8 percent. The impact, however, is not uniform in all countries. Import-dependent countries (such as Angola, Kenya, and Senegal) and countries where official development assistance and official aid are high relative to their export earnings (such as Eritrea) benefit most from capital inflows.

The growth of capital flows would benefit Sub-Saharan African nations by providing much-needed resources for investment in market infrastructure. However, its long-term sustainability depends on the strength of the region's economies and the continuation of transparent laws and regulations.

Potential Gains From Yield Increases Are Larger

The second scenario modeled by ERS estimates the effect of yield increases in the most vulnerable countries with the goal of improving their food production performance. This scenario couples increased capital inflows from the first scenario with 50 percent higher Sub-Saharan African grain yields by 2020. Such a boost in yields would significantly improve food security in Sub-Saharan Africa. The number of food-insecure people would decline an estimated 70 percent by 2020 to 168 million. In other words, less than 20 percent of the region's population would be food insecure following increased capital inflows and adoption of yield-enhancing technologies. Food insecurity would

largely be concentrated in the conflict-ravaged countries like the Democratic Republic of Congo and Somalia.

Improving Yields Requires Investment

Historically, food production growth was achieved mainly by expanding agricultural areas, but land has become scarce in many parts of the continent due to growing populations. Area expansion is possible in a few countries, such as the Democratic Republic of Congo and Angola, but the land is low quality, requiring significant investment to make it viable for food production.

Increasing yields for staple crops will require greater investment both domestically and through assistance from donors and international research organizations. Grain yields in Sub-Saharan Africa are among the lowest in the world—about 31 percent of average world yields.

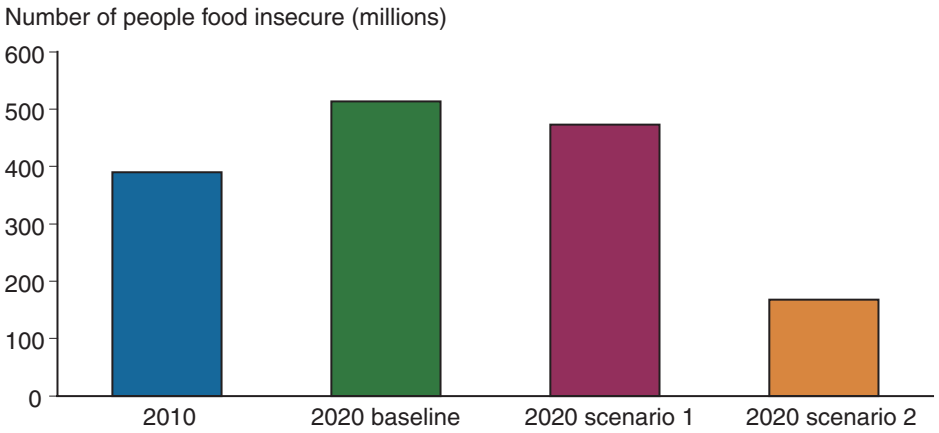
But what is the best strategy for raising yields? A study by the International Food Policy Research Institute investigated the total factor productivity (TFP—the amount of output per unit of total factors used for production) in Sub-Saharan Africa. The study found that TFP had significantly improved during 1984-2003, but growth was mainly due to efficiency gains rather than to technological change. In fact, the contribution of technological change to TFP growth was zero in 10 of the 30 study countries. The efficiency gains resulted from changes in selection of crops and targeting fertilizer use to the best performing crops. For this reason, food policy strategies are focusing on improving small farmers' access to improved technology. (See "Accelerated Productivity Growth Offsets Decline in Resource Expansion in Global Agriculture," on page 46.)

©FAO/P. Cenini

How Food Security Is Assessed

The ERS Food Security Assessment model projects food consumption and food access in 70 lower income developing countries—37 in Sub-Saharan Africa, 4 in North Africa, 11 in Latin America and the Caribbean, 10 in Asia, and 8 in the Commonwealth of Independent States. The model analyzes the gap between projected food availability (production plus commercial and food aid imports minus nonfood use) and two alternative consumption standards. The nutritional standard is the per capita nutritional requirements of roughly 2,100 calories per person per day. The average nutritional gap is the gap between available food and food needed to support a per capita nutritional standard. This approach, however, fails to address inequalities of food distribution within a country. Therefore, a distribution gap is estimated to measure the food needed to raise consumption in each income quintile to the 2,100 calories per person per day nutritional standard.

Technology adoption improves food security more than increases in capital inflow

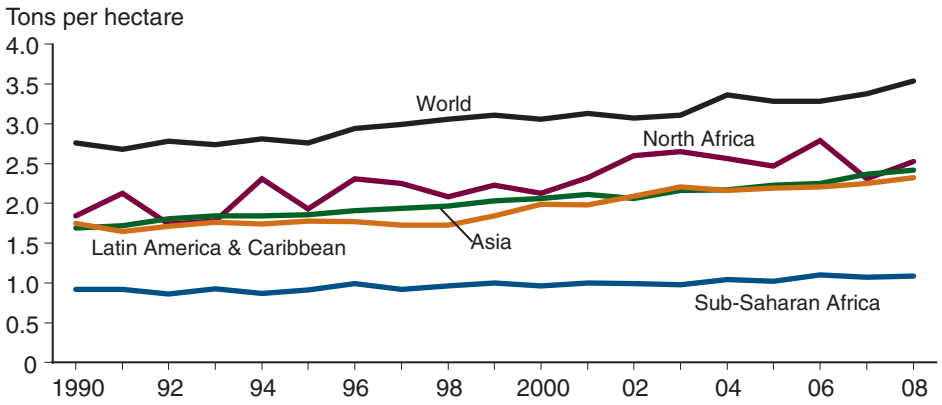


Note: Scenario 1 = increased capital inflow. Scenario 2 = increased capital inflow and higher yields.
Source: USDA, Economic Research Service.

Technology Adoption Has Been Slow

The bulk of food producers in Sub-Saharan Africa countries are small landholders, with farms of 1 to 5 hectares (1 hectare = 2.47 acres). For these farmers, finding the right mix of technologies that fits their agro-physical and economic conditions is not easy. Successful develop-

Sub-Saharan Africa grain yields are lowest in the world



Source: USDA, Economic Research Service using data from Food and Agriculture Organization of the United Nations, FAOSTAT database.

ment, introduction, and use of agricultural technologies and their integration into production practices also take time.

One contentious area that could impede farm investment is the land tenure system and lack of land rights in most Sub-Saharan countries. Mechanization of agriculture, by substituting industrial inputs for labor in a country with a large, unskilled labor force, could increase unemployment, leading to further vulnerability to food insecurity. This potential for unemployment implies the need for a government policy that includes investment in human capital formation to reduce the cost of adopting technology.

In Sub-Saharan Africa, fertilizer use is the lowest in the world: fertilizer is costly, and potential yield responses are limited by inadequate and variable water availability during the growing season. Although water availability varies considerably across the region, it has become a serious problem in many countries, particularly in southern and eastern Africa.

Irrigation can make the use of fertilizer and improved crop varieties profitable while increasing agricultural output. However, in Sub-Saharan Africa, 4.3 percent of arable land is irrigated, compared with a world average of 19 percent. Expanding irrigated area in Sub-Saharan Africa will be costly and require investment. The alternative is investment in drought-mitigating and water-harvesting techniques that could allow farmers to manage production risk more effectively by adopting new and improved plant varieties that are drought resistant, pest resistant, and tailored to a rain-fed environment.

Another neglected area is investment in rural market infrastructure that is essential to reduce costs of doing business in rural areas. However, securing investment for infrastructure is not a simple challenge. In 2000, according to the International Fund for Agricultural Development, road density in Africa was about a tenth of India's at the start of the Green Revolution three decades ago. According to the International Financial Corporation, investment in infrastructure in Sub-Saharan Africa is about $10 billion per year, roughly half of what is needed to support sustained economic growth.

Measures for Future Improvements

Food aid remains critical to Sub-Saharan Africa for short-term needs. The region received 4 million tons of food aid (grain equivalent) in 2008, which represented nearly two-thirds of total world aid. Experts point to the importance of targeting food aid to the most vulnerable populations to maximize its benefits. The positive trend along these lines is the increasing share of food aid allocated to emergency situations: from 18 percent of total food aid in 1990, to 47 percent in 2000, to 77 percent in 2008.

The U.S. Government's Feed the Future initiative focuses on improving the effectiveness of food aid, as well investing strategically in countries with a goal of reducing hunger. The objective is to address the underlying causes of chronic hunger by advancing agriculture-led growth that should help farmers—who are the majority of the world's food-insecure population. Increased revenue generates greater incomes, which helps the poor to purchase food and pull themselves out of poverty (http://www.state.gov/s/globalfoodsecurity/129952.htm).

Improved access to well-functioning markets, along with increased private sector investment in agriculture and nutrition support, enhances access to existing food supplies. Efforts to promote the consumption of healthier foods and improved maternal, child health, and nutrition services lead to more effective food use. Finally, improved effectiveness of humanitarian assistance will support enhanced stability, providing better ways of coping with short-term production variability.

This article is drawn from . . .

Food Security Assessment, 2010-20, by Shahla Shapouri, Stacey Rosen, May Peters, Felix Baquedano, and Summer Allen, GFA-21, USDA, Economic Research Service, July 2010, available at: www.ers.usda.gov/publications/gfa21/