

# Significant wheat production potential in eight African nations-climate, soil and economic data analysis

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In releasing the first ever comprehensive report on sub-Saharan Africa's economic and biological potential for producing wheat, scientists said today that the region's farmers may be growing only 10 to 25 percent of the production the research suggests is both biologically possible and economically profitable. With rainwater alone, and with proper use of fertilizer and other investments, 20 to 100 percent of farmlands in the 12 nations studied appear to be ecologically suitable for profitable wheat farming, according to an analysis based on advanced computer modeling techniques.

The analysis, prepared by researchers at the International Maize and Wheat Improvement Center (CIMMYT), comes precisely at a time when burgeoning populations and rapid urbanization in Africa are pushing up domestic imports of increasingly expensive [wheat grain](#). The report was released at the first conference ever to seriously explore where increased wheat growing in Africa is biologically feasible, economically profitable and internationally competitive as a hedge against [food insecurity](#), political instability and price shocks.

The authors warned of the need for further analysis to address the economic, social and environmental impact of boosting wheat production on the rich agricultural lands of eastern and southern Africa.

"Our study suggests that if the proper investments are made, eight of the

countries in our study could significantly reduce their dependence on wheat imports," said Bekele Shiferaw, a lead author and director of CIMMYT's Socioeconomics Program, based in Nairobi, Kenya. "But our work also suggests that fulfilling the promise of this study will require a shift in how the crop is viewed in sub-Saharan Africa and will only occur with significant support from governments and development agencies."

The researchers noted, however, the challenges posed by an ongoing lack of access to markets and the lack of support for addressing the growing needs of wheat farmers. "Because of the 'broad-brush' nature of the model used, harvest and profitability projections may be higher than what is likely to occur on-the-ground," said Hans-Joachim Braun, director of CIMMYT's Global Wheat Program. "However, the study points to the excellent case for wheat in Africa and the need for policy makers in individual countries to look carefully at the economic and food potential of this crop."

In 2012, African countries will spend about US\$12 billion to import some 40 million tons of wheat, particularly for people who live in the rapidly growing cities of Africa. Yet across the continent, which accounts for 15 percent of the global market for wheat, farmers produce only 44 percent of the wheat consumed locally, leaving Africa's growing demand for the crop largely in the hands of global traders.

"These trends threaten the nutritional and national security of the region," said Shiferaw. "If Africa does not push for wheat self-sufficiency, it could face more hunger, instability and even political violence, as bread riots in North Africa showed in recent years. Unfortunately there is a huge gap between what Africa needs and what it is producing now. If we don't try to bridge that gap, many Africans could easily go hungry."

To arrive at these conclusions, the authors carried out a comprehensive

review of economic and agricultural research and of other relevant data to understand the dynamics of the African wheat economy. They then used an integrated biological and economic simulation-based model to assess the potential for competitive and profitable wheat production in areas that could support rain-fed production. The analysis focuses on Angola, Burundi, Democratic Republic of the Congo, Ethiopia, Kenya, Madagascar, Mozambique, Rwanda, Tanzania, Uganda, Zambia and Zimbabwe.

While each of the 12 countries has certain areas that could be profitable for competitive domestic production, simulated yields were highest in the highland production systems of eastern and Central Africa, including Rwanda, Burundi, Ethiopia, Kenya, Madagascar, Tanzania and Uganda. In terms of sheer land area available for profitable wheat production and actual quantity of wheat that can be produced profitably (wheat yield amount, which depends on the management practices; i.e., wheat genetic potential, climate, soil fertility, among other factors), the eight countries with land areas of at least 0.5 million hectares suitable for competitive production without irrigation include the following, in order of importance:

The estimated average net economic returns per hectare are highest in the highland areas of Rwanda, Burundi and Uganda, which have the most suitable soils and production conditions.

The study also concluded that fertilizer at the right levels could have a significant impact on yield and on profitability in most nations.

In three countries in southern Africa—Mozambique, Angola and Zimbabwe—increased wheat production in rain-fed areas may not be feasible, and irrigation would be required to grow wheat in the cool winter months. Zimbabwe is one of the most productive of the wheat-growing nations in Africa, but wheat farmers there are almost entirely

dependent on irrigation.

"According to this model, Rwanda is among the countries with the highest projected average mean yield for rainfed spring wheat production worldwide," said Braun. "We are showing the promise is there, but any decisions to act on these results should rest on an in-depth review of what investments will be needed and a study of the possible economic, environmental, economic and social trade-offs of making those investments."

At the same time, researchers say that even a return on investment of US\$200 per hectare would make a difference in the region, providing farmers with income and their people with a way to protect against spikes in the global price of wheat.

"Based on a net economic return per hectare of US\$200, the study suggests the region is producing less than 10-25 percent of what we project could be produced profitably," said CIMMYT Director General Thomas Lumpkin. "This could mean that a select group of African nations hold great potential for profitably increasing the amount of wheat they are producing."

According to the authors of the study, the potential for expansion of wheat production is greatest in countries with some underutilized but suitable land and with good market access. Given that wheat is currently a relatively minor crop in many of the countries, farmers will not expand production until there are markets and value chains that offer competitive prices. In countries and production areas where land is scarce and labor is cheaper (e.g., many highland and mid-altitude production areas), the potential for intensive cereal production using modern varieties and inputs is high. Here market access and extension support will be the critical constraints to intensification. In areas where land is abundant and labor is scarce, wheat production using

mechanization would be a feasible option.

## **Study pinpoints need for support from the top**

To fulfill the promise in the nations identified as having great potential for increased wheat production, governments and development agencies will need to invest significantly in required infrastructure and technical support, according to Braun and his colleagues. This would include the following:

- More detailed analysis of profitable ways to expand [wheat production](#) in Africa.
- New, improved wheat varieties suited for different wheat-growing zones in Africa.
- An effective and vibrant seed sector to ensure that seed of improved varieties is multiplied and marketed to farmers.
- Effective extension services to introduce new wheat varieties and cropping techniques to smallholder farmers.
- Improved practices for processing, storing and delivering wheat to market after harvest.
- Development of farm-to-market value chains for wheat producers to supply grain at internationally competitive prices.
- Improvements in wheat import, trade and food aid policies to prevent local producers from being crowded out.
- Information on what would help locally grown wheat compete with imports in terms of taste, quality, and needs of local manufacturers.
- Data on the potential for producing wheat profitably using irrigation, which would allow some farmers to make money growing wheat during the dry season.

"Governments and non-government organizations must overcome the

mindset that Africa is not a wheat-producing region," said Mahmoud Solh, Director General of the International Center for Agricultural Research in the Dry Areas (ICARDA). "This study suggests that if the right things are done to support farmers, whether now or in the future, we could see a dramatic improvement in Africa's ability to feed itself by producing major staples locally, including [wheat](#)."

Provided by International Maize and Wheat Improvement Center

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