AGRICULTURAL INNOVATION IN AFRICA PROJECT

THE NEW HARVEST
Agricultural Innovation In Africa

BELFER CENTER
for Science and International Affairs
John F. Kennedy School of Government
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Agricultural Innovation in Africa

PROJECT BACKGROUND AND RATIONALE

African agriculture is at the crossroads. Persistent food shortages are now being compounded by new threats arising from climate change. But Africa faces two major opportunities that can help transform its agriculture and use it as a force for economic growth. First, advances in science and technology worldwide offer African countries new tools needed to promote sustainable agriculture. Second, efforts to create regional markets will provide new incentives for agricultural production and trade. This is the focus of the Agricultural Innovation in Africa (AIA) project. The project seeks to disseminate policy-relevant information on how to align science and technology missions with regional agricultural development goals. It does so in the context of the larger agenda to promote regional economic integration and development.

The AIA project builds on the findings of the expert report Freedom to Innovate: Biotechnology in Africa's Development prepared by the High Level African Panel on Modern Biotechnology of the African Union (AU) and the New Partnership for Africa's Development (NEPAD). The panel's main recommendations include the need for individual countries in central, eastern, western, northern and southern Africa to work together at the regional level to scale up the development of biotechnology. The upcoming study, The New Harvest: Agricultural Innovation in Africa, is a continuation of that effort. As detailed in the chapter outline that follows, it positions the agriculture at the center of efforts to spur economic development in Africa. It outlines the policies and institutional changes needed to promote agricultural innovation.

THE NEW HARVEST AGRICULTURAL INNOVATION IN AFRICA

1. AGRICULTURE AND ECONOMIC GROWTH

The current global economic crisis, rising food prices and the threat of climate change have reinforced the urgency to find lasting solutions to Africa's agricultural challenges. Africa is largely an agricultural economy with the majority of the population deriving their income from farming. Most policy interventions have focused on "food security", a term that is used to cover key attributes of food such as sufficiency, reliability, quality, safety, timeliness and other aspects of food necessary for healthy and thriving populations. This chapter outlines the critical linkages between food security, agricultural development and economic growth and explains why Africa has lagged behind other countries in agricultural productivity. It argues that improving Africa's agricultural performance will require deliberate policy efforts to bring higher technical education, especially in universities, to the service of agriculture and the economy. It focuses on how to improve the productivity of agricultural workers, most of whom are women, through technological innovation.

2. TECHNOLOGICAL ADVANCEMENT

The Green Revolution played a critical role in helping to overcome chronic food shortages Latin America and Asia. The Green Revolution was largely a result of the creation of new institutional arrangements aimed at using existing technology to improve agricultural productivity. African countries are faced with enormous technological challenges. But they also have access to a much larger pool of scientific and technical knowledge that was not available when the Green Revolution was launched. The aim of this chapter is to review major advances in science, technology and engineering and identify their potential for use in African agriculture. This exploration will also include an examination of local innovations as well as indigenous knowledge. It will cover fields such information and communications technology, genetics, ecology and geographical sciences. It will emphasize the convergence of these and other fields, and their implications for African agriculture.

3. ENABLING INFRASTRUCTURE

Enabling infrastructure (covering public utilities, public works, transportation and research facilities) is essential for agricultural development. Infrastructure is defined here as facilities, structures, associated equipment, services, and institutional

arrangements that facilitate the flow of agricultural goods, services and ideas. Infrastructure represents a foundational base for applying technical knowledge in sustainable development and relies heavily on civil engineering. The aim of this chapter is to outline the importance of providing an enabling infrastructure for agricultural development. Modern infrastructure facilities will need to reflect the growing concern over climate change. In this respect, the chapter will focus on ways to design "smart infrastructure" that takes advantage of advances in the engineering sciences as well as ecologically-sound systems design. Unlike other regions of the world, Africa's poor infrastructure represents a unique opportunity to adopt new approaches in the design and implementation of infrastructure facilities.

4. AGRICULTURAL INNOVATION SYSTEMS

The use of emerging technology and indigenous knowledge to promote sustainable agriculture will require adjustments in existing institutions. New approaches will need to be adopted to promote close interactions between government, business, farmers, academia and civil society. The aim of this chapter is to identify novel agricultural innovation systems of relevance to Africa. It will examine the connections between agricultural innovation and wider economic policies. Agriculture is inherently a place-based activity and so the study will seek to outline strategies that reflect local needs and characteristics. Positioning sustainable agriculture as a knowledge-intensive sector will require fundamental reforms in existing learning institutions, especially universities and research institutes. Most specifically, key functions such as research, teaching, extension and commercialization need to be much more closely integrated.

5. HUMAN CAPACITY

Some of Africa's most persistent agricultural challenges lie in the educational system. Much of the focus of the educational system is training young people to seek employment in urban areas. Much of the research is carried out in research institutions that do not teach while universities have limited access to research support. The aim of this chapter is identify new ways to enhance competence throughout the agricultural value chain. The chapter stresses the need to build the capacity of rural women who perform most agricultural tasks. The chapter will take pragmatic approach that emphasizes competence-building as a key way to advance social justice. Most of the strategies to strengthen the technical competence of African farmers will entail major reforms in existing universities and research institutions. In this respect, the proposals will need to be considered in the context of agricultural innovation systems.

6. BUSINESS DEVELOPMENT

The creation of agricultural enterprises represents one of the most effective ways to stimulate rural development. The chapter will review the efficacy of the policy tools used to promote agricultural enterprises. These include direct financing, matching grants, taxation policies, government or public procurement policies and rewards to recognize creativity and innovation. The chapter will draw on examples such as China's mission-oriented "Spark Program" which helped to popularize modern technology in rural areas and has spread to more than 90 percent of the country's counties. Inspired by such examples, this chapter will explore ways by which African countries could create incentives that stimulate entrepreneurship in the agricultural sector. The chapter will take into account new tools such as information and communication technologies and the extent to which they can be harnessed to promote entrepreneurship.

7. REGIONAL INNOVATION SYSTEMS

African countries are increasingly focusing on promoting regional economic integration as a way to stimulate economic growth and expand local markets. Considerable progress has been made in expanding regional trade through regional bodies such as the Common Market for Eastern and Southern Africa (COMESA) and the East African Community (EAC). There six other such Regional Economic Communities (RECs) that have been recognized the African Union as building blocks for pan-African economic integration. So far regional cooperation in agriculture is in its infancy and major challenges lie ahead. This chapter will explore the prospects of using regional bodies as agents of agricultural innovation through measures such as regional specialization. The chapter will also explore ways to strengthen the role of the RECs in promoting common regulatory standards.

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ABOUT THE SCIENCE, TECHNOLOGY, AND GLOBALIZATION PROJECT

Science Technology and Globalization Project

The Science, Technology, and Globalization Project (STG) is based at the Harvard Kennedy School's Belfer Center for Science and International Affairs and is the institutional home of the AIA project. The aim of STG is to undertake research, conduct training, provide policy advice, and disseminate information on interactions between technological innovation and globalization, with particular emphasis on implications for developing countries.
http://www.belfercenter.org/global

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