Conference Paper No. 8

Overview of Commodity Successes

by

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Paper presented at the NEPAD/IGAD regional conference
"Agricultural Successes in the Greater Horn of Africa"

Nairobi

November 22-25, 2004

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A. Identifying Successes

African farmers and agricultural policy makers have achieved a series of substantial successes in agricultural development, although these have proven inadequate in number and scale to counter Sub-Saharan Africa's daunting demographic challenge. Though temporally and regionally scattered, many have endured for decades. Determined to learn from past successes, several institutions – the International Food Policy Research Institute (IFPRI), International Water Management Institute (IWMI), Free University of Amsterdam, University of Reading and the New Partnership for Africa's Development (NEPAD) – have commissioned investigations of successful episodes in African agriculture (Gabre-Madhin and Haggblade, 2003; Reij and Steeds, 2003; Wiggins, 2000; Penning de Vries et al., 2004). By examining a series of these cases in which important advances have occurred in the past in African agriculture, participants in this conference aim to identify promising avenues for achieving success more consistently in the future.

In order to identify common ingredients and processes that underlie these earlier successes, we must identify a range of representative successful episodes, contrasting instances over time or space where performance has lagged, then study and compare them. To identify a broad range of successful episodes in African agriculture, our analytical team first conducted an inventory of past successes in African agriculture (Gabre-Madhin and Haggblade, 2003; Penning de Vries et al., 2004). From this inventory, we selected several dozen cases for in-depth review and dispatched case study teams to investigate. Together, these case studies provide a series of important contrasts – among private and public instigators of change, points of intervention, levels of subsidy involved, food and export crops, regional diversity, duration and scale of impact (Table 1) .

B. Defining Success

In conducting this review, we have defined "success" as: *a significant, durable change in agriculture resulting in an increase in agriculturally derived aggregate income, together with reduced poverty and/or improved environmental quality.*

C. Case Study Summaries

These case studies reveal a series of impressive efforts spearheaded by a large array of actors, including farmers, governments, private traders, researchers, donors and NGOs. The following thumbnail sketches offer quick highlights of some of these accomplishments.

Cassava: The cassava breeding, pest and disease fighting efforts of the past three decades have improved the lives of probably a hundred million poor consumers and farm family members across West, Central and Southern Africa. IITA and associated government research programs have averted a series of devastating mealybug and mosaic virus attacks across the continent. In the process, they have produced a series of improved cassava varieties that yield 40% more than traditional varieties, even without fertilizer (Nweke, 2003; Haggblade and Zulu, 2003). Dubbed Africa's "best-kept secret," by Nweke et al. (2002), these efforts have arguably proven the continent's most powerful poverty fighter to date.

Maize: The development and diffusion of modern, high-yielding varieties of maize have transformed this imported cereal from a minor crop in the early 1900's into the continent's major source of calories today. Maize breeding in Southern Rhodesia and Kenya launched the first major breakthroughs during th e1960's, though research efforts subsequently spread throughout the continent with strong support from international centers such as CIMMYT and IITA from the 1970's onward. Although unsustainable financial subsidies artificially inflated production gains in many locations, the breeding breakthroughs have proven an undeniable success, with improved maize germ plasm probably benefiting a minimum of 10 million small farms throughout Africa as well as tens of millions of its urban consumers (Smale and Jayne, 2003).

Bananas: For over 800 years, beginning about 500 A.D., farmers in the Great Lakes Region experimented intensively with imported bananas, attracted by the new crop's lower labor requirements, high calorie yields per hectare and favorable effects on soil erosion. Through assiduous selection of cultivars, farmers bred a wide range of varieties suitable for human consumption. Led by inventive local farmers, these efforts launched an extraordinary agricultural and demographic revolution in the Central African Highlands beginning about 1300 A.D and laid the foundation for the subsequent political rise of the Buganda kingdom. In doing so, they developed an important food security crop for the region (Gabre-Madhin and Haggblade, 2003).

Modern tissue culture offers prospects for rapid advances in both yield and resistance to major pests and disease (Wambugu, 2004). Moreover, it enables rapid and sterile multiplication of pathogen-free planting material. Recent efforts by the Kenya Agricultural Research Institute (KARI), in conjunction with a local private biotechnology company, have begun to produce in vitro banana plants commercially. Even at full commercial costing, the tissue culture plants roughly double both yield and income under farmer conditions (Qaim, 1999). Together, farmers and scientists have developed a highly suitable food security crop that currently accounts for over one-fourth of caloric consumption in countries such as Rwanda and Uganda (FAOSTAT).

Cotton: Since independence in the 1960's, West African cotton production and exports have both grown rapidly, at a compound annual rate of about 6.5% per year over the past forty years. francophone Africa's share in world exports has grown from near zero to 16%, making them the world's third largest cotton exporting block after the USA and former USSR. Roughly 1 million smallholder farm families produce cotton in francophone Africa (Tefft, 2003; Gabre-Madhin and Haggblade, 2003).

Horticulture: From the early 1970's onward, Kenya's private traders have steadily expanded high-value exports of fruits and vegetables from Kenya. Smallholders supply about 75% of all vegetables and 60% of all fruits. By the mid-1990's, between 100,000 and 500,000 Kenyan farmers and distributors earned income from this horticultural export trade. One of the country's fastest growing foreign exchange earners, horticultural exports have tripled in real terms over the past 30 years, growing to $175 million in 2000 (Minot and Ngigi, 2003).

Despite this rapid and well-publicized growth, domestic markets for horticulture products currently account for only 10% of domestic horticulture production. The remaining 90% is marketed domestically (Tschirley et al., 2004). While growing supermarket penetration in urban areas has led to significant market share gains in staples and dairy

products, they currently retail only about 4% of domestic horticulture, even in Nairobi (Mathenge and Tschirley, 2004). So traditional wholesale and retail market channels remain dominant. Given high perishability and the high value of these horticultural products, investments in traditional domestic market channels may yield high payoffs (Tschirley et al., 2004).

Dairy: Dairy production in Kenya has grown rapidly in recent decades resulting in per capita production double the levels found anywhere else on the continent. Smallholders have captured a steadily rising share of that market so that, today, some 600,000 small farmers operating 1 to 3 dairy cows produce 80% of Kenya's milk. As a result, recent panel data indicate that by the year 2000 nearly 70% of Kenyan smallholders produced milk and that it had become their fastest growing income source. Among the small farmers who produce milk, annual net earnings from milk average $370 per year. In spite of similarly favorable agro-ecological environments, the highland areas of Ethiopia and Uganda have not experienced the rapid growth in dairy production seen in Kenya (Ngigi, 2003; Ahmed, Ehui and Assefa, 2003).

Fodder crops. Limited availability and quality of cattle feed limits livestock productivity, particularly in concentrated settings around major urban markets. Given small farm sizes in peri-urban settings, open grazing impractical and quality feed remains scarce. KARI and ILRI began research on leguminous fodder shrubs such as Calliandra in the 1980's. By the mid-1990's, with support from ICRAF and KEFRI, the research team began distributing material for village nurseries and for testing by farmers. Pilot extension efforts by researchers and a variety of NGO and CBO partners has led to promising results, fodder crops that not only provide high-quality cattle feed but simultaneously improve soil fertility for subsequent food crops. Early assessments suggest that a farmer with 500 shrubs would earn an extra $130 per year, through increased milk production or reduced feed purchase. Given large and growing demand for fodder, researchers anticipate significant potential for expansion (Franzel, Arimi and Murithi, 2002; Wambugu, Franzel, Tuwei and Karanja, 2004).

Table 1 –Case Study Summaries

	Commodity Case Studies							
	Maize	Cotton	Cassava	Banana	Fodder crops	Dairy	Horticulture	
							Export	Domestic
1. Region	East & Southern Africa	West Africa	West,Central, Southern Africa	Eastern Africa	Kenya	Kenya, Uganda, Ethiopia	Kenya, Ivory Coast	Kenya
2. Who initiated change?								
a. key instigators	• commercial farmers • govt breeders • government policy makers • parastatal mktg companies	• donor and national governments • parastatals marketing companies	• IITA • NARs • rural artisans	• NARs	• KARI • ILRI • KEFRI • ICRAF	•commercial farmers • government policy makers • parastatals	• private traders	• private traders
b. supporting actors	• private seed companies	• farmer organizations	• NGOs • private oil companies	• private labs	• NGOs • CBOs			• supermarkets
3. What interventions triggered change?								
a. expanded production possibilities								
• technology	***	**	***	***	***	***	*	
• input supply	***	***	*	*	*	***	**	
• investments in asset base		*			**	**		
b. improved incentives								
• political lobbying	***	*				***		
• output markets	***	***				**	***	***
4. Market outlets	• domestic	• export	• domestic	• domestic	• domestic	• domestic	• export	•domestic
5. Were large recurrent public subsidies involved in sustaining smallholder growth?								
	• yes	• yes	• no	• no	• no	• yes	• no	• no

*** = critical interventions; ** = important; * = supporting activities

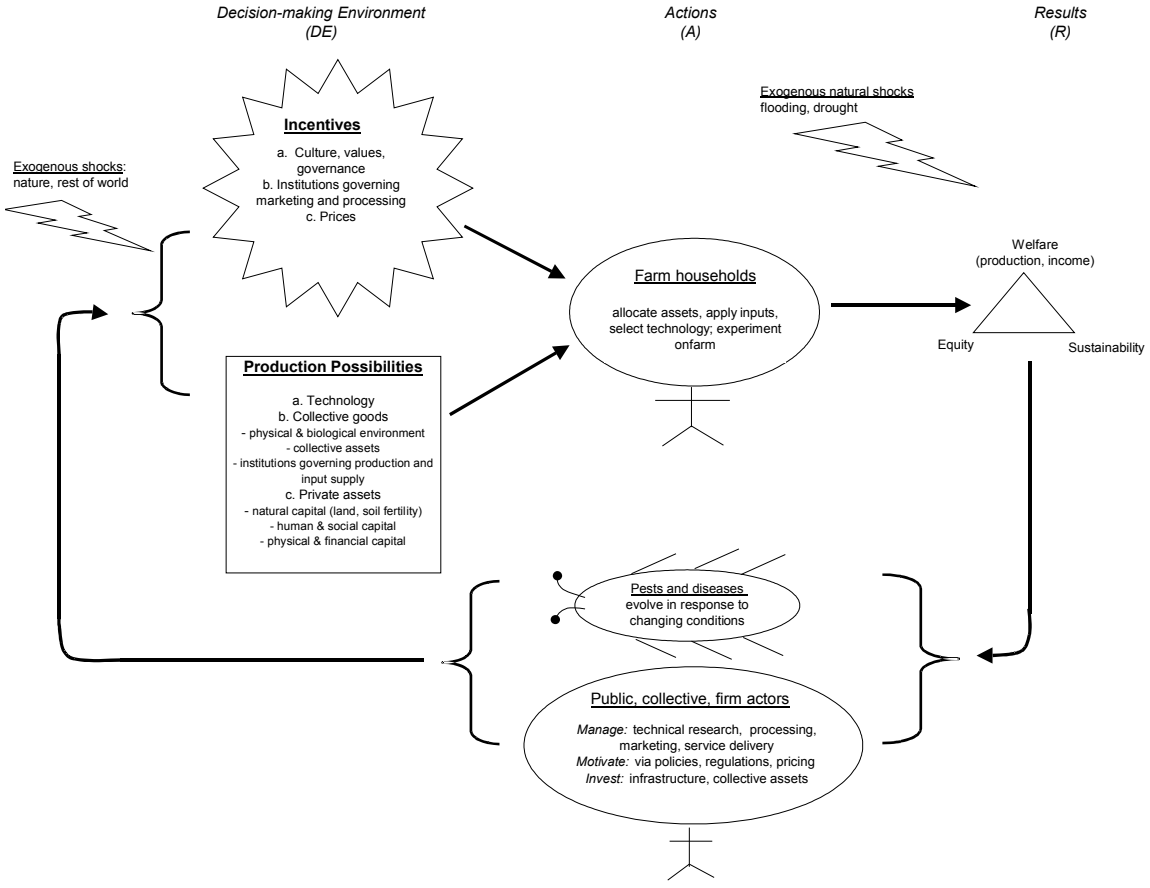
II. GENERALIZING FROM PAST SUCCESSES

What common ingredients and processes underlie these earlier successes? By examining a series of instances in which important advances have occurred in the past in African agriculture, this conference hopes to identify promising avenues for achieving similar success in the future.

A. Analytical framework

Since African governments have abandoned the era of state farms, future improvements will depend on improved performance by millions of individual African farmers. Therefore, our case study teams have adopted a dynamic analytical framework placing farmer decision-making at its core (IFPRI, 2003). Agricultural systems evolve continuously as individual crops and their human managers respond to ever-adapting pests, diseases, weed species and environmental conditions. In this inherently dynamic system, two key structural features of the agricultural system govern human responses at any given point in time (Figure 1).

Figure 1 -- The Dynamics of Agricultural Change: The DE-A-R Framework



First, production possibilities place initial bounds on the scope of action available to farmers. These opportunity sets depend on the available quantity, productivity, and distribution of key productive assets such as land, labor, capital, and water; on the stock of available biological and agronomic technology; on the state of physical infrastructure; and on supporting institutions for resource management, input supply and marketing.

Second, from within the available opportunity sets, prevailing incentive structures subsequently determine which of the many available options farmers will select. Incentives such as enhanced food security, social solidarity, or risk reduction influence individual and household decision-making, while market prices affect both input supply as well as production, storage, processing and marketing of outputs.

Levers available for initiating change, thus, fall into two categories:

a. Expanded production possibilities:
   - technology
   - collective goods (physical environment, collective assets, institutions governing production and input supply)
   - private assets (soil fertility, human capital, physical and financial capital)

b. Improved farmer incentives:
   - governance, values, culture
   - institutions governing output marketing and processing
   - prices (exchange rates, tariffs, taxes, market interventions)

Examining the case studies in depth permits us to explore a series of important questions: Which levers of change have proven most powerful? Who has taken the key initiatives? What policy environments have most effectively facilitated scaling up to achieve large-scale impact?

B. Assessing replicability

In some instances, technologies can directly transfer from one location to another. SR52, the breakthrough hybrid maize first released by the Zimbabwean agricultural service in 1961 spread rapidly in Zimbabwe and also to surrounding countries of Malawi and Zambia where it remains important in breeding lines even today. Similarly, five of the six improved varieties of cotton instrumental to the steady rise of productivity in Mali came from outside of Mali, from allied research institutes across the Sahel.

Yet, in other instances, technologies prove location-specific. Direct import of IITA cassava varieties into Zambia, for example, have not fared well because of different altitude, temperature, soils and rainfall. Many varieties of hybrid maize from temperate zones will not flower in equatorial regions because differences in daylight hours trigger tasseling. Pests, soils and policy environments vary across locations, making direct technology transplants uncertain. ICRAF's work with improved fallows demonstrates quite clearly the need for location-specific adaptive research.

In many instances, therefore, the processes of change may prove more replicable than the individual technologies themselves. Therefore, discussion at this conference will pay particular attention to how the process of change unfolded in each instance. What institutions, investments, and interactions have proven key to enabling success in each of the cases we will review?

C. Validating Findings with Government and Private-Sector Decision-Makers

To help answer these questions requires considerable judgment and collateral knowledge. For that reason, the conference has assembled a group of experienced agricultural specialists from government, the private sector and from across the region to help with this synthesis effort.

Following plenary presentations by the case study analytical team, the participants will spend the bulk of their time interacting in a series of professionally facilitated small-group working sessions. Though the prepared case study material serves as a springboard for discussion, the participants contributed by sharing insights from their own considerable experience. The varied backgrounds of the conference participants – private and government, producer and processor, researcher and practitioner – provides a rich set of complementary expertise that served to animate and invigorate interactions in the informal working group environment.

D. Case Study Groupings

To facilitate interaction and cross-fertilization of ideas, the eight case studies have been paired up into four small groups (Table 2). The first group will review the maize and cotton case studies. Though on the surface these cases look quite different, looking at food staples versus export crops in very different regions, the models are, in fact, quite similar. In both instances, public agencies have been the prime movers in providing a full suite of technology, inputs and output marketing services. Both likewise involve recurrent public subsidies to sustain the smallholder systems.

The second working group will examine the cassava and banana cases. These technology-led successes in vegetatively propagated food security crops, which offer prospects for year-round harvest and a counter to cereal-based lean seasons. Neither case involves large-scale, recurrent public subsidies, though both have demonstrated potential for significant cross-border interaction and scaling up.

The third small group will concentrate on horticulture crops. They will contrast markets for export with the much larger domestic distribution system. Both demand access to water and ready access to markets. This group will evaluate the relative opportunities in export and domestic markets as well as requirements for their expansion.

The final group will focus on livestock. They will concentrate on dairy and on fodder crops. Contrasting across countries, the group will attempt to understand why the Kenya model has not been replicated in Ethiopia and Uganda. They will also explore

issues of intensification and fodder crops in peri-urban settings as well as livestock crop farming interactions more broadly.

Through the facilitated small-group working sessions, participants in each of these small groups will work together to answer the following key questions:

1) Who took the key initiative? (private, public?)
2) What levers of intervention have proven most powerful?
3) What technologies and processes are replicable more broadly in the region?
4) What actions are required to initiate replication?
5) Who is best positioned to take the lead?

Table 2 – Working Group Case Study Groupings

Group	Commodities	Commonalities
WG5	• maize • cotton	• public-led models • vertically integrated package of support including technology, inputs and marketing • recurrent subsidies
WG6	• cassava • bananas	• technology driven • vegetatively propagated food security crops • year-round harvest • no recurrent subsidies • significant cross-country interaction
WG7	• horticulture	• private sector led • alternate markets: domestic vs. export • water management
WG8	• dairy • fodder crops	• livestock-crop interactions • intensification of both dairy and cropping

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