

## Agriculture for development in sub-Saharan Africa: An update

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Agriculture has multiple functions to fulfill for the development of the sub-Saharan Africa countries. It should be a source of growth and an instrument for poverty reduction and contribute to the provision of environmental services. Yet it is still used far below its potential, with gains in land and labor productivity lagging behind those of other regions. Successful use of agriculture for development will require greater attention from governments and donors, supported by scholarship and learning. The economics profession has an important role to play in helping to re-conceptualize in a new paradigm the role of agriculture for development, to design and evaluate new approaches, to contribute to capacity building, to advise on policy and to mobilize political support.

**Keywords:** agriculture; development; sub-Saharan Africa

**JEL codes:** Q10; O13; O10

*L'agriculture doit remplir de multiples fonctions pour répondre au développement des pays de l'Afrique sub-saharienne. Elle devrait être source de croissance ainsi qu'un instrument de réduction de la pauvreté et devrait contribuer à la provision des services environnementaux. Cependant, celle-ci n'est que très peu exploitée si l'on considère son potentiel, avec un accroissement faible de la productivité de la main d'oeuvre et de la terre par rapport aux résultats des autres régions. Une utilisation efficace de l'agriculture au service du développement nécessitera une plus grande attention de la part des gouvernements et des donateurs, le tout soutenu par la recherche et la connaissance. Les économistes ont un rôle important à jouer lorsqu'il s'agit d'aider à re-conceptualiser, grâce à un nouveau paradigme, le rôle de l'agriculture au service du développement, de concevoir et d'évaluer de nouvelles approches, de contribuer au renforcement des capacités humaines, de conseiller en matière de politiques économiques et de mobiliser le soutien politique.*

**Mots-clés :** agriculture ; développement ; Afrique sub-saharienne

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## 1. Introduction

The objective of this update is to introduce the first special issue of the *African Journal of Agricultural and Resource Economics*. This issue, on ‘Agriculture for Development in Sub-Saharan Africa’, puts into perspective some current and expected changes in agriculture, the associated economic activities and rural society. The papers in this issue were prepared for a conference on this topic organized by the African Economic Research Consortium (AERC) in Mombasa, Kenya, May 2009. The conference had two main purposes: to assess the frontiers of research in economics as applied to agricultural development and smallholder competitiveness, and to establish research priorities for future efforts in that direction. This update takes the World Development Report 2008 (World Bank, 2007a) as a starting point.

## 2. Toward a new paradigm in using agriculture for development in the ‘agriculture-based’ countries

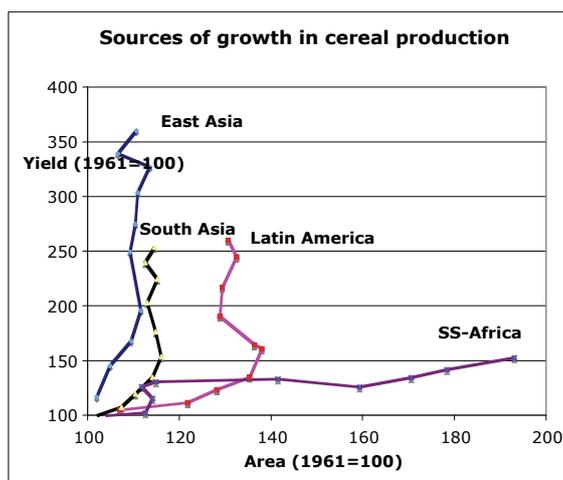
The agriculture-based countries have, by definition, a large share of total poverty in the rural sector and a large share of GDP growth originating in agriculture, the latter fundamentally because agriculture accounts for a large share of their GDPs. They include all the sub-Saharan African countries other than South Africa as a transforming country and some mineral-rich countries. The current role of agriculture in the development of these countries is not just to support industrialization – as in the well-known dual economy models and the classical models of ‘agriculture on the road to industrialization’ (Mellor, 1998) and ‘agricultural-demand-led industrialization’ (Adelman, 1978) – and to diversify the economy away from agriculture (following the regularities of the structural transformation with a declining share of agriculture in GDP and in the labor force). Instead, in the emerging paradigm espoused by WDR 2008, agriculture has multiple functions for the development of these countries: to help trigger overall economic growth at early stages, to reduce poverty, to increase food security, to equalize gender status, to reduce rural-urban income disparities, to conserve resources and to provide environmental services (Byerlee et al., 2009). These multiple functions can be win-win, but more generally they imply trade-offs and the consequent need for country-level priority setting. Deciding how to use agriculture effectively for development (a matter that is frequently neglected) should therefore be an important component of Poverty Reduction Strategy Papers and other national planning exercises.

*Claim 1: Using the multiple functions of agriculture to develop the agriculture-based sub-Saharan African countries is an important option that should not be overlooked. How to do this must be designed in priority-setting exercises conducted at the country level.*

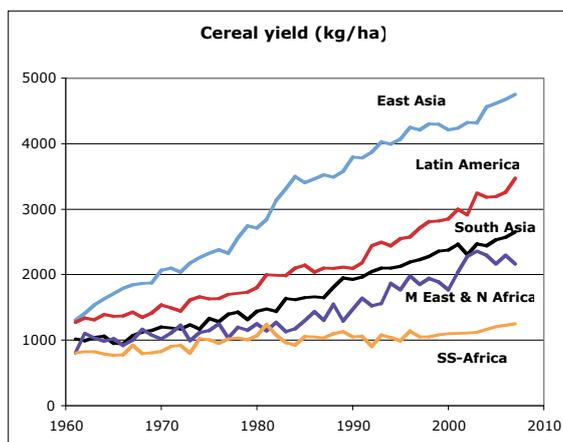
## 3. Inconvenient facts about the comparative performance of sub-Saharan Africa

Agricultural growth in sub-Saharan Africa has been lagging behind other regions of the world, especially in value added per capita, which, although it has stopped declining since 1994, remains sluggish in comparison. Area expansion has been the main source of output growth in cereal production in sub-Saharan Africa, in contrast to East and South Asia, where rising yields have been the main source, and to Latin America, where area expansion that was initially the main source has also shifted to rising yields (Figure 1). However, more than in

most other parts of the world, increasing scarcity of land has become a stark reality for sub-Saharan Africa, compromising reliance on area expansion as a future source of growth, and calling for emulation of the Latin American growth reversal. Yet cereal yields have been overall stagnant while those in other regions of the world have increased steadily (Figure 2), with some better performers in sub-Saharan Africa such as South Africa, Côte d’Ivoire and Zambia showing the way forward in achieving yield gains in agriculture. Accelerated growth thus requires, and will increasingly require, gains in land productivity that have to date not materialized at an aggregate level; in other words, Africa needs a ‘Green Revolution’. In the context of climate change, yields more resilient to extreme climatic events will also be an important feature of this Revolution.



**Figure 1: Title of vertical axis must be pivoted to vertical: “Yield (1961=100)”  
See figure pasted below**



**Figure 2: Land productivity in cereal production**

Two important reasons for the lack of progress in land productivity are the continued low adoption of chemical fertilizers (Figure 3) and the failure to expand areas under irrigation. While increased use of chemical fertilizers may cause environmental concerns at high levels of use (272 kg/ha of arable land in East Asia, 148 kg/ha in high income countries and 131 kg/ha in South Asia), this should not yet be a concern in sub-Saharan Africa with only

11 kg/ha. Progress has not been made in increasing labor productivity in agriculture, when labor productivity gains are essential for reducing poverty in the farming population.

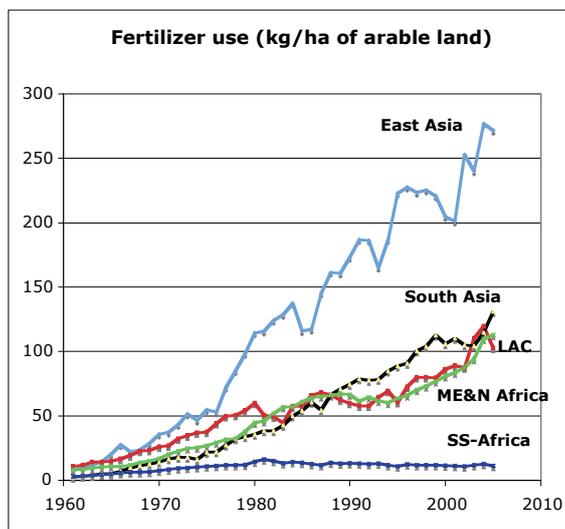


Figure 3: Fertilizer use in agriculture

While there has been intense displacement of the labor force out of agriculture, this has in most cases not been associated with growth in GDP per capita, with the result that structural transformations are truncated in comparison with normal patterns of growth as observed cross-sectionally and in East and South Asia (Figure 4). Nigeria, Côte d’Ivoire, Cameroon and South Africa are illustrative of large-scale labor displacements out of agriculture, without GDP per capita growth. China displays the opposite pattern, with rapid GDP per capita growth but delayed official transfers of labor out of agriculture.

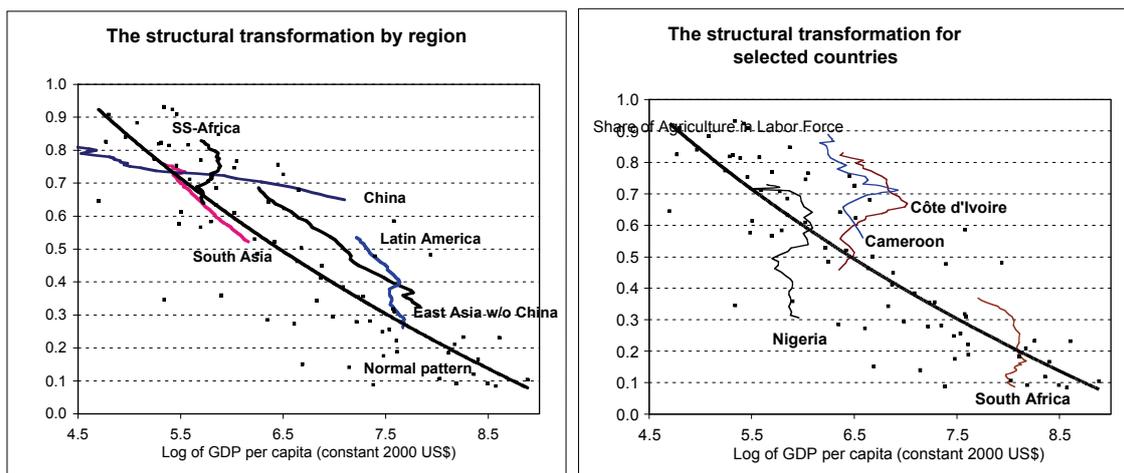


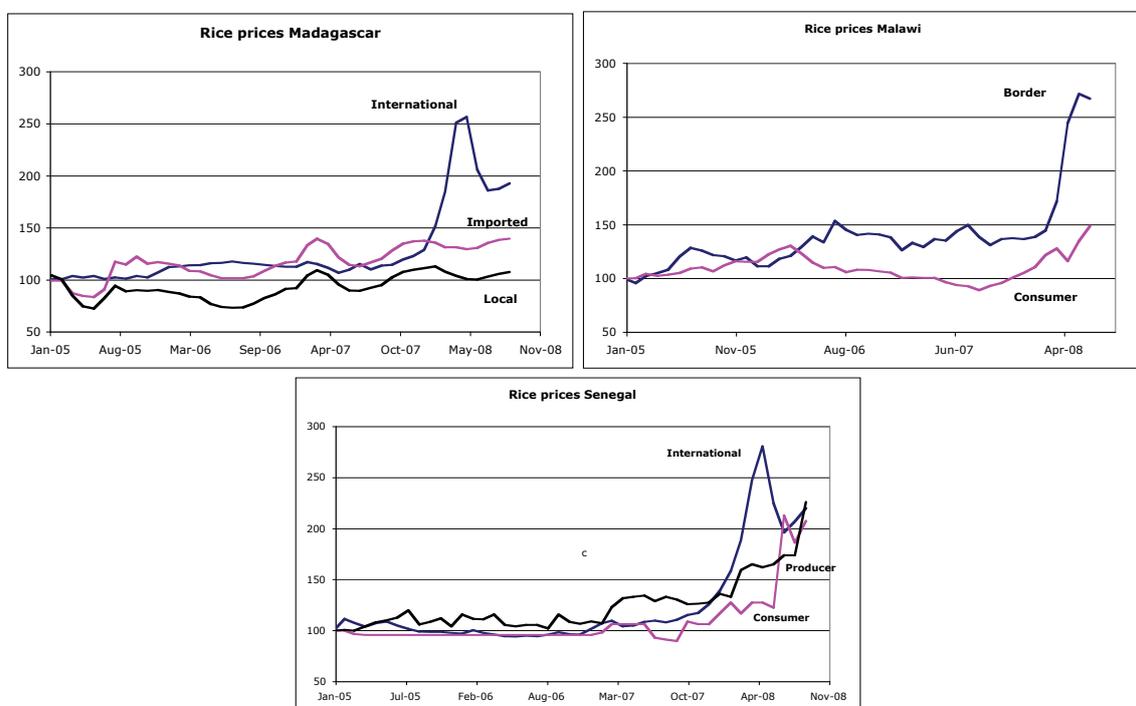
Figure 4: Title of vertical axis, left panel is missing. Should be: “Share of agriculture in the labor force”. See picture pasted below.

As a consequence, rural poverty has been persistent, with an actual absolute increase in the number of rural poor, and 70% of African poverty remaining rural. Largely because they have been too low relative to population growth, land and labor productivity gains in the recent period have not been associated with a reduction in rural poverty, again compared to what productivity growth has achieved in South Asia and especially East Asia.

*Claim 2: Agriculture in sub-Saharan Africa is used far below its potential, with gains in land and labor productivity lagging behind other regions. Releasing pent-up productivity growth in agriculture offers a major opportunity for development that has yet to be taken up.*

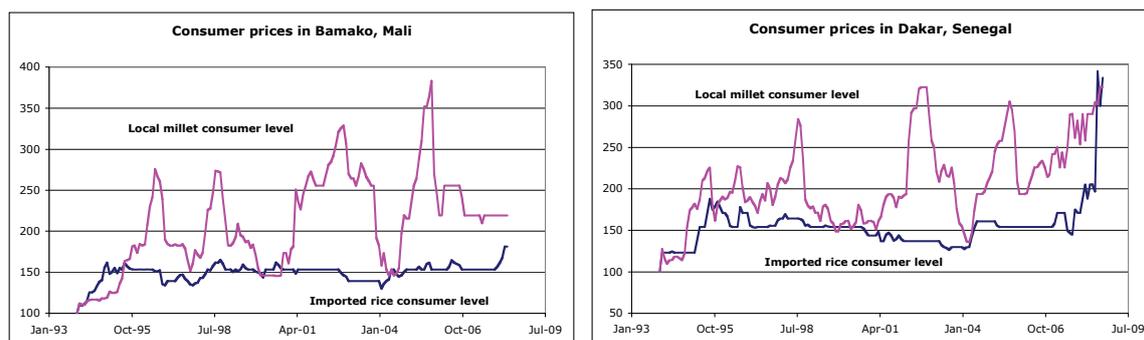
#### 4. Recent evolution and combined crises

The food crisis with higher and more volatile international market prices is particularly threatening to sub-Saharan Africa, where most countries are net food importers and most of the population spends a large share of its income on food staples. Propagation of the global food crisis to the national level is, however, far from straightforward. The transmission of prices from international markets to domestic markets has been very uneven across countries and commodities, ranging from high transmission for rice in Senegal to low transmission in most other countries such as Madagascar (Daviron et al., 2008) and Malawi (Figure 5). Higher transmission for a particular commodity tends to be associated with greater import dependency and lower diversification in consumption, but the determinants of transmission are also idiosyncratic to countries depending on policy interventions, real exchange movements, transactions costs on markets and the competitive structure in imports and processing. Frequently assumed full transmission has led to overblown predictions of impact.



**Figure 5: Price transmission for rice from international to domestic market  
January 2005=100**

There is a price policy dilemma originating in the contrast between (1) more stable consumer prices for imported foods (such as rice in Mali and Senegal, as can be seen in Figure 6) with eventual world price shocks as in the 2007–2008 food crisis, where there was high transmission, as in Senegal, and (2) prices disconnected from the international market for local cereals (with little transmission through substitutions in consumption) but with very high and visibly rising variability, such as millet in Mali and Senegal (Daviron et al., 2008).



**Figure 6: Consumer prices for imported rice and local millet in Mali and Senegal January 1994=100**

*Source:* Daviron et al. (2008)

The food situation for the world, and especially for sub-Saharan Africa, has changed drastically in the last five years (Abbott, 2009). New pressures have become evident on both the demand side, associated with continued rapid population growth, income effects and demand for biofuels, and the supply side, associated with fluctuating energy prices, climate change, water scarcity, soil depletion and pandemic zoonotic diseases. With rising international market prices signaling that supply is on the whole not keeping up with demand, rising price volatility in a context of low international grain stocks, defensive trade policies and speculative movements on commodity markets, much greater focus needs to be placed on the supply side of food, and in particular on achieving sustainable productivity gains and greater resilience to shocks.

Dealing with international market price volatility and domestic yield instability raises anew the issue of food security as a major policy concern, when it had slipped off the policy agenda following structural adjustment and trade liberalization. This requires revising policy decisions regarding trade when international market prices for staple foods are more volatile, use of national food reserves (Wright, 2009), social safety nets for the vulnerable, supply response in agriculture for greater domestic self-sufficiency, and promotion of subsistence farming for ‘farm-financed social welfare’ (Owen, 1966) for those beyond the reach of social safety nets when exposed to shocks.

To ensure secure access to food it is necessary to focus not only on chronic poverty but also on vulnerability to transitory poverty, and to adjust current social assistance programs that are better equipped to deal with the former than the latter. To assess the welfare incidence of price changes it is necessary to identify net sellers and net buyers among rural households, which often reveals the surprising fact that a large majority of landed households are in fact net buyers of food and thus negatively affected by higher and more volatile prices (De Janvry & Sadoulet, 2009).

*Claim 3: It is both increasingly urgent and increasingly difficult to use agriculture for development. Changing conditions mean that more attention must be paid to the supply side of agriculture, which has been neglected in the past 25 years of declining prices. Renewed attention must also be paid to food security strategies, using a broad spectrum of instruments that include increased productivity gains in agriculture, combined trade and food reserves policies, social safety nets for the vulnerable, and reliance on subsistence farming for net-buyer smallholders not protected by formal social safety nets.*

## **5. The continued neglect of agriculture**

In spite of greater public concern with agriculture – on account of the food crisis, the persistence of rural poverty and the contributions of agriculture to climate change – public budgets allocated to agriculture in sub-Saharan Africa still fall short of the 10% NEPAD guideline and the 15% that successful Asian countries allocate to agriculture. Similarly, overseas development assistance allocated to agriculture in sub-Saharan Africa has been steadily declining over the last 15 years, with only modest improvements since 2006. There is also continued under-investment in agricultural research, although comparing rates of return on investment to the opportunity cost of capital shows that there are high pay-offs from such investments.

The neglect of agriculture is also apparent in structural adjustment programs that have been extremely detrimental to the institutional infrastructure of agriculture, including market facilities, financial services, property rights, producer organizations and governance for agriculture. Clearly, if agriculture is to perform better, greater attention must be paid to the institutions that serve the sector. Most urgent is to redesign the Ministries of Agriculture so they can not only support agricultural growth but also make agriculture an effective instrument for development. This essential institutional reconstruction is still far from complete.

Reversing the neglect of agriculture will require increased public expenditure and overseas development assistance, but the financial crisis is likely to make it more difficult for governments and international donors to meet commitments to agriculture. Greater emphasis must therefore be placed on improving the *quality* of public expenditure and foreign assistance – an aspect where there is considerable room for improvement. There are also encouraging new initiatives in progress including the CAADP (Comprehensive Africa Agricultural Development Program) policy guidelines, a more proactive role for the GFAR (Global Forum on Agricultural Research) increased budgets for the CGIAR (Consultative Group on International Agricultural Research), successful disbursements under the World Bank's Global Food Crisis Response Program and the Gates-Rockefeller Foundations' AGRA (Alliance for a Green Revolution in Africa) initiative. These initiatives need to be supported by high quality monitoring and impact evaluations for guidance and improvement. Such support is still largely in the initial stages.

Because sub-Saharan Africa's agriculture is very diverse, setting priorities for allocating additional funding requires local consultations. This diversity can be seen if we look at the large number of starchy staple foods that contribute to consumers' calorie consumption: 21% of daily calorie consumption from maize, 18% from cassava, 13% from rice, 12% from millet, 10% from wheat, 10% from other roots and tubers, 9% from sorghum and 3% from other cereals. This diversity makes it very difficult to set priorities, as there are large

economies of scale in research and development, as well as in specialized marketing services. While diversity calls for setting local priorities, economies of scale require coordination at a higher geographical level. Combining local delivery of improved varieties with economies of scale in generation is a major institutional challenge to a Green Revolution in sub-Saharan Africa.

*Claim 4: The continued under-performance of agriculture is due to policy neglect and insufficient attention by donors and these weaknesses can both be remedied.*

## 6. Toward a productivity revolution in smallholder farming

One of the reasons for the poor past performance of public investment in agriculture has been insufficient recognition of the difficulty of such investing. We should be under no illusion that using agriculture successfully for development is a complex and multi-pronged enterprise that requires conceptualization, resources, capacity, coordination, political commitment and time. Short-run impacts on poverty are easier and faster to achieve via cash or food transfers (that have often been made conditional on beneficiary behavior toward child attendance at school and good health practices), which explains the rising popularity of transfers as opposed to rising autonomous incomes as instruments, but they cannot be sufficient and adequate to solve the rural poverty problem. Helping local people to improve their own autonomous incomes has to be the main focus of sustainable poverty reduction strategies.

Rainfed agriculture, which accounts for 88% of sub-Saharan Africa's cultivated area, is carried out under heterogeneous conditions – agro-ecological environments, crops, farming systems and exposure to risks all vary widely. Managing this heterogeneity requires decentralization and participation in order to design and implement local solutions. Since this heterogeneity also stems from varied social systems with a great diversity of institutional arrangements, a multisectoral approach is needed to deal with the resulting constraints. Key issues to be addressed include exhausted soils, insufficient infrastructure (roads, water), low levels of education and health, a private sector limited by an uninviting investment climate, under-funded producer organizations and weak governance for agriculture. The situation of small countries and large economies of scale in such investments as R&D and infrastructure invites regional cooperation.

In using agriculture for development, the process through which growth in agriculture is obtained is as important as the outcome, in particular to achieve poverty reduction, gender equality and environmental sustainability. Smallholder farming must therefore be the dominant approach, in spite of some advantages associated with large-scale farming and the contracting out of land to international agribusiness that has recently been advocated by some development economists and pursued by some governments (Collier, 2009).

The challenges of a productivity revolution in smallholder farming in sub-Saharan Africa are daunting, yet need to be confronted, and there are good signs that success can be achieved. The response to this challenge must have the following six basic characteristics:

- First, it must succeed where it has failed before, and success must be **rapid** to avoid major human disasters. Old recipes will consequently not work. Innovations have to be part of the solution.

- Second, it must be **specific** to the conditions of sub-Saharan Africa. The region is characterized by a great degree of heterogeneity and the broader supporting conditions – markets, institutions and public goods – are weak. What is needed is thus participatory multi-pronged approaches that can be designed as integrated territorial approaches (as has been explored for example in the Millennium Development Villages). Territorial approaches are also important to help coordinate agriculture with a broad array of rural non-farm activities that can offer expanding income opportunities to the local population.
- Third, it must deal with the challenges of **sustainability** and environmental friendliness that were not concerns in the original Green Revolution in Asia (viz. the environmental consequences in the Indian breadbaskets, with extensive chemical pollution, depletion of aquifers and loss of biodiversity). The classic seed-fertilizer-water package will not suffice. It needs to be complemented by environmentally sustainable approaches such as agro-ecology and conservation agriculture.
- Fourth, it must go **beyond cereals** to include high value crops – fruits and vegetables, livestock, fish and some forest products – and provide opportunities for forming links to integrated value chains for high value products so as to produce non-traditional exports and cater to supermarkets.
- Fifth, it must address brand **new challenges** such as climate change (particularly vulnerability to climate shocks and risk management) and the forces of globalization (particularly volatile prices and the rapidly changing demands of value chains).
- Sixth, it must redefine the **role of the state** in support of agriculture for development. This includes the issues of strengthening property rights to land, since security of access is still not guaranteed in many parts of sub-Saharan Africa, using ‘smart’ subsidies to encourage an increase in productivity and help farmers cope with price shocks, creating public-private partnerships in the delivery of public goods and productive investments, redesigning functions for Ministries of Agriculture, and giving civil society an active role in public affairs.

We see these challenges being successfully addressed in large numbers of locations. The list of success stories is long and varied (see for example the World Bank’s *Agriculture Investment Sourcebook*, 2007b). It includes land certification schemes that provide security of access and support land rentals, technological innovations that provide drought and flood resistance and improved nutrition, more complete financial services that combine credit with savings and insurance, whole value chain approaches that bring smallholder farmers into contract farming with agro-industry, commodity exchanges that improve domestic market performance and create links with international commodity markets (Gabre-Madhin, 2009), extension systems that cater more effectively to clientele by using IT capacities, community-driven development schemes that allow local participation in delivering public goods (Binswanger, 2006), and producer organizations that not only serve their members’ business needs but also give them a voice in the definition of public policy. These success stories need to be better identified, understood and scaled up so they become reflected in aggregate statistics. Opportunities exist for profitable investments in agriculture, as can be seen in the impressive gains achieved in the production of non-traditional exports. And the private sector is showing a clear renewal of interest in the investment opportunities offered by agriculture.

*Claim 5: For agriculture to be used successfully for development, governments and donors will need to pay it much greater attention, with the support of broader scholarship and learning. The economics profession has an important role to play in reconceptualizing in a new paradigm the role of agriculture for development, designing and evaluating new approaches, contributing to capacity building, participating in policy advice and mobilizing political support.*

## **7. Need for social science scholarship in support of agriculture for development**

We cannot assume that we know the answers to the question of how to use agriculture for development in sub-Saharan Africa since a productivity revolution has to be idiosyncratic and locally adapted. Useful lessons can be learned from historical successes in other regions of the world and from widespread local achievements in the region. There is a huge deficit of good social science scholarship applied to issues of agriculture for development. For this reason, this special issue explores research frontiers and priorities in the following five fields of importance for agriculture for development:

Improving systems of land administration to provide better property rights and protection of assets (Klaus Deininger)

Technological change in smallholder agriculture and understanding the adoption gap (Aliou Diagne)

Institutional innovations for smallholder competitiveness (Willis Oluoch-Kosura)

Risk management practices of small farmers in developing countries and the effect on technology adoption (Marcel Fafchamps)

Research programs for discovering the reasons for low agricultural productivity in Africa (Christopher Udry).

*Claim 6: The objectives of this volume are to help assess the frontiers of the field and develop agendas for research in economics on how to improve the use of agriculture for development. The potential for success exists. To yield results that can make a difference, this effort needs to be part of a broader sustained undertaking.*

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