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AFRICA EMERGING MARKETS FORUM

Structural
Transformation
and African
Agriculture

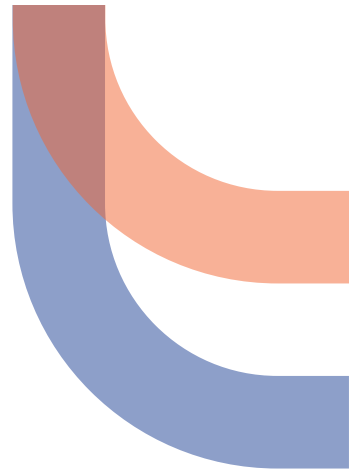
Hans P.
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Abstract

The purpose of the Africa Emerging Markets Forum is to discuss the continent's economic and social challenges and to share ideas for better results on the ground. This paper focuses on the performance and potential contribution of agriculture development, first looking at the current constraints and then setting out some suggestions for the way forward.

Over the past 50 years, the normal structural decline in the share of agriculture in the economy and accompanying convergence of incomes in the agricultural and non-agricultural sectors, has not yet happened in sub-Saharan Africa. The economy in terms of sector shares in total output has been practically frozen, as has the structure of production within agriculture itself, its technology, and its mode of growth primarily via area expansion. As a consequence, African agriculture remains extremely under-capitalized, and the number of poor and hungry has increased in both the rural and urban areas.

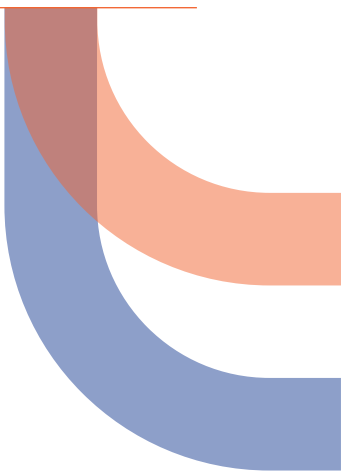
Encouraging signs for a new beginning for agriculture discussed in this paper include: resumption of economic growth, reduction in agricultural dis-protection, end of the secular downward trend in agricultural prices, growing domestic and regional demand for food, improvements in the institutional environment for rural development, and a growing commitment of African

Governments to agricultural development. While there is much talk about another structural transformation in Africa towards large scale commercial farming, economies of scale in farming are generally decreasing, and the success rate of large scale farming has been very limited in Africa. The family farm model therefore remains an appropriate model for most of African agricultural development.

To seize opportunities underlying the above encouraging signs, sub-Saharan Africa will need to support economic growth by a) continued sound macroeconomic policies, b) removal of the remaining agricultural taxation that still disadvantages African farmers relative to all other farmers in the world, c) improving services for small farmers, d) significantly increasing investment in agricultural technology generation and dissemination, e) empowering local governments, communities, and farmer organizations for their own development and f) strengthening the already existing regional agricultural institutions.

An overall conclusion emanating in this paper is for individual countries adapt and customize the above broad goals into country specific action plans to enhance the performance and contribution of the agriculture sector, in line with the CAADP compacts on which they are already working.

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Abbreviations and Acronyms

CAADP	Comprehensive Africa Agriculture Development Programme
CGIAR	Consultative Group on International Agricultural Research
FAO	Food and Agriculture Organization of the United Nations
FARA	Forum for Agricultural Research in Africa
NEPAD	New Partnership for Africa's Development
OECD	Organisation for Economic Co-operation and Development
R&D	Research and Development
TFP	Total Factor Productivity
SSA	Sub-Saharan Africa
WTO	World Trade Organization

Structural Transformation and African Agriculture¹

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Discussion Draft

I. Introduction

Despite the current international economic crisis, we are now in a period of optimism about the prospects for Africa and for African agriculture and rural development. Before the economic crisis per capita economic growth has been above three per cent, and per capita agricultural growth around one per cent. Armed conflicts are down to 5 from 15 in 2003. While there are setbacks, such as the recent Kenya and Zimbabwe crises, democracy has advanced significantly. Sub-Saharan Africa is now making faster progress in its business environment than the Middle East and North Africa or Latin America (World Bank and International Finance Corporation, 2006). Africa is in the process of strengthening its regional and sub-regional institutions. Agriculture had returned to the forefront of the international development agenda even before the recent spike in food prices, and is even more of a priority as a consequence. The African Union, in conjunction with the New Partnership for Africa's Development, has developed the Comprehensive Africa Agriculture Development Programme (CAADP) and is encouraging countries to allocate more fiscal resources to agricultural development.

Yet Africa's challenges are enormous: Africa is second only to Asia in its size and heterogeneity. It includes Mediterranean climates in northern and southern Africa, subtropical and tropical highlands, the world's largest deserts and vast stretches of arid, semi-arid, sub-humid and humid tropical areas. Of Africa's 900 million people, about two thirds live in villages and small rural towns. The continent has a larger proportion of very small and/or landlocked countries than any other region of the world. There are significant differences in culture and historical backgrounds, education levels and population trends. Economic growth has differed widely across countries and over time. These large differences across and within countries give rise to different development and growth opportunities.

Agriculture is the most critical sector in the economies of most non-oil exporting African countries. It constitutes about

a fifth of Africa's GDP and contributes about half of the total export value. Almost three fourths the continent's population depends on the sector for their livelihood. The debate on how to enhance performance of African agriculture is therefore central, not only for macro economists seeking high growth rates but to the very survival of the continent.

The InterAcademy Council (2005) cites the following unique features of sub-Saharan African agriculture that represent special challenges in terms of agricultural performance: (i) dominance of weathered soils of poor inherent fertility; (ii) predominance of rain-fed agriculture, little irrigation and very limited mechanization; (iii) heterogeneity and diversity of farming systems; (iv) key roles of women in agriculture and in ensuring household food security; (v) poorly functioning markets for inputs and outputs; and (vi) a large and growing impact of human health on agriculture. But these challenges have to be seen against the backdrop of the great opportunities arising from unused and under-used arable land and from the improved growth environment in Africa generally that will be reviewed in this paper. In this short paper we will have few opportunities to discuss the implications of the enormous heterogeneity and the specific features of African agriculture that represent challenges. But they suggest that we need to be careful with generalizations beyond important cross-country regularity in policies and outcomes that have shaped economic outcomes over the past decades. Recommendations for specific countries require much deeper country-specific analysis.

In section 2 we first review the normal role that agriculture plays, or should play in the structural transformation process of the economy, and the contribution that it has and can make to growth and poverty reduction. Section 3 then reviews the appalling long term trends of economy-wide and agricultural growth in sub-Saharan Africa (SSA) that led to the failure of the structural transformation to occur, and that have left a terrible legacy of poverty and hunger. Section 4 considers the turnaround factors for African agricultural and rural development that are already in place

¹ Much of the background work for this paper was carried out by Hans Binswanger and Alex McCalla with the support of the International Fund for Agriculture and the African Development Bank to prepare a background paper to the joint evaluation of their agricultural development programs in Africa. However, the views expressed in this paper

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or underway, and that suggest cautious optimism rather than continued gloom. Section 5 discusses the way forward in agriculture, i.e. the actions that need to be tackled to propel agriculture and the broader economy into a deeper structural transformation under four headings: (1) the future of family farmers, (2) enhancing agricultural profits and rural investment, (3) overcoming the widening technology gap, and (4) the imperative for regional organization in the area of agriculture. A few conclusions are summarized in section 6.

II. The Role of Agriculture in Economic Transformation

Studies of the patterns of economic growth initiated by Kuznets and later pursued by Chenery have shown important regularities in structural composition of economic activity that have recently been reviewed again by Timmer (2009). Prior to economic transformation, agriculture generally accounts for the bulk of economic output and labor force, with the share of agriculture in total value-added typically falling far short of its share in the labor force, thus suggesting even then, a lower productivity of labor in agriculture than in industry and services. Industrial growth then leads to an increasing share of industry in general and manufacturing in particular, and depending on the labor intensity of industry, pulls labor out of agriculture more or less rapidly. With a lag, services also start to increase their share in value added and in the labor force. This structural change itself, by moving workers from lower to higher productivity activities, accelerates economic growth. In advanced economies this transformation has gone so far that the shares of agriculture in GDP and in the labor force are now very small. With increasing productivity in agriculture, the gap in labor productivity between the sectors is shrinking; the shares of agriculture in output and employment approximating each other and so do incomes across the sectors. Thus agriculture becomes more like any other sector of the economy.

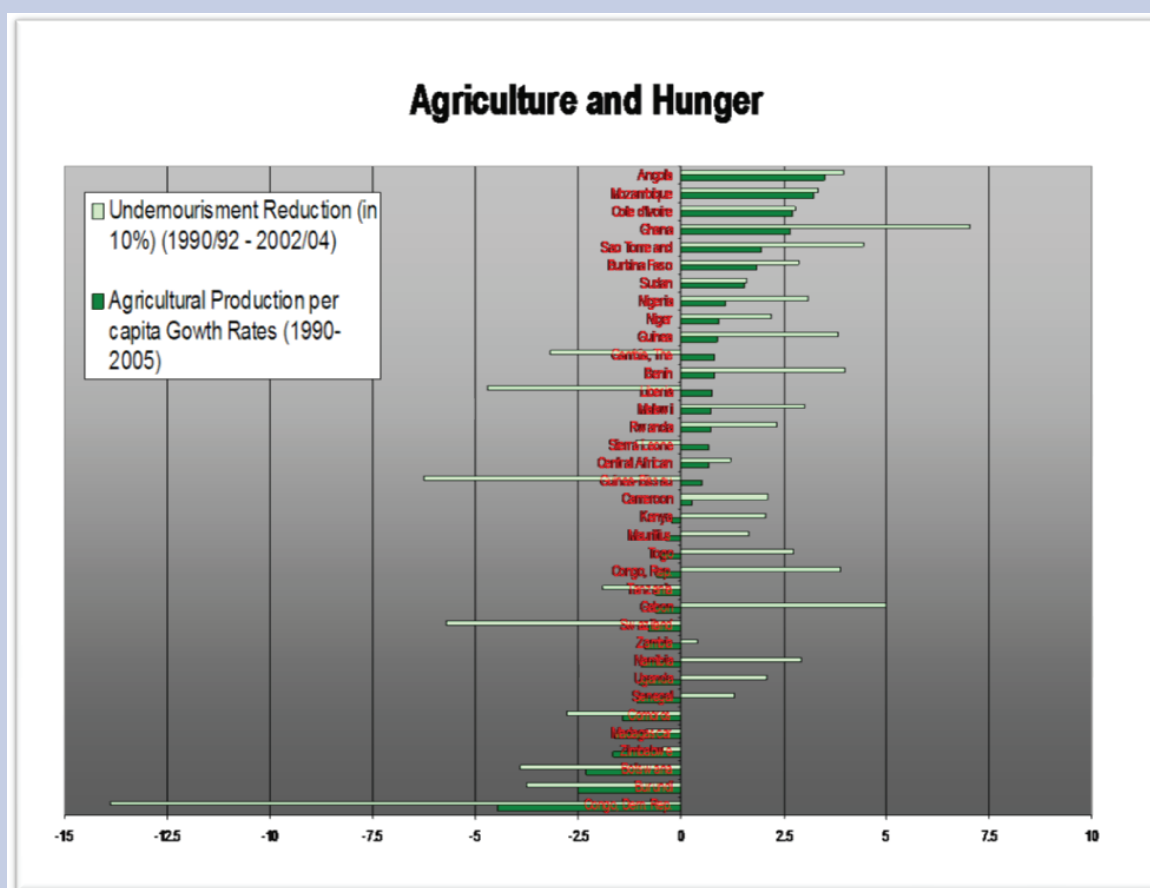
During the structural transformation, however, labor productivity in agriculture, and therefore agricultural incomes, typically fall far behind non-agricultural productivity and incomes, opening a widening inter-sector income differential that is the cause of major political problems. The reason for the widening gap is that it takes a long time before the

cost of withdrawing labor from agriculture translates into higher agricultural wages and therefore economy-wide unskilled wages. It is only towards the end of the structural transformation that the inter-sector productivity, wage and income differences start to fall and we reach the convergence of productivity and incomes across sectors. Timmer (2009) shows that over the past 50 years the turning point where the divergence turns to convergence has been reached at later and later stages in the economic transformation of successful growth performers, perhaps suggesting that industry is becoming less and less able to absorb labor.

The political problems associated with the widening income gaps between rural and urban areas have been resolved in OECD countries via enormous agricultural subsidies that have harmed the developing world and are still the major source of problems in domestic policies and in international trade negotiations. The political issues have also dramatically flared up in Asia in the past few years: In China over the last three years they have led to a massive response of policy makers in the form of extending health insurance, free education up to year nine, and safety nets to rural areas over the past years. Rural infrastructure programs have been massively accelerated and taxation of agriculture has been abolished altogether. A few WTO conforming agricultural subsidies have also been introduced. At the same time China has tripled its level of expenditures for agricultural research since its accession to the WTO. It is clear that China is trying to use structural policies to bridge the income gaps and therefore avoid falling into the trap of high subsidies of the OECD countries. In India the employment guarantee scheme and the self-help groups that organize and assist women with credit have been extended nationwide, while irrigation and fertilizer subsidies have been maintained at very high levels.

While the share of agriculture in the economic output is declining all along the growth path, nevertheless agricultural output keeps increasing in absolute terms, although at a slower rate than economy-wide growth. In the process, rapid agricultural growth can make a massive contribution to poverty reduction despite its declining share in output. As Johnston and Mellor (1961) showed nearly 50 years ago, agricultural growth reduces rural poverty because:

- it raises agricultural profits and labour income;



Source: Pingali et al., 2007.

- it raises rural non-farm profits, employment and labour income via linkage effects;
- it leads to lower prices for (non-tradable) foods, which is especially beneficial for the poor;
- lower food prices raise real urban wages and accelerate urban growth; and
- a tightening of urban and rural labour markets raises unskilled wages in the wider economy.

number of rural poor has increased in Africa and South Asia while it has decreased in East Asia and the Pacific. The World Development Report 2008 summarizes an extremely large body of literature that demonstrates how effective agricultural growth is in reducing poverty. Over the previous decade to about 2005, global poverty, as measured by a two dollar a day poverty line, declined by 8.7 per cent in absolute terms. This decline was entirely attributable to the reductions in rural poverty, with agriculture as the main source of growth. At the same time, urban poverty has increased. Interestingly, contrary to the view that sees structural transformation of the economy away from agriculture as a major source of economic growth and poverty reduction, migration has not been the main instrument for rural (or overall) poverty reduction in the

recent past. This is consistent with Timmer's discussion above that over the past 50 years or so it has become more difficult to reach the point where productivities and incomes start to converge between the sectors.

It is therefore not surprising that Agricultural growth also has a much more direct impact on hunger than general economic growth does. Figure 1 shows that, by and large, the countries with faster agricultural growth have made more progress against hunger. While hunger has declined significantly in West Africa, it has increased significantly in countries experiencing conflicts or coups d'état, such as Liberia, Sierra Leone, the Comoros, Burundi, Guinea-Bissau and, most dramatically, the Democratic Republic of the Congo. Other countries that have seen sizeable increases in hunger are The Gambia and, surprisingly, Botswana.

III. The Failure of the Agricultural and the Structural Transformations

Due to historically high population growth rates and negative economy-wide growth in previous decades, it has been difficult for Africa to achieve high per capita income growth and despite recent growth per capita incomes of the 1970s have not been fully regained. Fortunately the demographic transition in Africa has finally started, bringing the population growth rate down to about 2.5 percent again with projected rates over the next decade being at 2 percent (Table 1).

Growth in agricultural output over the period fluctuated markedly, from 3.4 percent in the 1960s down to 0.75 percent in the 1970s; then back up to 3 percent in the 1990s; only to see a decline to about 2.3 in the current decade. Interestingly agricultural value-added increased faster in the 1970s and in the current decade than agricultural output, probably as a consequence of the spike in food prices in the 1970s that changed terms of trade (TOT) in favour of agriculture, and the start of the food price spike in this century up to 2007 that had a similar impact. (There are different estimates of agricultural output growth reported in the WDR of 2007 that are at 3.5 percent for the current decade, and the source of the discrepancy in estimates is still being sorted out).

With both agriculture and the economy at large performing poorly during the past nearly 50 years, it is not surprising that the structural changes that have characterized the other regions of the world have not occurred in Africa. The shares in value-added of industry, services and manufacturing have changed very little: the share of agriculture has declined only from 21 percent to 17 percent, with the corresponding gain in the services sector rather than in industry. The industry share has been stuck at around 30 percent, for nearly 50 years, with the share of manufacturing within industry declining from 17 to 14 percent. Clearly Africa has not experienced any of the gains that other regions have gotten from structural transformation. This is also reflected within agriculture itself, where the shares of crops and livestock have remained around 77 percent and 23 percent respectively. Since there has been little per capita income growth, there has been no increase in consumption of higher value livestock products and thus no increase in demand of livestock products to drive an increase in the share of livestock in agriculture.

The next five rows in Table 1 show that growth of agricultural output has been achieved primarily by growth in the crop area harvested from about 93 million ha to about 169 million ha, as well as an even more rapid increase in the agricultural labor force that has doubled from about 96 million to 195 million. This means that the land/labor ratio has declined modestly, from 0.97 ha to 0.87 ha per worker. Neither the productivity of land nor the productivity of labor have increased rapidly. Output per hectare harvested in constant dollars of 2000 has gone up from 352 dollars to 423 dollars, or by about 71 dollars per ha, while output per worker has grown from 352 dollars to 424 dollars, or by 72 dollars per worker.

Table 1 also shows low growth in productivity of land and labor. The extremely slow pace of land and labor productivity growth is explained by the fact that the share of harvested area irrigated has stagnated for nearly 50 years at a little over three percent, the fertilizer input today is still at the about the level of 7 kg per ha it reached in the 1970s and the number of tractors has remained at 1 per 1000 ha for the same period. The capital intensity of agriculture in terms of fixed and working capital has not increased and African agriculture remains extremely decapitalised.

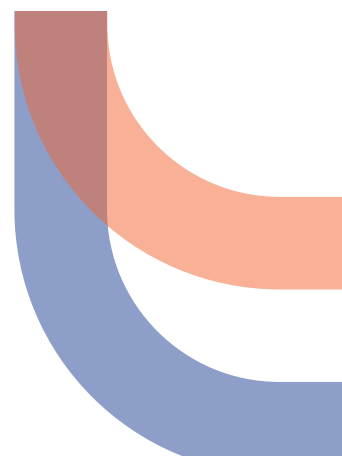


Table 1: The long term evolution of the structure of African economies and of agriculture

	1961-70	1971-80	1981-90	1991-00	2001-07
Population growth (annual %)	2.52	2.80	2.93	2.71	2.47
GDP per capita (constant 2005 PPP \$)	1,451	1,775	1,643	1,516	1,685
GDP per capita growth (annual %)	2.40	0.80	-1.13	-0.39	2.73
Growth in gross agricultural output (average annual %)	3.43	0.75	2.79	3.06	2.29
Growth in real agricultural value-added (average annual %)	n.a.	2.41	2.03	2.97	2.95
Industry, value added (% of GDP)	31	33	34	30	30
Manufacturing, value added (% of GDP)	17	17	17	16	14
Services, value added (% of GDP)	48	48	48	53	52
Agriculture, value added (% of GDP)	21	20	18	18	17
Crop share of agricultural output (% of total)	76.8	76.4	74.6	77.9	77.3
Livestock share of agricultural output (% of total)	23.2	23.6	25.4	22.1	22.7
Crop area harvested (million hectares)	92.7	99.8	109.7	147.2	169.3
Crop output per hectare harvested (const. 2000 US\$ per ha)	278.6	314.8	334.7	360.7	377.7
Animal output per head of cattle-equivalent (const. 2000 US\$)	42.3	44.9	49.7	52.0	52.9
Agricultural labor force (millions)	95.6	114.4	139.4	170.1	195.2
Share of labor force employed in agriculture (% of total)	83.0	78.4	73.3	68.5	64.4
Agricultural output per worker (const. 2000 US\$ per worker)	351.6	359.7	353.3	400.8	423.6
Area harvested per worker (hectares)	0.97	0.87	0.79	0.87	0.87
Growth in agricultural output per worker (average annual %)	1.56	-0.99	0.66	1.22	0.62
Irrigated cropland (% of area harvested)	3.1	3.4	3.9	3.4	3.2
Fertilizer per area harvested (kg per hectare)	3.0	6.8	9.7	8.3	7.2
Tractors per area harvested (units per 1000 hectares)	0.7	1.0	1.1	1.1	1.1
Percent of population living on less than \$2/day constant 2005 PPP\$)	n.a.	n.a.	74.9	77.1	74.3

*All data originally from IMF and FAO, as presented in Fuglie (2009). 48 countries, excluding South Africa

Despite these dismal long term trends, Fuglie (2009) shows that there has been modest total factor productivity since around 1980, while in the previous 20 years it was zero (Table 2). That means that the total factor productivity growth over the past 25 years has been 32 percent.

However, the growth rate in TFP has been trailing very much behind other developing Regions: “Growth in these conventional factors of production [(land, labor, capital, fertilizers] accounted for 85 percent of total output growth over the entire period [emphasis added]. This is a far larger share than for most developing countries. A recent study by Fuglie

Table 2: Total factor productivity index for African agriculture

	1961	1971	1981	1991	2001	2006
Total Factor Productivity Index	100	102	100	111	125	132

*Source, Fuglie, 2009, table 4, 48 countries, except South Africa

(2008) found that for developing countries as a whole, growth in inputs accounted for about 40 percent of the increase in agricultural output between 1961 and 2006, with TFP improvements responsible for the other 60 percent, and with the TFP share of output growth rising over time" (Fuglie, 2009, p 20).

As a consequence of the failure of agriculture and of the structural transformation, rather than being reduced over the past five decades as elsewhere in the world, poverty and hunger have deepened in Africa. "[Sub-Saharan] Africa has the highest incidence of poverty of all developing regions. It accounts for 10 per cent of the world's people, but is home to 30 per cent of the world's poor... It is at the bottom of the United Nations Development Programme's human development index, reflecting low levels of education, health, and economic welfare." (World Bank 2005, p. 1). Around 200 million of Africa's 900 million people are undernourished, and 33 million children go to bed hungry every night. As a result of the slow growth in per capita income in sub-Saharan Africa, poverty there has failed to decline between 1990 and 2003. Urban poverty is increasing as well, but more than 70 per cent of the continent's poor still live in rural areas. In addition, poverty rates in rural areas are still much higher than in urban areas. The rural poor include small-scale farmers, nomads and herders, artisanal fishers, wage labourers, households headed by women, unemployed youth, entirely landless people and displaced persons. The impact of growth on poverty reduction is well illustrated by the cases of eight sub-Saharan African countries that have seen per capita growth rates of 2.9 per cent, on average, in the 1990s and have reduced poverty at an annual rate of 1.5 per cent during the period (Ndulu et al., 2007).

Economic growth and rural development have been the slowest in Eastern and Southern Africa. Of the 350 million

people in the sub-region, about 260 million live in rural areas, which account for 83 per cent of extreme poverty in Africa. Among Africa's regions, poverty, hunger and HIV/AIDS are significantly worse in East, Southern and Central Africa than in West Africa. Of the 125 million poor people in Western and Central Africa, around three quarters live in rural areas.

The conclusions from this section are as follows:

- Agriculture and agricultural productivity growth have been unable to provide the basis of a structural transformation in the economies of sub-Saharan Africa, and for the reduction in poverty and hunger, as they have done so well in North America, Europe, and for East Southeast, and South Asia. Nor has industry been able to provide the counterpart urban development. This inability of industry to grow fast is partly the consequence of the lack of agricultural and therefore agro-industrial growth, and partly of macro-economic and industry-specific factors.
- Far from reducing the role of agriculture in economic development, global trends may also force Africa to put even more emphasis on agricultural growth than other regions of the world have done in the past. First because of the finding discussed previously, that migration and hence urbanization have contributed little to global poverty reduction in the past ten years; and second because of the finding of Timmer (2009) also discussed previously that it has become more difficult to reach the point in the economic transformation where agricultural and non-agricultural productivity and income gaps start declining rather than increasing.

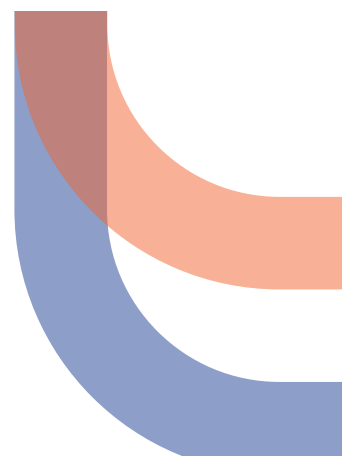


Table 3: Growth rates in GDP at constant prices: 2007–2011

Region	2007	2008	2009	2010	2011
Advanced economies	2.7	0.9	–3.7	0.0	2.6
Emerging and developing economies	8.3	6.1	1.6	4.0	6.1
Africa	6.2	5.2	2.0	3.8	5.2
Sub-Saharan Africa	6.9	5.5	1.7	3.9	5.4
World GDP	5.2	3.2	–1.9	1.9	1.4.3

Source: IMF World Economic Outlook (April 2009).

IV. Turnaround Factors for African Agricultural and Rural Development

Accelerating Economy-Wide Growth

Economic growth in Africa has accelerated significantly since the 1990s and, despite the current global economic crisis is expected to resume in 2010 and 2011 (Table 3). What accounts for this significant turnaround? Since 2002, the number of armed conflicts has been significantly reduced; better macroeconomic management has combined with accelerating improvements in the business environment and a more appropriate public/private sector division of labor; as a consequence, fiscal deficits and inflation have come down and growth has accelerated. Significant advances in democracy have made governments more accountable to their populations. (Ndulu et al, 2006). Africa has built stronger regional and sub-regional organizations at both the political level as well as for agricultural research; new private and emerging economy donors are providing growing volumes of aid. All these positive trends have led to a significant acceleration of per capita economic and agricultural growth and significant reductions in poverty headcount in the fastest-growing countries. Unfortunately, except in Western Africa, they have not yet translated into measurable reductions in hunger and malnutrition.

Accelerating economy-wide growth benefits agriculture directly, because it increases demand and therefore the prices of non-traded agricultural goods. In addition, the positive factors that led to the economy-wide growth are also good for agriculture, such as improved macro-economic stability,

a better investment climate, and lower real interest rates. They favor agriculture directly, and indirectly because they encourage investment in agricultural marketing, input supply and agro-industries, and therefore lay the basis for improving input and output markets. All these direct and indirect impacts tend to make agriculture more profitable and therefore allow farmers to invest more to overcome their deplorable state of under-capitalization.

Areas where progress is less satisfactory are the persistent HIV/AIDS crisis; the several stubborn conflicts that have defied resolution; little improvement in governance and decentralization; slow regional integration with a persistence of underfunded regional and sub-regional organizations; inadequate fiscal commitments to agriculture and rural development by national governments; poor financial sectors with high intermediation margins and borrowing rates that concentrate on lending to governments and the organized urban sector; and slow progress in the infrastructure linking landlocked countries and remote regions of coastal countries to the centers of demand and the harbors (Binswanger and McCalla, 2009b).

Decline in Agricultural Taxation

Additional agriculture-specific positive trends include significantly improved price incentives for agricultural producers as a consequence of unified exchange rates, lower industrial protection, and reduced export taxation of agricultural exports. Figure 2 taken from Anderson and Masters (2009) shows that the dis-protection of agriculture through these three channels led to an increase of agricultural

taxation to about 20 percent from the second half of the 1950s to the second half of the 1970s, but that this has been declining to around five percent in the first half of this decade. Agricultural dis-protection was concentrated on exportable agricultural commodities and led to the well-known major losses of market share in many of these commodities to other Regions of the world. On the other hand import-competing commodities were never taxed.

However, Anderson and Masters (2009) also show that Asia changed from being a net dis-protector of agriculture until around 1960 to a net protector of agriculture at rather high levels of between 20% and 25% since the second half of the 1980s. The same protection levels are also now applied in Eastern Europe and Central Asia. Similarly, Latin America, since the mid-1980s, is protecting its agriculture at a rate of about 5%. For the average of the developed world, protection rates remain at close to 40%. As a consequence, the positive changes in protection rates in Africa have not closed the gap with other Regions, and African producers still face the poorest agricultural incentives in the World.

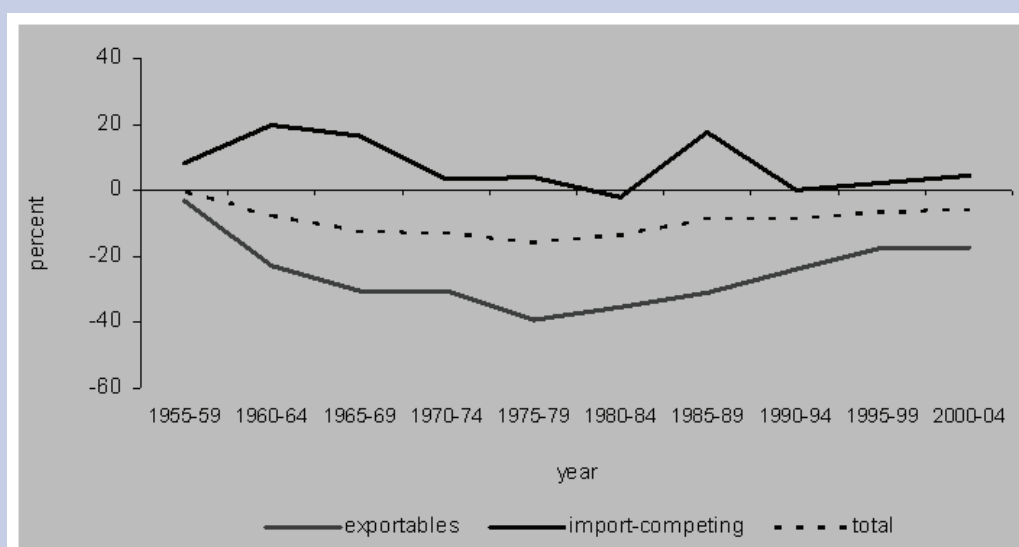
Anderson and Masters (2009) show both which countries are still dis-protecting agriculture sharply and which

commodities are affected, thus providing detail guidance on where improvements are needed. With more rapid growth, African countries should also become more able to raise taxes via other means than taxing their exports, so fiscal reasons for these adverse agricultural policies are also declining.

The End of the Secular Decline in International Agricultural Prices

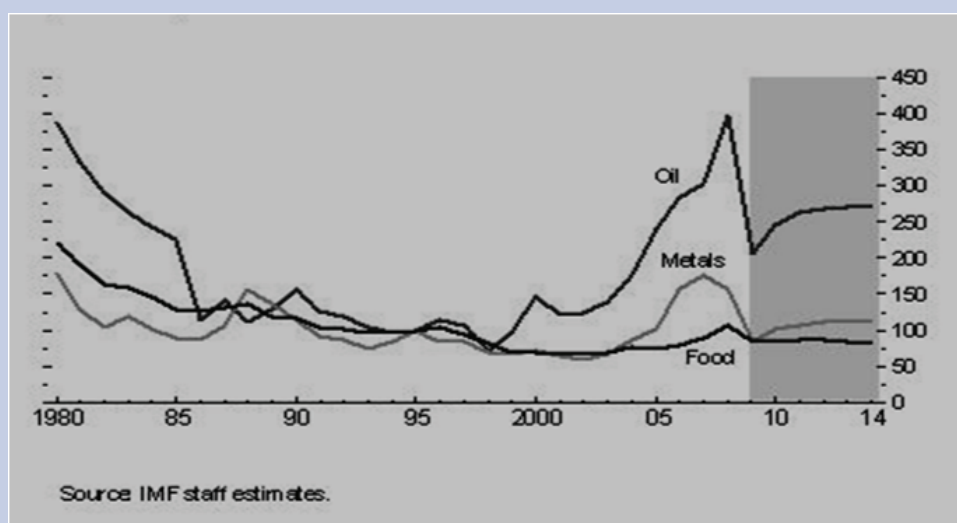
From the mid 1920s to the early 1970s global terms of trade in for agriculture as compared to manufactured goods changed relatively little. In the mid 1970s a massive spike in oil and food prices provided a brief stimulus to agriculture, but was followed by a sharp step down of the agricultural TOT to about 60 percent of their prior secular trend by the end of the 1990s. (Coleman 2009, and figure 3 which picks up the declining price trend in 1980). The oil and food price shocks, combined with massive economic imbalances and the debt crisis, also triggered a broader collapse of economic growth, and led to the initiation of structural adjustment in the 1980s. The structural adjustment period focused primarily on restoring macro-economic balance, increasing the space of the private sector, and reducing the dis-protection of agriculture

Figure 2: Nominal rates of assistance to exportable, import-competing, and all agricultural products, African region, 1955–2004



Unweighted average across 16 countries.
Source: Anderson and Masters (2009).

Figure 3: The evolution of real commodity prices, 1980–2014. (1995 = 100)



Source: IMF World Economic Outlook update, January 28, 2009.

via elimination of overvalued exchange rates, reduction in industrial tariffs and reduction in direct agricultural taxation. In many countries structural adjustment was a slow process and its fruits in terms of macro-economic stability and more widespread economic growth only started to emerge in earnest in the 1990s, finally vindicating the policies.

Looking at Table 1, we see that the 1970s were a period of collapse of agricultural production growth to less than one percent per year, followed by a sharp rebound in the 1980s. The per capita income growth figures, on the other hand, suggest that other sectors responded to structural adjustments much later, since per capita income continued to decline in the 1980s and 1990s.

Figure 3 shows that from 1980 to around 2000, real food prices in U.S. dollar terms dropped steadily to about half their levels. This created huge benefits for food consumers and poor farmers who are net buyers of food but also implied large losses for those net sellers of food who were not able to adopt new and more efficient technologies to offset the price declines, many of which were in Africa. It benefitted net food-importing countries and hurt net food exporters who were not able to compensate for the falling prices with efficiency gains in production. Africa was unable to compete in many food commodities and therefore became a net importer for food.

This fact then compounded the difficulties faced by Africa since 2007 when food prices spiked again. Figure 3 shows that while real commodity prices in general declined through the 1980s and 1990s, and then rose sharply since 2003 to a sharp spike. Real food prices, however, started to rise only in 2007, significantly later than oil and metals prices, and peaked in 2008. Using real prices reduces the food price shock since 1998–2000 to about a 65% increase. The percentage increase of the 2008 shock is significantly less than the food price shock of the early 1970s, and real prices are still lower than in 1980. Nevertheless the recent food price shock created a real crisis for food-importing countries.

In Figure 2 we have already seen that the peak of agricultural dis-protection in the 1970s coincided with the beginning of the sharpest decline in agricultural terms of trade in the 20th century that carried thorough the entire structural adjustment period up to the end of the 1980s. We can only speculate what would have happened if the international TOT had not declined so sharply and so rapidly, and if improved domestic agricultural incentives from the structural adjustment policies had been combined with better international agricultural prices. Undoubtedly the impact of structural adjustment on African agriculture would have been much higher, farmers would have reaped much higher profits,

and invested these back into inputs and capital investments, perhaps altering the serious de-capitalization of the agricultural sector and accelerating the technological transformation.

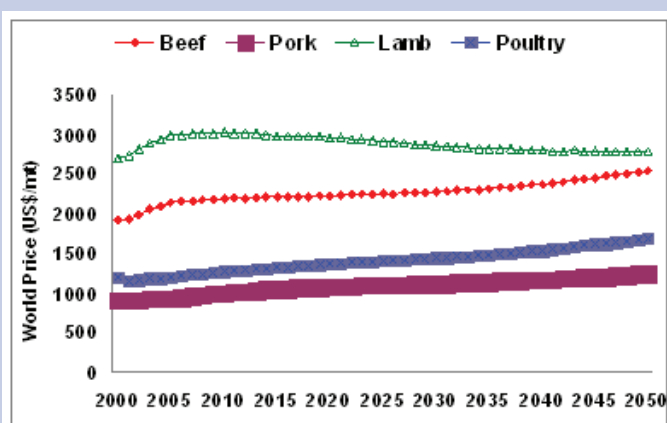
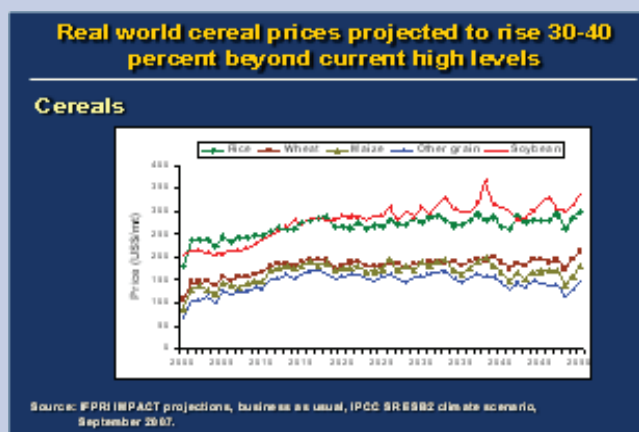
The recent food price spike reflects (1) the rapidly rising food demand from accelerating global economic growth since the mid-1990s, especially concentrated in Asia and in Africa; (2) the emergence of demand for biofuel crops, especially maize, oilseeds, and sugar cane; (3) poor weather conditions in several parts of the world, especially since 2005; (4) declining rates of productivity growth in major cereals; and (5) declining trends in food stocks, which fell from over 600 million tons in 2000 to around 400 million tons in 2008. These stock changes are not just a consequence of bad harvests but also reflect the information revolution, new hedging mechanisms in food and financial markets, and altered storage behavior of major importers and exporters (OECD and FAO, 2008). These longer trends and weather events then have led to declines in stocks to use ratios to the same or lower levels as those that led to the food price explosion in the 1970s (*ibid*). The recent food price rises have triggered export restrictions in many food-exporting countries, aggravating price increases. In rice, for example, prices shot up precipitously after major players such as India and Vietnam applied export limitations. Further food subsidies and other policies that tend to dampen domestic food and agricultural price rises slow necessary adjustments in demand and truncate or eliminate domestic supply response. (Binswanger and McCalla, 2009a,b)

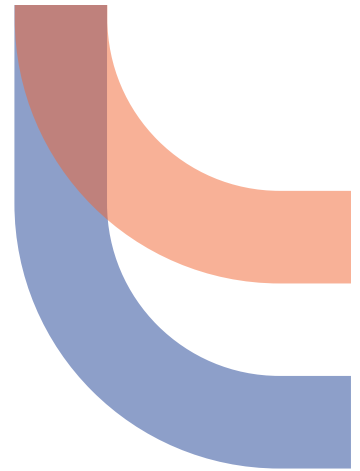
Are higher prices here to stay? The extensive body of literature that is emerging on this topic is reviewed in Binswanger and McCalla (2009a,b). The conclusion set forth in the OECD-FAO Agricultural Outlook (2008) comes the closest to our reading of the literature: "World reference prices in nominal terms for almost all agricultural commodities covered in this report are at or above previous record levels... This will not last and prices will gradually come down because of the transitory nature of some of the factors that are behind the recent hikes. But there is strong reason to believe that there are now also permanent factors underpinning prices that will work to keep them both at higher average levels than in the past and reduce the long-term decline in real terms."(p.11).

A recent IFPRI analysis using their International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT) model makes much longer-term projections all the way to 2050. It projects that real grain and oilseed prices will not decline from the levels they reached in late 2007 and will show a modest increase through 2050 (see figure 4 for rice, wheat, maize, oilseeds and soybeans). This is one of the first substantive analyses we have seen that seems to support the proposition that the long-term decline in grain and oilseed prices may be over.

In the short run, higher food prices are exacerbating the situation for poor urban populations and for poor net buyers of food in rural areas, especially in food-importing countries that have few options in trying to prevent a pass-through of

Figure 4. Long-term crop price projections to 2050





international prices to consumers. Africa's food import bills will rise by more than one per cent of GDP in most North, East and Southern African countries and a few West African ones. At the same time, many of these countries are being hit even harder by higher global energy prices. The spike in food prices therefore required urgent action in the form of safety nets and balance-of-payments support.

In the longer run, once food prices have stabilized, they will provide improved opportunities for African farmers, particularly as domestic and regional markets will expand because of rising incomes. Higher prices should lead to higher farm profits, higher savings and farm investments, higher rates of technology adoption, and increased off farm and agro-industrial linkages. As in East and South east Asia, higher prices may therefore contribute to the agricultural transformation and eventually to the structural changes that for so long have eluded Africa.

The Growing Domestic and Regional Demand for Food

Where will the next market opportunities for African farmers lie? Recent studies of the history and prospects of commercial agriculture in SSA suggest that domestic and sub-regional markets will represent the main opportunities for SSA producers in the short to medium term (Poulton et al., 2007; World Bank, forthcoming). Since SSA is an importer of many agricultural commodities, SSA producers compete in these markets at the import parity price rather than the lower export parity price. In addition, quality standards are not as high and phytosanitary barriers are much lower than in international markets. Bottlenecks in road and export infrastructure in SSA are likely to be removed only gradually, reinforcing these conclusions. Of course, with appropriate policies and investments, including in transport infrastructure and technology, positive international market trends in agriculture could eventually be captured by SSA as well.

On the demand side, the trends are favorable for domestic and subregional markets: The combined value of domestic and regional markets for food staples within SSA is considerably in excess of its total international agricultural exports (Diao et al., 2003) and will grow significantly with both population and income over time. SSA's demand for food staples is projected to approximately double by 2020. Moreover, an increasing

share of output will become commercialized as the continent becomes more urbanized. This offers considerable growth in national and regional markets for food staples that in value terms could far exceed the potential growth of all high-value agricultural products, at least for the next decades.

The fact that domestic and subregional markets for food crops present the best opportunities does not mean that there are no opportunities in international markets. However, all notable cases of SSA agricultural export success, with the exception of sugar, have so far occurred in high-value commodities (a basic commodity value of US\$500 per ton or more: tobacco, tea, groundnuts, cashews, seed cotton, coffee; Poulton et al., 2007). They are high value because "ideal" agro-ecological conditions or low labor costs are necessary for their production, which limits global supply and provides advantage to SSA producers. Their high value in turn allows SSA supply systems to recoup their inherently high costs. By contrast, SSA has yet to record any significant export success in low-value commodities (e.g., cereals, cassava, soybeans) that can be grown in a wide range of locations, including by mechanization.

Although most countries grow many of the same food crops, especially maize, there are latent differences in their comparative advantages, even within the same sub-regions (Diao et al., 2003), leading to subregional trade opportunities. Subregional trade could therefore be a relatively efficient way of smoothing out the impacts of droughts on production and prices at country and subregional levels. There are many physical and institutional impediments to cross-border trade within SSA, including differences in food safety requirements, rules of origin, and quality and product standards. More important, trade in food staples was for long discouraged by national food policies that placed a high priority on self-sufficiency, and vestiges of these policies still prevail in many countries. One of the biggest impediments to large-scale private investment in cross-border trading capability, particularly in Southern and Eastern Africa, is the unpredictable behavior of governments in imposing export bans whenever they fear food shortages in their own markets.

In its analysis of growth strategies in East and Central Africa, IFPRI reaches the same conclusions: "First, the analysis indicates that the greatest potential for agriculture-led

growth and poverty reduction in the region lies in agricultural subsectors serving domestic and regional markets—not those directed at overseas markets. Export commodities will continue to be crucial income earners in key parts of ECA, but they will not be the answer to the problem of widespread poverty and hunger in the region. Second, the analysis indicates that among agricultural subsectors for which there is large and growing domestic and regional demand, staples loom large as a group. Production and sale of these ‘poor man’ crops can be pathways out of poverty for millions of citizens of ECA” (Omamo et al., 2006).

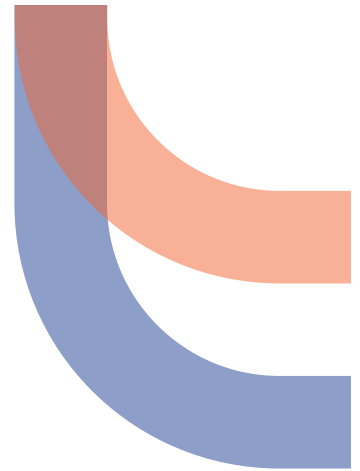
The Changing Institutional Environment for Agricultural Growth

We now turn to specific institutional issues that have in the past hampered agricultural and rural development in Africa, that have improved since the 1980s, and that were discussed in Binswanger (2008). We consider the following five pillars of the institutional environment: The private sector, independent civil society, local government, communities, and the sector institutions that provide specific agricultural support services. In 1980, in a typical country in Africa, a young rural woman (or man) who wanted to help develop her community would have found herself almost completely disempowered. Three of the five pillars of the institutional environment for rural development, discussed in this section, were poorly developed: The first pillar, the private sector, was largely confined to small-scale farming and the informal sector. Much of the marketing, input supply, and agro-processing was in the hands of parastatal enterprises. The second pillar, independent civil society, community organizations, and traditional authorities, was highly constrained or suppressed. In the wake of decolonization, central governments had suppressed the third pillar, local government, or starved it of fiscal authority and resources. Since none of these three pillars was providing much opportunity for the young woman, she had to join the central government if she wanted to contribute to her community. But the central institutions failed the rural sector miserably (World Bank, 1982).

Compared with the situation in 1980, the institutional environment for agricultural and rural development has improved significantly. The role of the private sector, including producers’ associations, has expanded dramatically, although

the private-sector response has not yet altered input and output markets sufficiently to create a vibrant and competitive environment for small farmers. Communities and civil society organizations have greater opportunities to participate in development and are receiving domestic and foreign support. While most governments have decentralization initiatives under way, administrative and fiscal decentralization lags far behind political decentralization. The sector institutions responsible for setting and monitoring policy and financing or providing services for small farmers remain excessively centralized and largely ineffective, however. It is now widely understood that these four sets of institutions need to collaborate at the local level to promote local and community development, including agricultural development, via public-private partnerships and other mechanisms. Such collaboration needs to be led and fostered by central government, which continues to have overall policy and financing responsibilities and which needs to drive further decentralization and public-sector reform. (Binswanger and McCalla, 2009a,b)

What should an institutional environment for rural and agricultural development look like? No institution by itself can carry the burden of local development. Instead, the new paradigm that has emerged gives equal weight to the private sector, communities and civil society, local government, and the sector institutions such as health, education, and agriculture (World Bank, 2004). This is a departure from the past, when different disciplines and sectors single-mindedly advocated approaches involving only one of the four sets of actors. A broad consensus has been reached that local development (and therefore rural development) has to be viewed as a coproduction by all these pillars. They need to take account of their comparative advantage, delegate functions to the other partners in coproduction, and reform themselves to be able to function under this new paradigm. For further discussions of how each of the pillars would have to adjust to fit into this model see Binswanger and McCalla (2009a,b). How such an integrated approach would be fostered in a particular country should depend on past history, what currently exists and can be built on, the prevailing traditions and cultures and past history, and a diagnosis of the existing capacities and dis-functionalities. Only country-specific analysis can reveal where the greatest weaknesses are and



the best opportunities for improvements in the institutional environment. There are no universal magic bullets (Binswanger et al., 2009).

Well-structured institutions can tackle all the components of rural development, from health and education to infrastructure, agricultural services, social protection, resource management, and more. Not only does the institutional environment determine who can contribute to development and how successful that contribution will be; it also is the most important determinant of the distribution of benefits. More specifically, where institutions are disempowering, they can be used by strong individuals and groups to direct the benefits of development to themselves via elite capture.

Building the capacity of agricultural and rural institutions can best be done in the context of a broader, national capacity-development strategy and programme. It cannot be done as a top-down provision of capacity-development services. Rather, it involves learning by doing, whereby communities, local governments, farmers' organizations and private-sector actors are given opportunities and resources and can exercise control over their own development.

While there are no studies that measure the impact of the strengthened institutions on agricultural growth, there is little doubt that the institutional improvements already achieved, in addition to macroeconomic stability and better price incentives, are one of the reasons for the recent acceleration of agricultural growth.

The Growing Commitment of African Governments to Agriculture

Until very recently, agriculture in much of Africa was given short shrift in macroeconomic, trade and agricultural policies and was starved of fiscal resources. Even at the height of donor support for agriculture in the 1980s, foreign aid, apart from often being poorly designed, was insufficient to compensate for these negative policies and lack of domestic resources. This situation became even more acute after the dramatic decline of such aid in the 1990s and early years of this century. As the volume and quality of aid from traditional donors have stagnated, the rate of increase in financial commitments for agricultural and rural development from national governments has remained low. In general, African

countries have placed far more hope on donor support for their agricultural and rural development programmes than is warranted by: (i) the past volumes and quality of aid; (ii) insufficient donor specialization and coordination; (iii) the extent of follow-through on recent aid commitments; and (iv) the modest scale of improvements in donor behaviour over the past two decades. The growing fiscal capacity arising from rapid economic growth offers a major opportunity for change (Binswanger and McCalla, (2009a,b).

Fortunately the commitment of African governments to agriculture has been growing over the last half decade. NEPAD and the African Union developed the CAADP framework, which contains four pillars: (1) land and water management, (2) market access, (3) food supply and hunger, and (4) agricultural research. Under this framework, countries develop CAADP compacts that are to be translated into national agricultural development programs that are jointly funded by governments and via budget support from the donors. As of this writing most SSA countries are working on their CAADP compacts, and about 15 are close to complete them. It remains to be seen whether this strategic coordination activity for the agricultural sector will progress to fundable programs, significant government funding, and coordinated donor support. However, in their Maputo declaration in 2007, African heads of State committed to allocate at least 10 percent of public expenditures to agriculture. And the heads of State of the G8 have committed in 2009 to increase their support for agricultural development to 20 billion dollars. While these declarations are often followed more in the breach than in reality, they provide the best momentum yet for increased commitment to agriculture.

V. The Way Forward

In this section we discuss actions that need to be tackled to propel agriculture and the broader economy into a deeper structural transformation under three headings:

1. the future of family farmers,
2. enhancing agricultural profits and rural investment,
3. overcoming the widening technology gap, and
4. the imperative for regional organization in the area of agriculture.

The Future of Family Farms

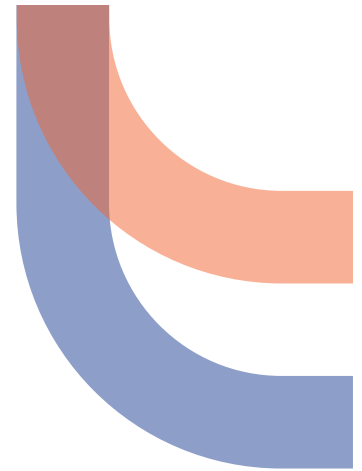
Another structural transformation from family farms to large scale commercial farming is often discussed in Africa. The discussion has reached fever pitch as a consequence of the many recent media reports about the scramble for agricultural land in Africa that was first triggered by the biofuels boom and later stimulated even further by the global food price explosion. Investor interest is driven mainly by biofuels speculators (Cotula, Dyer, and Vermeulen, 2008) and by the desire to invest in land for food production (Grain Briefing, 2008). The debate over the relative advantages and disadvantages in Africa of large-scale versus small-scale farming models has been further stimulated by leading development economist Paul Collier (2008). Information and analysis presented at the World Bank (2009) make it clear that there is enormous potential for competitive commercial agriculture in Africa and that the more favorable prices expected to prevail over the longer term are likely to make investments in African agriculture even more attractive in future. What is not clear, however, is whether the large-scale farm models contemplated for such investments have been fully thought through.

Past experience is not very encouraging. For decades, empirical data from all over the world have consistently shown that large farms dependent on hired managers and workers are less productive and less profitable (per hectare) than small farms managed by families and operated primarily with family labor. The results were presented by the World Bank (2009). What this means is that farm-level agricultural production (primary production) is normally subject to diseconomies of scale. This finding is admittedly counterintuitive: One would assume there are scale economies associated with use of large machines, better access to capital and credit, increased power to negotiate favorable prices for inputs and outputs, stronger incentives to stay abreast of rapid technical change, and the ability to self-provide infrastructure and services.

Probably because the finding is so counterintuitive, an enormous amount of work has focused on examining the decreasing scale economies in agriculture and exposing the reasons for the relative efficiency of the family farm. (For a summary of the literature, see Binswanger et al., 1995.) The theoretical literature shows that the main source of the superior productive efficiency of small farms derives from the

greater incentives felt by family labor to work hard. In addition, the heterogeneity of land quality, even within small farms, and the fact that production occurs under highly variable weather conditions put a premium on close management and supervision of farm operations by family members, who have a strong incentive to maximize returns. The productivity advantage is therefore not so much associated with smaller farm size per se but with the incentives felt by management and labor. The recurring empirical finding that primary agricultural production is usually characterized by decreasing economies of scale shows that the advantage conferred by these greater incentives are, in practice, rarely offset by the lower information, financing, and marketing costs and other advantages typically enjoyed by larger-scale operations.

Exceptions to the lack of economies of scale arise in the so-called “plantation crops,” such as sugar, oil palm, tea, or bananas, and horticultural crops grown for export. After harvest, these crops need to be processed very quickly and/or transferred to a cold storage facility; otherwise they experience rapid declines in quality and hence value. Assuming the farm operations of planting and harvesting can be successfully coordinated with the off-farm operations of processing and shipping, the economies of scale associated with the processing and/or shipping of these crops are transmitted to the farm level (Binswanger and Rosenzweig, 1986). The coordination problem associated with plantation crops is typically solved using one of three organizational models: (1) production takes place on a large-scale farm or plantation over which the processing firm has direct control, (2) production is assured by small-scale family farmers working under contract with the processor; or (3) production is assured by a mix of the two farm types, usually constituted as a nucleus estate surrounded by family farmers. In Thailand, the contract farming model is universally practiced for plantation crops. The economies of scale that can be realized through the use of agricultural machinery are realized in Thailand and in many other parts of the developing world through the use of contract hire services for machinery. In Thailand and elsewhere, access to information and credit is provided by specialized institutions that cater to smallholders, and infrastructure is provided by the public sector. All three modes of organization also can be found in African sugar, oil palm, and tea production.



Some proponents of large-scale farming model have argued that even if large-scale farming is not more productive, it is easier to introduce and easier to scale up rapidly, making it more suitable for jump-starting agricultural growth. This argument is not supported by empirical evidence, however. Over the past 15 years and more, rapid growth in agriculture has not been positively correlated with large-scale farming models. Over this period, Brazil's agricultural growth rate of about 4% has been exceeded by China, Vietnam, and no fewer than eight sub-Saharan African countries (Angola, Benin, Burkina Faso, Côte d'Ivoire, Ghana, Liberia, Mozambique, and Nigeria), all of which feature agricultural sectors dominated by small-scale farming (Wiggins, 2008).

Yet if large-scale agriculture is less efficient, why are there such apparently successful large-scale farming sectors in eastern and southern Africa and in other parts of the developing world, most notably Latin America? Should small-scale family operations not have driven the large operations out of business, thanks to their greater productive efficiency? Binswanger et al. (1995) showed that the early spread of commercial agriculture in Latin America and in the settler economies of South Africa, Kenya, and Zimbabwe involved the systematic appropriation of high-quality land by settlers, combined with displacement of indigenous populations to areas with typically lower soil fertility and locational disadvantages. To further undermine the competition from indigenous farmers, smallholders were often prohibited from producing cash crops or excluded from marketing cash crops via monopolistic marketing boards. In addition, public infrastructure, research and extension services, and subsidized credit were focused on the large-scale farms. Finally, to help the large-scale farms attract labor, taxes were imposed on the indigenous population, which, in the absence of a commercial crop, they could pay only by selling their labor to the large-scale farms as workers or tenants. It was only thanks to discriminatory rules of the game that conferred settler farms with extreme privileges that the large-scale commercial farms of Africa and Latin America were able to prosper.

The paper on the experience of the Commonwealth Development Corporation (CDC) shows a 50-year history of support to the introduction of large-scale farming all over

Africa. Of all the ventures studied, about one-half failed outright—for technical reasons, economic reasons, or both. Not surprisingly, most of the successes involved plantation crops (including timber and wood products). Some of the successful ventures used the contract farming or nucleus estate models. The CDC considered food crop production to be better done by the smallhold sector and only rarely ventured into food crops, recording a few rare successes and many failures. No large-scale venture supported by the CDC ever managed to achieve export competitiveness in food crops. High costs of machinery and high overhead costs associated with expatriate management were usually the main obstacles. The only large-scale farming ventures that have ever managed to produce food crops for export have been the large-scale commercial farms that were created with extremely high levels of state support under colonialism or apartheid.

However, previous chapters described how agricultural production and marketing conditions are changing rapidly, often in ways that apparently provide advantages to larger-scale operations. Examples of where these changing conditions are encouraging the emergence of large-scale farming are beginning to appear in Africa. Maertens and Swinnen (2006), Maertens (2008), and Tyler (2008) describe how tightening phytosanitary requirements have caused production for export of fruits and vegetables to shift toward larger farms in Senegal and Kenya. Another example of successful large-scale commercial farming in Africa involves irrigated production of sugar (Tyler, 2008b). In contrast, rain-fed sugar production continues to be dominated by smallholders, who often work under contract to a centralized processing facility. The higher incomes associated with these crops have significantly reduced poverty in surrounding communities. However, these success stories represent special cases of highly perishable products produced for export into markets characterized by very demanding quality standards or that have to be processed quickly in a large sugar factory. They therefore fit the case of “plantation crops” discussed earlier.

If past experience with large-scale commercial agriculture in Africa has been mixed, the same can be said for small-scale commercial agriculture (Poulten et al., 2007). Clearly, there have been some unequivocal success stories, cases in which growth in smallhold agriculture has generated

important economic and social benefits and has served as a powerful source of poverty reduction. Some of the best-known examples have been in the cotton production systems of Francophone West Africa (Grimm and Gunther, 2004; Tefft et al., 1997).

Experience from throughout the world suggests that the development of smallhold-led commercial agriculture is much more likely to succeed when smallhold farmers have ready access to technology, inputs (including credit), market information, and marketing services. Under contract farming, some of these services are provided by the contractor, and their costs are privately financed. In the absence of contract farming, they have to be financed partly or entirely by the state, either at the national level or at the local level. Many different models exist for the provision of these services: via farmer's organizations, NGOs, private sector providers contracted by government, or government services of local or national governments.

Based on this review, there is little to suggest that the large-scale farming model is either necessary or even particularly promising for Africa. The argument in favor of large-scale agriculture is further undermined by the finding of this study that the most promising markets for Africa's farmers are domestic and regional markets for basic food crops and livestock products, which do not fall into the category of plantation crops.

That large-scale farming is in most cases unlikely to be the most appropriate avenue for the commercialization of African agriculture does not mean that there are not important investment opportunities in the sector. However, for the foreseeable future, the main opportunities for private investors, domestic or foreign, will remain in seed development, input supply, marketing, and processing. At the same time, many opportunities exist for engaging family farmers in agribusiness ventures through contract farming arrangements or via organizations of small farmers. For this reason, the future of smallhold production remains bright.

Hazell et al. (2007) make a very good case for policy support for small farmers:

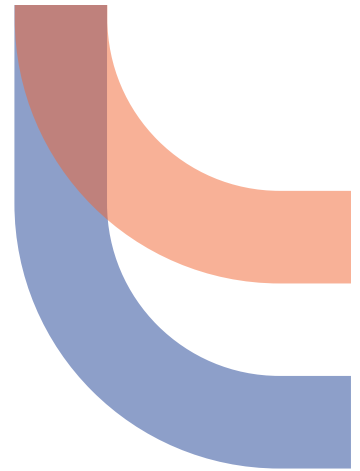
In conclusion, the case for smallholder development as one of the main ways to reduce poverty remains compelling. The policy agenda, however, has changed. The challenge

is to improve the workings of markets for outputs, inputs, and financial services to overcome market failures. Meeting this challenge calls for innovations in institutions, joint work between farmers, private companies, and NGOs, and for a new, more facilitating role for ministries of agriculture and other public agencies. New thinking on the role of the state in agricultural development, wider changes in democratization, decentralization, and participatory policy processes, and a renewed interest in agriculture among major international donors do present opportunities for greater support to small-farm development. But unless key policymakers adopt a more assertive agenda toward small-farm agriculture, there is a growing risk that rural poverty could increase dramatically and waves of migrants to urban areas could overwhelm available job opportunities, urban infrastructure, and support services. (p. 32)

Enhancing Agricultural Profits and Rural Investment

Even in a good institutional environment, few of the needed investments will be made if agriculture and agro-industry are not profitable. This is obvious in the case of on-farm investments, but none of the other institutional pillars will be in a position to invest unless agriculture and agro-industry are profitable. Unless they can save, communities will not have the means to finance or co-finance their investments. Independent civil society organizations must finance a share of their costs from local sources, and these again depend directly or indirectly on profits from agriculture and other natural resources. Local governments which do not mobilize part of their own resources tend not to be accountable to their constituencies (Manor, 1999) and to be vulnerable to elite capture. The local tax base, in turn, depends on agricultural and natural-resource profits.

It is sometimes assumed that private agricultural investments can be financed via credit. But even where institutions for rural finance could be built, their success depends on the borrowing and repayment capacities of the farmers involved, and both of these capacities depend critically on agricultural profitability. There is therefore no shortcut to capital accumulation in agriculture except via higher profits and, ultimately, higher savings and investment levels based on these profits.



It is often assumed that rural non-farm activities can be an engine of growth for rural development. But most rural non-farm activities produce goods and services that are linked to agriculture via forward, backward and consumer-demand linkages (Hazell and Hagbladde, 1993; World Bank, 1983). The advantage offered by lower rural wages in terms of industrialization is frequently offset by other disadvantages of a rural location. Therefore, the potential for rural industrialization is usually over-estimated. Agriculture, therefore, remains the single most important driver of the rural non-farm sector. Based on this discussion and the analysis presented in other sections of this report, we will now summarize the remaining challenges to be met in order to improve agricultural incentives.

The Remaining Challenges of Agricultural Incentives

A declining number of countries in the region continue to pursue disastrous macroeconomic policies; Zimbabwe is an example. Elsewhere, inflation remains stubbornly high, leading to high real interest rates that make it difficult for agriculture to compete for investment resources. Although, on balance, protection rates are no longer negative, net protection rates remain below minus 10 per cent in Côte d'Ivoire, Ethiopia, the United Republic of Tanzania, Zambia and Zimbabwe. Unlike industrial products and importable agricultural products, agricultural exportables continue to have zero or negative protection. Agricultural products and inputs suffer from excessively high transport costs on account of poor infrastructure, policy interventions and illegal road blocks.

The Inadvisability of Protection of Importables and Subsidies for Exportables

Sub-Saharan African countries have already altered their own policies and eliminated the sector's overall disprotection (see section IV). However, they still have fewer agricultural incentives than other regions of the world, especially the OECD countries. It would be tempting for African policymakers to attempt to further improve agricultural incentives by following the example of OECD countries and subsidizing their agricultural exports or restricting imports to protect their producers. However, as shown in section IV, on average African countries already provide protection for

their agricultural importables. Raising these protection levels further would in many instances tax poor consumers, and increase poverty, rather than reducing it. In the context of the current agricultural price boom, it would be more appropriate to lower the protection levels than to raise them. Increased protection of agricultural importables would also often lead to higher protection levels for these products than for industrial goods and would therefore indirectly disprotect them. The possibility of subsidizing agricultural exports is constrained by the poverty of these countries and is a very inefficient way of supporting the agricultural sector compared to the use of scarce fiscal resources for the expansion of infrastructure, technology development and smallholder services. In addition, such subsidies would infringe WTO rules if the Doha Round of negotiations were to succeed.

Input Markets

The World Development Report 2008 argues that developing efficient input markets is a necessary prerequisite to expanded use of improved seeds and fertilizer in sub-Saharan Africa. Yet these markets are subject to highly seasonal demand for small quantities which are dispersed over wide geographic areas with little infrastructure. The World Development Report shows that domestic port and transport costs represent up to 50 per cent of farm-gate fertilizer costs in Malawi, Nigeria and Zambia, compared with slightly over 25 per cent in the United States. Scale economies in fertilizer production are substantial, so for the vast majority of small African countries, domestic production is infeasible. In fact, as noted by the World Development Report, cost-effective minimum import lots of 25,000 tons are "...considerably above the annual demand in most Sub-Saharan African countries." (World Development Report 2007, p. 150).

This also raises the perennial issue of fertilizer subsidies, which is addressed in detail in the World Development Report 2007 (box 6.7, p. 152). The 2007 report puts forward a proposal for what it terms "market smart" subsidies targeted at poor farmers which would be designed to encourage initial use of incremental amounts of fertilizer. It also notes that widespread use of fertilizer subsidies is expensive. Zambia spent 37 per cent of its public budget for agriculture in 2004/2005 on its fertilizer support programme, for

example. Of course, other inputs will become important in the commercialization process as needs for tools, machinery, pest management and possibly irrigation equipment emerge. Market-oriented agriculture requires access to functioning input markets. The challenge is how to encourage and support their development.

Rural Finance

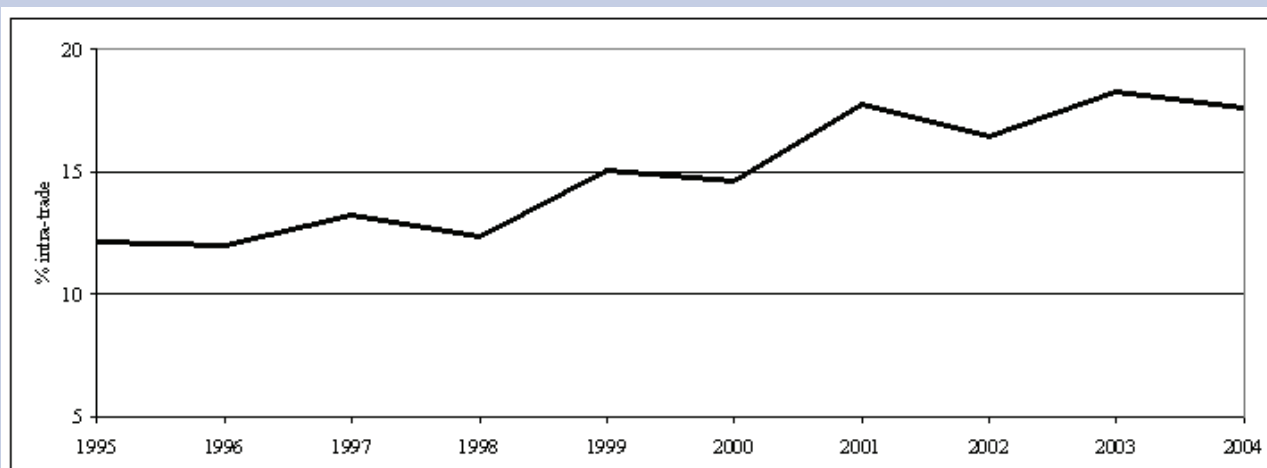
Despite the overriding importance of spurring investments in agriculture based on equity, an important input market is rural finance. The macroeconomic instability that characterized Africa well into the 1990s has resulted in exceptionally high real interest rates. Agriculture is rarely so profitable that it can compete with urban investments in such environments. In addition, rural areas in general and small farmers in particular face crippling disadvantages in financial markets. Clients are usually small and widely dispersed, and seasonality and covariant risk make financial intermediation difficult (Binswanger and Rosenzweig, 1986). While cooperative institutions have been a success for larger farmers in middle-income countries such as Brazil, specialized agricultural financial institutions have been a failure all over the world (World Bank, 1996). The microfinance movement can make a modest contribution, but it has found it difficult to overcome

the disadvantages associated with rural areas and emerge as an important agricultural lender (Gine, 2004).

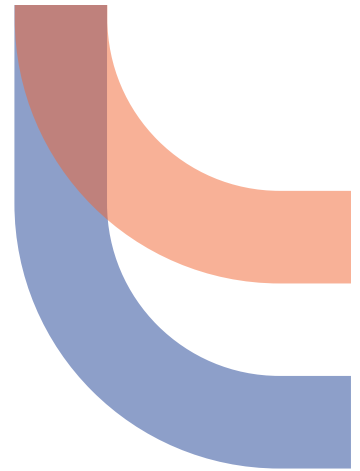
Successful approaches to improving rural financial intermediation have been focused on savings mobilization, postal systems, improved access to finance for the rural non-farm sector, input suppliers, marketing systems and contract farming (Yaron et al., 1998). The Government of India has obliged commercial banks to open rural branches and to reserve a proportion of their lending for agriculture and agro-industry. Two separate studies have shown that these measures have had a significant impact on agricultural growth and rural wages (Binswanger and Khandker, 1995)

In light of the above analysis, it is not surprising that IFAD, the AfDB and the World Bank have found it difficult to achieve more than spotty success in the area of rural finance in sub-Saharan Africa. Yet all of them put rural finance high on their agenda in their agricultural programmes. They are looking for improvements in technology, such as banking via mobile phones and record keeping on smart cards as possible ways to cut transactions costs and simplify accounting. An alternative approach to fostering rural investment is to focus on agricultural profitability in general and support for effective, easily accessible and low-cost savings mechanisms, such as postal savings systems linked to rural savings clubs.

**Figure 5. Trends in intra-African trade in Agriculture
(Africa's imports from Africa as a percentage of Africa's total imports)**



Source: FAO, 2006, based on WTO annual trade statistics.



A complementary approach would be to finance more agricultural and rural investments via matching grants from governments, with the matches coming both from community contributions in kind from individual savings.

Output Markets

The same problems which hinder input markets also impede the development of output markets. Most of these problems have already been discussed: low population density, the disadvantages of being landlocked, poor road and port infrastructure, high transport costs in connection with given types of infrastructure, illegal extraction of payments along transport routes, insufficient competition, poor financial markets and the resulting high cost of finance, and a business environment that is only slowly improving. The market development of food crops is also impeded by frequent and unpredictable government interventions in the market. Fortunately, farmer associations are increasingly entering input and output markets, although a great deal more support will be needed if they are to achieve the kind of prominence they have in East Asian countries or Brazil, for example. The World Development Report 2008 provides a comprehensive analysis of how to foster output markets in general and the participation of producer organizations in particular. As we discussed earlier in this section, intraregional trade in basic commodities offers real possibilities for African agriculture but is constrained by serious barriers to trade.

Barriers to Intraregional Trade

Intraregional trade offers major opportunities for sub-Saharan African agriculture. Domestic demand for most agricultural commodities is price- and income-inelastic, and rapid gains in production will therefore inevitably lead to lower domestic prices and quickly reduce increases in farm profits. Moreover, a high degree of volatility in production translates into high price variability and risk. Opening subregional trade can reduce the impacts of these factors and increase regional food security. Intra-African trade in agriculture has accounted for no more than a small share of total African trade, but that share has risen from 11 per cent to 18 per cent over the period (see figure 6). The largest deficits are in grains, followed by oils and fats, dairy products and meat. Thus it seems that

there is substantial potential to expand intra-African trade in agricultural and food products. Of course there are barriers that have to be overcome, including transport and handling costs, sanitary and phytosanitary issues, tariff and non-tariff barriers to trade, and market information problems. Lynam has argued that there are real possibilities and real challenges in developing profitable access for African smallholders to growing urban markets in Africa (private communication from John Lynam, Associate Director of the Rockefeller Foundation Food Security Programme).

Nevertheless, regional integration in agriculture has been slow. The ECA has shown that “there have been some strides in trade, communications, macroeconomic policy and transport. Some regional economic communities have made significant strides in trade liberalization and facilitation,... in free movements of people,... in infrastructure,... and in peace and security... Overall, however, there are substantial gaps between the goals and achievements of most regional economic communities, particularly in greater internal trade, macroeconomic convergence, production, and physical connectivity.” (ECAfrica, 2004, p. 1).

Phytosanitary rules and regulations are steadily becoming more serious barriers for developing-country agricultural and agro-industrial exports. Their increasing stringency is driven by consumer demand factors, as well as by their potential to replace tariff barriers as a means of protection against imports (World Bank, 2005a). Developing countries have little choice but to insert themselves into the standard-setting processes and bodies and to build up their capacity to comply with these regulations (Ingco and Nash, 2004). Small countries are at a particular disadvantage because of the difficulties they encounter in providing the necessary services. Regional collaboration and integration will be necessary to enable compliance at an affordable cost.

Overcoming the Widening Technology Gap

Despite high returns on agricultural research in Africa documented in Alston et al (2000), the science and technology divide between agriculture in sub-Saharan Africa and the rest of the world is growing because of inefficient and underfunded science and technology institutions in the region and rapid changes in the international research environment

for biotechnology and private agricultural research. Borrowing opportunities from other regions and elsewhere within the continent are constrained by the uniqueness and the heterogeneity of African agricultural environments discussed in the introduction of this paper. Combined with a relatively poor climate and resource base and the large number of stressors on productivity, this region requires more rather than less research. The challenges of natural resource management, climate change and growing climate risks only add to this imperative. In terms of its resource endowments and production mixes, African agriculture differs more sharply from the developed world than other developing regions of the world (Pardey et al., 2006), and this situation limits Africa's ability to benefit from intercontinental or subregional technology transfer and spillovers from scientific and other research results. These facts tell us that sub-Saharan Africa requires a greater scientific and adaptive research effort than other regions.

Despite the greater need, however, the agricultural research effort in Africa has been lagging badly, leading to deteriorating national and international agricultural research systems for Africa. In 2000, global agricultural R&D spending amounted to US\$36.3 billion, of which 37 per cent was conducted by the private sector, while 63 per cent, or about US\$23 billion, was conducted by public entities. In all, 93 per cent of private research was conducted in developed countries (Pardey et al., 2006). On the other hand, public agricultural R&D grew faster in the developing world and is increasingly concentrated in China, India and Brazil. In stark contrast, public agricultural research in sub-Saharan Africa grew by only about 1 per cent per annum in the 1990s, and in 2000 totalled around US\$1.6 billion. Sub-Saharan Africa has the smallest share of private agricultural R&D spending in the world (only 1.7 per cent of its already low public spending levels). Of total agricultural research spending, donors provide about 40 per cent and, in some countries, this figure rises to 60 per cent. Only five African countries – Botswana, Ethiopia, Mauritius, Nigeria and South Africa – are paying the recurrent budget of their national agricultural research services out of national sources. “Collectively these data point to a disturbing development: a growing divide regarding the conduct of (agricultural) R&D and, most likely, a consequent growing

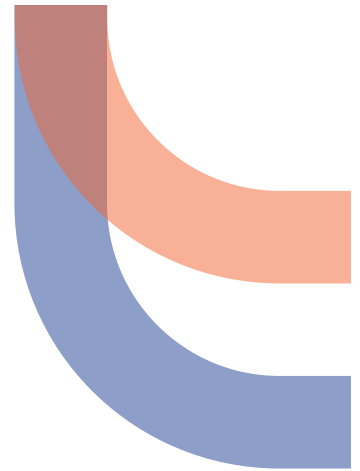
technological divide in agriculture... The measures also underscore the need...to raise current amounts of funding for agricultural R&D while also developing the policy and infrastructure needed to accelerate the rate of knowledge creation and accumulation in the developing world over the long haul.” (ibid, p. 68).

The Changing Nature of Technology Discovery

All around the world, innovation is shifting away from a linear pattern that starts with scientific discovery and moves successively to technology development, adaptation to local conditions and dissemination to farmers. In its place comes a broader and more circular paradigm. It is broader in the sense that innovations are no longer concentrated in basic foods or industrial agricultural outputs but instead include the entire value chain, which extends from farm production, natural resource management, assembly, processing, marketing and retail to consumers. Within this broader paradigm, private R&D play an increasing role. This is facilitated by the development of broader intellectual property rights in agricultural technology. This provides many promising opportunities, but it also generates high levels of anxiety about the possibility of exclusion and high transaction costs for developing-country agricultural innovation. A number of larger developing countries are taking advantage of opportunities for greater private-sector involvement, including, most recently, India, which now boasts over a hundred private domestic and multinational seed companies. The private seed sector is also expanding in Africa, with Kenya being perhaps the most advanced. The latest major change is the emergence of biotechnology.

Biotechnology

Farmers have been genetically modifying plants and animals for 5,000 years or more, and agricultural scientists have joined them in this activity ever since the Mendelian revolution in the nineteenth century. The only controversial issue is whether or not it is appropriate to transfer genes from one species to another. Evenson and Raney (2007) address these political and scientific issues. Among the developing countries, China and Brazil, followed by India, have invested heavily in agricultural biotechnology. On the other hand, the CGIAR system is spending less than 10 per cent of its overall



budget on biotechnology research, perhaps because of the resistance put up by important European donors. The huge success of Bt (*bacillus thuringiensis*) cotton and the prospects of nutritionally fortified rice and other crops have taken some of the wind out of environmental critics' sails. Bt cotton has resulted in dramatic reductions in pesticide use, as well as providing higher yields and incomes for small farmers without having any adverse environmental consequences.

The potential offered by our rapidly expanding knowledge of genomics and our increased capacity to modify useful plants and animals can become an important factor in adaptation to and mitigation of climate change, desertification, increasing resource scarcity, and threats from pests and diseases. Possibilities for building in stress (drought, heat and cold) resistance, immunity to pests and diseases, and improved nutritional values, as well as for "manufacturing" pharmaceuticals in living plants, were wild dreams 20 years ago but are now much closer to reality. For example, Monsanto and BASF have just announced a US\$1.5 billion biotechnology research and development partnership in which the "Focus of efforts will be on the development of higher yielding crops that are more tolerant to adverse environmental conditions such as drought." (CropBiotech Update, 23 March 2007).

Even where gene technology is donated, progress may be slow progress, despite the fact that at least three biotech initiatives in Africa are being pursued by NEPAD, AATF and the Alliance for a Green Revolution in Africa. Carl Eicher et al. (2006) reviewed biotechnology development for six food crops and cotton in Africa and found unexpected scientific, legal, economic and political barriers to the development of genetically modified crops, together with long delays in developing and implementing national bio-safety regulations and guidelines. These authors concluded that, unfortunately, with the exception of Bt cotton, most genetically modified crops are at least 10-15 years from reaching smallholders in Africa. Can Africa afford to be left behind by China, India, and Latin America? Should it adhere to complex regulations dictated by others?

Whatever the answers to the above questions prove to be, biotechnology approaches must be nested and integrated into plant breeding programmes. Special attention should

be given to raising public awareness of and political support for biotechnology, and a commitment should be made to strengthening African capacity in biotechnology, bio-safety, food safety and intellectual property rights, along with training the next generation of African plant breeders and genetically modified crop specialists.

Fortunately, African leaders have started to respond to this challenge by creating consensus on what needs to be done, improving their national institutions of higher learning and research, building subregional and regional agricultural technology institutions, and developing biotechnology networks and institutions. Pillar 4 of the Comprehensive Africa Agriculture Development Programme provides a vision and an action plan for science and technology relating to African agriculture. The challenges are intensified by increasing competition for resources, climate change and rising international agricultural prices. These responses are being mounted within the framework of a rapidly changing global research system that encompasses biotechnology, intellectual property rights and patent systems, and a growing range of players, especially the private sector. Unfortunately, the significant institutional responses that have been forthcoming have so far not been matched by adequate funding from international donors or national governments, especially in the areas of biotechnology and science education.

The Imperative or Regional Integration

Throughout this paper, many critical issues are explored that can be best, or only, solved by regional action. Several examples follow:

- the small countries that dominate the African scene often lack financial capacity for public goods investments;
- small landlocked countries generally do worse and depend on regional integration to be able to do better;
- expanded regional trade in agriculture and food products is good for growth, farmer's incomes and regional food security; the short-term management challenges of the current food price spike and the long-term opportunities arising from prices that are expected to settle at higher than past levels only add to this imperative;

- efforts to augment regional trade and food security will be aided by the harmonization of standards and sanitary measures and bolstered by subregional and regional capacities for their implementation;
- more open borders and internal infrastructure should encourage private-sector traders;
- for small countries, regional infrastructure – roads, communications, ports – is critical for access to each other's and external markets;
- reversing land degradation and desertification and preserving biodiversity require transboundary collective action;
- management of crucial but endangered forestry and fisheries resources must be approached on a transnational basis;
- defense against plant and animal disease epidemics require collective responses at subregional and regional levels;
- success in agriculture crucially depends on indigenous scientific capacity to generate new technology, and since many countries are small and poor, this is far better done on a regional or subregional platform: the Forum for Agricultural Research in Africa and subregional organizations are on the right track but the effort needs to be greatly expanded;
- biotechnology research is expensive and requires a large critical mass; therefore, the combined efforts of two or three regional institutes will be far superior to those of 48 or 24 underfunded, under-resourced national institutions;
- indigenous scientific capacity requires trained people, which, here again, is better done by regional institutions which have the critical mass and necessary financial support; and
- regional approaches to rural financial architecture may increase potential deposits and loanable funds and may spread risk;

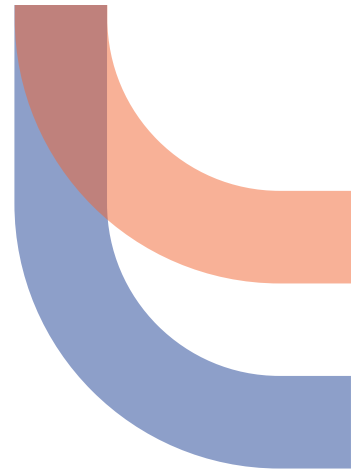
These examples are, it is hoped, sufficient to illustrate that the potential for regional approaches and an overall regional strategy for rural Africa are significant. Yet, in all most of these

areas, institutional development programmes remain massively underfunded. The main reason for this is that regional efforts produce regional and subregional public goods, and their financing is therefore subject to the well-known problem posed by free riders in the financing of public goods. Except in the case of the largest countries, which have an incentive to supply themselves with these regional public goods, countries will seek to benefit from the investment of others.

VI. Conclusions

Over the past 50 years, the normal structural change that leads to a declining share of agriculture in economy-wide output and in employment, and that, via productivity growth leads to the convergence of incomes in the agricultural and non-agricultural sectors, has not yet happened in Africa. Neither has agriculture been able to significantly contribute to this economic transformation via fast productivity and output growth and via the transfer of its labor to the non-agricultural sector, nor has the non-agricultural sector been able to provide its own contribution to the structural transformation. The structure of the economy in terms of sector shares in total output has been practically frozen, as has the structure of production within agriculture itself, its technology, and its mode of growth primarily via area expansion. As a consequence African agriculture remains extremely under-capitalized, and the number of poor and hungry has increased in both the rural and urban areas.

Over the last 50 years it may have become more difficult for countries to advance in their structural transformation to the point where productivity in all sectors becomes sufficiently high and agriculture has become a sufficiently small sector in both output and employment that agricultural and non-agricultural incomes start to converge, and agriculture becomes more like any other sectors of the economy. This means that agricultural growth and development is not only much needed as a contribution to the structural transformation, but that it also may increasingly become the main or only avenue for rural poverty reduction. This puts an even greater imperative onto policy makers to focus on agricultural and rural development.



Encouraging signs that a new beginning for agriculture and for the structural transformation may be underway have started to emerge over the past decade: Economic and agricultural growth in sub-Saharan Africa (SSA) have resumed and economy-wide growth has been particularly impressive. This has been a consequence of reduced prevalence of conflicts, macro-economic stabilization, a slowly improving business environment, and a widening role for the private sector, local governments, civil society and communities. Incentives for agriculture have improved as a consequence of reductions in agricultural dis-protection. The secular downward trend in agricultural prices ended in the early 1990s; growing incomes in Asia and Africa, combined with continued rapid population growth, are fuelling food demand, which is expected to lead to a gradual upward trend in international real agricultural prices. For Africa the major agricultural growth opportunities will be in regional and domestic markets for food staples. An additional factor favouring success is the rising commitment of African governments, and its sub-regional and regional organizations to agricultural development, as summarized in the CAADP commitments. The greater commitment may lead to better leadership and donor coordination, and more reliance in agriculture on domestic fiscal sources rather than donor money to support the many public and semi-public goods required for agricultural growth.

While there is much talk about another structural transformation in Africa towards large scale commercial farming, economies of scale are generally decreasing, as a consequence of superior incentives of family members to work hard, and invest in their own farm and their savings in supervision costs. Except in South Africa and a few selected plantation crops, the success of large scale farming has therefore been limited. The economies of scale arising from large machines, in input markets and output markets, and in finance can often be overcome by institutional arrangements such as cooperative marketing and input supply, and contract farming, as has been done in Europe and Asia which have been much more successful than Africa in their structural transformation. The family farm model therefore remains an appropriate model for most of African agricultural development.

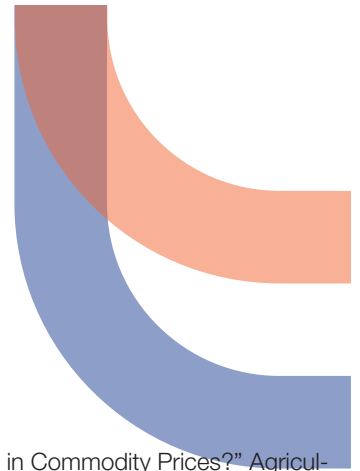
To seize these opportunities, SSA will have to support economic growth via continued sound macroeconomic policies, further improvements in the investment climate, and investments in infrastructure and institutions. In the agricultural sector SSA will have to:

1. remove the remaining agricultural taxation that still disadvantages African farmers relative to all other farmers in the world,
2. improve its services for small farmers,
3. significantly increase its investment in agricultural technology generation and dissemination at national and subregional levels, including in bio-technology that will help increase resistance and resilience against the many stressors that agricultural plants and animals face in the harsh conditions of Africa,
4. empower local governments, communities, and farmer organizations for their own development via further administrative and fiscal decentralization and community-driven development, and
5. strengthen the already existing regional agricultural institutions for agricultural trade, bio-safety, phytosanitary regulations, seed production, regulation and trade, and technology generation.

An overall conclusion emanating in this paper is for individual countries to adapt and customize the above broad goals into country specific action plans to enhance the performance and contribution of the agriculture sector, in line with the CAADP compacts on which they are already working.

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Related research

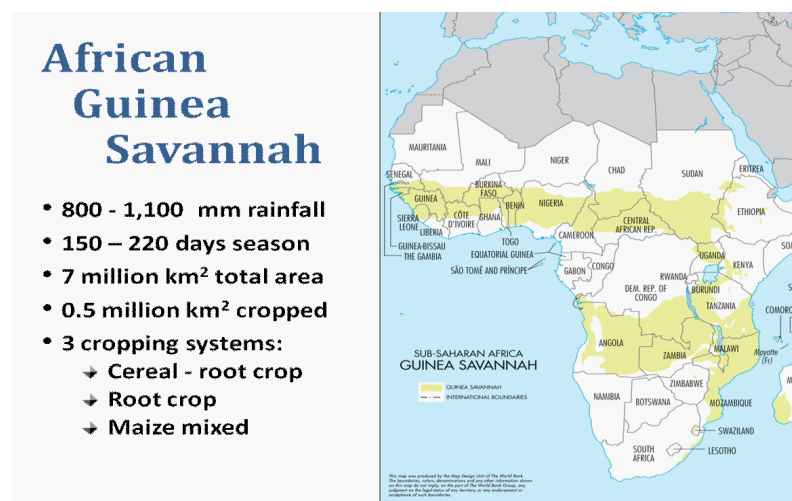
Awakening Africa's Sleeping Giant

Prospects for Commercial Agriculture in the Guinea Savannah Zone and Beyond

The Sleeping Giant study focused on Africa's Guinea Savannah zone, which covers about 600 million hectares in Africa, of which about 400 million hectares can be used for agriculture, and of which less than 10 percent are cropped. This zone is one of the largest underused agricultural land reserves in the world. The largely rain-fed land and the agro-climatic potential are similar to that found in the Cerrado and North East Thailand. But rather than stagnating, over the past 45 years, these two landlocked regions have become world powers in agriculture, one based on large scale agriculture, and one based on family farmers. Based on this careful comparative study, this report argues that opportunities abound for farmers in Africa, and especially the Guinea Savannah, to gain or regain international competitiveness. This provides reasons for optimism regarding the future prospects for agriculture as a major source of inclusive growth in many parts of Africa.

The many challenges and how to overcome are discussed in the report. Although it would be easy to feel overwhelmed by the long list of constraints discussed, Brazil and Thailand provide important lessons about how these constraints can be overcome. Arguably the most important lesson of all relates to the role of the state. In Brazil and Thailand, successive governments played a vital role by establishing a conducive enabling environment: it was characterized by favorable macroeconomic policies, adequate infrastructure, a strong human capital base, competent government administration, and political stability. Rather than relying solely on heavy state management and investment, central and local governments of Brazil and Thailand were able to engage effectively with private investors, farmers' organizations, rural communities, and civil society organizations. After decades of state domination, many initiatives currently underway in the African countries are beginning to use similar approaches.

This report published by the World Bank in 2009, was coordinated and written by a small team comprising Michael Morris, Derek Byerlee, and Paula Savanti (World Bank) and John Staatz (Michigan State University), as well as Hans P. Binswanger-Mkhize, Tswane University of Technology, Pretoria, who also originally designed the study.



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