Future Agricultures

Working Paper

Agricultural growth in the New Alliance countries

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January 2015

Acknowledgments and disclaimer

Many thanks to Andrew Dorward for his comments on an earlier draft of this paper. The interpretations and views expressed are however those of the authors alone. They do not necessarily reflect those of the Institute of Development Studies, Overseas Development Institute, the Future Agricultures Consortium or the UK Government's Department for International Development.

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Summary

Rural Africa has changed considerably since the early 1990s. Demand for agricultural output is greater owing to higher world prices, economic growth, urbanisation and an enlarged urban middle class. Above all, governments and their development partners have revived their interest in agriculture during the 2000s. Concerted efforts are now underway to raise agricultural productivity and the rate of agricultural growth.

This prompts the two main questions addressed by this study. Is agriculture in Africa growing faster than in the past, and closer to the ambitious goal set in Maputo in 2003 of six percent growth per year? Equally important, is productivity in agriculture rising? Increased labour productivity will be critical for the transition of African countries from agrarian to urban economies.

The focus here is on the countries that had by early 2014 joined the New Alliance for Food Security and Nutrition: Benin, Burkina Faso, Côte d'Ivoire, Ethiopia, Ghana, Malawi, Mozambique, Nigeria, Senegal and Tanzania.

Since 2000, and especially since 2010, reports of success in Africa's agriculture have become more frequent, in contrast to the often very gloomy assessments seen formerly. These form part of a more general literature that lauds increased overall economic growth in Africa.

Accounts of African economic success, however, are usually qualified: much of the growth comes from extractives and agriculture for which world prices have risen since the mid-2000s, rather than manufacturing, with apparently little diversification of economies. The search for transformation of African economies remains, it seems, a work in progress. The fear that growth may not come from rising productivity, but from higher prices and the accumulation of more labour and land, is most strongly expressed about smallholder agriculture, reflecting longstanding concerns that productivity in this sub-sector is not only low, but also growing slowly if at all.

Studies in the 2000s of changes to agricultural productivity show some signs of improvement, although these gains have been limited compared those seen in other parts of the developing world.

Both those studies and this one rely on official statistics on agricultural production, areas, yields, labour and land use. How reliable the data are is questionable. Few countries have regular agricultural censuses or sample surveys of farmers to estimate the area and yield of crops. Most rely on assessments made by the field staff of agricultural ministries, which may reflect an upward bias from subordinates keen to report progress to their superiors, or may under-estimate production as minor and novel crops and activities receive too little attention.

Originally it was hoped that national statistics could be corroborated by accounts from small-scale studies using direct observation of farms. These would also provide qualitative insights on drivers of change. Unfortunately, the existing literature of small-scale studies has few reliable accounts of change through time. Most of the published literature concerns observations at one time.

The official statistics show that between 1990-1992 and 2009-2011, African agricultural production grew by an annual average of 3.2 percent a year, just ahead of population growth, so that per capita production expanded by 0.8 percent a year. Within the continent, North and West Africa did better than the average. Agricultural growth was faster in several New Alliance countries, in some cases by large margins: Malawi, Mozambique, Ethiopia, Ghana and Benin all exceeded four percent a year. In the first four of these countries, growth exceeded that of population by two percent a year — so that over the 19 years, domestic agricultural production was almost half again as much per person as it was in 1990-1992.

Compared to the far slower growth seen from the early 1970s to early 1980s, there has been a marked acceleration in the last two decades. There are, however, few signs of an acceleration in growth of agriculture from the 1990s to the 2000s, although rates of growth between the different regions of Africa have converged to some extent in the 2000s.

Composition of output, at the level of groups of products, has changed very little since the early 1990s. Some individual crops and livestock products have for particular countries grown especially rapidly, over two decades of annual increases of five percent or more. Most of these are staple crops destined for domestic and regional markets; traditional cash crops for export have grown significantly less. The rising non-traditional cash crops — horticulture, flowers, some fish — may be growing rapidly, but they remain in most cases small activities compared to the bulk of agricultural production destined for national markets.

Regarding productivity, increased production has been in part owing to more land and labour being employed in agriculture in most parts of Africa. But that does not mean that productivity has stagnated. Yields per hectare have been increasing in most parts of Africa: for the continent as a whole the value of production per hectare, in constant terms, was 45 percent higher in 2009-2011 than in 1990-1992. Some of that may have arisen from rising unit value of production. Cereal yields, however, in physical terms show an increase of 30 percent over the same period. Yield gains have contributed more to growth of output than area expansion in most cases.

Labour productivity, too, is rising, by 24 percent over the two decades for Africa as a whole, with higher rates being seen in some New Alliance countries.

That said, yields per hectare and production per agricultural worker remain low. If those working the land had to depend solely on the value of their produce, they would live in extreme poverty.

Despite the growth reported, cereal imports to Africa continue to rise, suggesting either that the production statistics are exaggerated, or else that consumption is increasing well ahead of population growth. The latter certainly applies: the average person in Africa consumed by 2009-2011 nearly 15kg more of cereals than they did two decades ago. Cereal imports, however, are highly concentrated: geographically in North Africa; and within sub-Saharan Africa, almost entirely in imports of rice, wheat and wheat flour. The rise of these imports may have more to do with urban consumer demands for foods that are easy to prepare —and perhaps seen as modern — than to lack of domestic supply of staples.

A degree of corroboration of these results can be obtained by looking at changes in poverty and malnutrition in the ten New Alliance countries since the early 1990s. In largely agrarian societies agricultural growth should lead to reductions in poverty and malnutrition.

In all but two New Alliance countries — Côte d'Ivoire and Nigeria — poverty has been falling significantly over the last two decades (Figures 3.14 and 3.15), with annual average rates of reduction of more than one percent a year in seven cases — albeit from high initial levels. Ethiopia, Ghana and Senegal have cut their rates of poverty by more than 20 percentage points. For six of the ten countries, moreover, it seems that the rate of poverty reduction accelerated after 2000.

Child nutrition, measured by stunting of under-fives, has improved across all New Alliance countries other than Benin since the early 1990s. Nonetheless, progress has been slow at under two percentage points a year, so that stunting remains at high or very high levels in seven of the ten countries.

These statistics provide some support for the growth seen in the official statistics, although the relation between agricultural growth and the reduction of poverty and malnutrition is quite weak, even if in the expected directions.

These results inevitably have to be qualified by the limitations of the national level data. To date there are no reliable proxies for agricultural change. Neither are there sub-national studies through time that would provide a check.

This might not matter so much if the official agricultural statistics, flanked by potential corroborating data from national economic growth, changes in poverty and nutrition, and agricultural imports, told a striking and consistent story. But, for the most part, they do not. Frustratingly they can be summarised as portraying the metaphorical glass of water: either half full or half empty, depending as much as anything on taste.

For lack of more reliable statistics, debates over agricultural performance remain locked between those who see small-scale observations of smallholders intensifying for urban markets as either representative of current reality or future dynamism, versus those who point to limited agricultural growth and the prevailing high rates of poverty and under-nutrition in the African countryside as evidence that change is limited and slow.

The implication of these reflections is that policymakers have less guidance from this evidence than they should have. It is thus no surprise that governments receive conflicting messages about the priorities for their agricultural development. To a large extent, policy can thus only be based on plausible, rather than confirmed, causal links — backed up by the inevitably selective use of case studies.

In that vein a final positive reflection is that most governments, supported by donors, foundations and non-governmental organisations, are today more likely to be stimulating agriculture through investments and policies that plausibly will contribute to growth, than in the past when policies that were likely to harm farmers were quite common. The gross errors of the past, it seems, are in most parts of Africa being consigned to history.

1. Introduction

1.1 Recent changes in rural Africa

Rural Africa in 2014 differs substantially from what it was two decades ago in several respects. Opportunities for farmers are greater than before owing to economic growth and urbanisation. In many countries economic growth resumed in the mid-1990s following a decade or more of stagnation. That growth, moreover, accelerated in at least half the countries of Africa during the 2000s: by the early 2010s lists of the world's fastest growing economies usually include more from Africa than anywhere else[1]. The growth of urban centres has increased the demand for food. In many countries a significant urban middle class has emerged (Tschirley et al. 2014; AfDB 2011) prepared to pay a premium for higher value and prepared foods. These domestic markets are larger than any conceivable level of exports. Moreover, the cost of getting from farm to market has fallen owing both to improved roads in some areas, and the increasing proximity of towns as rural market centres grow into substantial urban areas.

Rural populations have grown, so that parts of rural Africa are relatively densely settled: Africa is no longer easily characterised as a land-abundant continent of low settlement density. Indeed, it seems that in recent years, half of all people in rural Africa live in relatively densely settled areas, those with 150 or more persons per square kilometre (Jayne et al. 2014).

Policies have changed as well: many governments have shown greater interest in agriculture and its development in the 2000s than previously, marked at the continental level by the 2003 Maputo Declaration of African ministers of agriculture, and the start soon after of the Comprehensive Africa Agriculture Development Programme (CAADP). Increased government interest has been matched by donors, non-governmental organisations (NGOs) and foundations seeking to support and reinforce agricultural development initiatives.

Last but not least, rising global food and energy prices and the search for alternative investment opportunities in the wake of the global economic crisis have brought the formal private sector into the picture in new ways.

1.2 Questions arising: is agriculture performing better?

From this changed context emerge the questions that led to this study. Firstly, is agriculture in Africa growing faster than in the past, and closer to the ambitious goal set in Maputo in 2003 of six percent growth per year? Equally important, is productivity in agriculture rising? Increased labour productivity will be critical for the transition of African countries from agrarian to urban economies.

The focus here is on the countries that had by early 2014 joined the New Alliance for Food Security and Nutrition: Benin, Burkina Faso, Côte d'Ivoire, Ethiopia, Ghana, Malawi, Mozambique, Nigeria, Senegal and Tanzania. The New Alliance, formed in 2012, aims to bring together governments, private sector companies, development partners and farmers to stimulate investment in agriculture. The New Alliance operates by convening stakeholders at country level to agree on programmes of private investment in support of the overall strategy set out in CAADP country compacts. It aims to lift 50m people out of poverty by 2022.

The original aim of this paper was to examine the record of changes to agriculture in the ten New Alliance countries, looking at the above questions plus additional ones on levels of investment, distribution of growth by farm size and potential explanations of patterns observed.

This proved considerably over-optimistic. Data on agriculture in the ten New Alliance countries are readily found through FAOSTAT, the data portal of the United Nations Food and Agriculture Organization (FAO), although there are major question marks about their reliability. A longstanding concern (Mosley 1992; Bates 1981; Stolper 1966), recent work has again drawn attention to the quality and political economy issues around national-level agricultural data in Africa (Jerven 2013a; 2013b). Few if any of these countries have regular agricultural censuses or sample surveys of farmers to estimate the area and yield of crops. Most rely on assessments made by the field staff of agricultural ministries, who typically modify the previous year's data by considering the current year's weather, incidences of pests and diseases, visual inspection of fields and conversations with producers and other local observers.

At least two major biases may thus exist: one is to overstate production increases to please directors in the ministry who have ordered greater efforts to produce this or that crop, and generally to show the field staff in a favourable light. The other is that minor, sometimes novel crops and enterprises may be barely detected by exercises where thoughts are directed first and foremost to the main, longstanding crops. Unreliable data present fundamental problems for analysts and policymakers alike, and significantly undermine any movement toward 'evidence-based policy' in African agriculture (Whitfield 2012).

Originally it was hoped that national statistics could be corroborated by accounts from small-scale studies using direct observation of farms. These would also provide qualitative insights on drivers of change. Unfortunately, the existing literature of small-scale studies has few reliable accounts of change through time. Most of the published literature concerns observations at one time. Hence the original plan and ambition had to be set aside.

This working paper summarises what the official data may indicate, while just how reliable those insights may be will be discussed in the conclusion.

The rest of paper is set out as follows. The second section reviews some of the recent literature on agricultural growth in Africa; the third section sets out the analysis of the quantitative data on agricultural performance and outcomes in reduction and poverty; and the fourth section concludes.

2. Recent literature on agricultural growth in Africa

The revival of interest in African agriculture has stimulated research in new directions. While before 2000 many studies were concerned with explaining why agricultural performance on the continent had disappointed, some more recent studies have looked at success in African agriculture.

Two lines of enquiry can be picked out. One looks at cases of either specific crops or districts, to derive hypotheses about the changes seen and their explanation; the other approach measures changes in production and productivity at country, regional or continental level and in some cases then seeks to relate these to potential causes.

2.1 African success: case studies

Early efforts to derive lessons from studies of success in African farming at the level of crop or district include the work of the International Food Policy Research Institute (IFPRI) and Wiggins.

IFPRI (Haggblade et al. 2003; Gabre-Madhin and Haggblade 2001) asked more than 1,100 specialists in African agriculture to nominate up to three examples of success in agricultural development, eliciting 253 nominations from 118 replies. From these they selected eleven cases for more detailed study, including seven specific commodities — maize, cassava, banana, cotton, horticulture, floriculture and rice — plus a cattle vaccine, soil fertility measures, farm organisation and research capacity. Given the commodity focus of most of these, technical advances for the specific crop were emphasised. Key actors in these cases comprised government for research, extension and physical infrastructure; while many others— farmers, small-scale traders, non-governmental organisations, parastatals and large private firms — played a role in supply of inputs and marketing.

These cases, documented around the turn of the new century, often showed spurts of growth that subsequently gave way to stagnation or decline. Sustaining success appeared a challenge. That impression may need revision, given the apparent acceleration in growth of agriculture in many countries of the continent in the 2000s.

Wiggins (2000; 1995) brought together findings from village and district studies from the 1970s onwards where a notable growth in production of a specific activity or a range of products has been documented. These reviews stressed the importance of demand in stimulating development, often domestic demand that seemed to confirm Boserup's (1965) hypotheses about the ways in which increasing population density and associated urbanisation would lead to intensification of farming. On the supply side, increased production typically came from relatively small changes to existing farming systems: smallholders had invested in improved seed, fertiliser, tools, draught animals and, in some cases, in (simple) irrigation. There were few accounts of dramatic change, and none of changed agricultural structures. That said, however, the accumulation of marginal advances could over a decade or more amount to considerable increases in production.

Subsequently there have been further accounts of African agricultural success, increasingly part of a literature of overall African economic success. Parts of Africa are growing rapidly. Radelet (2010) picks out 17 such countries:[2]

> Consider the economic turnaround in the 17 emerging countries: between 1975 and 1995,heir economic growth per capita was essentially zero. But between 1996 and 2008, they achieved growth averaging 3.2 percent a year per capita, equivalent to overall GDP growth exceeding 5 percent a year. That growth has powered a full 50 percent increase in average incomes in just 13 years. (Radelet 2010)

It is not just economic growth: in most cases this has been accompanied by more trade and investment; poverty falling overall from 59 percent to 48 percent; and better social outcomes in rising school enrolment and health indicators.

Radelet identifies two preconditions for growth: more democratic and accountable government; and 'sensible' economic policies — low inflation, competitive exchange rates, low fiscal deficits and more liberal economic policy with fewer trade barriers. Three other conditions have sustained growth: the end of onerous debt with better relations to donors, as conditionality has been replaced by the Paris Principles of country-led development strategies; mobile phones, the internet and other similar new technologies; and new leadership in business, politics and administration.

The World Bank in *Yes Africa Can* (Chuhan-Pole and Angwafo 2011) takes a similar line to Radelet, illustrating success by 26 cases. These are seen as either having rectified a government failure or else having addressed a market failure (Table 2.1). Eight of the 26 cases, picked out in bold, are specifically agricultural.

Table 2.1 Categorising Successes: Overcoming Government and Market Failure

Approach	Case study [Agricultural cases in bold]
Overcoming or avoiding massive government failure	- Liberalisation of the exchange rate and other reforms to revive **the cocoa sector in Ghana** - Removing barriers to trade and creating incentives for entrepreneurship in the **coffee sector in Rwanda** - Liberalisation of the **fertiliser market in Kenya** - Liberalisation of the **cotton sector in Burkina Faso** - Facilitating private partnerships in the power sector across sub-Saharan Africa through independent power producers - Wide-ranging economic liberalisation in Tanzania - Reforming the economy in a post-conflict environment in Uganda and Mozambique - Good timing and good luck for diamond mining in Botswana
Rebuilding a government or creating a government where none existed	- Rebuilding government following civil wars in Liberia and Sierra Leone - Using traditional systems for collective action in Somaliland
Rationalising government involvement in markets	- Development of a system of air, rail, and road transport and cold storage to support **mango exports in Mali** - Provision of textile and apparel industry infrastructure in Lesotho - Catalytic government role in private sector development in Mauritius - Using **input subsidies to improve agricultural output in Malawi** - Provision of gorilla reserves to boost tourism revenues in Rwanda - Shifting the government role in the ICT sector from monopoly provider to regulator across sub-Saharan Africa - Success in malaria control across sub-Saharan Africa
Listening to the people	- Performance-based financing in the health sector in Rwanda - Abolishment of fees to achieve free universal primary education in Uganda - Training and deploying extension workers to improve access to health care in Ethiopia - Lowering fertility through family planning programmes - Developing **new varieties of rice, NERICA, to increase yields and decrease food insecurity** - **Using Moneymaker pumps to support innovation and diffusion of technology in the agricultural sector** - Using mobile phones to improve financial access in Kenya via M-PESA

Source: Chuhan-Pole and Devarajan 2011: Table 1

IFPRI returned to agricultural successes with the 2009 volume *Millions Fed*, which reported 21 cases across the developing world (Spielman and Pandya-Lorch 2009). While this has plenty of cases from Asia and the Green Revolution, it also presents six from Africa: improved maize in Eastern and Southern Africa; cassava; soil and water conservation in Burkina Faso and Niger; cotton reforms in Burkina Faso; fertiliser markets in Kenya; and, rinderpest eradication. Drivers of success are seen to come from policy and public investments, including creating private incentives, funding public research and extension and providing roads and irrigation. They also come from processes of planning and implementation, including collaborating across stakeholders in government, farming, civil society and business; community engagement; leadership; and allowing programmes to evolve as they experiment and learn to find effective solutions (see Sumberg et al. 2012 for an analysis of *Millions Fed* as 'success making').

It seems that optimism is growing. Indeed, in late 2013 the African Union convened a meeting called *Optimism for African Agriculture and Food Systems*. The report of this explicitly noted how the narrative around African agriculture is changing, from past accounts of difficulties and disappointments, to a more positive vision:

> …leaders are paying new attention to the positive role that African agriculture plays in economic development across the continent. This narrative and accompanying leadership vision emphasizes farming as an important business, which, when linked with other enterprises across the food system supply chain, serves both rural and urban communities, not just by providing food security, but also as fuel for local economies, a foundation for cultural and social stability (including important roles for women and young people), and a driver of infrastructure development that benefits all sectors. (Meridian Institute 2013)

Participants at this meeting drew courage not only from the country-level statistics on agricultural growth,

but also from cases gathered by IFPRI and Michigan State University (see Reardon et al. 2013) that showed how smallholders in parts of Africa were intensifying to serve the growing and diversified food markets of urban Africa, and how informal supply chains were investing and innovating to facilitate links between farmers and urban consumers. Smallholders, women farmers and small to medium-scale enterprises in food supply chains were seen as the main actors, with scope to create jobs for young people. The report on the meeting concludes with what may be a new received wisdom for African agriculture: 'Together, we are witnessing the dawning of a new era for African agriculture and food systems' (Meridian Institute 2013).

Accounts of African economic success, however, are usually qualified: much of overall growth comes from extractives and agriculture, rather than manufacturing, with apparently little diversification of economies. Some fear that success may be transitory, the product of the rise of commodity prices seen in the 2000s. The search for transformation of African economies remains, it seems, a work in progress (ACET 2014). The fear that growth may not come from rising productivity, but from higher prices and the accumulation of more labour and land, is most strongly expressed about smallholder agriculture, reflecting longstanding concerns that productivity in this sub-sector is not only low, but also growing slowly if at all.

A further concern is that much of the growth may come from activities that often generate little employment, such as extraction of oil, gas and minerals; so that growth has been 'jobless', with unemployment and underemployment of young people being a major social and political concern. That, however, is not a fear that applies in agriculture where growth tends to be unusually intensive in labour.

What, then, do the national statistics, with all their imperfections, tell us about the growth of agriculture and its productivity?

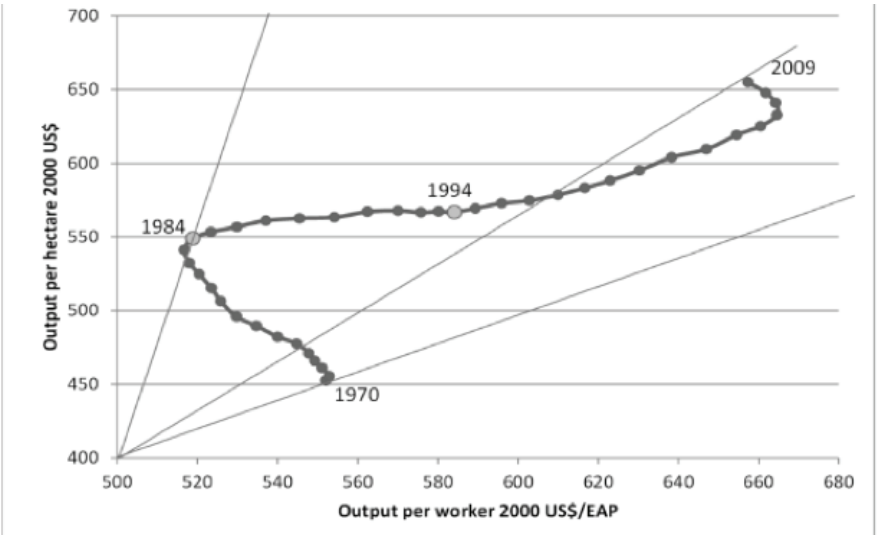
2.2 *Measuring and explaining productivity of African agriculture*

Several recent assessments have looked at the evidence of agricultural growth in Africa in the 2000s, the extent to which this represents improved productivity, and the potential causes.

World Bank data shows agricultural GDP for sub-Saharan Africa rose — in constant US dollar terms — at an annual average of 2.3 percent in the 1970s and 2.2 percent in the 1980s, in both cases slower than the population increase[3] of 2.8 percent a year for the two decades. For the 1990s and 2000s, in contrast, the rate of agricultural growth rose to 3.4 percent a year, ahead of a population growth that declined to 2.6 percent a year in the 1990s and 2.5 percent in the 2000s (Nin Pratt et al. 2012). The authors identify two factors associated with accelerated growth: higher commodity prices seen since the early 2000s; and policy reform that began in some countries in the 1980s, most of which had been implemented by the late 1990s.

The more critical question posed, however, concerns the nature of agricultural growth: does it come from, on the one hand, expanded area and increased labour input, or does it come from increases in productivity? Partial measures of productivity of land and labour provide some insight. Growth of land and labour productivity has been slow over the last forty years, but changing fortunes can be seen when land use and productivity are plotted through time (see Figure 2.1 and Nin Pratt et al. 2012).

Figure 2.1 Changes in productivity of land and labour in agriculture, sub-Saharan Africa, 1970–2009



Source: Nin Pratt et al. 2012: Figure 4.7, using data from FAOSTAT. Labour taken as the economically active population in agriculture.

From 1970 to 1984 yields per hectare rose in sub-Saharan Africa, but output per worker economically active in agriculture fell. Subsequently yields increased slowly until 2000, after which they have grown more rapidly. Labour productivity, however, rose considerably from 1984 through to the mid-2000s, after which it has apparently fallen back a little.

Total factor productivity (TFP)[4] is a more comprehensive measure than these two partial statistics. Fuglie (2010) at the United States Department of Agriculture (USDA) compiled comparable data sets for agriculture across the world from the 1960s onwards from which to estimate changes in TFP. Worldwide, TFP has been rising notably through time, so much so that by the 2000s in many parts of the world inputs were being withdrawn from agriculture even as it grew (Table 2.2).

During the 2000s, farming in the high-income, developed countries shed inputs of all kinds, especially labour. Thanks, however, to quite rapid increases in productivity of more than 2.3 percent a year, agriculture grew. The developing world saw slightly slower growth of TFP, but increased use of most inputs, so growth was much more rapid. Within the developing world, however, sub-Saharan Africa differs from other regions: it has had much lower growth of TFP — just under one percent a year. Growth has come largely from additional use of inputs.

Fuglie's work is not the only estimate of TFP growth in Africa; several others have been carried out (see Rezek et al. 2011 for a review). All show a pattern of growth of productivity in the 1960s, halted by reversals in the 1970s, followed by renewed growth subsequently. Estimates, however, depend on which of several methods are used. Rezek et al. suggest that statistical estimates seem better than the non-parametric data envelopment analysis often used. Using a statistical method, they estimated changes in TFP across Africa as shown in Figure 2.2.

The pattern mentioned can again be seen: TFP growth falling and turning negative in the 1970s, followed by sharp recovery from the early 1980s since when growth has fluctuated in the range 0.5-1.5 percent a year. TFP here is decomposed into technical change and efficiency, the former being the technical possibilities on offer, the latter being the extent to which farmers take advantage of them.[5] Hence it is also clear that technical change has long been positive, but has been accelerating since the mid-1980s, while efficiency follows the pattern of TFP, with varying growth since the early 1990s in the range of 0.1-0.9 percent a year.

So although sub-Saharan Africa has had slow growth of TFP compared to other parts of the world, productivity has been improving since the early 1980s. Similar results have been reported by Benin et al. (2011; see Figure 2.3). Indeed, in this account the rates estimated for the 1990s and 2000s are rather high, with TFP improving by more than two percent a year.

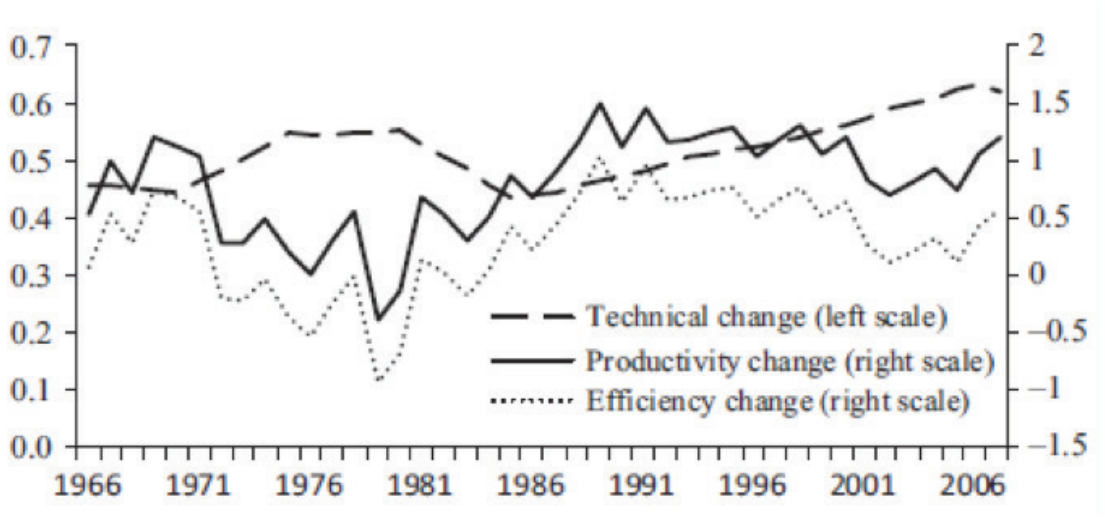
Two papers go on to consider what explains changes in productivity. Fuglie and Rada (2011) model changes in TFP in Africa as a function of national and international agricultural research — taken as a stock of capital using an (Almon) lag function in which research findings are applied cumulatively over eight years, then less so until after 16 years they are considered depleted; plus other conditioning factors such as policy, roads, schooling, conflict and HIV/AIDS. Returns to research are both significant and high, both national and international, with signs of economies of scale at country level in research. For all countries, the return to research is 29 percent, with an estimate for the international public (CGIAR system[6]) research of 58 percent — well above other estimates of the return to the CGIAR across the developing world. The conditioning variables have the expected effects: favourable policy for agriculture improves productivity; while conflict reduces it, as does the prevalence of HIV/AIDS.[7]

Table 2.2 Growth of agriculture, total factor productivity and factors of production, world and selected regions 2001–2010, annual average changes

Global region	Agricultural output	Total factor productivity	All inputs	Land	Labour	Machinery capital	Livestock capital	Materials (fertilisers)
World	2.50	1.81	0.70	0.37	-0.23	1.23	1.16	1.99
Developed countries	0.59	2.32	-1.73	-0.77	-3.34	-0.51	-0.28	-2.07
Developing countries	3.39	2.20	1.20	0.93	-0.13	3.47	1.55	3.53
East and South Asia	3.40	2.69	0.71	0.63	-0.65	3.25	1.31	3.90
Latin America	3.37	2.67	0.70	1.89	-0.50	0.06	1.24	2.00
Sub-Saharan Africa	**3.26**	**0.99**	**2.28**	**1.83**	**2.06**	**1.32**	**2.60**	**4.14**
West Asia and North Africa	2.42	2.04	0.39	-0.11	0.12	1.19	1.62	-0.19

Source: USDA, Economic Research Service, derived from Food and Agriculture Organization of the United Nations and other agricultural data using methods described in Fuglie et al. (2012). Found in March 2014 at: http://www.ers.usda.gov/amber-waves/2013-november/growth-in-global-agricultural-productivity-an-update.aspx#.UzMZ56h_vz4

Figure 2.2 Average annual productivity growth, technical change and efficiency change, sub-Saharan Africa, five-year moving average for 39 countries

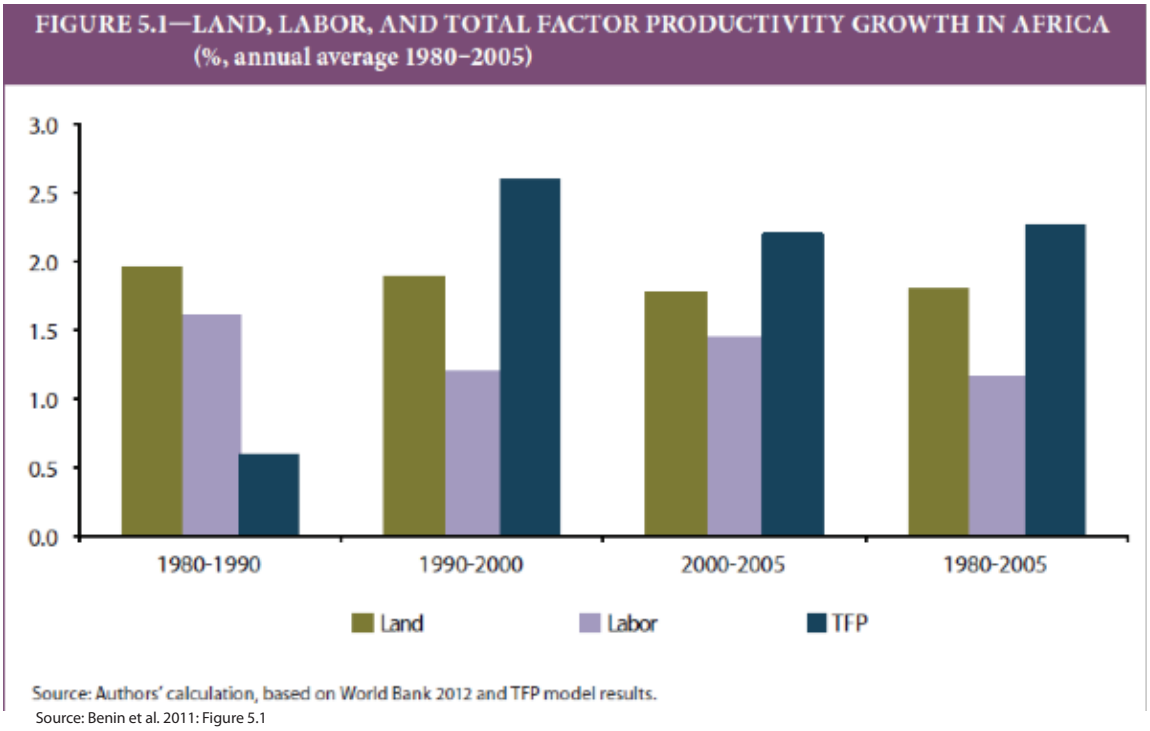


Source: Rezek et al. 2011: Figure 1

Nin Pratt et al. (2012) decompose growth to look at sources of change in production, looking at TFP, factors of production, terms of trade and agricultural output prices. The difference across countries in agricultural growth can largely be explained by differences in TFP and agricultural prices. Surprisingly, they do not see revived growth as coming from research spending, because such spending has increased only slowly and its impacts may not yet be apparent.

Two qualifications apply to these quantitative studies. One is that they all depend on official statistics collated by FAO, the World Bank and the USDA: as discussed in the introduction, few of the statistics for agricultural production and the inputs used could be considered reliable, much less robust. It is surprising that there is only a single reference to the quality of data — concerning the Nigerian agricultural workforce — in the studies reviewed. The fear is that a measure such as TFP could be greatly influenced by errors in the data, and the fact that

Figure 2.3 Changes in land, labour and total factor productivity for Africa, 1980–2005



Source: Benin et al. 2011: Figure 5.1

all studies use the same data creates a self-reinforcing dynamic.

The other qualification concerns regional and continental aggregates. Given the disparate sizes of the countries, changes in geographical aggregate statistics may very largely reflect changes in one or two countries for the region. West Africa, for example, is dominated by Nigeria where both agricultural and population statistics are often questioned.

In sum, then, both case studies and the country-level statistics suggest faster growth of agriculture in the 2000s than has been since the 1960s, with some signs of rising productivity of land and labour — even if these gains are limited compared to other parts of the developing world.

3. Agricultural performance of the New Alliance countries from 1990 to 2011

This section presents results derived from officially reported national-level statistics for the period from 1990 to 2011, mainly drawing on data supplied by national governments to the FAOSTAT database.

In most cases, statistics have been calculated for Africa as whole; for the five UN regions[8] — Eastern, Middle, Northern, Southern and Western; and for the ten New Alliance countries.

3.1 Context: economic growth

Most of the New Alliance countries have been growing relatively quickly since the early 1990s (Figure 3.0). Six of the ten have registered two percent or more a year growth of per capita GDP, with Ethiopia and Mozambique reporting growth equivalent to rates of over three percent a year, albeit from very low baselines. At the other end of the range lies Côte d'Ivoire where civil conflict was associated with a fall in GDP over the last two decades.

Comparing the 1990s to the 2000s, in seven out of ten New Alliance countries growth has accelerated, the exceptions being Benin, Burkina Faso and Côte d'Ivoire. Half of the countries have been growing at three percent or more a year per capita in the 2000s, a rate that would double incomes in less than 24 years.

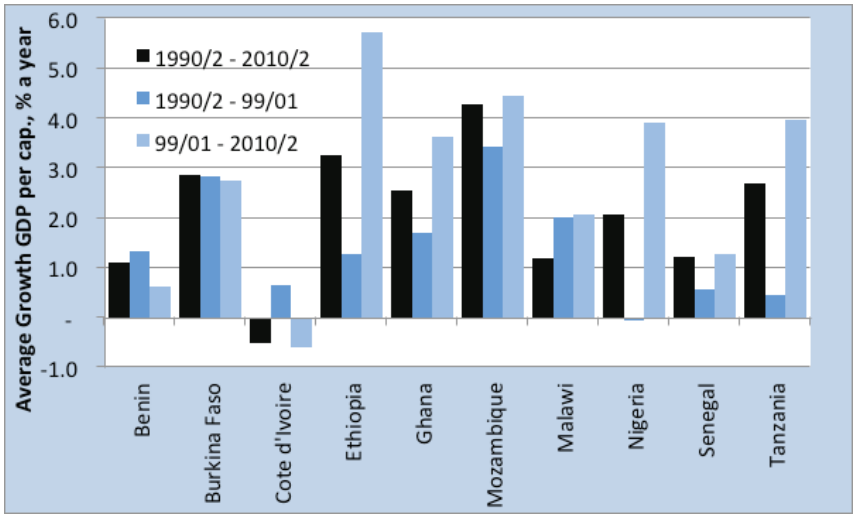
How well do these rates compare to agricultural growth, as computed in the next section? As might be imagined given the importance of agriculture in most of the ten economies, the correlation is quite strong at 0.71, implying that about half the variation in overall economic growth might be explained by agricultural growth. Outliers include Malawi where farming growth has outstripped that of the overall economy; while overall growth outpaced agricultural growth in Burkina Faso, Senegal (both perhaps due to remittances) and Tanzania (perhaps due to minerals).

3.2 Growth of agricultural production

Between 1990-1992 and 2009-2011[9], African agricultural production grew by an annual average of 3.2 percent a year, just ahead of population growth, so that per capita production expanded by 0.8 percent a year. Within the continent, North and West Africa did better than the average (Figure 3.1). For most regions there were modest increases in production per person, with only one region where production lagged behind population growth, Middle Africa.

Compared to continental and regional growth rates (Figure 3.2), those in eight out of the ten New Alliance countries were faster, in some cases by large margins: Malawi, Mozambique, Ethiopia, Ghana and Benin all exceeded four percent a year. In the first four of these countries, growth exceeded that of population by two percent a year — so that over the 19 years, domestic agricultural production was almost half again as much

Figure 3.0 Economic growth, New Alliance countries, GDP per capita, 1990-1992 to 2010-2012



Source: World Development Indicators, The World Bank

per person as it was in 1990-1992. Côte d'Ivoire and Senegal saw less growth than the continental average: in the former increased production only just matched population, while in the latter it fell slightly behind. Overall, the New Alliance countries coincide with the more successful agricultural economies of Africa.

These aggregate statistics provoke further questions, including:

- Are there signs that agricultural growth has accelerated during the last two decades?
- Has the composition of output changed significantly? Is the output of some products growing particularly quickly?
- If agricultural output is growing ahead of population growth, then why are food imports rising in Africa?
- To what extent is productivity of agriculture rising?

These will be addressed in turn.

Figure 3.1(a) Growth of agricultural production, production index by value, three year moving average, Africa and regions, 1990-1992 to 2009-2011

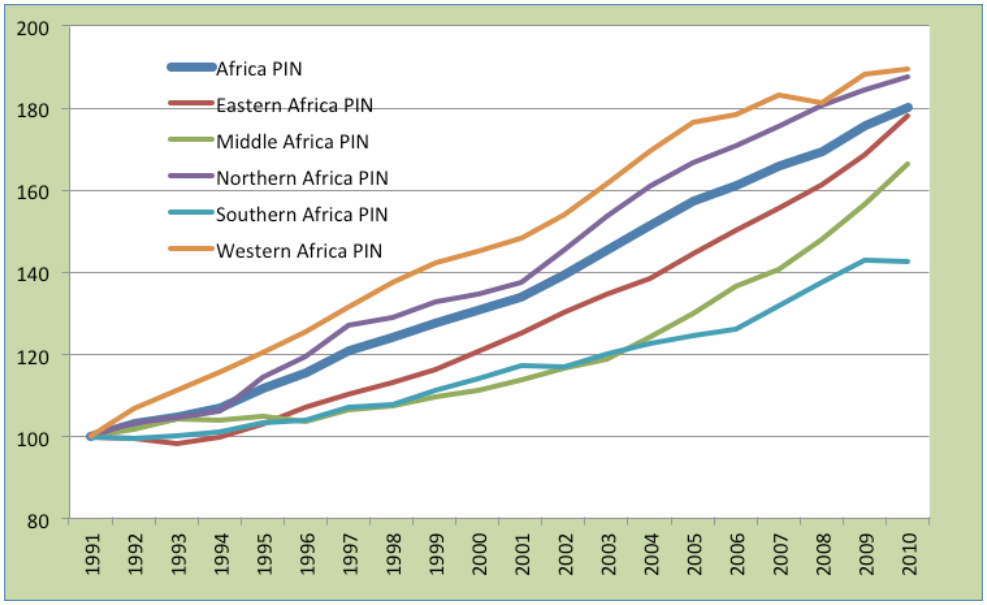
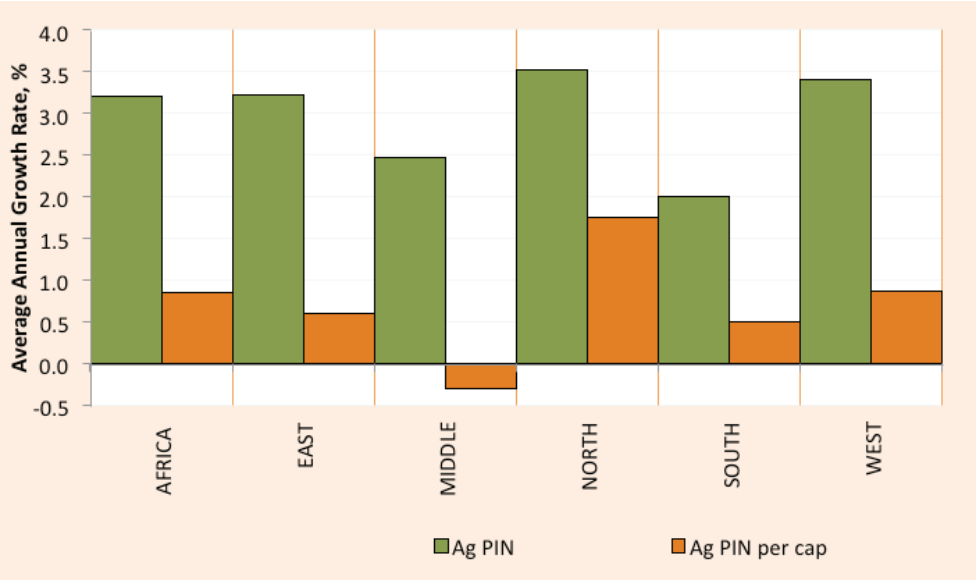


Figure 3.1(b) Growth of agricultural production, average annual growth rate, three year moving average, Africa and regions, 1990-1992 to 2009-2011



Source: FAOSTAT data. Production indices constructed by using price for each commodity at 2004-2006. Index set to 100 in 1990-1992. Growth rates computed by regression of production index on time.

Trends in growth rates

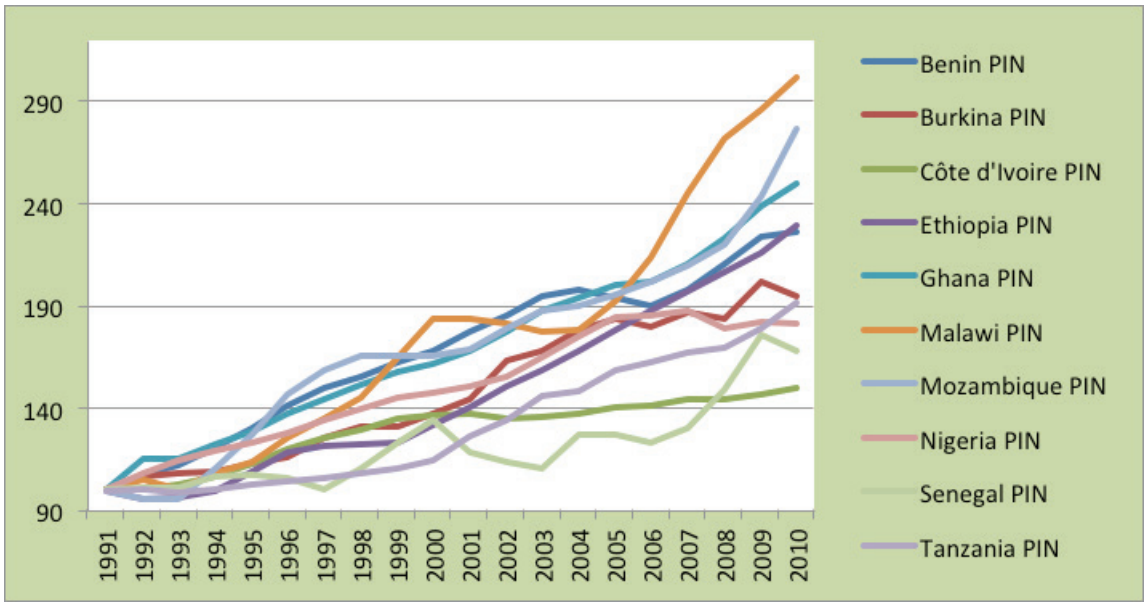
There has been a small acceleration in growth at the continental level, and for three of the five regions shown in Figure 3.3(a). Middle Africa has seen the largest increase, but that is partly owing to the very slow growth of the region in the 1990s.

Changes in growth rates have tended to reduce the disparities of the 1990s when North and West Africa grew faster than elsewhere. During the 2000s growth in these regions has slackened, while that in the other three regions has accelerated.

For the New Alliance countries, however, growth slowed in the 2000s for seven of ten, the exceptions being Ethiopia, Senegal and Tanzania. Again, since the latter two exhibited some of the slowest growing agricultures of the 1990s, changes in growth rates tended to reduce the disparities across countries — especially since growth slowed significantly for some of the fastest growing agricultures of the 1990s.

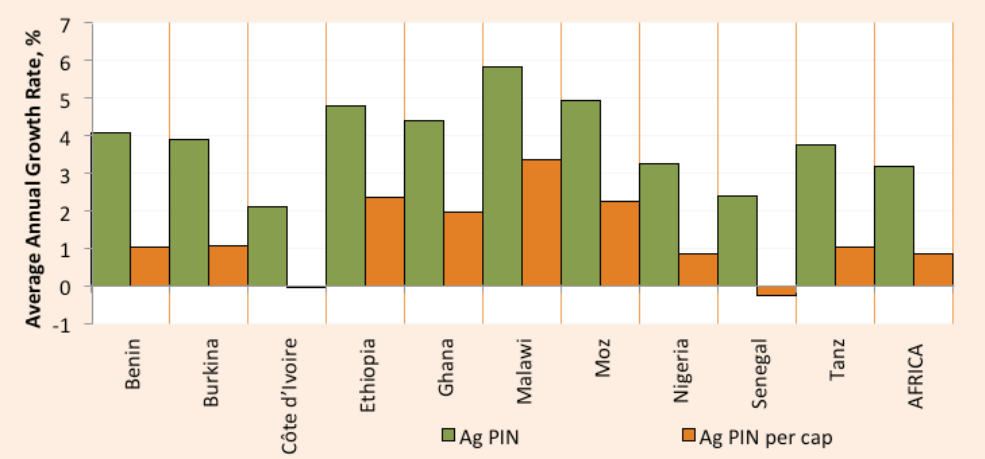
Although agriculture may be growing only a little faster in the 2000s compared to the 1990s, this needs to be set in the longer historical context. Between the early 1970s and 1980s most parts of Africa saw very low agricultural growth. Rates seen since 1990 are considerably greater than those seen at that time.

Figure 3.2(a) Growth of agricultural production, production index by value, three year moving average, New Alliance countries, 1990-1992 to 2009-2011



Source: FAOSTAT data. Production indices constructed by using price for each commodity at 2004-2006.

Figure 3.2(b) Growth of agricultural production, average annual growth rate, three year moving average, New Alliance countries, 1990-1992 to 2009-2011



Source: FAOSTAT data. Production indices constructed by using price for each commodity at 2004-2006. Index set to 100 in 1990-1992. Growth rates computed by regression of production index on time.

Figure 3.3(a) Agricultural growth rates, Africa and regions, 1990s and 2000s compared

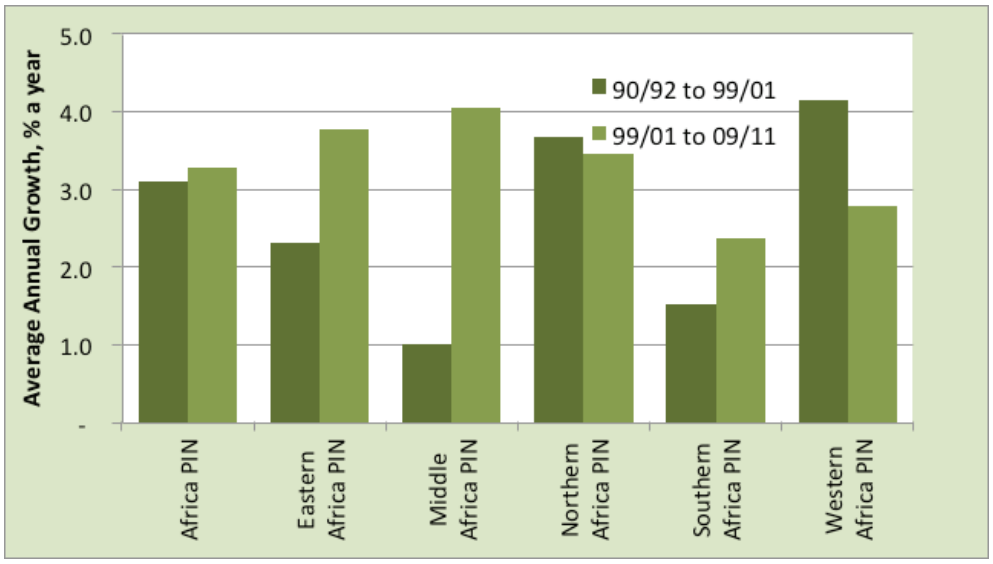
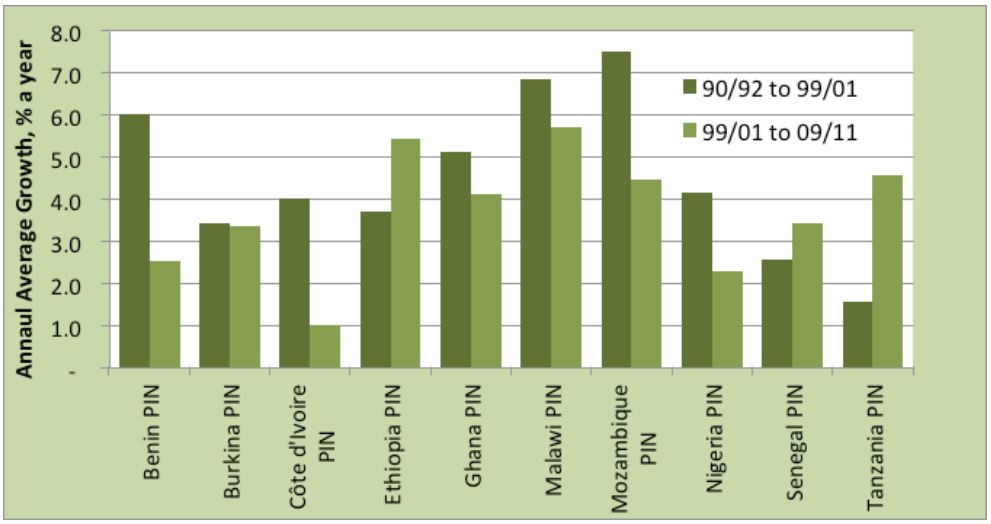


Figure 3.3(b) Agricultural growth rates, New Alliance countries, 1990s and 2000s compared



Source: FAOSTAT production indices. Growth rates computed by regression of 3 year moving averages.

Composition of growth

When the composition of agriculture in Africa is broken down by major groups of crops and livestock, little change is apparent from the early 1990s to the present (Figure 3.4). Agriculture is dominated by a few product groups that make up 87 percent of the value of production: roots and tubers, livestock, cereals, fruits and vegetables. Relatively little output is made up of the traditional export crops of cotton, cocoa, coffee, rubber, sugar, tea, etc. — almost all of which fall in the 'beverage, fibre and other non-food category' in the chart.

Over the two decades, changes at this level of disaggregation have been modest. The share of cereals has fallen by three percentage points while that of roots and tubers has risen by the same amount. Livestock's share rose by a percentage point, that of beverage, fibre and other non-food crops — very largely the traditional cash crops — fell by two percentage points. The share of the other groups has not changed.

Star performers amongst individual products

At this considerable level of aggregation, however, it may not surprise to see few changes in composition. Hence for the New Alliance countries we looked for those products where growth has reached six percent a year on average over two decades — the Maputo target.[10] We also looked at whether growth rates for particular products had changed since the Maputo declaration, comparing rates for 1990-1992 to 2003-2005 with those for 2003-2005 to 2009-2011. To focus on significant products, the search was limited to crops for which at least 10,000 tonnes, and for livestock products at least 5,000 tonnes, were produced annually in 1990-1992 — thereby ignoring minor products that might have grown from a very low base.

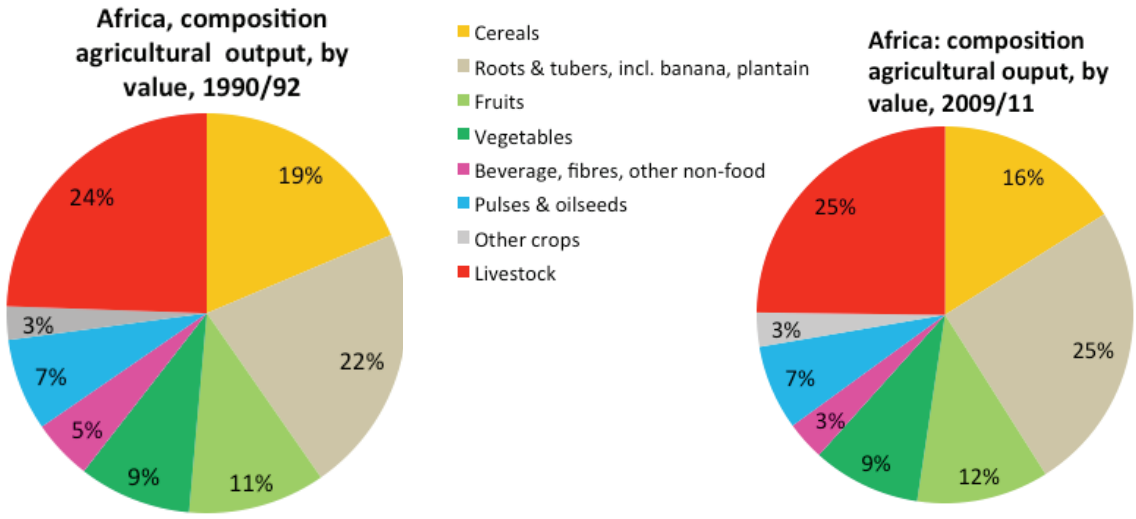
Trends in production for all crop products were examined to identify 'stars', those growing at more than an average of six percent a year, and 'near-stars', those achieving five percent a year of growth on average. Crop results appear in Table 3.2(a), livestock in 3.2(b). Production graphs of the products were also examined to determine if any display prima facie evidence of systematic fudging or possible data error. A summary of possible data issues is presented in the annex. Those stars or near-stars which have been identified as crops with questionable data are highlighted in grey in Table 3.2.

For crops, high performers can be seen in all categories, but in most countries it is cereals, roots and tubers (starchy staples), pulses and fruit and vegetables that are most common. For livestock, most of the high performers are meat, especially that from pigs and poultry, some small stock — but none from beef. Somewhat surprisingly, only in Ethiopia and Tanzania does dairying feature.

With the exception of fruit such as pineapple, the high performers are largely produce destined for domestic and regional markets. The traditional export crops are notable by their scarcity: only cotton and sugar in Mozambique, rubber in Côte d'Ivoire, and tobacco in Tanzania show stellar performance.

Overall, commodity booms seem largely comprised of food crops for domestic and regional markets.

Figure 3.4 Composition of agricultural production, Africa, by value, 1990-1992 and 2009-2011



Source: FAOSTAT production indices. Growth rates computed by regression of 3 year moving averages.

Table 3.2(a) Crop stars (bold) and near-stars (italics) in New Alliance countries, 1990-1992 to 2009-2011

	Benin	Burkina Faso	Côte d'Ivoire	Ethiopia	Ghana	Malawi	Mozambique	Nigeria	Senegal	Tanzania
1990-92 to 2009-11										
Starchy staples 30,16	**Cassava** *Yams* *Maize* **Rice** *Sweet potato*	**Maize** **Rice** **Sweet potato**		**Maize** **Sorghum** *Teff* **Wheat** *Barley* **Millet** **Sweet potato** *Yams* **Bananas** **Rice**	*Cassava* **Yams** **Plantains** *Maize* **Rice**	**Cassava** *Maize* **Potatoes** **Bananas** *Rice* **Sorghum**	*Cassava* **Maize** **Sweet potato** *Sorghum* **Rice** **Bananas** *Potatoes*	**Sweet potato** **Taro** **Potatoes** *Wheat*	*Rice* **Cassava**	**Bananas** **Sweet potato** **Rice** *Potatoes*
Pulses, nuts, hops 14,14	*Beans, dry*	*Cow peas, dry* *Ground nuts*	*Shea nuts*	*Broad, horse beans* **Beans, dry** **Chick peas** *Peas, dry* **Vetches** **Lentils** *Hops*	**Ground nuts**	**Groundnuts** *Pigeon peas*	*Pulses, nes* *Cashew nuts*	*Groundnuts* **Cashew nuts** *Soybeans*	**Cow peas, dry**	*Beans, dry* **Groundnuts** **Pigeon peas** *Cow peas, dry* **Pulses, nes** **Cashew nuts** **Peas, dry** **Chick peas**
Oil crops	*Palm oil* *Palm kernels*			*Sesame seed* **Oilseeds, nes** *Linseed*	*Oil palm fruit*			**Palm kernels** **Sesame seed**	*Oil palm fruit*	**Sunflower seed** **Sesame seed** *Oilseed, nes*
Cash crops (trad)5,4		*Cotton*	**Rubber**		*Cocoa beans*		**Sugar cane** **Cotton**			**Tobacco**
Fruit and veg 18,10	**Pineapples** *Tomatoes* *Chillies & pepper*		*Fruit, tropical nes* **Mangoes**	**Cabbages** **Chillies & pepper** *Onions, dry* **Garlic** **Fruit, tropical nes** **Oranges**	**Oranges** **Tomatoes** **Onions** **Chillies & peppers, dry** **Pineapples**	**Mangoes** *Cabbages*	**Pineapples**	*Veg, fresh nes* **Tomatoes** *Onions, dry* *Melonseed* **Ginger**	**Onions, dry** **Tomatoes** *Watermelons*	*Tomatoes*
Stars, Near star	3,8	3,5	2,2	18,8	9,4	6,4	9,5	8,6	4,3	12,5

Table 3.2(b) Livestock product stars (bold) and near-stars (italics) in New Alliance countries, 1990-1992 to 2009-2011

1990-92 to 2009-11										
Meats (8,6)	*Chicken meat*	**Pig meat**		*Sheep meat* *Goat meat* **Camel meat**	**Chicken meat** **Goat meat** *Sheep meat*	**Pig meat**	**Pig meat**	*Goat meat* *Pig meat* **Sheep meat**	**Chicken meat**	
Eggs			*Hen eggs*		**Hen eggs**			*Hen eggs*	*Hen eggs*	
Dairy (4,1)				**Cow milk** **Camel milk** **Goat milk** *Sheep milk*						**Cow milk**
Aquatic				**Capture fish**			**Capture fish**	*Capture fish* **Aquaculture**		
Hides				*Sheep skins* **Goat skins**				*Goat skins* **Sheep skins**		

Source: FAOSTAT data. Note: Stars defined as crops with average annual growth rate >6%, near stars with growth rate >4% but less than 6%. Stars appear in bold, near stars in italics.
Growth rates for Ethiopia calculated for 1993-1995 to 2009-2011.

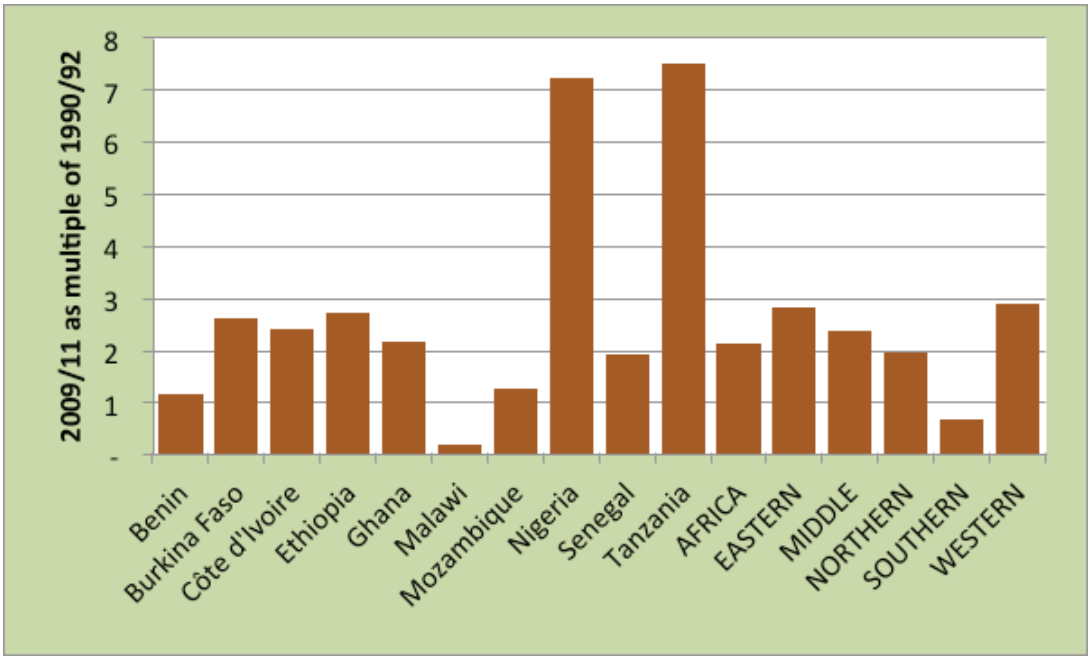
For aquatic products, total production from capture fisheries and aquaculture were included where each of the quantities of these produced was above 5,000 tonnes, aggregated across species.

Cereals imports

Despite the apparent growth in both agricultural and food production over the last two decades, imports of cereals have increased considerably. For the continent as a whole imports have more than doubled, rising from 29m tonnes to 63m tonnes between 1990-1992 and 2009-2011. Most of the regions of Africa and the New Alliance countries have seen their imports at least double, with only a few exceptions. Benin, Mozambique and Senegal have lesser increases, while Southern Africa and Malawi have reduced their imports (Figure 3.5).

To help answer this, cereals imports need to be set in context. If cereals imports are compared to population (Figure 3.8), it is readily apparent that for many countries, the amount imported is not large: less than 40kg a person a year, or about one (90kg) bag of grain from the field

Figure 3.5 Change in cereals imports, Africa, regions and New Alliance countries, 1990-1992 to 2009-2011



Source: FAOSTAT data

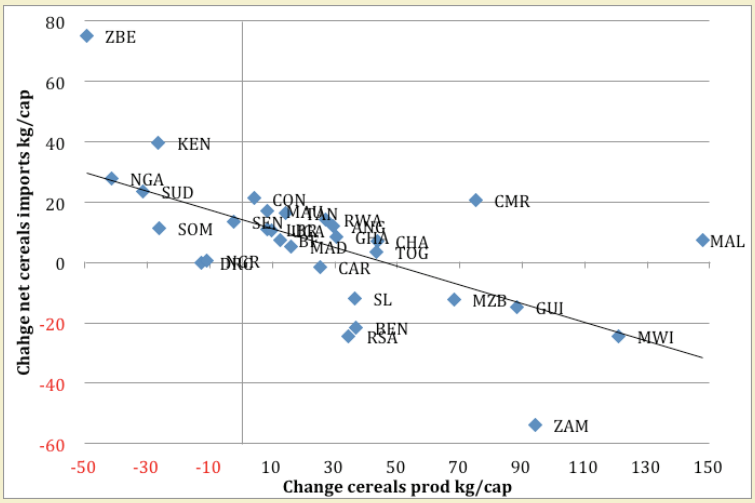
Do these statistics mean, as some not surprisingly think, that production is overstated and that the continent is increasingly reliant on external food supplies (see Box 3A)?

Box 3A: Do cereals imports correlate with domestic production?

Do rising cereals imports to Africa correlate inversely with reported domestic production of cereals from 1990-1992 to 2009-2011? We compared for all countries the change over this period in domestic cereals production to the change in net cereals imports, in both cases expressed per person. Simple accounting suggests that where cereals production per person is rising, then cereals imports should be falling. A first analysis showed that North Africa produced many outliers in the relationship, with much higher imports than might be imagined given rising cereals production. That probably arises from the demands of chicken farms for feed.

Omitting North Africa gives a much clearer analysis, where fully 40 percent of the change in imports can be explained by changes in domestic cereals production. A scatter graph is instructive (Figure 3.7).

Figure 3.6 Changes in cereals production and net imports, sub-Saharan Africa, 1990-1992 and 2009-2011



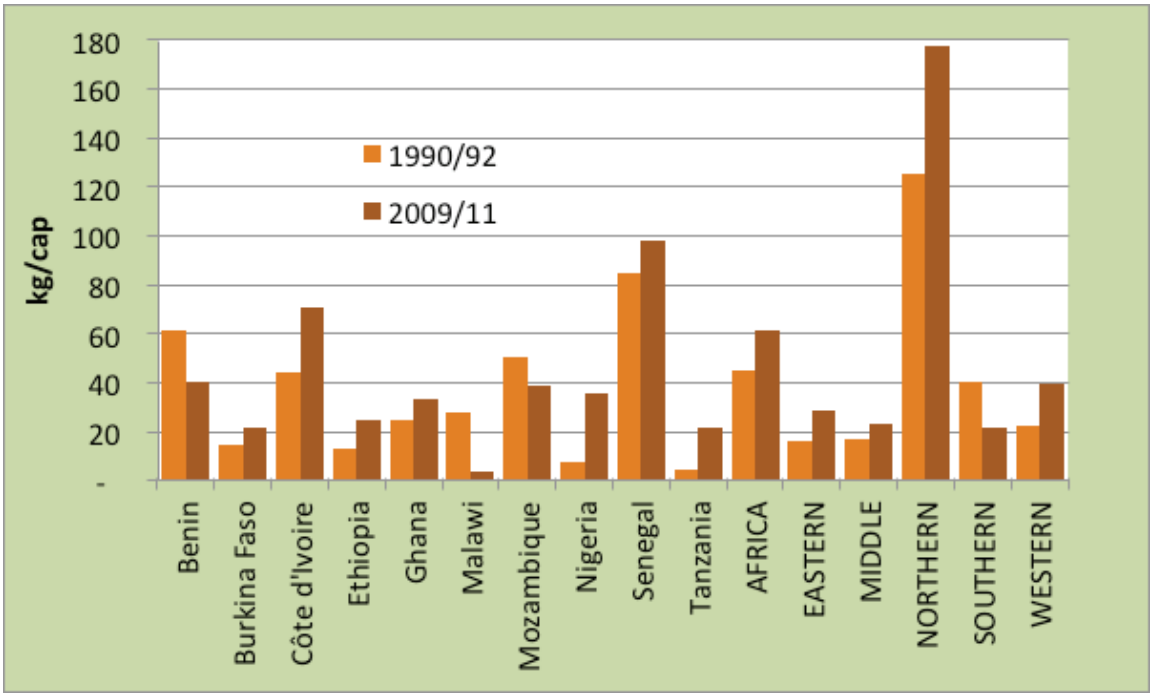
Source: FAOSTAT data

Most countries cluster around the trend line estimated by linear regression. Countries above the line are those that have seen more imports than expected – Zimbabwe, Kenya, Cameroon and Mali being prominent. Those below are those that have seen less than expected, such as Benin, South Africa and Zambia.

Two things are readily apparent. First, a country that produced the same amount of cereals per person in the two periods would have seen rising imports per person. The regression estimates an intercept of 14.5 kg per person. Simple accounting thus misleads. This is not that surprising, however, if incomes are rising: even if the elasticity of demand for cereals is low, it is still positive, so that per capita consumption of cereals almost certainly rose over the two decades.

Second, only 40 percent of the variation can be explained by regression: most of the variation in changing cereals imports responds either to other factors – most probably country variations in the popularity and costs of imported rice and foods made from imported wheat – or possibly to errors in data.

Figure 3.7 Cereals imports per person, Africa, regions and New Alliance countries, 1990-1992 to 2009-2011



Source: FAOSTAT data

per person, allowing for waste and processing. The great exception comes from Northern Africa, where cereals imports have reached more than 175kg a head. Côte d'Ivoire and Senegal of the New Alliance countries also have notably higher cereals imports than others.

How dependent is Africa on imports for its supply of cereals? Overall, 29 percent of supplies have come from imports in recent years compared to 24 percent in the early 1990s (Figure 3.8). Variations across regions and countries are, however, pronounced. Northern Africa depends on imports for 48 percent of its supplies; Senegal is similarly dependent, while Côte d'Ivoire depends more than 50 percent on imports. On the other hand, for most other countries in the New Alliance dependence on imports is 20 percent or less, with the three landlocked territories of Burkina Faso (nine percent), Ethiopia (11 percent) and Malawi (one percent) having notably low levels of dependence.

Dependence on cereals matters less in countries where roots and tubers make up an important part of staple foods, as applies in coastal West Africa, Middle Africa and some parts of Eastern Africa. Hence, for example, while Côte d'Ivoire may depend on imports for more than half of its cereals, these only make up about 27 percent of the combined dietary energy of cereals, roots and tubers consumed in that country.

Africa's cereals imports can be deceptive when aggregated. Breaking the different products down into categories produces some intriguing insights. In 2009-2011 the continent imported (net) almost 64m tonnes of cereals. Out of those imports, only five items registered 1m or more tonnes: wheat at 38m tonnes and wheat flour at almost 1.5m tonnes, rice at almost 12m tonnes, maize at 11m tonnes and barley at around 1m tonnes. These items make up fully 94 percent of cereals imports.

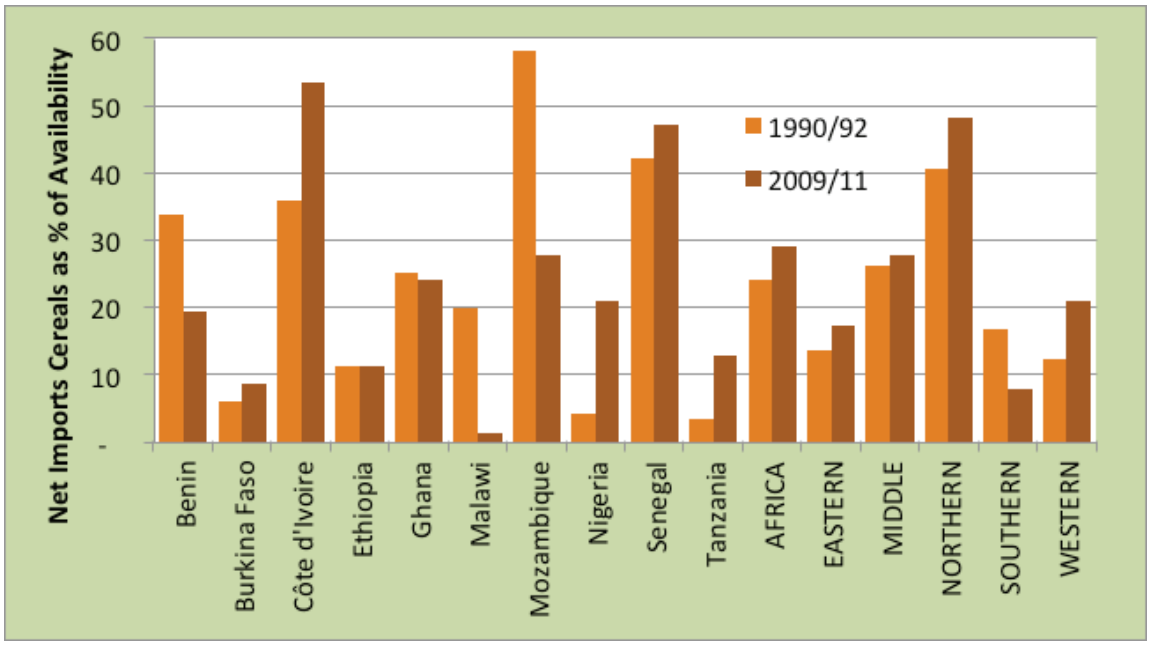
Where are these imports going? Northern Africa dominates cereals imports as a whole, accounting for almost all barley and maize imports. Barley imports are (probably) largely for brewing: beer brewing has boomed in Algeria, Egypt and Tunisia over the last two decades. Most of the maize is probably headed for livestock feed, since maize barely features in North African cooking, while the region has booming poultry production — output of chicken has risen by 2.5 times in the last two decades in the region.

Hence, the net cereal imports of the rest of Africa, sub-Saharan Africa, are almost entirely a matter of rice, wheat and wheat flour. Wheat and wheat flour imports reflect the popularity of bread, pasta, biscuits and cakes with urban populations across Africa. Africa has limited areas where wheat can readily be grown: wheat does not thrive in the moist and hot tropics, and even in some of the appropriate areas, farmers are unfamiliar with the crop (Mason et al. 2015, forthcoming).

Rice imports have exploded in the last two decades, with amounts imported doubling, tripling or more since the early 1990s (Figure 3.10). Rice imports, net, are largely to sub-Saharan Africa, with West Africa taking about half the imports.

In sum, then, cereals imports may be rising, but with two major qualifications. One, the boom in wheat imports has much to do with the tastes of urban consumers for wheat products — and their convenience for urban households where working adults mean little time can be spared for cooking (Mason et al. 2015, forthcoming).

Figure 3.8 Net imports of cereals as share of domestic supply, Africa, regions and New Alliance countries, 1990-1992 and 2009-2011



Source: FAOSTAT data

Two, rice presents a puzzle. Africa can grow rice, both wetland and upland: West Africa is one of the world's two rice hearths. Failure to increase local production to meet rising local demand, however, may be explained by the segmentation of rice markets whereby local rice lacks the characteristics of even quality, cleanliness and packing that imported rice has (Lançon and Benz 2007).[11]

Changes in productivity

Raising productivity matters as much if not more than increasing production. Improved productivity allows factors of production to be moved from agriculture to other sectors, thereby facilitating their growth as well as the transition from an agrarian to an industrial economy. Higher labour productivity in agriculture should lead to higher incomes for those working on farms. Yet there is concern that what growth there has been in agriculture in Africa has come primarily from adding land and labour, with little improvement in productivity.

Previous work (see Section 2.2) has tended to estimate total factor productivity, but has done so with limited data and in some cases using a method that may not be reliable. Here the approach is simpler: to examine what has happened to the productivity of land and labour, using straightforward statistics.

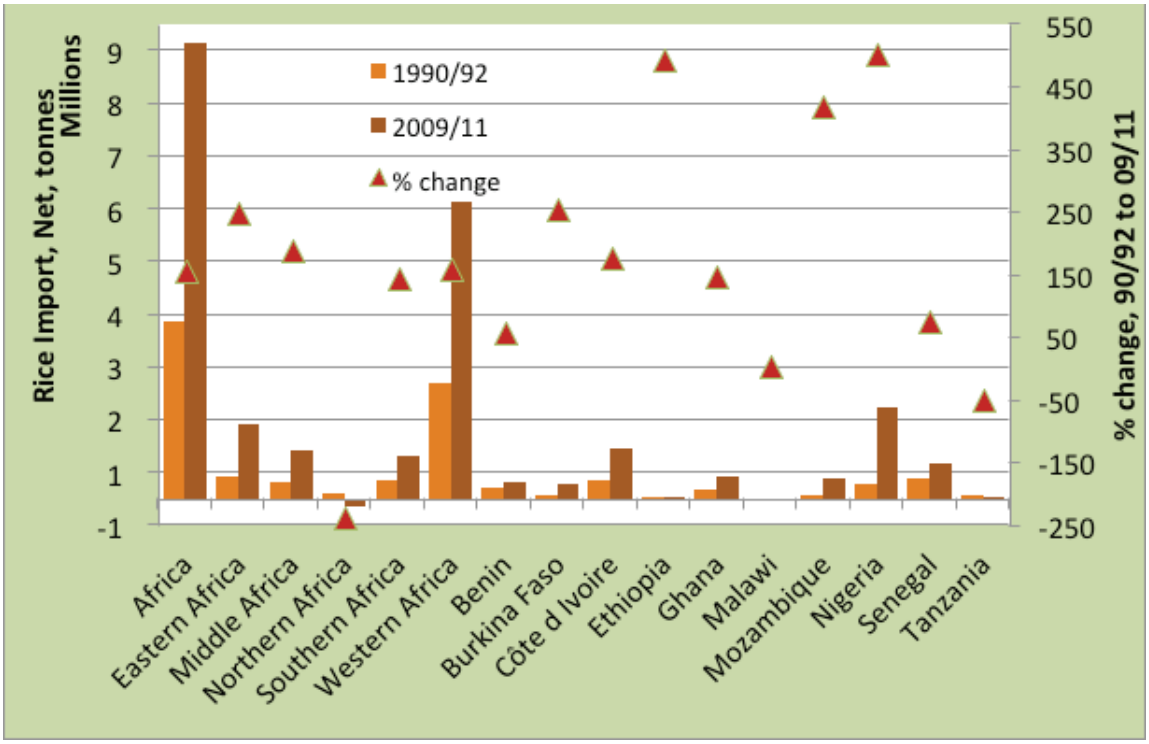
Land productivity: crop yields

Has the increase in agricultural output in Africa come from expanding the cultivated area, rather than intensification of cultivation with rising yields per hectare? Expansion of land for arable and permanent crops has, in fact, been modest over the last two decades: an annual average growth of just 1.1 percent (Figure 3.10). The region with the highest increment in land, West Africa, has expanded the area to crops by 1.6 percent a year on average. The New Alliance countries, however, have apparently seen a greater rate of increase in their cultivated area: six of the ten countries had growth rates of two percent a year or more, with Ghana exceeding three percent a year. Of course, given that most of the New Alliance countries have seen faster agricultural growth than the continental average over the last two decades, it should not be surprising that they also saw above average expansion in the cultivated area. The question then is whether their growth is largely a result of this, or whether they saw intensification and higher land productivity as well.

Taking as a measure of overall land productivity the value, in constant terms, of gross production divided by the area to arable and permanent crops,[12] Africa saw considerable increases in land productivity (Figure 3.11) for the period in view. For the continent as a whole, agriculture was producing 45 percent more per hectare at the end of the two decades — the equivalent of an annual average increase of two percent a year.

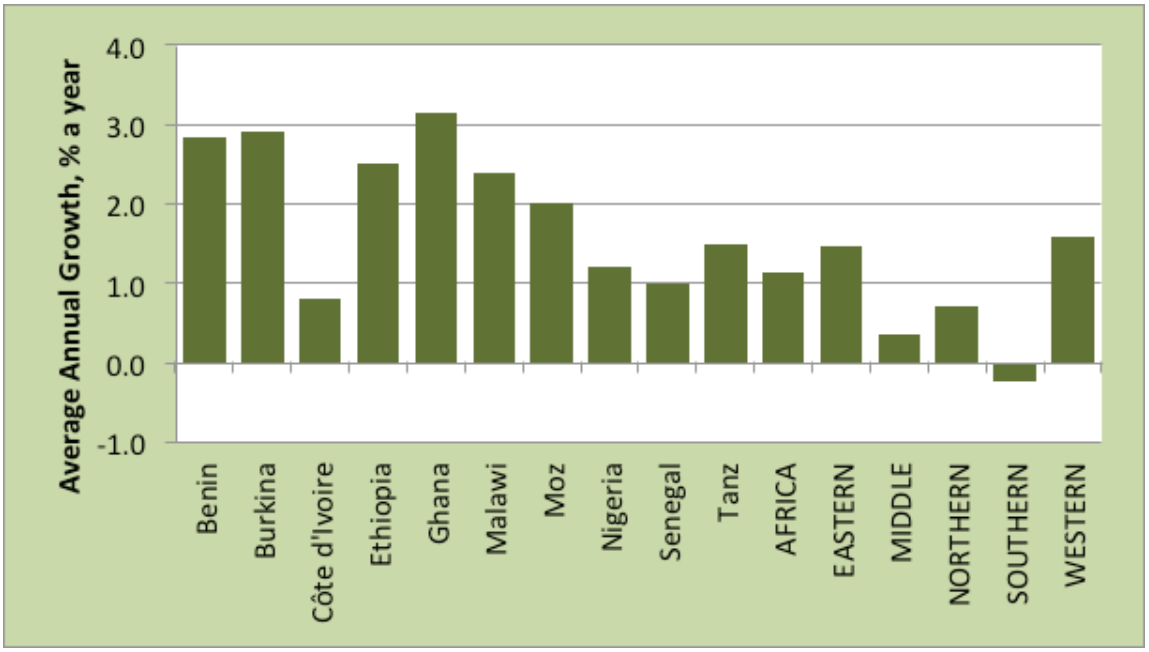
Geographical averages, however, hide some wide variations in performance across countries. Half of the New Alliance countries have increases greater than the continental average, with especially large increases seen in Malawi and Mozambique, although the latter began from a very low base indeed. At the other end of the range, Burkina Faso and Côte d'Ivoire saw only slight increases in their land productivity.

Figure 3.9 Imports of rice, Africa, regions and New Alliance countries, 1990-1992 to 2009-2011



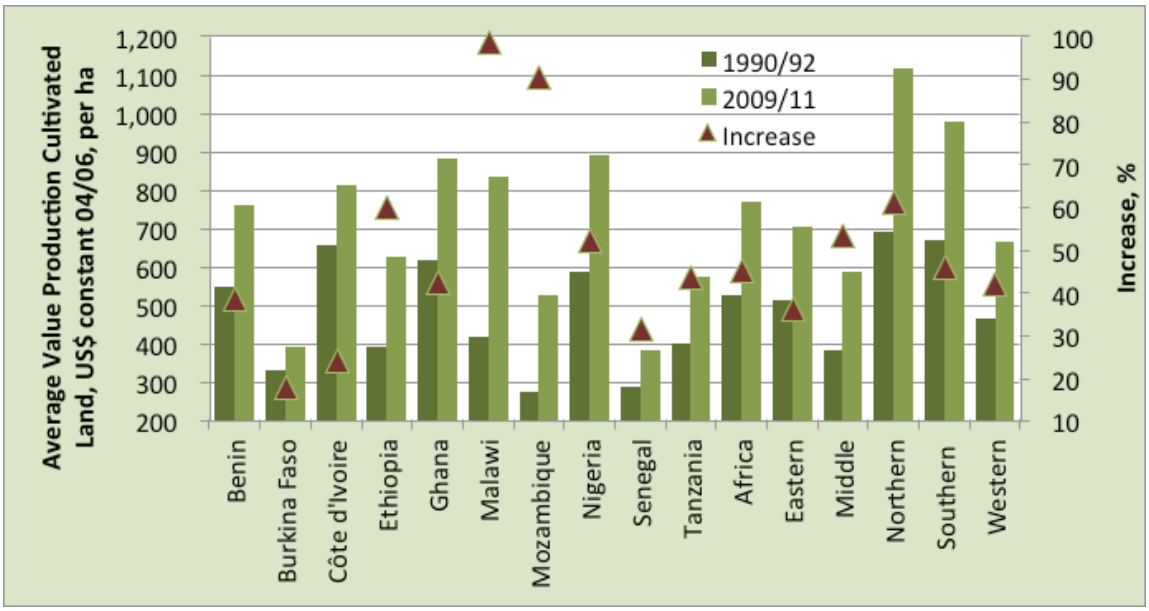
Source: FAOSTAT data

Figure 3.10 Increases in area to arable and permanent crops, 1990 to 2011



Source: FAOSTAT data

Figure 3.11 Average value production on cultivated area, Africa, regions and New Alliance countries, US$ constant 2004-2006, for 1990-1992 and 2009-2011



Source: FAOSTAT data for gross production value using constant prices for output, compared to land under arable and permanent crops.

Aggregate land productivity could increase if farmers were switching from low to high value crops, although it seems (see the previous section) that the composition of output was little changed in the two decades. To check whether the aggregate measure reflects changes for specific crops, cereal yields were examined (see Figure 3.12).

Over the two decades, cereal yields have grown continentally and in all regions and countries, albeit in most cases from low initial levels. Percentage increases for the two decades are 30 percent for all of Africa. The regions show increases between 25 percent for North and 137 percent for Southern Africa. Most New Alliance countries have exceeded continental average increases, with five having raised yields by 50 percent or more: Côte d'Ivoire, Ethiopia, Ghana, Malawi and Mozambique, the last two showing very large increases indeed.

Cereals yields remain, however, low: only one of the New Alliance countries, Malawi, has reached 2t/ha. Only one region, Southern Africa, has an average level of more than this, at 3.6t/ha.

In sum, yields have been increasing in most parts of Africa. The idea that agricultural growth has been mainly the result of expanding the area with little or no improvement in land productivity is not supported by the available national data. In most cases, yield gains have contributed more to growth of output than area expansion: this is true for Africa as a whole, for all regions, and for most New Alliance countries with the exceptions of Benin, Burkina Faso and Ghana.

Labour productivity

Over the two decades, the estimated economically active population in agriculture in Africa has increased by 45 percent. Only one region saw the numbers fall: Southern Africa. In several of the New Alliance countries, the increase was more than 50 percent, although it fell in Nigeria[13] and barely rose in Côte d'Ivoire.

The growth of the agricultural labour force has, however, been less than that of production, so that labour productivity has risen (Figure 3.13). For Africa as whole, labour productivity rose by 24 percent, although larger gains of 40 percent or more were seen for Northern, Southern and Western Africa. For all but two New Alliance countries, gains were 40 percent or more, the exceptions being Burkina Faso and Senegal.

These gains, however, have mostly been from a low base. Even by the end of the 2000s, only four New Alliance countries and three regions saw the average agricultural worker producing more than US$1,000 a year: Benin, Côte d'Ivoire, Ghana, Nigeria and the regions of Northern, Southern and Western Africa. Labour productivity remains very low indeed for the other six New Alliance countries — less than US$500 a worker a year in all cases other than Malawi where the figure is US$630 a year.

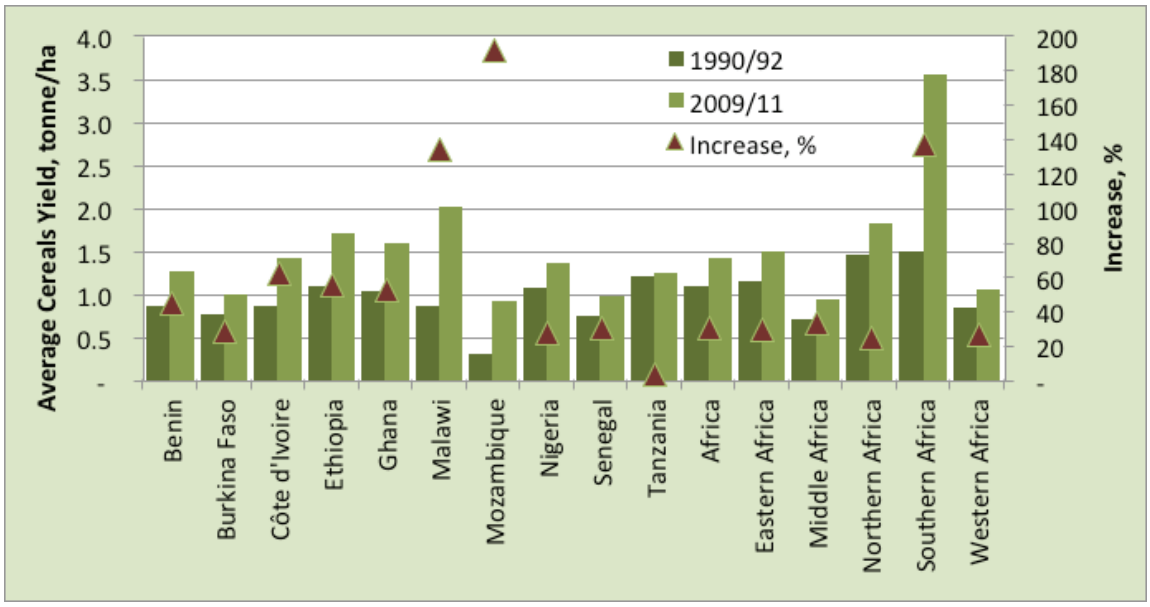
In sum, labour productivity is rising and relatively quickly in the New Alliance countries, but from a low base. However, despite increases in land and labour productivity, for most people employed, farming alone still generates little more than a poverty wage.[14]

3.3 *Outcomes: poverty and nutrition*

Although other factors come into play, in agrarian societies it is to be expected that agricultural growth should lead to reductions in poverty and malnutrition.

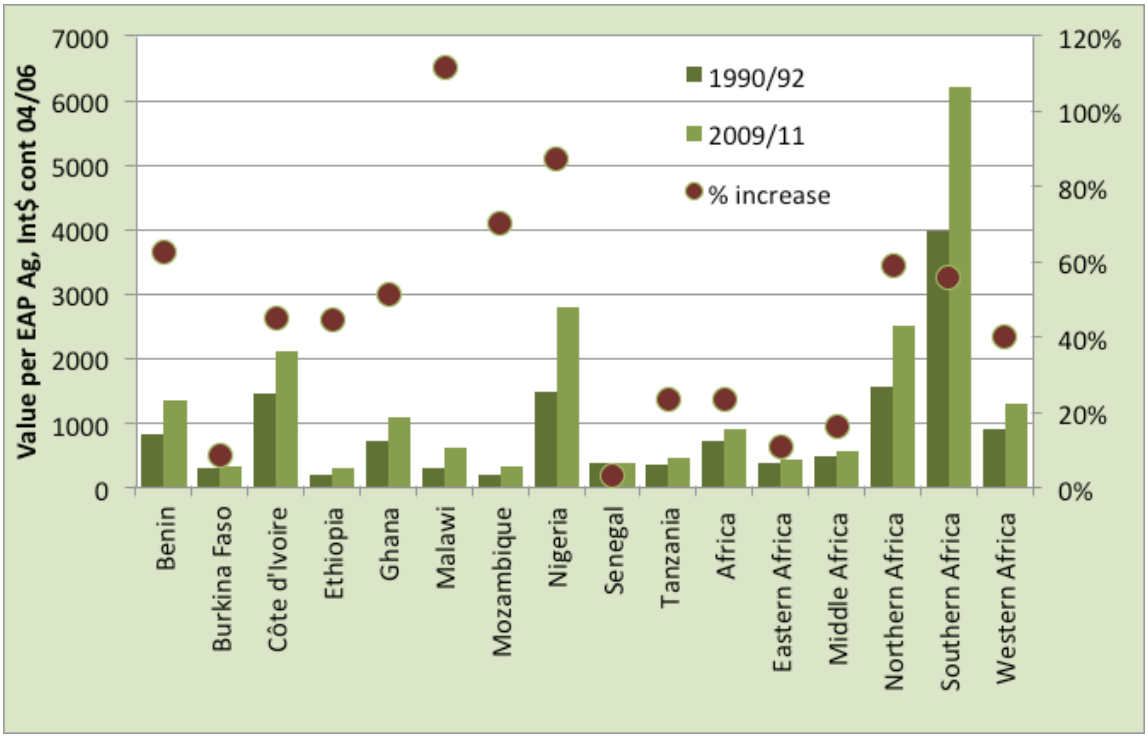
In all but two New Alliance countries — Côte d'Ivoire and Nigeria — poverty has been falling significantly over the last two decades (Figures 3.14 and 3.15), with annual average rates of reduction of more than one percent a year in seven cases — albeit from high initial levels. Ethiopia, Ghana and Senegal have cut their rates of poverty by more than 20 percentage points. For six of

Figure 3.12 Cereals yields, Africa, regions and New Alliance countries, 1990-1992 to 2009-2011, t/ha



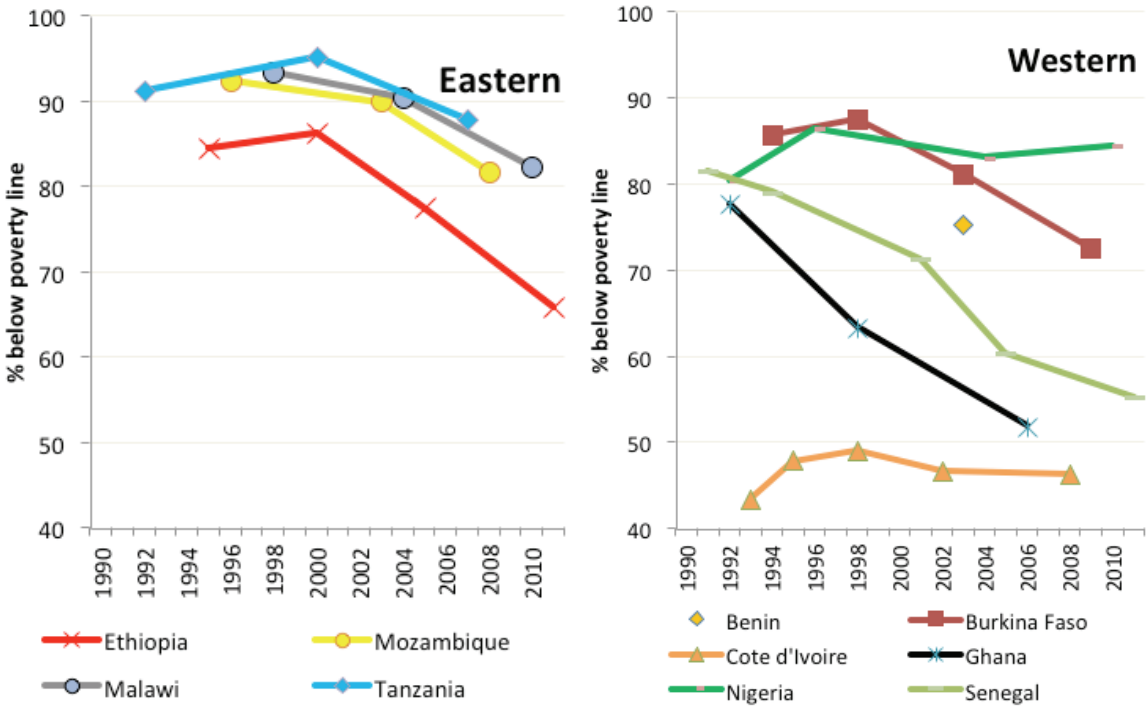
Source: FAOSTAT data

Figure 3.13 Value of production per agricultural worker, Africa, regions and New Alliance countries, US$ constant/worker, 1990-1992 and 2009-2011



Source: FAOSTAT data

Figure 3.14 Poverty headcount at US$2 per day poverty line, New Alliance countries, 1990 to 2011



Source: World Bank WDI

the ten countries, moreover, it seems that the rate of poverty reduction accelerated after 2000.

Child nutrition, measured by stunting of under-fives[15], improved across almost all New Alliance countries other than Benin from 1990 to 2014 (Figure 3.16). Nonetheless, progress has been slow, so that stunting remains at high levels in six of the ten countries. Rates are generally lower across the West Africa countries, but here too improvements have been limited and in some cases progress has been interrupted by rises in the prevalence of stunting.

Although rates of stunting for some countries have been volatile — surprisingly so, since as a chronic condition, stunting might be expected to fluctuate less than wasting and underweight — a rough idea of improvements can be gained from looking at changes from the first to last observations within the period under review (Figure 3.17). Nine of the New Alliance countries have seen stunting rates fall, although even in the largest fall seen, that of Ethiopia, the rate is equivalent to less than two percentage points a year.

Comparing outcomes to economic and agricultural growth

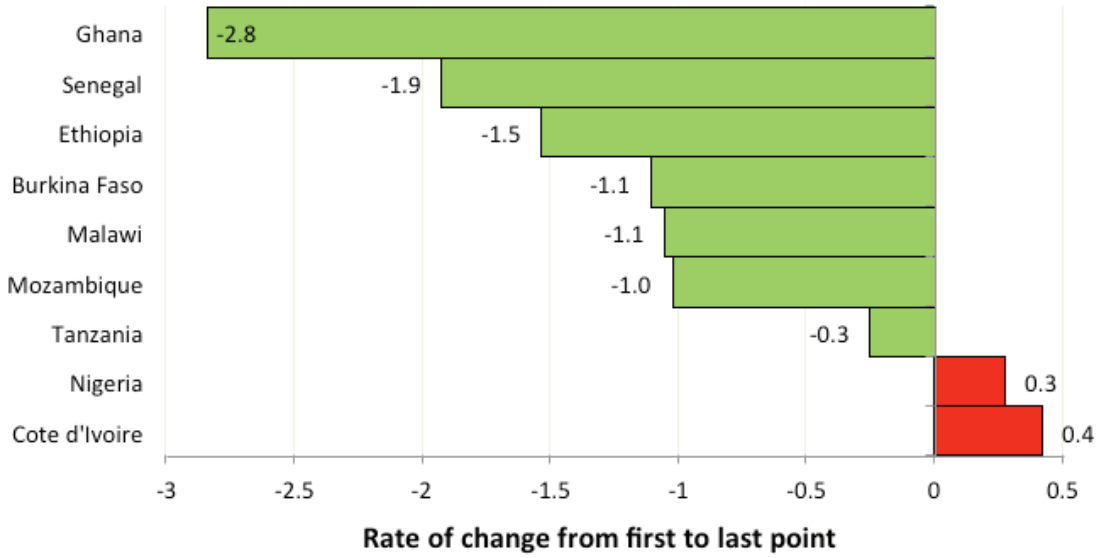
How closely do economic and agricultural growth mirror each other in the New Alliance countries?

Figure 3.18(a) shows that economic and agricultural growth are reasonably closely related: almost half the variation in each series can be accounted for by variations in the other.

Agricultural growth is more weakly related to poverty reduction, although the expected pattern is discernible in Figure 3.18(b): countries with larger growth of agriculture over the two decades tend to see larger reductions in poverty.

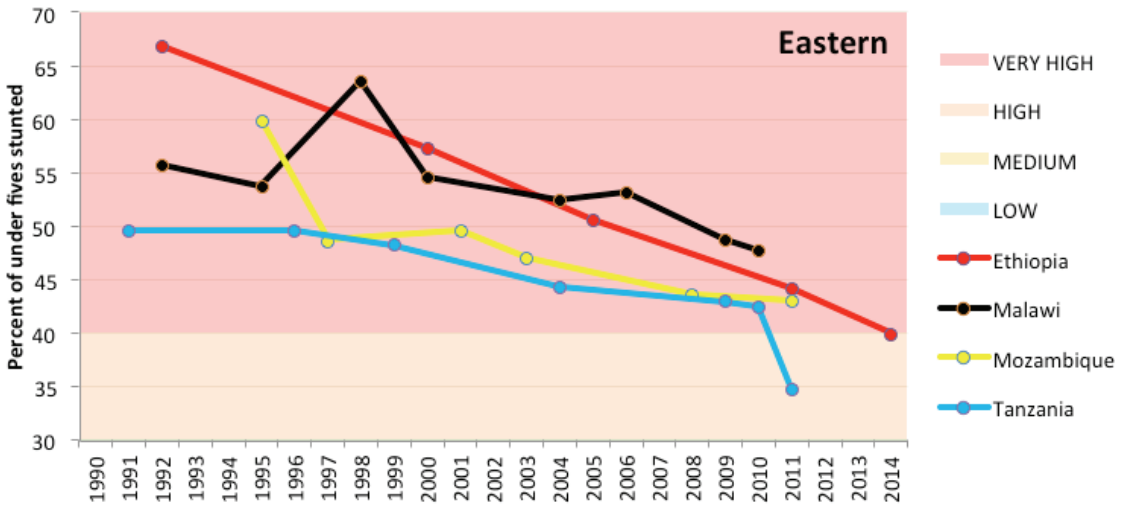
Similarly, agricultural growth only weakly related to the reduction of child stunting, shown in Figure 3.18(c). In this case, the outlier of Benin with rising child stunting stands out. Stronger relations of agricultural growth with poverty and nutrition should perhaps not be expected given imprecise measurement and the several other factors that influence these outcomes.

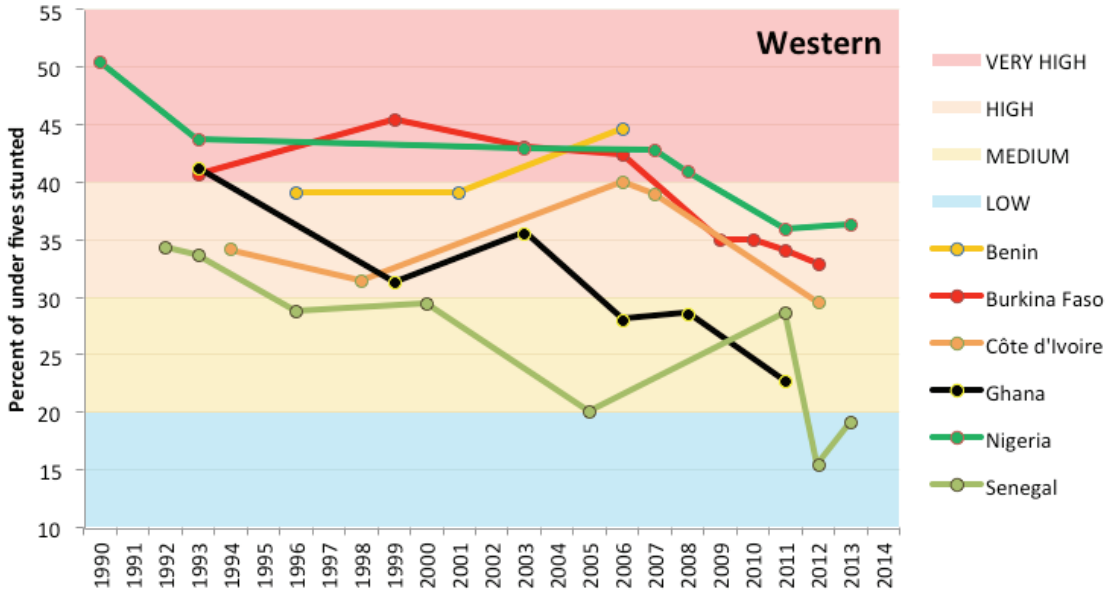
Figure 3.15 Average annual rate of reduction in poverty, New Alliance countries, 1990 to 2011



Source: Calculated from WDI data. See Figure 3.14 above for years over which the rates have been calculated.

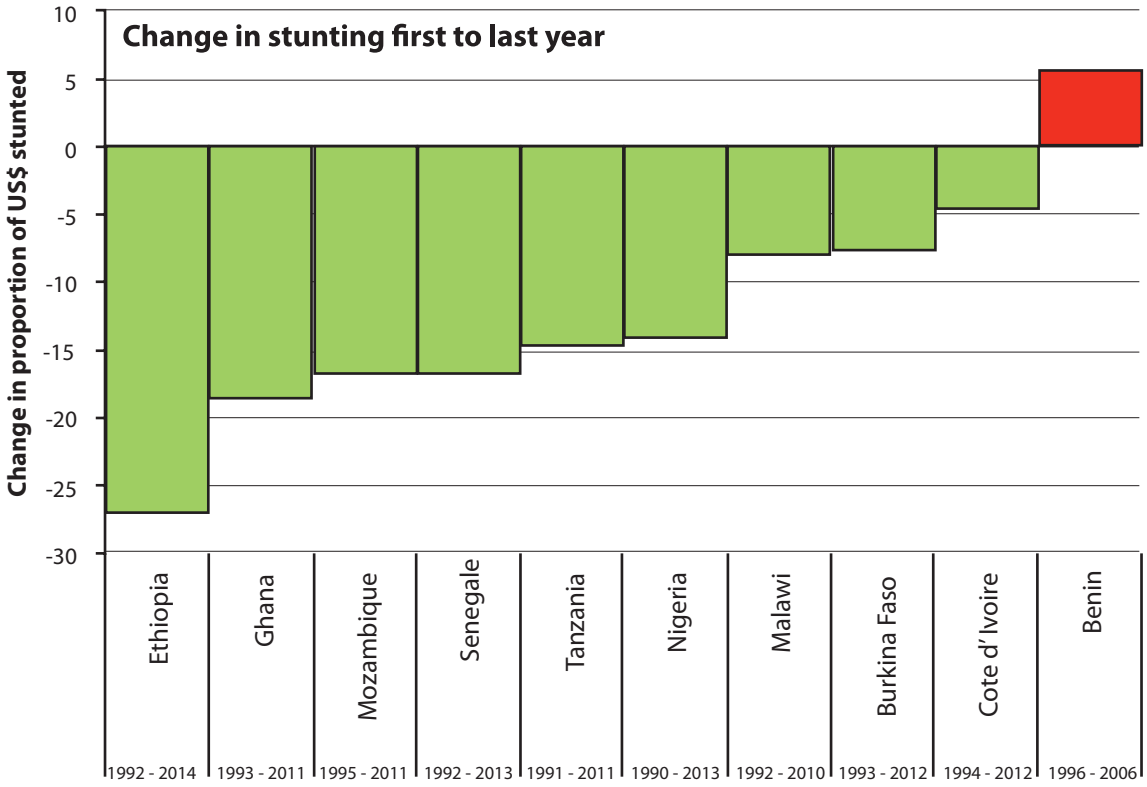
Figure 3.16 Stunting, New Alliance countries, 1990 to 2014





Source: Joint Malnutrition Estimates, 2014, World Health Organization. Note: 2014 data for Ethiopia is preliminary, from Central Statistical Agency, Ethiopia, July 2014 (Ethiopia Mini Demographic and Health Survey 2014). Classifications of severity from 'Low' to 'Very high' are from the WHO.

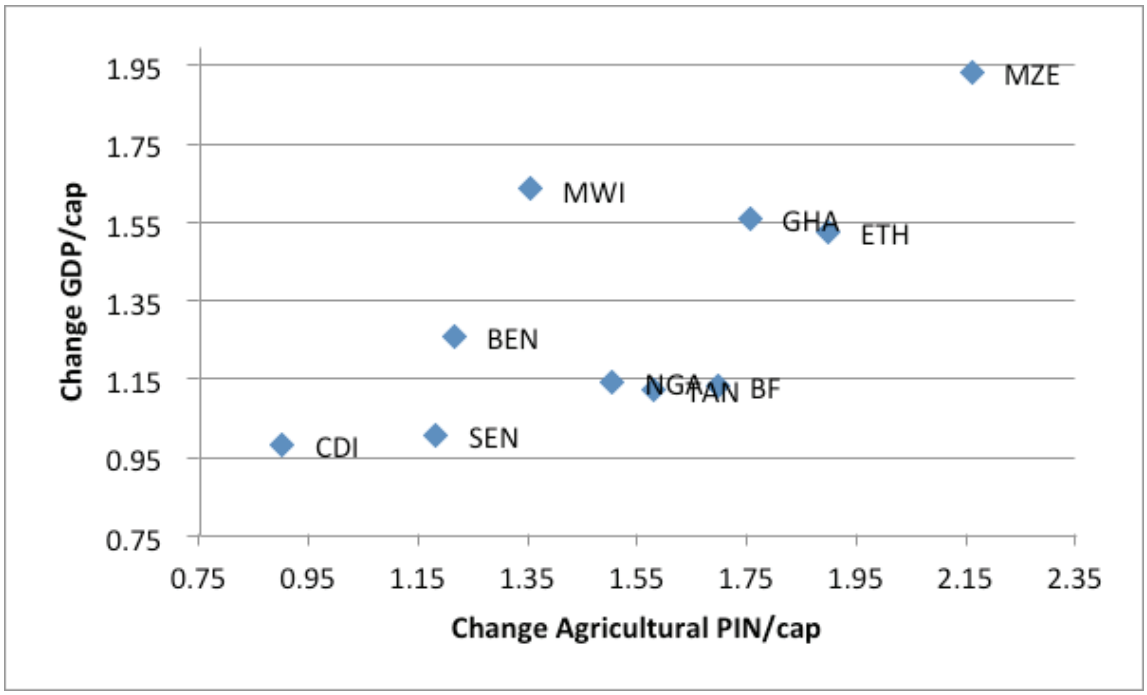
Figure 3.17 Changes in stunting, New Alliance countries, 1990 to 2014



Source: Joint Malnutrition Estimates, 2014, World Health Organization. Note: 2014 data for Ethiopia is preliminary, from the Central Statistical Agency, Ethiopia, July 2014 (Ethiopia Mini Demographic and Health Survey 2014).

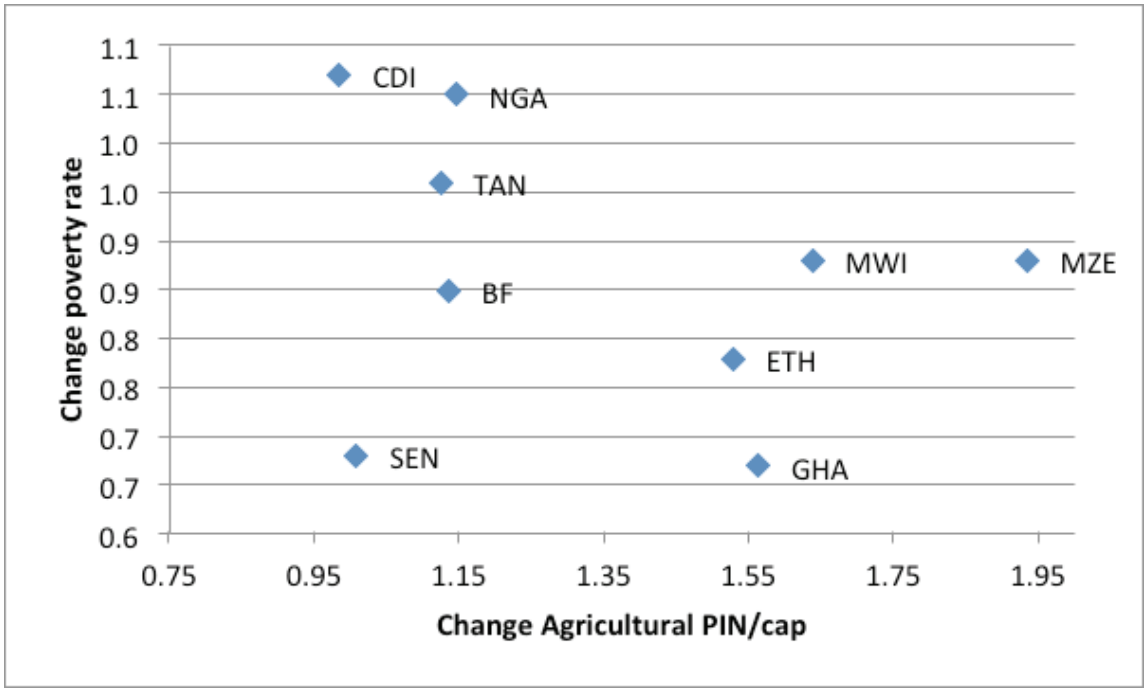
Figure 3.18 Growth of agriculture and its relation to economic growth, poverty and stunting, New Alliance countries, 1990-1992 to 2009-2011

(a) Economic and agricultural growth



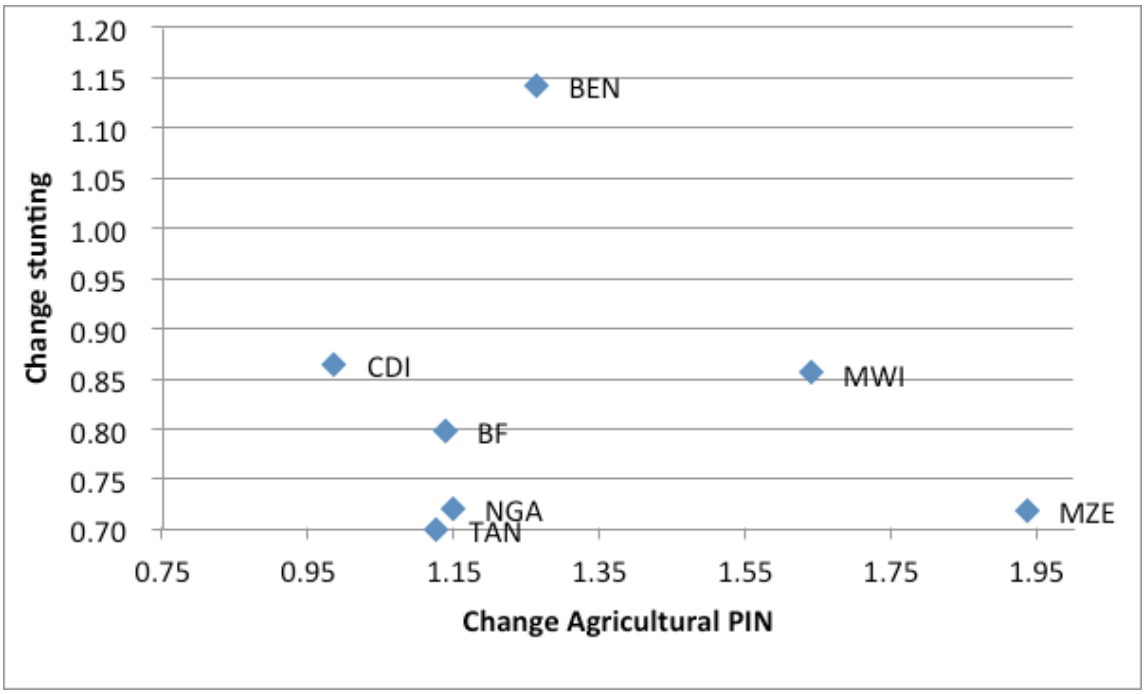
Source: World Development Indicators, World Bank

(b) Agricultural growth and poverty reduction



Source: FAOSTAT, FAO

(c) Agricultural growth and reduction of stunting



Source: Joint Malnutrition Estimates, 2014, World Health Organization

4. Conclusions and discussion

The key finding from this examination of the published statistics is that, yes, African agriculture has been growing ahead of population growth, and especially so for most of the New Alliance countries, since the early 1990s. Compared to the far slower growth seen from the early 1970s to early 1980s, there has been a marked acceleration in the last two decades. There are, however, few signs of an acceleration in growth of agriculture from the 1990s to the 2000s, although rates of growth between the different regions of Africa have converged to some extent in the 2000s.

While the composition of output seems not to have changed notably, some crops and enterprises have grown faster than others. Most of those that have performed well, with annual average growth over two decades of five percent or more, are staple crops destined for domestic and regional markets. Traditional cash crops for export have grown significantly less. The rising non-traditional cash crops — horticulture, flowers, some fish — may be growing rapidly, but they remain in most cases small activities compared to the bulk of agricultural production destined for national markets.

A common perception is that while agriculture may have grown, productivity has languished. It is true that over the last two decades in most parts of Africa more land and labour have been deployed in agriculture. But that does not mean that productivity has stagnated. Yields per hectare have in fact been increasing in most parts of Africa: indeed, yield gains have contributed more to growth of output than area expansion in most cases. Labour productivity, too, is also rising and relatively quickly in the New Alliance countries.

That said, yields per hectare and production per agricultural worker remain low: if those working the land had to depend solely on the value of their produce, they would live in extreme poverty.

Despite the growth reported here, cereals imports to Africa continue to rise, suggesting either that the production statistics exaggerate, or else that consumption is increasing well ahead of population growth. The latter certainly applies: the average person in Africa consumed by 2009-2011 nearly 15kg more of cereals than they did two decades ago. Cereals imports, however, are highly concentrated: geographically in North Africa; and within sub-Saharan Africa, almost entirely in rice, wheat and wheat flour. The rise of these imports may have more to do with urban consumer demands for foods that are easy to prepare —and perhaps seen as modern — than to lack of domestic supply of staples.

How far can we trust the data?

The data on agricultural production, land and labour overwhelmingly come from assessments rather than measurements. It is difficult to know how accurate they are. There are few ways to corroborate them, either. We had hoped that studies at district and village levels might provide guidance, but too few of these measures have been tracked through time, so they do not help.

For economic growth, there have been attempts to check the official statistics by using proxy measures, either the assets recorded in the frequent demographic and health surveys (Young 2012) or even looking at night-time satellite images to assess the degree of artificial light as a correlate of economic prosperity (Henderson et al. 2009). The former study suggests that economic growth in much of Africa has been substantially greater than that shown in official statistics; while the latter indicates that about half of the 24 African countries studied probably grew more slowly and half more quickly than officially reported.

To date, no such proxy has been suggested for agriculture.

Assessing performance at a continental, regional or national level can be deceptive. Growth in African agriculture is uneven, through time and place — as well as by farming system, crop and livestock type. The continent is large and circumstances vary considerably. Generalisations about performance of agriculture at regional and continental levels hide so much of this variation as to be potentially misleading. Indeed, within most countries something similar might be said when, for example, aggregating performance over northern and southern Ghana, or combining changes in the highlands of central Kenya with those in the lowlands around Lake Victoria.

That makes it more difficult to produce simple descriptions of change, but it also offers opportunities to compare cases and derive lessons. For most parameters of interest there is enough variation within Africa to suggest that lessons for Africa can as easily be found within the continent, as by making comparisons to differing contexts in Asia or other parts of the world. But if reliable national estimates are lacking, then those for smaller areas within countries are almost entirely absent until one gets to the occasional cases where district or village studies have been repeated through time. To the best of our knowledge, such longitudinal studies are very few indeed[16].

Implications

All of this might not matter so much if the official agricultural statistics, flanked by potential corroborating data from national economic growth, changes in poverty and nutrition and agricultural imports, told a striking and consistent story. But for the most part, they do not. Frustratingly they can be summarised as portraying the metaphorical glass of water: either half full or half empty, depending as much as anything on taste.

For lack of more reliable statistics, debates over agricultural performance remain locked between those who see small-scale observations of smallholders intensifying for urban markets as either representative of current reality or future dynamism, versus those who point to limited agricultural growth and the prevailing high rates of poverty and under-nutrition in the African countryside as evidence that change is limited and slow.

The implication of these reflections means that policymakers have less guidance from this evidence than they should have. It is thus no surprise that governments receive conflicting messages about the priorities for their agricultural development. To a large extent, policy can thus only be based on plausible, rather than confirmed, causal links — backed up by the inevitably selective use of case studies.

In that vein a final positive reflection is that compared to the past, most governments, supported by donors, foundations and NGOs, are more likely today to be stimulating agriculture through investments and policies that plausibly will contribute to growth, than in the past when policies that were likely to harm farmers were quite common. The gross errors of the past, it seems, are in most parts of Africa being consigned to history.

End Notes

1 Radelet (2010) picks out 17 fast-growing African economies. A 2012 review of countries by their expected growth from 2013 to 2017 found no less than ten from sub-Saharan Africa: Rwanda, Congo Rep, São Tomé, The Gambia, Côte d'Ivoire, Ghana, Zambia, Mozambique, Guinea and South Sudan. Libya from North Africa also made the list (http://www.businessinsider.com/worlds-fastest-economies-2012-10?op=1)

2 Clockwise from the Horn: Ethiopia, Uganda, Rwanda, Tanzania, Mauritius, Mozambique, Zambia, Botswana, South Africa, Lesotho, Namibia, São Tomé, Equatorial Guinea, Ghana, Burkina Faso, Mali and Cape Verde.

3 Even population statistics may be imperfect: some population censuses in Africa have been disputed.

4 TFP shows the relation between output and the factors used to produce it: land, labour and forms of capital. With better technology and effective deployment on farms, it is possible to produce more from the same inputs. TFP growth reflects this.

5 More formally, technical advances shift the production possibility frontier outwards, while efficiency measures the degree to which this frontier is reached.

6 Originally the Consultative Group on International Agricultural Research, although since 2008 the group prefers to be known by the acronym alone.

7 Fuglie and Rada (2011) estimate that the benefit to agricultural production of anti-retroviral therapy may save Africa as much as US$640m a year. In 2007, WHO estimates that 1.9m to 2.3m persons received such therapy, suggesting a return of almost US$280 in increased agricultural output for each person treated.

8 For the most part the UN classification of countries corresponds to previous regional groupings, but there are some surprises. The main one is that Southern Africa is restricted to the five countries that make up the Southern African Customs Union (SACU). Countries often considered part of Southern Africa, such as Mozambique and Zimbabwe, belong to the (large) Eastern Africa region. Northern Africa includes Sudan.

9 Since agricultural output fluctuates annually with the random effects of weather, three-year averages have been taken.

10 The Maputo Declaration in 2003 included a target for agricultural GDP growth of six percent per year. While this is ambitious for a whole agricultural sector to achieve year after year, it may be possible for individual crops and livestock products.

11 Cost of production in West Africa has been falling, while Nigeria and other countries have tried to stimulate local production by applying tariffs to imports. But both have had limited impact. Urban consumers are prepared to pay well over the price of local rice to get rice with their preferred characteristics (Lançon and Benz 2007).

12 Grazing land has been omitted, largely because the reported figures for this area are often scarcely credible. It seems that different countries have different ways of defining grazing land.

13 Fuglie and Rada (2011) mention the need to adjust Nigerian farm labour for their calculations, so this statistic may be doubted.

14 Assuming that labour is the main input other than land, so that value of production sees few deductions for costs of purchased inputs — perhaps ten percent — then the African average in 2009-2011 of US$913 might result in an income per worker of US$820, or US$2.25 a day. Given that for each person working there is probably one dependant (child or elderly), then farming households remain in deep poverty on US$1.13 a day per person. This omits the seasonal nature of farm work; some households may have time to undertake other productive work in the off seasons, augmenting their incomes.

15 Stunting is a good indicator of chronic or long-term nutritional deficiency.

16 One example is the set of more than 900 households from Kagera region, Tanzania, who were first surveyed in the early 1990s (de Weerdt 2006) and have subsequently been re-interviewed twice in the 2000s (Christiaensen et al. 2013). While that has

produced rich insights into changes in assets, incomes and poverty, as well as migration and its effects, it does not apparently contain much if any detail on changes in agriculture.

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ANNEX A: Production trends for the main crops used in the 'growth star' analysis - scanning for questionable data series

Country	Product	Potential problem apparent in official data	Star/Near star?
Benin	Pineapple	Sharp spike over the last few years – from around 150k tonnes in 2008 to around 250k tonnes in 2010, and back to 150k tonnes in 2011.	Star
	Rice	Rapid rise 2010 to 2011 – around 125k tonnes to 220k tonnes.	Star
Burkina	Rice	Sharp increase 2007 to 2008, from about 60k tonnes to close to 200k tonnes. Similar volatility seen in other crops, as 2007 was a bad year across a number of crops; not sure it's bad data.	Star
	Pig meat	*Very even-looking line for most of the series.*	Star
Côte d'Ivoire	Shea nut	Spike in the early to mid-1990s; i.e. goes from below 10k tonnes in 1993 to 36k tonnes in 1995 and then back down to 20k tonnes in 1996 before levelling out.	Near star
	Hen eggs	*15k tonnes to 40k tonnes in two years.*	Near star
Ethiopia	Sweet potatoes	Spikes from 260k tonnes in 2008 to 740k tonnes in 2010, before falling to 400k tonnes in 2011. (But were 2008 and2011 just very bad years?)	Star
	Yams	Large rise from 230k tonnes in 2008 to 400k tonnes in 2009 – too high?	Near star
	Garlic	Very volatile – rises from 80k tonnes in 2003 to almost 200k tonnes in 2003.	Star
	Dry beans	Rapid rise towards end of series – from 150k tonnes in 2006 to close to 370k tonnes in 2010.	Star
	Cabbages, other brassicas	[*POSSIBLY*] From 160k tonnea in 2003 to 280k tonnes in 2005	Star
	Chilies, peppers, green	[*POSSIBLY*] 120k tonnes in 2005 to 220k tonnes in 2006.	Star
	Cow milk	*Leaps up from 1m tonnes to 2.5m tonnes from 2001 to 2002.*	Star
	Camel milk	*Very volatile.*	Star
	Goat milk	*[POSSIBLE] Strong acceleration from 2001.*	Star
	Goat meat	*[POSSIBLE] Strong acceleration from 2001.*	Near star
	Sheep meat	*[POSSIBLE] Strong acceleration from 2001.*	Near star
	Goat skins	*[POSSIBLE] Strong acceleration from 2001.*	Star
	Sheep skins	*[POSSIBLE] Strong acceleration from 2001.*	Near star
	Camel meat	*[POSSIBLE] Very sharp rise 2006 to 2008.*	Star

Ghana	Oil palm fruit	Sharp rapid increase from around 1m tonnes in 2002 to around 2m tonnes in 2004.	Near star
	Rice	Sharp rise from around 200k tonnes in 2007 to 500k tonnes in 2010.	Star
	Onions, dry	Shoots up from 2008 very rapidly – about 40k tonnes to over 90k tonnes in 2009.	Star
Malawi	Cassava	1999 to 2002 spike in production – then very rapid rise. From 1999 to 2001 went from around 1m tonnes to almost 3.5m tonnes.	Star
	Bananas	Step change after 1998 – from about 100k tonnes to 300k tonnes in 1999.	Star
	Pig meat	*Rapid acceleration 2006 to 2008; 15k tonnes to 40k tonnes*	Star
Mozambique	Cassava	From 2008 to 2010 very sharp rise – from around 4m tonnes to around 10m tonnes.	Near star
	Sweet potatoes	Post 1998 the series stepped up – from about 50k tonnes in 1998 to 400k tonnes in 1999 – after which it was very volatile.	Star
	Sorghum	Very volatile; from around 70k tonnes in 1992, to 300k tonnes in 1998, to 120k tonnes in 2005, to 380k tonnes in 2008.	Near star
	Bananas	Turns up sharply after 2004 with a suspiciously straight line.	Star
	Rice	[*POSSIBLY*] Sharp rise in 2008 – from approximately 85k tonnes to 250k tonnes in 2010.	Star
	Pig meat	*Step rise 1994 to 1995 of around 100k tonnes*	Star
	Capture fisheries	*[POSSIBLE] Step rises from 2002 to 2003 and from 2007 onwards.*	Star
Nigeria	Taro	Steps up from 1997 from just below 1m tonnes to just below 2m tonnes.	Star

	Sweet potatoes	Follows similar pattern to Taro (just flat at the end). Steps up from 1994; some periods of flat lines.	Star
	Potatoes	Leaps up in 1998; follows very similar pattern to Taro and Sweet potatoes (all three are very linked).	Star
	Cashew	Leaps up from 1998 to 1999 – from about 150k tonnes to about 400k tonnes.	Star
	Soybeans	[*POSSIBLY*] Sharp dip from around 600k tonnes in 2008 to around 300k tonnes in 2010, before a sharp rise into 2011 at more than 550k tonnes.	Near star
	Wheat	[*POSSIBLY*] Very rapid rise from 2008 (around 50k tonnes) to 2011 (around 160k tonnes).	Near star
	Pig meat	*[POSSIBLE] Suspect too flat-looking lines.*	Near star
	Goat meat	*[POSSIBLE] Suspect too flat-looking lines.*	Near star
	Sheep meat	*[POSSIBLE] Suspect too flat-looking lines.*	Star
	Goat skins	*[POSSIBLE] Suspect too flat-looking lines.*	Near star
	Sheep skins	*[POSSIBLE] Suspect too flat-looking lines.*	Star
Senegal	Cassava	Extreme peaks; sharp one from 2007 to 2008, from 300k tonnes to 900k tonnes, then back down again in 2009.	Star
	Rice	Sharp rise after 2007, from 200k tonnes to 400k tonnes in 2008, then 600k tonnes by 2010.	Near star
	Oil Palm Fruit	Long flat bits.	Near star
	Onions, dry	Very volatile.	Star
	Tomatoes	Very volatile.	Star
	Cow peas, dry	Very volatile.	Star

Tanz	Bananas	Volatile; rapid rise from around 0.7m tonnes in 2001 to 2.2m tonnes in 2002	Star
	Sweet potatoes	Sharp rise at the end from 1.5m tonnes in 2009 to 3.5m tonnes in 2011.	Star
	Rice	Sharp rise from 1.5m tonnes in 2009 to 2.5m tonnes in 2010.	Star
	Potatoes	Very flat line with sharp rise towards the end.	Near star
	Dry beans	Suspect data over the 1990s.	Near star
	Sunflower seed	Sharp rise 2010 to 2011; from 300k tonnes to 800k tonnes.	Star
	Groundnuts	[POSSIBLY] Sharp rise 2009 to 2011; 350k tonnes to 650k tonnes.	Star
	Pulses, nes	Unlikely spike over the early 2000s	Star
	Sesame seed	[POSSIBLY] Rapid rise 2010 to 2011; 150k tonnes to 350k tonnes.	Star
	Pigeon peas	Straight line over the 1990s.	Star
	Cow peas	Straight line over the 1990s.	Near star

Future Agricultures

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