



AGRICULTURE DIALOGUE

Phase 1

Keynote Paper 1

The Agricultural Policy Challenge

CABRI 

CONNECT • SHARE • REFORM



CABRI Agriculture Dialogue Phase 1

Keynote Paper 1

The Agricultural Policy Challenge



Contents

List of tables and figures	iii
Acronyms and abbreviations	iv
Acknowledgements	vi
1. Introduction	1
2. Agriculture strategies	1
2.1 International attitudes to agriculture and development	2
2.2 Pan-African agricultural programmes and strategies	3
2.3 National agricultural strategies	5
3. Expenditure on agriculture in Africa	6
3.1 Needs assessment	6
3.2 Total investment	7
3.3 Private investment	8
3.4 Public expenditure	10
3.5 International funding	11
3.6 Returns to public expenditure	14
4. Key policy challenges	15
4.1 Production and productivity	15
4.2 Markets, subsidies and trade	19
4.3 Water and energy	22
4.4 Land and acquisitions	25
4.5 Climate change, irregular supplies and disaster preparedness	26
5. Evidence-based policy	27
6. Conclusion	29
References	32



List of tables and figures

Table 1:	Timeline of African agricultural policy events, 2002–2011	3
Table 2:	Gross capital formation in agriculture – Africa and other regions	7
Table 3:	Agricultural capital stock per worker	8
Table 4:	Private investment funds	9
Table 5:	Agriculture's share in official development assistance	11
Table 6:	Constraints to agribusiness in five value chains	21
Figure 1:	Rate of growth in agricultural value added	4
Figure 2:	Agricultural public expenditure as a percentage of total public expenditure	4
Figure 3:	Source of investment in agriculture in developing countries	8
Figure 4:	Share of agricultural spending in total public expenditure for major world regions	10
Figure 5:	Public expenditure on agriculture as a percentage of total public expenditure	11
Figure 6:	Sources of finance for CAADP investment plans	12
Figure 7:	Agricultural production, food and non-food products	16
Figure 8:	Variation in value of production per hectare and per farmer	16
Figure 9:	Sources of yield increase by world region, 1961–2009	17
Figure 10:	Agricultural labour productivity for the largest and fastest growing African countries	17
Figure 11:	World food prices	19
Figure 12:	World price indices for energy and food	23
Figure 13:	Major state-sponsored land acquisitions in Africa	26



Acronyms and abbreviations

AAC	African Agricultural Capital
AAF	African Agriculture Fund
AFCR	Africa Food Crisis Response Framework
AfDB	African Development Bank
AgSS	Agricultural Sector Strategy
AU	African Union
BCR	benefit-cost ratio
CA	conservation agriculture
CAADP	Comprehensive Africa Agriculture Development Programme
CABRI	Collaborative African Budget Reform Initiative
CBA	Cost cost-benefit analysis
CGIAR	Consultative Group on International Agricultural Research
DFID	Department for International Development
ECA	Economic Commission for Africa
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organisation
FDI	foreign direct investment
GAFFSP	Global Agriculture and Food Security Programme of the UN
IAASTD	International Assessment of Agricultural Knowledge, Science and Technology for Development
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
IP	investment plan
IPCC	International Intergovernmental Panel on Climate Change
IRR	internal rate of return
IWMI	International Water Management Institute
MDG	Millennium Development Goal
NAPA	National Adaptation Programme of Action
NEPAD	New Partnership for Africa's Development
ODA	official development assistance
PRSP	Poverty Reduction Strategy Paper
PSIA	poverty and social impact assessment
RISDP	Regional Indicative Strategic Development Plan
SADC	Southern African Development Community
SME	small and medium-sized enterprises



SSA	sub-Saharan Africa
SWAp	sector-wide approach
UNFCCC	United Nations Framework Convention on Climate Change
WDR	World Development Report
WFP	World Food Programme



Acknowledgements

This paper was produced by Mokoro Limited. The Team Leader was Kit Nicholson. For more information, contact info@cabri-sbo.org.



1. Introduction

This paper is part of the documentation prepared to inform a dialogue across Africa on budget reform in the agriculture sector. The purpose of the dialogue is to share experience, so that countries can adopt the policies and procedures that are most appropriate to their situation.

This paper aims to identify the main challenges facing the agriculture sector across Africa. It aims to provide evidence on how these policy challenges have been assessed by existing reviews and case studies. It does not aim to propose optimum policies. Rather, it concludes by proposing those practices that African governments can adopt to ensure that policy formulation is effective and has an impact on public expenditure.

The focus of the paper is on what are normally considered the core sub-sectors of government in the agriculture sector, including:

- research and extension, both for crops and for livestock, including use of improved practices;
- market regulation;
- facilitating the growth of rural financial services;
- intervention in markets, particularly in circumstances of market failure;
- land reform and regulation; and
- infrastructure that would not be undertaken by the private sector, including irrigation schemes for smallholders and rural roads.

Some of the above are not always the responsibility of ministries of agriculture. The paper does not cover forestry or fisheries.

The paper focuses on the policy challenges facing governments. However, in order to do this effectively, it also considers the possible role of the private sector and how government policies and budgets affect the private sector.

The paper starts by presenting existing policy statements relating to the agriculture sector in Africa, at international, pan-African and national level. It then reviews evidence on financing needs and on the various sources of financing available to deliver policy. The central part of the paper reviews evidence on the key challenges facing each of the main agricultural sub-sectors. The paper concludes with a summary of these challenges and a brief reference to techniques that governments can adopt to make strategies and policies count. These techniques are picked up in the other keynote papers being prepared for the dialogue.

2. Agriculture strategies

The policy challenges facing Africa are reflected in international, pan-African and national strategies, which influence the allocation of resources. The Comprehensive Africa Agriculture Development Programme (CAADP), as part of the New Partnership for Africa's Development (NEPAD), has drawn attention to the need for improved public expenditure for agriculture. The Regional Indicative Strategic Development Plan (RISDP), in Southern African Development Community (SADC) countries, has also stressed the importance of agricultural expenditure. Various donors have drawn attention to the importance of agricultural investment and services, especially in recent years. Most national development plans or strategy statements, such as the Poverty Reduction Strategy Papers (PRSPs), include agriculture as one of the leading priorities within thematic areas of economic development and/or natural resource management.



2.1 International attitudes to agriculture and development

There has been strong progress in reducing malnutrition in the world (FAO, WFP & IFAD 2012). Until 2008, it appeared that the world was on track to meet the Millennium Development Goal (MDG) of halving undernourishment by 2015. However, progress was stalled by the world food and financial crises in 2008, and it is not yet clear whether the target will be met. According to the Food and Agriculture Organisation (FAO), meeting the MDG depends on three elements: a) ensuring that growth benefits the poor; b) ensuring that the poor use incomes for nutrition and health; and c) expanding government funding for public goods that benefit the poor. The FAO argues that agricultural growth is particularly pro-poor, but also that social protection is necessary to support those who miss out on growth.

Most models of economic development assume that development is accompanied by a diversification away from agriculture. Furthermore, until the early twenty-first century, most analysis assumed that technological advances would enable the world to feed itself at least for several generations and probably until population growth declined and an equilibrium could be reached. Thus, food supply was not regarded as being affected by the limits-to-growth arguments that have always been present in debate over energy policy.

Thus, for most of the 1980s and 1990s, the international development community provided only limited support for agricultural development. The World Bank had virtually withdrawn from agriculture, along with key bilateral donors, such as the Department for International Development (DFID). The regional development banks and the International Fund for Agricultural Development (IFAD) did continue to support agricultural development, but this was presented as rural development and was often linked with non-agricultural support. The Consultative Group on International Agricultural Research (CGIAR) continued to provide dedicated research support for agriculture, but even the CGIAR faced challenges to retain the high profile it achieved during the years of the Green Revolution.

This conventional wisdom began to be questioned around the turn of the century, with particular concerns about water shortages (Rosegrant, Cai & Cline 2002). At the same time, new views of economic history have been emerging. For example, Lipton (2005) claims that, apart from a few city states, almost all examples of widespread poverty reduction started with improvements in the productivity of small family farms. Increasing concerns over climate change (IPCC 2007) and the need to find low-carbon energy sources have focused attention on the sustainability of food supply (IAASTD 2009). These concerns are particularly serious for Africa (Parry, Rosenzweig et al. 1999; Cline 2007). The world food price crises of 2008 drew dramatic attention to the issue, leading to concerns about a 'Perfect Storm' of global events around the food-energy-water-climate nexus (GOS 2011; WEF 2011; Beddington n.d.).

Throughout the last fifty years, there has also been a strand of development thinking that believes that growth does not necessarily lead to poverty reduction. This is reflected in the central role that Poverty Reduction Strategy Papers (PRSPs) have played in national planning and development finance, and the concern is again at the forefront of international debate on the role of agriculture in Africa. For the first time in thirty years, many African countries have been experiencing strong economic growth over the last decade. However, despite this, there has been an increase in the number of poor people, and some of the fastest growing countries (for example, Mozambique since 2003 and Tanzania) have not reduced poverty (Diao et al. 2012). While agriculture has grown, the rate of growth has been only a third of that achieved by non-agricultural sectors (World Bank 2008).



The circumstances in which growth can be pro-poor and inclusive have been debated widely. In the last ten years, the potential role of agriculture as a source of pro-poor growth has been reassessed. Many of the agencies involved in agriculture have argued that agricultural growth is one of the most effective ways of reducing poverty in most developing countries (FAO 2012a; Diao et al. 2012). This argument was also put forward by the World Bank in the influential 2008 World Development Report (WDR), which focused on agriculture (see World Bank 2008). It was repeated in one of the background papers for the 2013 WDR on Jobs, which stressed the value of growth in labour-intensive activities such as agriculture (see Martins 2013).

The 'pro-agriculture' argument includes two strands, one of which maintains that support to smallholder agriculture provides the most effective way of reducing poverty, while the other asserts that supporting more commercial agriculture is the better way to proceed. The relative contribution to growth of smallholder food crops and export-oriented crops was considered by the International Food Policy Research Institute (IFPRI), which concluded that, while export crops may have the potential for rapid growth, the greater multiplier effects of smallholder food crops on the rest of the economy, and their greater impact on poverty, mean that growth in export crops has to be much higher than in smallholder food crops to generate the same impact on poverty reduction (Diao et al. 2012).

Table 1: Timeline of African agricultural policy events, 2002–2011

2011	Another rise in world food prices, returning to the high levels of 2008
2009–11	Most African countries prepare CAADP strategies and investment plans
2008	Major rises in world food and energy prices
2008	World Bank's World Development Report, <i>Agriculture for Development</i>
2007	IPCC's fourth <i>Synthesis Report</i>
2007	IWMI's <i>Water for Food, Water for Life</i>
2003	CAADP established
2002	IFPRI's <i>World Water and Food</i>

2.2 Pan-African agricultural programmes and strategies

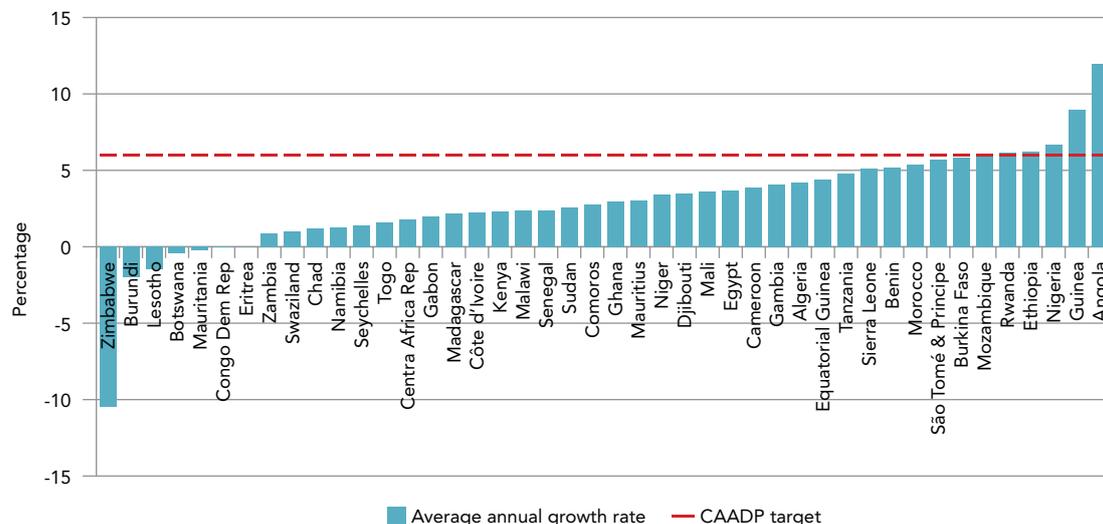
Comprehensive Africa Agriculture Development Programme (CAADP)

Until the turn of this century, African governments had played down the importance of agriculture in their strategic planning. This has now changed with the adoption of the CAADP and a series of new programmes and pan-African summits reasserting the key role that agriculture has to play in national development and poverty reduction.

The CAADP was launched in 2003 and is one of six themes identified in the AU's New Partnership for Africa's Development (NEPAD). It provides a powerful pan-African statement of commitment to agriculture and has helped to give new priority to agriculture across Africa. The CAADP has four pillars: land and water management; market access; food supply and hunger; and agricultural research. The CAADP target is to raise agricultural productivity by 6% per year. So far, this has been achieved by only six African countries, although about half the major agricultural countries in Africa have achieved more than 3% growth, as shown in Figure 1.



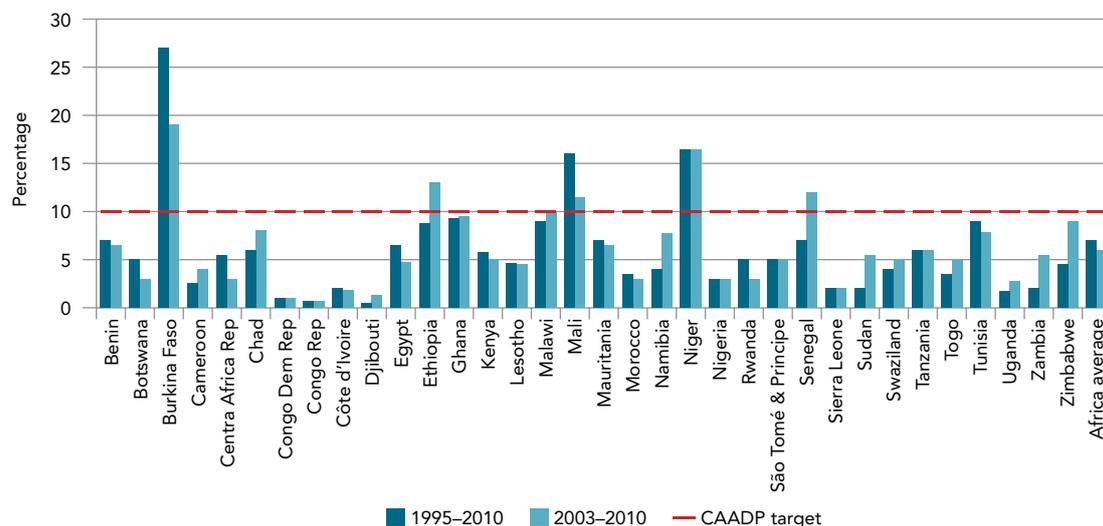
Figure 1: Rate of growth in agricultural value added



Source: (Benin et al. 2011)

Unlike the other NEPAD themes, the CAADP includes a target for public expenditure, which is to increase public expenditure in agriculture to 10% of national budgets. Figure 2 shows that only six African countries achieved that goal between 2003 and 2010: Burkina Faso, Ethiopia, Malawi, Mali, Niger and Senegal. The figure shows that the only countries to significantly increase the share of public expenditure going to agricultural between 1995–2003 and 2003–2010 were: Chad, Ethiopia, Namibia, Senegal, Sudan, Uganda, Zambia and Zimbabwe.

Figure 2: Agricultural public expenditure as a percentage of total public expenditure



Source: (Benin et al. 2011)

A CAADP multi-donor trust fund was created in 2008 and this now has US\$50 million of committed funds. The fund has two components that are implemented by pan-African and regional recipient institutions, with World Bank supervision, and one that is devoted to technical assistance in support of the CAADP. The mid-term review concluded that there had been strong progress in capacity-building, but that more progress was required in this regard, as well as with CAADP investment plans, policy reform and some new initiatives (World Bank 2012).



Regional Indicative Strategic Development Plan (RISDP)

The CAADP is complemented by the SADC's RISDP, which was approved in 2003 and applies to the 15-year period 2005–2020. The RISDP has detailed plans and milestones for the first five years and identifies 11 priority areas, covering all the major themes of development in the SADC (SADC 2003). A desk assessment of the first five years structures these priorities into four key priority areas: trade, industry, finance and investment; infrastructure and services; food, agricultural and natural resources; and social and human development and special programmes (SADC 2011). For agriculture, the planned achievements included: the establishment of an information system; livestock support programmes; agricultural research programmes; promotion of inputs; pest and disease surveillance and control; protocols and programmes for fisheries, wildlife and forestry; a land reform facility; and irrigation development. The desk assessment concluded that there had been progress in all areas, especially in the establishment of systems, strategies, protocols and institutions. Some field successes have been achieved (for example, in livestock and research), but implementation of field activities has been limited by lack of funding.

Africa Food Crisis Response Framework (AFCR) and Agriculture Sector Strategy (AgSS)

In response to increasing concerns about food prices, the African Development Bank (AfDB) agreed on the AFCR. In addition, a joint evaluation of engagement in African agriculture was undertaken by the AfDB and IFAD in 2009, which recommended continued engagement in agriculture, but with the adoption of a more selective and innovative approach. Building on this experience, the AfDB produced the AgSS in 2010, designed to guide their operations from 2010 until 2014 (AfDB 2010). The AgSS is shaped by the CAADP and the Regional Integration Strategy (RIS). The AgSS is based on two pillars: agricultural infrastructure (including rural roads, markets and storage, agro-processing and agricultural water management, plus support for infrastructure for livestock, fisheries and rural energy); and renewable natural resource management, covering land, water and forests. In addition, the AgSS will support research and capacity-building programmes. The AgSS involves a commitment of US\$5.3 billion for 2010–14, compared with an estimated annual financing need for sub-Saharan African agriculture of between US\$5.7 billion and US\$13.7 billion, if MDG1 is to be achieved and poverty is to be halved by 2015 (Rosegrant & Fan 2008).

Regional agricultural policies

The Common Agricultural Policy of the Economic Community of West African States (ECOWAS), known as the ECOWAP, aims to provide a process of alignment of agricultural policies that is similar to CAADP. In practice, so far, it has acted mainly as a synthesis of national policies (Zimmermann et al. 2009).

2.3 National agricultural strategies

National agricultural strategy documents should play an important role in guiding budgets and in linking the latest experience in the sector with the latest national policy directions.

African countries have developed a wide range of agricultural strategies, including the following: Ghana's MTADP (1998) and FASDEP I & II (2002); Kenya's SRA (2004); Namibia's NAP (1995), Zambia's SPDA (2004–15), Uganda's NAP (2011), Rwanda's PSTA I & II (2005–08, 2009–12); Tanzania's MTSP (2010); and South Africa's WPA (1995), DDAP (1998) and ASP



(2001).¹ A review of policies for agricultural sub-sectors in East Africa showed that countries also had a proliferation of sub-sectoral policies, strategies and laws, including 21 in Kenya, 10 in Rwanda, 15 in Tanzania and 20 in Uganda (EAFF 2011).

The CAADP introduced a commitment by member states to produce national CAADP compacts, supplemented by investment plans (IPs), demonstrating how CAADP commitments would be fulfilled. By February 2013, 30 countries had signed CAADP compacts and almost all of these include an IP that had been subject to a technical review to ensure that it was credible, implementable and in conformity with CAADP principles. These reviews have sometimes encouraged IP budgets to be more realistic. A further 12 countries have launched the CAADP process and are working towards producing a CAADP compact, leaving six still working towards launching the CAADP process. There is some evidence that the CAADP compact process has helped to reinvigorate agricultural policy (Kimenyi, Routman & Westbury 2012).²

In Nigeria, agricultural policy has shifted away from direct input subsidies towards vouchers, and more attention is being paid to storage and marketing. In Kenya, sector strategy statements have been influential in increasing the share of agriculture in public expenditure and thereby helping Kenya to implement the CAADP (Gitau et al. 2009). Agricultural strategy statements have also helped to ensure that the programmes, policies and regulations supported by agricultural expenditure follow a more stakeholder-based approach, in line with the national Vision 2030 statement. This is particularly important for politically sensitive areas of policy, including, notably, land policy. However, Gitau et al. also point out that, while stakeholder consultation is an important part of process policy formation, it does require a lot of time and makes it more difficult for the new policies to have a direct impact.

3. Expenditure on agriculture in Africa

Agriculture in SSA has not received significantly less total investment than other sectors, when expressed as a percentage of GDP and including both public and private. Although figures are not easily available, it is likely that nearly 80% of investment in agriculture has been private sector investment, mainly by farmers, with small amounts provided by private investment funds and foreign direct investment. Public investment in agriculture probably accounts for only about 20% of the total investment, including the private sector, and for about 50% of total public expenditure on agriculture, including recurrent expenditure. The total public expenditure on agriculture has fallen from over 8% of all public expenditure in the 1980s to about 3% since 2004. There are signs that this is changing, in response to the world food crisis of 2008 and in response to concerns about climate change.

3.1 Needs assessment

Various techniques have been used in estimating the public expenditure requirements for achieving agricultural growth, including unit cost analysis and econometric analysis (Diao 2012; Rosegrant & Fan 2008). These studies have difficulty in dealing with some basic economic processes, including the relationship between public and private investment (especially the

1 MTADP = Medium Term Agricultural Development Plan; FASDEP = Food and Agricultural Sector Development Policy; SRA = Strategy for the Revitalisation of Agriculture; NAP = National Agriculture Policy; PSTA = Strategic Plan for the Transformation of Agriculture; WPA = White Paper on Agriculture; DDAP = Discussion Document on Agricultural Policy; ASP = Agricultural Strategic Plan.

2 CAADP compacts and IPs are a condition for receiving support from the Global Agriculture and Food Security Programme (GAFSP), which is managed by the World Bank and has US\$1.25 billion pledged. However, GAFSP is active in only 18 countries, of which 11 are in Africa, so many countries have developed CAADP compacts without accessing GAFSP funds.



risk that public investment will displace, or crowd out, private expenditure), the risk that large inflows of foreign assistance may alter exchange rates, and the fact that non-agricultural investment (for example, in human capital, infrastructure and institutions) may also contribute to agricultural growth and so reduce the need for investment in agriculture. The IFPRI study attempts to address some of these concerns, but should be considered as illustrative only, given the limitation of data and the fact that, even where data exist, it would not be correct to assume that a large increase in public investment would necessarily achieve the same returns as have been achieved on recent investments (Diao et al. 2012). The IFPRI analysis suggests that, to achieve a 6% growth in agriculture, the level of public expenditure in agriculture needs to grow by 25–30% in Uganda. In Kenya, it would need to grow from current levels of about 5% of public expenditure to well over the Maputo declaration target of 10%, to achieve agricultural growth of 6%, unless there was a substantial increase in productivity. The analysis shows that, while the CAADP target of allocating 10% of public expenditure to agriculture might be a useful political statement, the level of expenditure required to meet the 6% growth target will vary significantly between countries.

3.2 Total investment

Table 2 shows that the total gross fixed capital formation (GFCF) in agriculture in Africa was US\$35 billion in 2007, of which US\$23 billion was in SSA. Agricultural GDP in SSA was US\$141 billion in 2007 and has been growing at an annual rate of about 3%, equivalent to about US\$4 billion. Therefore, the gross capital output ratio for agricultural production in SSA is about 5.75, which is relatively high. Agriculture accounted for about 15% of GDP in SSA in 2007 and about 14% of investment, suggesting that investment was roughly in line with GDP.

Table 2: Gross capital formation in agriculture – Africa and other regions

	Value (US\$ billion)						Share in total gross capital formation (%)					
	1980	1990	1995	2000	2005	2007	1980	1990	1995	2000	2005	2007
World	215.6	272.9	279.9	255.8	386.4	525.4	7.5	5.5	4.4	3.7	4	4.4
Developed	77.7	112.9	112.2	97.2	122.0	145.7	3.9	2.9	2.3	1.9	1.8	1.9
Latin America	16.6	21.6	23.4	21.5	28.1	44.8	8.5	9.6	6.9	5.5	5.8	6.2
Asia	67.3	77.2	117.4	114.7	197.0	274.4	21.2	15.3	13	11	9.8	9.7
SE Europe/CIS	33.6	44.8	12.4	7.7	10.3	25.3	11.4	19	10.5	10.6	7.4	6.2
Africa	20.1	15.9	14.0	14.3	22.3	34.6	18.5	17.3	14.2	14.1	12.9	13.9
N Africa	4.8	6.1	5.4	5.8	7.5	11.8	12.1	15.1	11.7	11.8	10.3	11.6
W Africa	10.1	3.3	2.7	2.7	5.7	10.2	30.2	31.8	31.5	27.6	30.6	31.5
C Africa	1.3	1.5	1.2	1.1	1.9	2.6	22	24.6	25.7	20.5	16.4	15.7
E Africa	1.8	2.8	2.5	3.0	4.7	6.6	37.3	40.7	36.2	34.4	33.1	32
S Africa	2.2	2.2	2.2	1.7	2.5	3.5	8.7	7.8	6.9	5.9	4.6	4.5

Notes: Includes agriculture, hunting, forestry and fishing. Full data on gross capital formation (GCF) for agriculture is available for only ten African countries. For the other countries, it is assumed that the sectoral composition of total GCF is the same as that of GDP.
Source: UNCTAD (2009) in Rakotoarisoa, lafrate & Paschali (2011)

Table 3 shows the level of capital stock per worker, which includes machinery (accounting for 40% in high-income countries and almost zero in low-income countries); land development (which is between 30% and 40% for most countries), livestock (which varies from 20% in high-income and transition economies to 60% in low-income countries) and plantation crops (which are less than 15% in all countries). The figure shows that investment in SSA is very low by the standards of middle-income countries, but is similar to the developing countries in Asia.

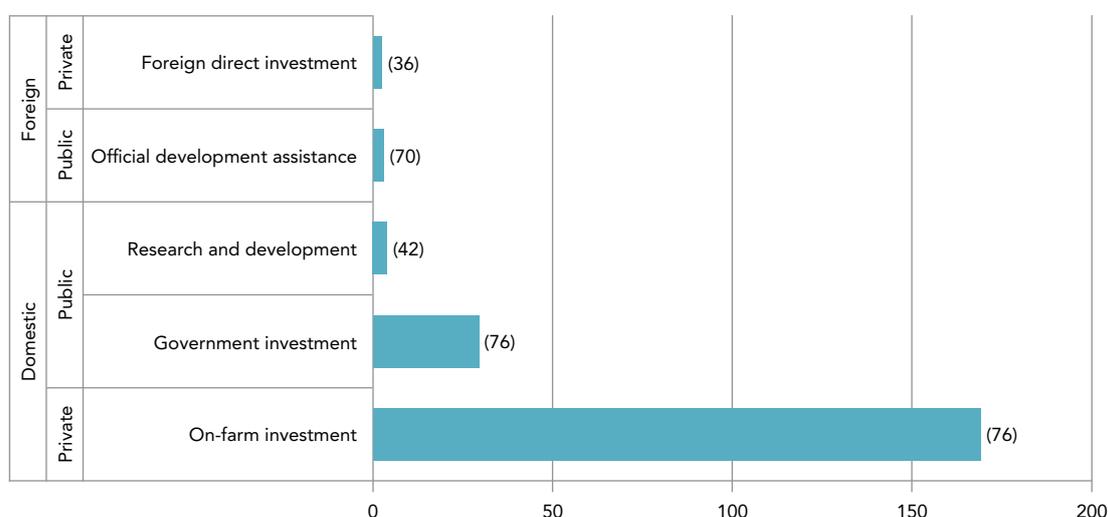
**Table 3: Agricultural capital stock per worker**

Income group/Region	Average agricultural capital stock per worker, 2005-07 (Constant 2005 US\$)	Average annual change (1980–2007)		
		Agricultural capital stock	Number of agricultural workers	Agricultural capital stock per worker
		(Percentage)		
High-income countries	89 800	0.2	-2.9	3.0
Low- and middle-income countries	2 600	0.9	1.2	-0.3
East Asia and the Pacific	1 300	1.8	1.1	0.7
East Asia and the Pacific, excluding China	2 000	2.1	1.4	0.7
Europe and Central Asia	19 000	-1.0	-1.7	0.7
Latin America and the Caribbean	16 500	0.7	0.0	0.7
Middle East and North Africa	10 000	1.8	0.9	0.9
South Asia	1 700	1.4	1.4	0.0
South Asia, excluding India	3 000	1.4	1.6	-0.1
Sub-Saharan Africa	2 200	1.5	2.1	-0.6
World	4 000	0.6	1.1	-0.5

Source: (FAO 2012a)

3.3 Private investment

There is no separate estimate of the composition of agricultural investment in SSA. However, Figure 3 shows the composition of investment for all developing countries and suggests that the private sector accounted for about 78% of agricultural investment in developing countries for the period 2005–07, amounting to about US\$18 billion. Only 1% of total agricultural investment was funded by foreign direct investment (FDI). The investment involved in large-scale land acquisitions is still unclear, but investors are likely to invest at least US\$1000 per hectare over a period of 5 to 10 years, which means that total investments associated with large-scale land acquisition could amount to as much as US\$5 billion per year.

Figure 3: Source of investment in agriculture in developing countries

Notes: The number of countries covered is shown in parenthesis next to the relevant type of flow. All flows are reported in constant 2005 US dollars with the exception of FDI inflows, which are reported in current US dollars. Data are the average for the years 2005–07 or for the most recent year(s) available prior to that period. There may be some overlap between data on ODA, on the one hand, and government investment in agriculture and/or expenditure on agricultural R&D, on the other.

Source: Lowder, Carisma & Skoet (2012).



Private investment funds

A recent review of private investment considered 31 investment funds, of which ten were in Africa (FAO 2010). Twenty-one of the funds had a capital base of between US\$8 million and US\$100 million. The funds covered in SSA are presented in Table 4. These suggest that the SSA investment funds had a target capital base amounting to about 7% of annual private investment in agriculture.

Table 4: Private investment funds

Fund	Source of funds	Start date	Geographical scope	Activities	Capital base
Actis Africa Agribusiness Fund	CDC-DFID	2006	Pan-African	Agribusiness, forestry	US\$93m
Africa Invest Malawi	ARCH	2006	Malawi	Production, processing	US\$18m
Africa Seed Investment Fund	AAC/AGRA	2009	East, Southern	Seeds	US\$12m
African Agricultural Capital	RF/GCF/VNV	2005	East	Varied production	US\$8m
African Agribusiness Investment Fund	Pvt/AfDB	2008	Pan-African	Agribusiness	US\$100m
Aventura Rural Enterprise Fund	EIB/CDC+	2008	Pan-African	Agribusiness	<€60m
Barak Structured Trade Finance	Pvt	2009	Pan-African		US\$200m
Emergent Africa Land Fund	Pvt	2008	Southern	Farmland	US\$500m*
Sierra Investment Fund	Pvt/Soros	2008	Sierra Leone	All sectors	US\$25m
Phatisa African Agriculture Fund	Pvt/Barak	2008	East, Southern	Varied	US\$300m
Total					US\$1 300m

Note: *The EALF website gives a target capital base of only US\$500 million, but the FAO study suggests €2 billion.
Source: FAO (2010)

The following are examples of such operations:

- The first funding cycle of the African Agriculture Fund (AAF) raised US\$151 million of private investment, out of the US\$300 million target. An initial allocation of US\$30 million was made to boost small and medium-sized enterprise (SME) returns, and a technical assistance facility of €10 million has been set up for smaller firms and outgrower/smallholder schemes. The fund covers production and distribution, with at least a quarter devoted to farm production. The AAF is managed by Phatisa Fund Managers.
- African Agricultural Capital (AAC) aims to stimulate private sector investment in African agriculture. It has received funding from the Rockefeller Foundation, the Gatsby Charitable Foundation and Volksvermogen NV, and focuses on small and medium-sized agriculture-related businesses in East Africa. It is managed by Pearl Capital Partners. AAC aims to benefit 150 000 smallholders and to increase household incomes by an average of at least US\$100 per year.
- AgDevCo provides social venture capital that prepares investment-ready opportunities for financing, with the aim of leveraging a much larger private investment. It is currently active in Ghana, Tanzania, Zambia and Mozambique, managing 'catalytic funds' totalling nearly US\$100 million.



Investment climate

According to the FAO review, the key factors governing the investment climate are as follows:

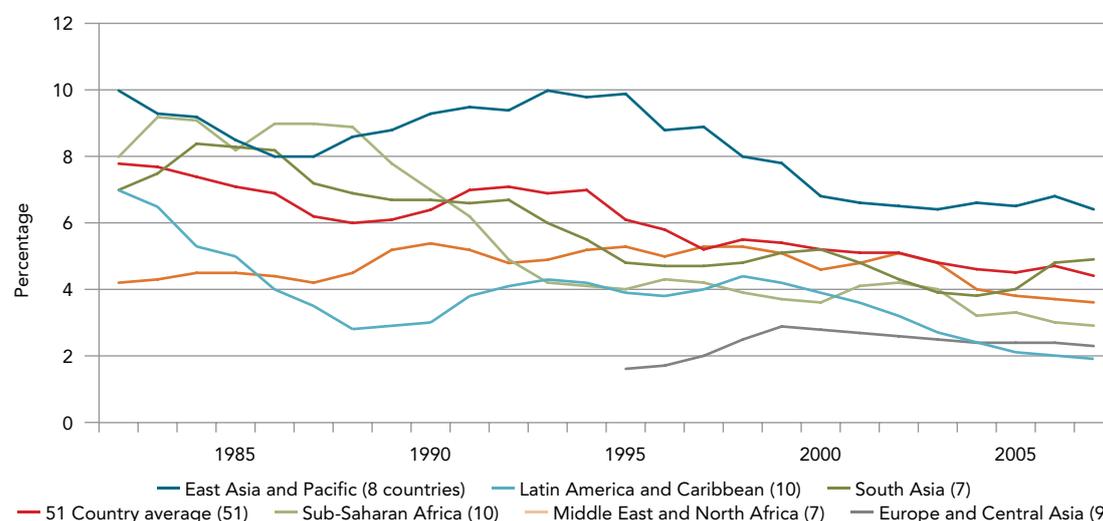
- good governance and effective market institutions;
- macroeconomic and political stability;
- open exchange rates, and transparent and stable trade policies that do not favour imported products;
- respect for property rights;
- a positive tax regime; and
- appropriate measures to manage environmental risks. (FAO 2010)

3.4 Public expenditure

Public expenditure on agriculture includes both investment and recurrent spending. Lowder et al. (2012) analysed agricultural public expenditure reviews in developing countries, which suggested that 42% of agricultural expenditure was on investment and 58% on recurrent expenditure.

Figure 4 shows that agriculture's share in total public expenditure in SSA has fallen from between 8% and 9% in the 1980s to less than 5% since 1993 and to about 3% since 2004. There are some signs that this trend has been reversed since the world food crisis in 2008, but it seems that the Maputo Declaration had little immediate effect.

Figure 4: Share of agricultural spending in total public expenditure for major world regions

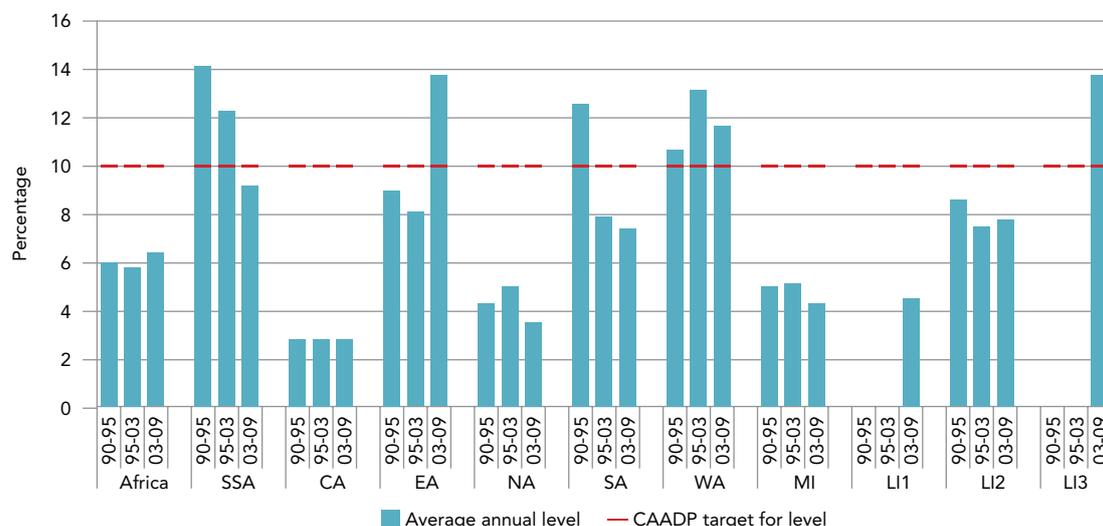


Note: Calculations include 51 low- and middle-income countries. Ethiopia was excluded from the calculation of the regional average for sub-Saharan Africa. Source: FAO (2012a), using IFPRI's Statistics of Public Expenditure for Economic Development (SPEED) database

The level of expenditure on agriculture is presented in Figure 5, which shows both the average annual change and the average annual share of total expenditure. The figure shows that agricultural expenditure in SSA was above the CAADP target of 10% for the period 1990–2003, but has fallen since to just below 10%. There are wide variations amongst the African regions, with Central Africa spending less than 3% on agriculture, and East and West Africa spending more than 10%. Southern Africa has seen a sharp decrease since 1990. One of the most surprising findings is that low-income countries with environments that are favourable to agriculture and have mineral revenue (i.e. LI1) spend only about 4% of total public expenditure on agriculture, while those countries without favourable environments or minerals (i.e. LI3) spend about 14%.



Figure 5: Public expenditure on agriculture as a percentage of total public expenditure



Note: SSA = Sub-Saharan Africa; CA = Central Africa; EA = East Africa; NA = North Africa; SA = Southern Africa; WA = West Africa; MI = middle income; L1 1/2/3 = low-income agricultural + mineral/agricultural/neither.
Source: Benin et al. (2010)

3.5 International funding

Agriculture accounts for a gradually increasing share of international assistance, as shown in Table 5. For SSA, the share of agriculture in all ODA has risen from 6.0% in 2003 to an average of 7.2% between 2003 and 2010, rising at an average annual rate of 4.6%. Increases have been seen across all African regions, with southern Africa rising fastest (at 5.4%) and North Africa rising slowest. Central, East and West Africa have all risen at between 3.5% and 4.9%. The rate of increase has been above 3.4% per year for all economic classifications and all regional economic communities, with the exception of the Arab Maghreb Union (UMA).

Table 5: Agriculture's share in official development assistance

Region/Sub-region	Share of total ODA			Share of total sector allocatable ODA		
		Annual average level	Annual average change (%)		Annual average level	Annual average change (%)
	2003	(2003–2010)		2003	(2003–2010)	
Africa	2.98	3.73	10.48	5.81	6.75	4.23
SSA	2.98	3.77	11.11	6.03	7.17	4.58
<i>Geographical location</i>						
Central	1.52	1.89	11.54	4.46	5.4	3.87
Eastern	3.6	4.33	8.42	6.28	7.55	3.47
Northern	2.95	3.41	4.4	4.48	4.27	0.14
Southern	2.44	3.77	10.67	4.3	5.98	5.43
Western	4.21	4.52	11.26	7.67	8.16	4.9
<i>Economic classification</i>						
Less favourable agriculture	4.81	5.54	6.96	8.58	9.98	3.39
More favourable agriculture	3.88	5.1	7.47	6.42	8.28	4.04
Mineral-rich countries	1.1	1.82	16.03	3.59	4.65	6.01
Middle-income countries	2.72	2.92	11.82	4.95	4.94	4.83

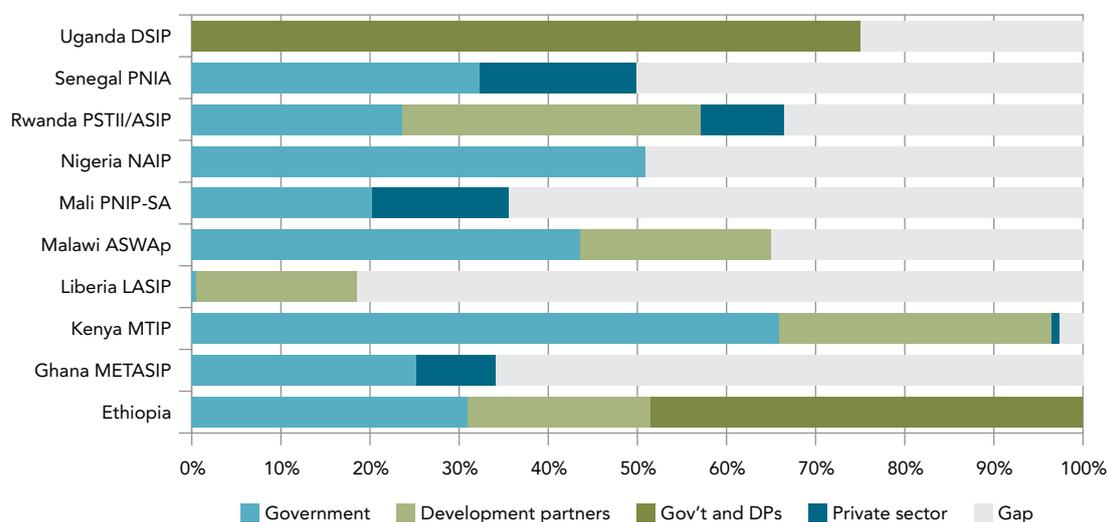


Region/Sub-region	Share of total ODA			Share of total sector allocatable ODA		
	2003	Annual average level (2003–2010)	Annual average change (%) (2003–2010)	2003	Annual average level (2003–2010)	Annual average change (%) (2003–2010)
<i>Regional economic community</i>						
CEN-SAD	3.75	3.94	8.46	6.54	6.87	3.89
COMESA	2.54	3.56	12.15	5.39	6.82	4.31
EAC	3.45	4.68	7.81	5.27	7.09	4.23
ECCAS	1.45	2.22	17.87	4.2	5.63	8.1
ECOWAS	4.21	4.52	11.26	7.67	8.16	4.9
IGAD	3.31	3.91	8.55	5.91	7.04	3.59
SADC	2.22	3.5	12.03	5	6.44	3.98
UMA	3.58	3.52	1.37	5.28	4.23	-2.75

Source: Benin et al. (2011)

Most of the CAADP compacts and IPs present an indication of the sources of funds for investments and the reliance on international partners. This is summarised in Figure 6. Only five countries make estimates of likely funding from donors, and these vary from 18% (in Liberia) to 33.5% in Rwanda. For some countries, there is no distinction between government and donor funding; in others, the donor funding may be included in the funding gap. It is, therefore, difficult to compare the countries. However, only one country (Kenya) expects to fund significantly more than 50% of CAADP investment from domestic revenue.

Figure 6: Sources of finance for CAADP investment plans



Note: Uganda's funding sources are not disaggregated in the figure because the disaggregated data were not available.
Source: Benin (2010), based on GAFSP 2010 documents and Ethiopia's Policy and Investment Framework



Sector wide approaches

Traditionally, donor support for agriculture has been provided through project support, either for specific investments or for integrated, area-based projects. Donors have also supported national projects associated with specific government programmes or activities, such as market information or crop storage. The Paris Declaration (2005), and the move towards alignment of aid with government priorities and systems, has led to some examples of donor support through a more sectoral approach, building on the experience with sector-wide approaches (SWAPs) in the education and health sectors. In most SWAPs, donor funding is provided through the budget against a range of policy commitments from the government.

The experience from Mozambique, Uganda and Zambia suggests that SWAPs in agriculture may be effective in building institutional capacity, but that it is difficult to ensure that this leads to benefits in the field, even when substantial support is provided over an extended period. In theory, the adoption of efficiency-based budgeting should help to ensure that newly capacitated institutions deliver results, but the experience with SWAPs suggests that there are major issues of inertia in public expenditure systems that make it difficult to achieve the desired results.

Experience with a SWAp for agriculture in Mozambique

In Mozambique, PROAGRI 1, which ran from 1998 until 2003, involved pooled donor funding but was not implemented through the budget. It was based on three objectives: institutional strengthening, improved productivity and the sustainable use of natural resources (Cabral, Shrivastava & Muendane 2007). The first phase was criticised for focusing too much on institutional development, especially at the central level, with little impact on farmers. PROAGRI 2 involved renewed commitment to a SWAp by donors, with resources being disbursed through the budget. It continued the support for institutional strengthening and attempted to address the criticism of phase 1 through the introduction of results indicators set out in a performance assessment framework agreed to with the donors. However, results were still disappointing and several of the main donors pulled out of the SWAp. Towards the end of PROAGRI, the government also demonstrated its frustration with the difficulties of achieving results in the field by introducing the Action Plan for Agricultural Production (PAPA), which included a more ambitious and interventionist approach to getting results in the field. PROAGRI 1&2 were followed by the Strategic Plan for Agricultural Development (PEDSA) (2010–19), which is aligned with the CAADP and shifts the focus more towards productivity and infrastructure. Some pooled donor funding is still present, but the support is reverting to targeted activities within PEDSA, and its investment instrument, the National Agrarian Sector Investment Plan (PNISA) for the period 2013–2017.



3.6 Returns to public expenditure

The CABRI Agricultural Sector Dialogue Keynote Paper on Budget Efficiency in Agriculture reviews evidence of the returns to public expenditure across the following main areas:

- For extension and research, there are many studies that claim very high returns to the adoption of new varieties and techniques. Two reviews from the 1990s suggest that most extension and research expenditure delivers internal rates of return (IRRs) greater than 50% (Evenson 1994; Alston et al. 1998). This is exceptionally high, and estimates as high as this would normally be subject to scrutiny to check that assumptions are realistic. Cost-benefit analysis (CBA) for conservation agriculture (CA) suggests that benefit-cost ratios (BCRs) of 2.0 can be achieved, but that this is variable and sensitive to local conditions.³
- For livestock, economic analysis of returns to major pan-African vaccination programmes suggests that these typically achieve BCRs of between 1.8 and 2.6, which is strongly positive but also suggests that such activities are sensitive to costs. Returns to more local support for animal health are likely to be higher, but there is limited evidence.
- Irrigation projects often claim ambitious IRRs (of more than 30%) at appraisal. This reflects the potential benefits if irrigation is well managed and other conditions are in place for good crop husbandry. In practice, returns tend to be lower, and a review of irrigation in SSA suggests that only 70% are profitable (You 2008). The rehabilitation of larger schemes generated the best BCRs. Large new schemes and small schemes both had BCRs of less than 2.0, although most small schemes had BCRs of more than 1.0.
- There are few economic evaluations of market support, but a review of four case studies suggests that farmers with market information receive prices that are 12% higher than those without such information, the former achieving very high BCRs of about 6.0 (Kizito 2011). However, most of the beneficiaries were smallholders who were already partly commercial.
- Assessing the returns from subsidies to inputs and for crop marketing is difficult and no clear conclusions can be drawn. Many African governments have argued that the economic and social benefits justify the high costs. Until recently, few development partners agreed with this assessment, but there is now some agreement that targeted subsidies may give positive returns.
- There is a long tradition of using CBA to evaluate roads, but the techniques developed are more difficult to apply to rural roads. One case study in Ethiopia found that IRRs of 12% to 34% were achieved from rural feeder roads (Stifel, Minten & Koro 2012).

The above analysis shows that most agricultural expenditure should expect to achieve returns that deliver IRRs of more than 20% or BCRs of more than 2.0. There are some examples of highly successful expenditure that can generate much higher returns (notably in research and market development), but these require complementary expenditure. As ministries of agriculture build their portfolios of experience in analysing returns to expenditure, the nature and depth of their interdependence should become clearer.

³ A BCR of 2.0 is roughly equivalent to an IRR of 20% in most circumstances, if a discount rate of 10% is used in calculating the BCR.



4. Key policy challenges

There have been major changes in African agriculture in the last ten years and it is necessary for policies to adapt rapidly to these changes. Global growth in population and changes in diet and energy demand mean that there is increasing pressure on natural resources, and world prices for crops and livestock are increasing. Climate change is creating greater uncertainty in African production and in prices. This creates new opportunities for Africa, but it also highlights the constraints facing African farmers and the risk that commercial investment might marginalise smallholders in some areas.

The gradual rise of private sector capacity in SSA means that governments can afford to withdraw gradually from some activities, although this has to be done in a planned manner, so that smaller farmers are not neglected, and without the government undermining market activity. The role of the government is thus evolving gradually into that of an enabler, creating the conditions to attract and support investors, while also trying to ensure that investment is beneficial for all social groups. This is especially important in an era of increased globalisation, which is leading to new trade and investment opportunities. These should benefit SSA but need to be handled carefully to avoid negative effects on local people and environments. Finally, climate change is creating more instability in agriculture, which increases the political pressure for some form of market stabilisation.

The following subsections describe the policy challenges for agriculture in five key areas. Unlike education, health and social protection, agriculture is an economic activity undertaken primarily by the private sector. As a result, much of the policy debate is associated with defining the appropriate role of the government in each of the areas involved. In high-income countries with well-developed markets, ministries of agriculture typically account for less than 1% of total spending, and most of this expenditure is on farm subsidies and the environment. In developing countries, there are several reasons why public expenditure on agriculture is normally much higher:

- smallholder farmers are usually amongst the poorest people, and support for their livelihoods is often seen as an effective way of reducing poverty;
- farmers in developing countries are also amongst the most vulnerable, because they live in natural environments that are exposed to increasingly unpredictable climates, and have limited resources with which to survive shocks; and
- while markets may be increasingly available to more advanced farmers in relatively fertile areas near to large cities, there are many rural areas where farmers have very few options for marketing produce.

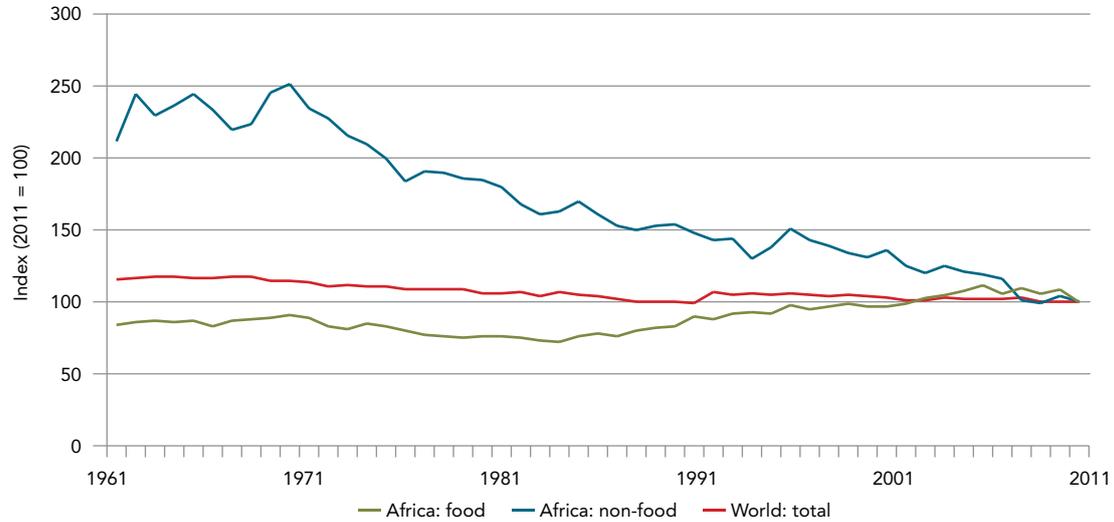
4.1 Production and productivity

Production

Agriculture accounted for 12.1% of GDP in SSA in 2011 and was worth about US\$155 billion (World Bank 2009). Food production in Africa has increased by about 2.7% per year over the last 40 years, compared with a population growth rate of 2.6% per year.



Figure 7: Agricultural production, food and non-food products

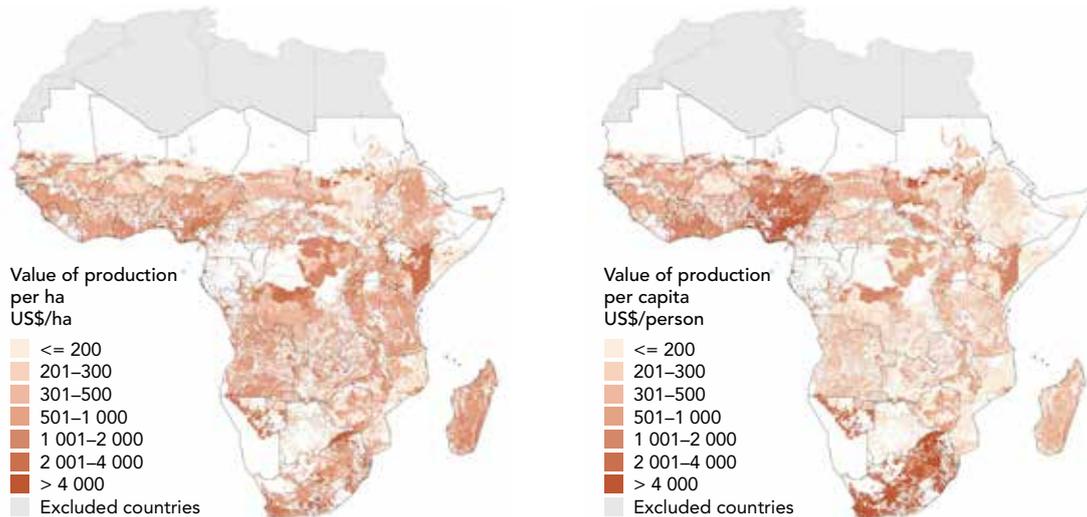


Source: FAOSTAT statistical database (faostat.fao.org)

Productivity

Productivity in African agriculture is low. Yields for most crops are between 20% and 35% of the world average. There are, however, larger variations in yields and in returns to labour in Africa, as shown in Figure 8.

Figure 8: Variation in value of production per hectare and per person

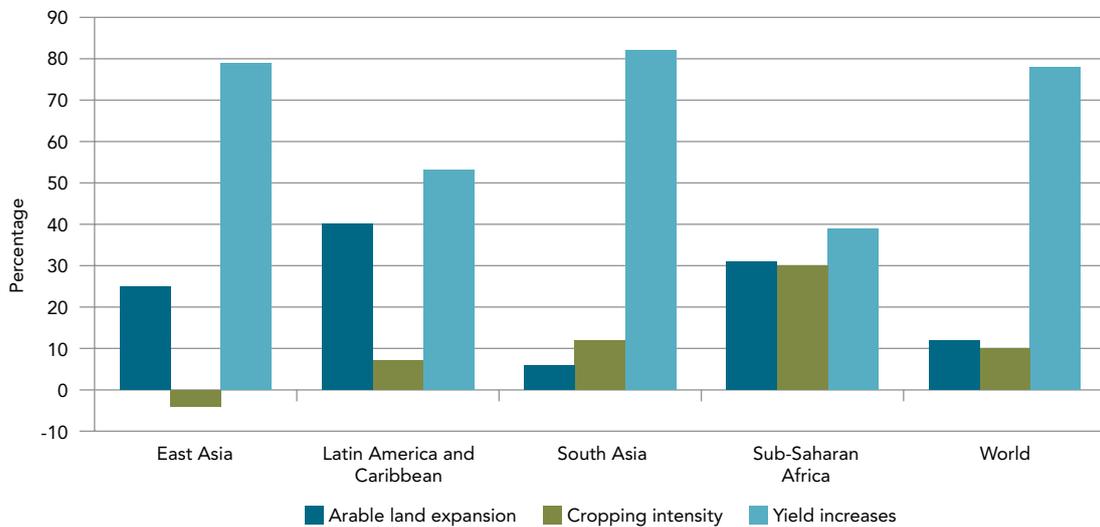


Source: Benin et al. (2011)

Growth in the production of cereals in Africa has been slightly higher than the world average, but about two-thirds of this growth has come from increased area and cropping intensity and only one-third from improved yields, whereas the increase in the production in the rest of the world has been caused almost entirely by improvements in yields, as shown in Figure 9. Yields for cereals across the whole of SSA have increased by 1.2% per year over the last 50 years, compared with an average growth rate of 2.0% for the whole world.



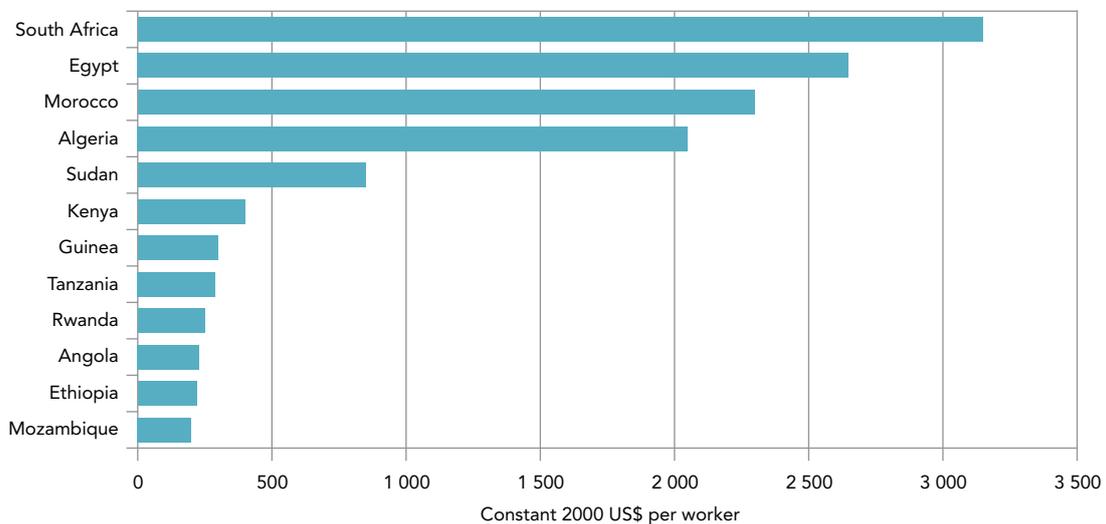
Figure 9: Sources of yield increase by world region, 1961–2009



Source: FAO (2012b)

Labour productivity in SSA grew from US\$269 per worker in the 1980s to US\$288 per worker in 2005, in constant 2000 US\$. Two-thirds of that gain happened after 2001. In high-income countries, labour productivity is more than US\$20 000 per worker, and in middle-income countries it ranges from about US\$500 to nearly US\$3000 per worker.

Figure 10: Agricultural labour productivity for the largest and fastest growing African countries



Source: (Benin et al. 2011)

Reasons for the limited progress in productivity include the following:

- Water supply is unpredictable in many African countries. Less than 4% of arable land is irrigated in SSA, compared to 34% in North Africa and the Middle East, and between 10% and 30% in other middle- and higher-income countries (World Bank 2009).
- There is limited availability of inputs, because they are not physically available, because they are not affordable or because the returns to use of inputs are too low or too unpredictable. SSA applies an average of only 11 kg/ha of arable land,



compared to about 150 kg/ha for high-income countries and between 35 and 150 kg/ha for middle-income countries (World Bank 2009).

- There is also limited availability of farm machinery, with one tractor for every 770 ha in Africa, compared with one tractor for every 23 ha in high-income countries (World Bank 2009).
- There is a lack of simple, widely applicable technology options, and slow transfer of the options that do exist.
- Uncertainty about land rights limits investment in land improvement and reduces interest in taking risks.
- Insufficient attention is paid to women, who are the main producers and labour force in agriculture in most SSA countries.
- In some countries, there is a reliance on increased area of cultivation, which may reflect rational farming choices, since it is often more cost-effective and risk-averting for African farmers to expand the area under cultivation than to intensify production, provided that area is available and taking into account the limited availability and high-cost of inputs.
- Infrastructure is often very poor in rural areas and roads are often in poor condition, especially during and immediately after the rainy season, when most farming activity takes place.
- The effects of HIV/AIDS on the agriculture sector are also very marked, especially in East and southern Africa, with many rural areas losing large numbers of the most active working age group, leaving crops and livestock to be cared for by the older generation.

A new green revolution for Africa

The green revolution promoted by the CGIAR system has been much less successful in Africa than in Asia. To address this, the CGIAR launched the SSA Challenge Programme for Water and Food (SSA-CP) in 2005, which has been co-ordinated by the Forum for Agricultural Research in Africa (FARA). The SSA-CP recognised that the natural resources in Africa are more varied than in Asia and that a more adaptive approach to agricultural research is required. This approach was termed Integrated Agricultural Research for Development (IAR4D) and focused on measuring impact on farmers. Two reviews after the inception phase suggest that, while some institutional progress had been made, it was difficult to identify concrete benefits (Ndiritu, Karanja & Vlek 2007; Biswas, Palenberg & Bennet 2008). Some concerns were also raised about inconsistencies with the SSA-CP, particularly in the relationship between competitive grants schemes compared with the participatory approach, and the focus on adaptive research compared with the call for 'new knowledge creation' and 'cutting-edge science'. Similar conclusions are drawn in a review of the Soil and Water Management Research Network (SWMnet) in East and Central Africa, which noted that too many resources were devoted to planning and workshops (ASARECA 2008).

The inception phase was followed by a 'proof of concept' phase. The external review of this phase concluded that strong progress had been made in using the IAR4D concept, but that it was still too early to determine the impact of the programme on farmers, and that a further extension of at least two years was required (Lynam, Harmsen & Sachdeva 2010).



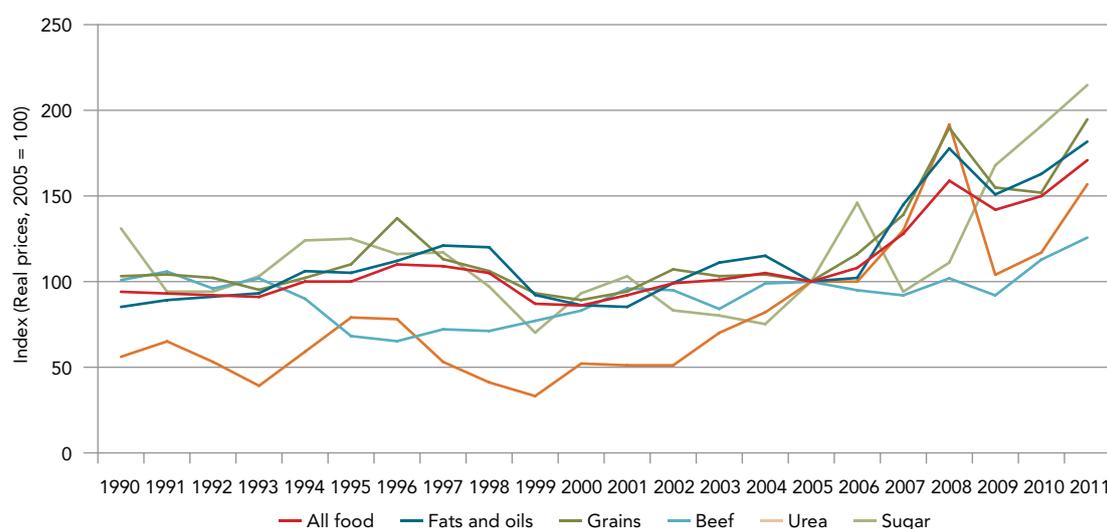
One of the most promising options for an African green revolution is CA, which involves many different practices, with the following common principles: little or no tillage; crop rotation; and the use of mulch to build up organic matter in the soil. CA is being adapted and promoted across Africa. Performance reviews suggest that yields are typically 40% to 200% higher than with conventional agriculture, although the technique can require more labour if mechanised options are not available (Twomlow et al. 2008; Marongwe et al. n.d.; Mazvimavi 2011; Milder et al. 2011; IODParc 2013). Despite this success, CA is still used on less than one million hectares in SSA, and this accounts for less than 1% of total global use of CA.

4.2 Markets, subsidies and trade

Prices

Food prices rose to record highs in 2008, following a series of poor harvests of several key food staples around the world. Prices declined in 2009, following improved harvests and a strong supply response, but have recently increased to levels that are close to the record levels of 2008. In the short term, high food prices have a dramatic impact on food poverty amongst the most vulnerable households in Africa, including many urban households and, also, many households in rural areas that do not have access to land or to farm employment. In the longer term, high food prices are likely to generate improved incentives for African farmers, and there is evidence of increased interest in investing in farming in Africa. While these general principles are the main concerns, there is a growing body of more nuanced analysis (FAO, WFP & IFAD 2011). Firstly, it seems that, in reducing poverty, access to high prices in protected markets is more effective than access to high prices globally; and, secondly, duties and restrictions on food imports offset some of the effects of world prices in some countries.

Figure 11: World food prices



Source: World DataBank (<http://databank.worldbank.org/data/home.aspx>)

There is a widespread view that price volatility has increased in Africa at the same time as prices have risen. This might be expected, if climate change has increased the unpredictability of supplies. However, a recent review found that, while there has been an increase in volatility in world prices, there has been no increase in volatility in prices in SSA (Minot 2012). The review also found that prices were more unstable in those countries where public intervention was greatest, although it is not clear whether this is because the intervention is in response to



greater inherent variability associated with production patterns or whether it is because the intervention itself causes the volatility.

Markets

African farmers often quote a lack of marketing opportunities as a major constraint to agricultural development. A recent review of experience in agricultural markets in Africa reached the following conclusions:

- Smallholder farmers are often better connected to markets than is commonly believed, and private enterprise is increasingly investing in processing and distribution and, as a result, reducing the costs of these activities. Mobile phones are opening up new opportunities that are popular with small farmers and have been embraced by a variety of initiatives.
- Markets will work only if improvements in productivity lead to farm surpluses.
- Grain storage capacities are often very limited, which restricts the marketing options available to farmers.
- State intervention must be disciplined and based on clear rules that give private investors confidence. In particular, state intervention in markets should be governed by clear rules with well-defined triggers for participating in market operations.
- Phytosanitary controls are an important public service. Grading and quality may also require some government support.
- Rural roads are an important consideration for increasing market activity.
- Trade regimes should be transparent and efficient, and the government can help in supporting mechanisms that reduce uncertainty in markets. (Jayne et al. 2011)

There is increasing confidence and optimism in the prospects for agribusiness development in Africa, which will generate strong benefits for agricultural markets and farmer incomes. A recent report by the World Bank estimates that the value added from agribusiness could triple to more than US\$1 trillion per year by 2030 (World Bank 2013). While recognising the constraints facing African farmers, the report highlights very strong demand from private investors interested in agribusiness in Africa. Questions are raised, however, about the impact on local livelihoods, which depend upon secure access to and use of land. The report describes the severity of the constraints to agribusiness in five value chains, as summarised in Table 6.



Table 6: Constraints to agribusiness in five value chains

	Rice: Ghana/ Senegal	Maize: Zambia	Cocoa: Ghana	Dairy: Kenya	Green beans: Kenya
<i>Output markets</i>					
Policies distorting markets	*	***	*	**	
Quality issues	**		*	**	***
Food safety		*	*	**	***
Social and environmental issues			**		***
Regional integration issues	**	***		**	
Price risk	**	***	**	*	*
<i>Inputs and technology</i>					
Policies distorting markets	**	***	*	*	
Access issues	***	***	***	*	
Land access issues	***	**	**		
<i>Infrastructure issues</i>					
Transport	**	**	**	*	
Other	*** (irrigation)	** (rural roads)	* (energy)	* (collection)	* (cold chain)
Access to finance issues	**	**	***	*	
Skills issues	*	*	**	*	***
Issues with engaging smallholders				*	***

Note: Asterisks denote level of importance of constraint, with three asterisks indicating the highest priority.
Source: World Bank (2013)

Subsidies

There has been much concern about agricultural subsidies in Africa, based on several key issues, including:

- heavy demands on public finance;
- the disruptive effect of the unpredictability of these demands on public finance;
- difficulties in managing effective targeting;
- the risk of creating incentives for uneconomic use of inputs; and
- the crowding out of private market development.

This conventional wisdom, however, is being challenged increasingly, with evidence of the importance of input subsidies in Asia, new modalities for delivering targeted subsidies more effectively, and improved economic returns from input use, which open up prospects of having more impact on sustained changes in farming practices (Dorward, Hazell & Poulton 2007).

For inputs, governments and donors are now more willing to support subsidies, provided that the following conditions are met:

- input subsidies should be guided by clear objectives that are explicitly aligned to national poverty-reduction objectives;
- packages should be developed that are sensitive to local agro-ecological conditions;
- inputs should be complemented by other support to improve agricultural productivity; and
- procurement should be through the market, thereby enhancing market development. (Druilhe & Barreiro-Hurlé 2012)



Urbanisation

Most African countries are still between 50% and about 80% rural, although the urban population in Africa is expected to account for 45% of total population by 2025. The rate of rural poverty is normally higher than urban poverty, although there are exceptions (for example, in Mozambique, Nigeria and Tanzania). Urban populations, therefore, offer a major source of potential demand for Africa's farmers, while also supplying the equipment, inputs and consumer goods for rural areas. However, because political power is likely to become increasingly based in cities, there may be political pressure to maintain intervention in food markets to reduce the costs of living for the urban population.

Trade and globalisation

Export crops have become less important and their share of total exports has fallen from 42% in the 1960s to under 10% since 2000, and there has been little diversification of agricultural exports (Rakotoarisoa et al. 2011). More than half of Africa's agricultural exports are of cocoa, coffee, cotton, sugar, tea and tobacco, and the lack of exports of other crops means that increases in production often depress domestic prices and so dilute the ability of farmers to benefit from improvements (Diao & Hazell 2004). Only 20% of Africa's food imports originate from other African countries.

Globalisation has created benefits for many of the fast-growing middle-income countries, as they gain from their comparative advantages, including natural resource endowments, cheap labour and investment in modern infrastructure. There may be political pressure to reverse this if progress is stalled (for example, because of natural resource constraints or because the difference in labour costs narrows). Many large developed and middle-income countries still maintain substantial market interventions, including agricultural subsidies, and there may be political pressure to utilise these instruments to increase intervention in world trade if world food prices rise even higher than they have in recent years.

4.3 Water and energy

Water

Agriculture accounts for 71% of global water use. Agricultural water use is increasing by about 50% every 20 years and will continue to do so, if there is no efficiency gain.

In 2007, the International Water Management Institute (IWMI) reviewed the state of world agriculture and whether water supply would be sufficient to enable the world to feed itself when the population reaches around eight or nine billion (IWMI 2007). They concluded that there would be enough water, but only if the efficiency of water use improved substantially. As the efficiency of water use in SSA starts from a low base, the potential for increased efficiency is high. The IWMI report highlights the following policy priorities for improving the efficiency of water use in SSA:

- integrated water resource management;
- improved access to water and better water rights, especially for small farmers;
- use of groundwater in some areas;
- improved efficiency of existing irrigation; and
- techniques for improving soil moisture in rain-fed agriculture.

Africa has only 4% of cultivated land under irrigation, compared with 13% for Latin America, 34% for North Africa and the Near East and 39% for Asia. This is partly because of a lack of



resources for infrastructure and institutions, but it is probably better explained by the nature of water resources and soils in Africa and the fact that, in many countries, there is sufficient land to grow rain-fed crops.

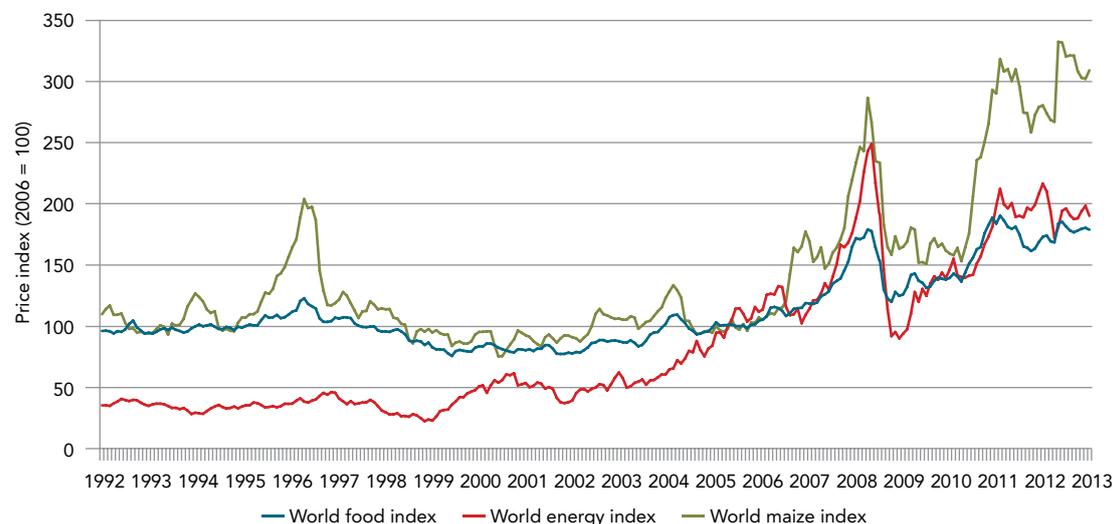
Most development agencies have considered that irrigation in Africa gives poor returns, with high costs and low results. However, a recent review found that this was not correct and that unit costs were not significantly higher in SSA, after taking into account the size of the scheme, the level of development of the country and the participation of farmers in investment and management (Inocencio et al. 2007). The study reviewed 314 irrigation projects in Africa, Asia and Latin America, funded by the World Bank, IFAD and AfDB. However, the study did find that failure rates were higher in Africa, partly because of a lack of markets for high value crops and the resultant use of expensive irrigation water for staple crops.

Energy

The International Energy Agency (IEA) estimates that the world will require 40% more energy over the next 20 years and that there will be increasing pressure to secure it from renewable sources, as the evidence of climate change becomes more dramatic (IEA 2009). Most developed countries have targets to increase the proportion of fuel that is derived from biofuels as an element of their climate change mitigation strategies. World production of biofuels has increased dramatically from about 20 billion litres per year in 2000 to about 80 billion litres per year in 2008. Approximately 75% of this production comes from the USA and Brazil, which produce mainly for domestic consumption. However, there is likely to be an increasing interest in the international biofuels trade, and investors are looking to Africa to supply that trade. In addition, most African countries rely on imported fuel that is relatively expensive, especially in rural areas; there is, thus, good potential for import substitution using locally grown biofuel.

Figure 12 shows that the markets for food and fuel have become more integrated and that, increasingly, the two products can be viewed as substitutes. At present, producing crops for biofuels does not seem to be more profitable than producing for food, and the integration of the markets, therefore, seems to be sustained by public policy on targets for renewable energy sources. However, unless new energy sources are found, it is possible that fuel prices will rise faster than food prices and that the markets will remain linked, unless public policy intervenes.

Figure 12: World price indices for energy and food





There has been dramatic growth in interest in investing in biofuels in Africa over the last ten years, and this has generated strong debate about whether biofuel production threatens food security or creates new cash-cropping opportunities. Large plantations may be useful in countries with vast areas of uncultivated and unforested land. However, it is often argued that in most African countries biofuel production should come from small farmers, so that there are benefits both for poverty reduction and for economic growth, while also taking care to monitor environmental and social impacts (Von Maltitz & Stafford 2011).

It is not easy to monitor the status of land acquisitions associated with biofuels, but a review by the IFPRI suggests that China has an interest in land totalling 4.8 million hectares in the DRC and Zambia, mostly for jatropha; other interests include Tanzania (5 investors and 575 000 ha of jatropha, sugar and sorghum); Mozambique (100 000 ha); Ghana (38 000 ha); and Ethiopia (13 000 ha) (Von Braun & Meinzen-Dick 2009). A study of the land required to meet a policy target of providing 5% of fuel consumption from biofuels suggested that, for Botswana, Namibia, Tanzania, Mozambique and Zambia, between 26 000 and 56 000 hectares would be required and that 307 000 hectares would be required to supply 2% of South Africa's fuel consumption (Maltitz et al. 2009).

There is some debate about the economic viability of biofuel production without subsidies. International experience suggests that commercial production of ethanol costs about US\$0.2 per litre for molasses, when this is available as a by-product of sugar production, and US\$0.5 per litre for sugar cane. This compares with retail prices for imported diesel in port cities of between US\$0.6 and US\$0.8 per litre, assuming a world crude price of US\$100 per barrel. New crops are being considered, with oil palm, maize, cassava, potato and rice all producing more than 1 000 litres of biofuel per hectare.

Jatropha has been considered as an attractive source of biodiesel in Africa, partly because it is already used in West Africa and can survive dry spells (although not without loss of yield). According to a 2008 survey, 120 000 hectares of jatropha was already being cultivated in Africa (with Zambia, Madagascar and Tanzania accounting for about 75% of this), and plans were in place for about 2 million hectares to be in production by 2015 (GEXSI 2008). The evidence on production costs for jatropha is still emerging, but it seems likely that local biodiesel can be produced at a small scale for less than US\$0.6 per litre, and at a more commercial scale for less than US\$0.8 per litre (Mitchell 2011; Portale 2012).

Biofuel yields are highly variable, even for the same crops in different situations. For example, yields of ethanol from sugar cane vary from 5 400 to 10 350 litres per hectare and yields from sweet sorghum vary from 500 to 5 600 litres per hectare. For biodiesel, soybeans yield between 230 and 550 litres per hectare and jatropha between 450 and 2 800 litres per hectare.

The interrelationship of energy, water and land is illustrated by the water footprint of biofuel crops (Gerbens-Leenes et al. 2009). There are large variations in the water footprint, ranging from sugar beet (which needs about 1 400 litres of water per litre ethanol) and sugar cane (2 500) to maize (2 600), cassava (2 900) and sorghum (9 800). Biodiesel crops require even more water, with soybeans needing 13 700 litres per litre of fuel and jatropha 19 900.

There are possibilities that new biofuel extraction processes may facilitate the conversion of lignocellulosic biomass (including grasses, crop residues and even trees), which would reduce pressure on arable land (Hoogeveen, Faurès & Van de Giessen 2009; Mitchell 2011).



4.4 Land and acquisitions

Land policy

Land policy (including distribution, utilisation, tenure, administration and adjudication) has a major impact on food security (ECA 2004). The FAO has recently produced a reference document that provides guidance for improving the governance of land tenure in the context of food security (FAO 2012c).

There are several strands to the debate on land policy. One strand is typified by analysis that reports on the benefits to be gained from secure land rights, both to provide incentives for farmers to invest in their own land and to act as collateral for borrowing (Deininger et al. n.d.). More recent analysis also emphasises the importance of land policy in poverty reduction, gender and local governance (Deininger 2003). However, there are wide variations in circumstances, and increased security of tenure does not always result in investment and improved productivity (Jacoby & Minten 2005). There are also complications in dealing with customary land, which can be an efficient way of sharing a common resource, but can also result in environmental degradation, depending on how well or poorly it is managed.

Many African countries have now developed national land policies (NLPs), often addressing the following issues: land registration; land restructuring and consolidation; the recognition of customary rights; regulations for markets in land rental and sales; taxation; and rules governing land use and the environment. A review of NLPs in eight African countries and one Asian country, concluded that most had been developed using an effective process of stakeholder participation, and many had taken difficult policy decisions, notably in recognising customary tenure (Molen, Silayo & Tuladhar 2008). The review concluded that NLPs are important documents but that the link to implementation needs to be strengthened. In particular, despite the widespread acceptance of the importance of land policy, many governments seem to expect it to be delivered with very few resources, perhaps because it involves mainly institutional investments, which are often undervalued compared with infrastructure investments.

The 2009 Sirte Declaration on Land Issues and Challenges in Africa raised the level of commitment to making progress on land policy. In 2010, a joint initiative by the AU, AfDB and ECA produced a framework to strengthen land rights, enhance productivity and secure livelihoods in Africa (AU-AfDB-ECA 2010). This framework stressed the importance of improving land rights for development, poverty reduction, and peace and security. It defined seven steps for policy development: consultation, drafting, costing, refinement, design, enactment and dissemination.

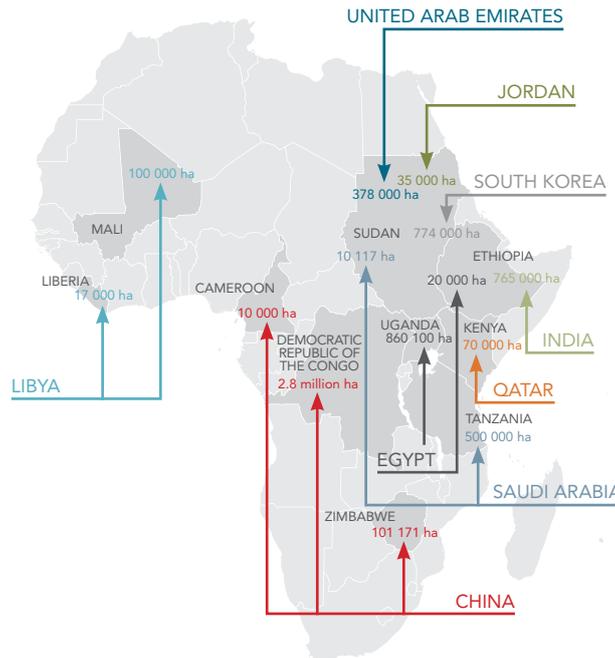
Acquisitions

A recent review for the Africa Development Forum quoted estimates suggesting that Africa has over 400 billion hectares of uncultivated land that is suitable for crop production, and which is not forested, protected or intensively settled (AU-AfDB-ECA 2012). Another review reports that about 29 million hectares of arable land is being sought for large-scale land acquisition, and that the proportions of this land are nearly 50% in the DRC, over 20% in Mozambique, 15% in Uganda and between 5% and 10% in Zambia, Ethiopia, Madagascar, Malawi, Mali, Senegal and Tanzania (Gurara & Birhanu 2012). Acquisition is motivated by uncertainty over future world prices for food, biofuel and other cash crops, and normally involves the payment of land fees, which are typically between US\$5 and US\$10 per hectare per year in most countries.



It seems clear that there is an urgent need to manage land acquisitions, particularly to ensure that the land rights of local people are respected. The Nairobi Action Plan on Large Scale Land-Based Investments in Africa stresses the importance of developing 'land policies and land use plans that facilitate equitable access and secure land rights for communities' (AfDB 2011).

Figure 13: Major state-sponsored land acquisitions in Africa



Source: Mo Ibrahim Foundation (2011)

4.5 Climate change, irregular supplies and disaster preparedness

Work on modelling the impact of climate change is being led by the Intergovernmental Panel on Climate Change (IPCC). The 2007 IPCC Fourth Assessment Report (AR4) provided an overview of the latest modelling, with two influential maps on trends in average temperature and rainfall (IPCC 2007). The Fifth Assessment Report is planned for 2014. In 2011, the first attempt to synthesise information on changing rainfall patterns was produced, showing that most parts of the world would see a marked increase in the concentration of rainfall and the extent and frequency of dry spells (IPCC 2011).

African farmers are amongst the most vulnerable in the world to climate change. It is clear that temperatures will rise substantially in all African countries, and this will require some changes in cropping patterns. In most parts of the continent, rainfall will become more concentrated and less predictable, resulting in more frequent crop failures and problems with livestock grazing. Trends in average rainfall are less clear. The AR4 suggested that North Africa and much of southern Africa will become significantly drier, but the situation in East and West Africa is more mixed. One recent review suggests that the wet coastal areas of West Africa are getting drier, but that some parts of the Sahel are getting wetter, opening up new opportunities for crop production (Jalloh et al. 2103).

The United Nations Framework Convention on Climate Change (UNFCCC) has co-ordinated the international response to climate change. A key first step was for countries to prepare



national adaptation programmes of action (NAPAs), and almost all African countries have now done so, using standard guidelines for participatory preparation. The NAPA process has been criticised for being too disconnected from mainstream national planning and for being unrealistic in terms of resourcing (UNEP 2008). As a result, the UNFCCC has been introducing national adaptation plans (NAPs) that focus more on mainstreaming. These planning developments are linked to the debates currently underway over the design of the Green Climate Fund and the operation of the existing funds, including the Least Developed Countries Fund and the Adaptation Fund.

In parallel with the NAPA and NAP process, many other projects have supported community-based and participative approaches to adaptation. These have focused on building awareness about climate change and the capacity to use local knowledge. Indeed, one recent review concluded that specific interventions were less appropriate than capacity-building activities (Ziervogel et al. 2008). The recently completed final evaluation of the six-year Climate Change Adaptation in Africa (CCAA) programme identified successes in building capacity, especially at local levels (Lafontaine et al. 2012). However, the CCAA evaluation was less clear about the impact of the programme on livelihoods, and there is a risk that a response to adaptation relying exclusively on process may suffer from problems similar to those of the SWAp approach to agriculture, in that relatively sophisticated institutional capacity is developed, but without clear field benefits.

Another strand in the global response to climate change and agriculture focuses more on the development of new practical techniques. A recent review by the World Bank led to the production of a brochure on climate-smart development, presenting examples of adaptation and mitigation, including the following: weather-based risk management; CA; agro-forestry; watershed restoration; biogas development; livestock and grazing management; and improved crop development (World Bank 2011). The CGIAR has launched the Climate Change, Agriculture and Food Security (CCAFS) programme, with three themes for 'place-based' research at benchmark sites (adaptation to progressive climate change, managing climate risk and pro-poor mitigation), plus a fourth theme integrating results for decision-making.

There is a wide range of analytical frameworks for assessing vulnerability to climate change. Most of these consider both the risks associated with climate change (including the sensitivity of the natural environment to these changes) and the human and financial resources available to survive these risks (Ringler et al. 2011). Livelihoods programmes typically aim to help households graduate out of vulnerability by surviving at least one year of climate shock.

5. Evidence-based policy

Impact assessment

All new policy is subject to impact assessment of one sort or another. Some of the key initiatives have included the following:

- CBA, which has been the central method for project selection and appraisal since the early years of the international development banks;
- log frames, which emerged out of the fusion of different national traditions within the EU, allowing a more flexible range of objectives and indicators to be defined, without the requirement for all analysis to feed into CBA;
- sector-specific impact assessment, including, notably, environmental impact assessment (EIA) and health impact assessment (HIA), which are used mainly to



ensure that certain basic standards are met (the International Association of Impact Assessment provides a forum for exchange of experience across the many different sectors in which impact assessment has become common); and

- strategic impact assessment, which refers to initiatives to assess major national strategies, such as those involved in meeting MDGs.

Poverty and social impact analysis

During the 1990s, many African countries took part in structural adjustment programmes that aimed to promote growth by facilitating private sector development. However, evaluations of structural adjustment led to the conclusion that growth did not necessarily result in poverty reduction. In response to these concerns, the International Monetary Fund (IMF) and World Bank introduced a stronger poverty dimension to their operations by adopting the Poverty Reduction and Growth Facilities (PRGFs) and the Poverty Reduction Support Credits (PRSCs) as their main lending instruments. These programmes required African countries to prepare Poverty Reduction Strategy Papers (PRSPs). A joint staff assessment by the IMF and World Bank of the first interim PRSPs concluded that PRSPs needed to be more clearly based on evidence (IMF 2002). As a result, a programme of poverty and social impact assessments (PSIAs) was introduced in 2002, and there are now hundreds of policies for which PSIAs have been undertaken. PSIAs are built on the well-established principles of evaluation, with the particular requirement of focusing on the distributional impact of policies.

A multi-donor trust fund was set up in 2010 to fund PSIA work related to World Bank operations. According to the World Bank PSIA website, 12 PSIA studies have been undertaken in Africa, of which one covers the agricultural sector. In addition, a PSIA in 2004 on the Ghanaian agricultural strategy FASDEP 1 led to changes in FASDEP 2, with more emphasis on food security (Zimmermann et al. 2009).

IFPRI modelling

IFPRI has developed an approach that uses a Computable General Equilibrium model of the economy to capture linkages in the economy and the associated multiplier effects, and which includes estimates of returns on investment. This has been applied in studies at the global, pan-African and country level (Diao et al. 2010; Diao et al. 2012):

- At the international level, the International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT) includes modelling of trade implications.
- At the pan-African level, a recent study of the impact of agricultural growth on poverty concluded that agricultural growth is 'crucial' for wider economic development and, especially, for poverty reduction. The research suggested that there are positive returns to agricultural investment, but did not analyse returns to non-agricultural investment, and, consequently, was unable to make a direct comparison. However, it did conclude that, because of the multiplier and poverty benefits from agricultural growth, investment returns in non-agriculture would have to be much higher. The study also looked at the difference between agricultural growth based on staple food crops and on export crops and concluded that, although the returns to investment on export crops were higher, the multiplier and poverty effects from growth in food crops were far greater. The study concluded that 'within agriculture, staple foods are essential to generating pro-poor growth, although smallholder-based export agriculture can also contribute' (Diao et al. 2012).



- At a national level, the IFPRI modelling approach was applied in Rwanda, and a similar conclusion was reached: the degree of linkage between smallholder agriculture and the rest of the economy meant that growth in smallholder agriculture was particularly successful in reducing poverty (Diao et al. 2010).

The IFPRI modelling approach has been adapted to include modules dealing with climate change, water, dietary habits and bioenergy. However, it is not able to take account of more qualitative issues, such as land tenure, or of less predictable trends, such as the development of institutions associated with innovation and marketing.

6. Conclusion

Top ten dialogue points

1. The circumstances in which agricultural input subsidies provide good returns and when they are inappropriate. Where subsidies are appropriate, the ways of managing these subsidies to reduce dependency and ensure an orderly exit strategy.
2. The role of intervention in agricultural markets to reduce variability and improve production incentives. How to manage this intervention in a way that works with market development.
3. The role of the private sector and civil society in extension and research, and the circumstances in which the public sector may be more effective, perhaps because the private sector has insufficient incentives or because civil society is more expensive.
4. How to get the most from new opportunities for private investment, including from BRICS countries, without losing sovereignty.
5. Establishing the right value for water and energy to help with prioritising different water users and energy producers.
6. Whether improved land tenure comes from registration of private rights or from strengthened communal rights.
7. The extent to which quantitative analysis (such as CBA and PSIA) should be relied on for evidence on the effectiveness of new policies. In particular, the use of CBA to assess the conditions under which new techniques (such as CA, low-cost irrigation and agro-forestry) are likely to be successful.
8. Whether smallholder or commercial agriculture makes the most effective contribution to overall economic development, taking into account the financial returns to investment and the higher multiplier effects of smallholder production.
9. Whether sector strategies should include estimates of expenditure implications, or whether this should be left to the budget process.
10. The extent to which the budget can be used as a management tool to promote new priorities for existing departments, and new priorities that cut across the responsibilities of different departments.

Key policy challenges

The components of good agricultural policy are now clear, although the particular solutions are dependent on country circumstances:

- There is no single option for improving farm productivity, but the most promising techniques include: those associated with improved soil moisture and, in particular, local variations of CA; improved seeds, especially where these introduce drought resilience; and new approaches to irrigation.



- There is a role for government intervention in some markets, but this must be done with clear rules so that processors and traders can invest with confidence. If intervention is done carefully, the potential for growth in trade is large, both nationally and regionally. Improved coverage of electricity and communications is already facilitating trade in many areas.
- Water will become an increasingly scarce resource, and governments need to invest in larger infrastructure while establishing much clearer rules about private responsibility for secondary and tertiary water infrastructure.
- Energy crops will provide increasing opportunities for African farmers, but governments will want to ensure that public policy does not provide incentives that are of higher value than for staple food crops, unless these are associated with mitigation benefits for which the country can receive international payments.
- Climate change will lead to substantial differences in cropping patterns, and one of the main objectives of agricultural research is to develop varieties and techniques that help farmers deal with more unpredictable rainfall.
- Trends towards urbanisation create a demand for African farmers. Governments should avoid policies that subsidise food prices in towns, and should rely on more targeted forms of social welfare.
- Secure access to land remains one of the major challenges for African farmers. This may be provided by formal land tenure or by strengthened customary rights. National land policies should clarify government positions on this and need to be supported by significant budget allocations.

Prioritising policies

Policy needs to be prioritised through a variety of techniques. The political process allows for wide-ranging evidence to be mobilised and assessed, and the qualitative nature of this process helps to ensure that it is reliable and broad-ranging. The agricultural sector is well-suited to quantitative analysis, and the following techniques should be considered for all major policy options:

- CBA is used widely and should provide valuable evidence. It is sometimes used as a technique that tests whether a policy or programme achieves more than a minimum acceptable return. However, in practice, it is more powerful when it is used to explore the sensitivity of policies to other conditions and to justify the balance of activities and complementary policies and programmes that need to be supported to ensure viability.
- PSIA can use some of the same analytical techniques as CBA, but focuses on the extent to which policies reduce poverty. CBA is unable to address this effectively because of the difficulty in defining the relative value of benefits for poor people compared to benefits for people who are not poor. There is now a wide body of international experience in the use PSIA in different situations.



Making policies count

Policy formulation takes place intermittently, influenced by changes in government, popular movements, national and international events and major studies. In contrast, public expenditure patterns tend to evolve slowly and incrementally. Government administrations have a strong tendency towards inertia arising from the difficulties of shifting work practices in complex organisations, competition between institutions, and incentives against risk-taking.

Governments can introduce new policies simply by making changes in the normal process of incremental budget evolution. In countries where budgets are set at a ministry level, this happens mainly through the internal management of the ministry. The transparency of policy implementation is much improved if budgets can be set at the level of programmes or departments, and this can be achieved through the use of various budget techniques, which are dealt with in other papers for the agricultural sector dialogue. The structure of the agricultural sector lends itself relatively easily to the adoption of programme budgets, because programmes can be aligned with the departments in charge of the main sub-sectors.

National and sectoral strategies are valuable tools for influencing the budget in a more comprehensive way, in combination with other tools. Key features of national and sector strategies include the following:

- Strategies need to include expenditure estimates for policies. These ensure that total expenditure is realistic, with explicit reference to medium-term fiscal frameworks. Strategies can afford to be more optimistic about spending ceilings than can budgets, but only to a limited extent. They should include several revenue scenarios (e.g. one realistic and one optimistic) and clear principles for managing uncertain revenue.
- Strategies need to include prioritised policies. This is achieved partly through the proposed changes in expenditure patterns, but can also be facilitated by changes in phasing.
- Strategies should aim to influence whatever document initiates the budget cycle (e.g. the budget strategy paper). This document reviews the major policy changes and obtains from the Cabinet a clear orientation on the broad directions of resource allocation across ministries, and for selected programmes within ministries, that are considered to be of national significance.



References

- AfDB (African Development Bank) (2010) *Agricultural sector strategy 2010–14*. Available at: <http://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/Agriculture%20Sector%20Strategy%2010-14.pdf>.
- AfDB (2011) *Nairobi action plan on large scale land-based investments in Africa*. Available at: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Nairobi%20Action%20Plan%20Final_English.pdf.
- Alston JM, Marra MC, Pardey PG & Wyatt TJ (1998) *Research returns redux: A meta-analysis of the returns to agricultural R&D*. IFPRI, EPTD Discussion Paper 38. Available at: <http://www.ifpri.org/sites/default/files/pubs/divs/eptd/dp/papers/eptdp38.pdf>.
- ASARECA (Association for Strengthening Agricultural Research in Eastern and Central Africa) (2008) *Mobilizing for effective and optimum utilization of land and water resources to reduce poverty in ECA. The SWMnet legacy report 2003–2007*. Available at: <http://www.asareca.org/swmnet/downloads/1189494741SWMnet%20Legacy%20Final.pdf>.
- AU-AfDB-ECA (2010) *Framework and guidelines on land policy in Africa*. Available at: http://www.uneca.org/sites/default/files/uploaded-documents/fg_on_land_policy_eng.pdf.
- AU-AfDB-ECA (2012) *Land and Africa's development future: Governing the risks and opportunities of large-scale landbased investments*. Eighth African Development Forum (ADF-VIII). Available at: http://www.uneca.org/sites/default/files/uploaded-documents/adfviii-land-issues-paper_en.pdf.
- Beddington J (n.d.) *Food, energy, water and the climate: A perfect storm of global events*. Government Office for Science. Available at: <http://www.bis.gov.uk/assets/goscience/docs/p/perfect-storm-paper.pdf>.
- Benin S, Kennedy A, Lambert M & McBride L (2010) *Monitoring African agricultural development processes and performance: A comparative analysis*. ReSAKSS Annual Trends and Outlook Report 2010. IFPRI. Available at: http://resakss.files.wordpress.com/2011/06/resakss_aw_ator_2010_web.pdf.
- Benin S, Nin Pratt A, Wood S & Guo Z (2011) Trends and spatial patterns in agricultural productivity in Africa, 1961–2010. *ReSAKSS Annual Trends and Outlook Report 2011*. International Food Policy Research Institute (IFPRI). Available at: <http://blog.resakss.org/2012/09/25/aw-ator-2011/>.
- Biswas A, Palenberg M & Bennet J (2008) *Report of the first external review of the Water and Food Challenge Program*. CGIAR Science Council. Available at: http://www.sciencecouncil.cgiar.org/fileadmin/templates/ispc/documents/Publications/2e-Publications_Reviews_ChallengePrograms/SC_CPER_Water_Food_Jan2008.pdf.
- Cabral L, Shrivastava A & Muendane C (2007) *Formulating and implementing Sector-wide Approaches in agriculture and rural development: The National Programme of Agrarian Development (PROAGRI) – Mozambique*. Available at: www.donorplatform.org/load/2411.
- Cline W (2007) *Global warming and agriculture: Impact estimates by country*. Washington DC: Peterson Institute for International Economics.
- Deininger K (2003) *Land policies for growth and poverty reduction*. Available at: http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2003/08/08/000094946_0307250400474/Rendered/PDF/multi0page.pdf.



- Deininger K, Jin S, Adenew B, Gebre-Selassie S & Nega B (n.d.). *Tenure security and land related investment: Evidence from Ethiopia*. Available at: <http://elibrary.worldbank.org/docserver/download/2991.pdf?expires=1371050813&id=id&accname=guest&checksum=C71B784ED2F68D37E2877D10DBB059BC>.
- Diao X, Fan S, Kanyarukiga S & Yu B (2010) *Agricultural growth and investment options for poverty reduction in Rwanda*. Available at: <http://www.ifpri.org/sites/default/files/publications/rr166.pdf>.
- Diao X & Hazell P (2004) *Exploring market opportunities for African smallholders*. IFPRI 2020 Africa Conference Brief 6. Available at: <http://www.ifpri.org/sites/default/files/pubs/pubs/ib/ib22.pdf>.
- Diao X, Thurlow J, Benin S & Fan S (eds) (2012). *Strategies and priorities for African agriculture: Economywide perspectives from country studies*. Washington DC: International Food Policy Research Institute. Available at: <http://www.ifpri.org/sites/default/files/publications/oc73.pdf>.
- Dorward A, Hazell P & Poulton C (2007). *Rethinking agricultural input subsidies in poor rural economies*. Future Agricultures Discussion Paper. Available at: http://fac.dev.ids.ac.uk/pdf%20files/rethinking_input_subsidies.pdf.
- Druilhe Z & Barreiro-Hurlé J (2012) *Fertilizer subsidies in sub-Saharan Africa*. ESA Working paper No. 12-04. FAO. Available at: <http://www.fao.org/docrep/016/ap077e/ap077e.pdf>.
- EAFF (Eastern Africa Farmers' Federation) (2011). *Database of agricultural policies in East Africa*. Available at: <http://88.198.10.114:8080/jspui/bitstream/123456789/47/1/Database%20of%20Agricultural%20Policies%20in%20East%20Africa.pdf>.
- ECA (Economic Commission for Africa) (2004) *Land tenure systems and their impacts on food security and sustainable development in Africa*. Available at: http://www.unctad.org/Content/documents/land_tenure_systems%20and%20their%20impacts%20on%20Food%20Security%20and%20Sustainable%20Development%20in%20Africa.pdf.
- Evenson R (1994) *Improving agricultural extension: A reference manual*. FAO. Available at: <http://www.fao.org/docrep/W5830E/w5830e06.htm>.
- FAO (Food and Agriculture Organisation) (2010) *Agricultural investment funds for developing countries*. Available at: http://www.fao.org/fileadmin/user_upload/ags/publications/investment_funds.pdf.
- FAO (2012a) *The state of food and agriculture: Investing in agriculture for a better future*. Available at: <http://www.fao.org/docrep/017/i3028e/i3028e.pdf>.
- FAO (2012b) *Statistical yearbook 2012*. Available at: <http://www.fao.org/economic/ess/ess-publications/ess-yearbook/yearbook2012/en/>.
- FAO (2012c) *Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of food security*. Available at: <http://www.fao.org/docrep/016/i2801e/i2801e.pdf>.
- FAO, WFP & IFAD (2011) *The state of food insecurity in the world 2011. How does international price volatility affect domestic economies and food security?* Available at: <http://www.fao.org/docrep/014/i2330e/i2330e.pdf>.



- FAO, WFP & IFAD (2012) *The state of food insecurity in the world 2012. Economic growth is necessary but not sufficient to accelerate reduction of hunger and malnutrition*. Available at: <http://www.fao.org/docrep/016/i3027e/i3027e.pdf>.
- Gerbens-Leenes W, Hoekstra AY & Van der Meer TH (2009) *The water footprint of bioenergy*. Proceedings of the National Academy of Sciences. Available at: <http://www.pnas.org/content/early/2009/06/03/0812619106.full.pdf>.
- GEXSI (Global Exchange for Social Investment) (2008) *Global market study on Jatropha. Project inventory: Africa*. Available at: http://www.jatropha-alliance.org/fileadmin/documents/GEXSI_Jatropha-Project-Inventory_AFRICA.pdf.
- Gitau R, Kimenju S, Kibaara B, Nyoro J, Bruntrup M & Zimmermann R (2009) *Agricultural policy-making in sub-Saharan Africa: Kenya's past policies*. Tegemeo Institute of Agricultural Policy & Development. Available at: <http://www.tegemeo.org/documents/work/Wp34-Agricultural-Policy-Making-Africa-Kenya-Past-Policies.pdf>.
- GOS (Government Office for Science) (2011) *Foresight. The future of food and farming*. Available at: <http://www.bis.gov.uk/assets/foresight/docs/food-and-farming/11-546-future-of-food-and-farming-report.pdf>.
- Gurara DZ & Birhanu D (2012) *Large-scale land acquisitions in Africa*. AfDB Africa Economic Brief. Available at: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/AEB%20VOL%203%20Issue%205%20Mai%202012_FINAL.pdf.
- Hoogeveen J, Faurès J-M & Van de Giessen (2009) Increased biofuel production in the coming decade: to what extent will it affect global freshwater resources? *Irrigation and Drainage* 58(S1): S148–S160.
- IAASTD (2009) *Agriculture at a crossroads: Summary for decision makers of the sub-Saharan Africa (SSA) Report*. Available at: http://www.unep.org/dewa/agassessment/docs/IAASTD_SSA_SDM_JAN_2008.pdf.
- IEA (International Energy Agency) (2009) *World energy outlook 2008*. Available at: <http://www.worldenergyoutlook.org/media/weowebiste/2008-1994/WEO2008.pdf>.
- IMF (International Monetary Fund) (2002) *Review of the poverty reduction strategy paper (PRSP) approach: Early experience with interim PRSPs and full PRSPs*. Available at: <http://www.imf.org/External/NP/prspgen/review/2002/032602a.htm>.
- IMF (2013) *Primary commodity prices*. Available at: www.imf.org/external/np/res/commod/index.aspx.
- Inocencio A, Kikuchi M, Tonosaki M, Maruyama A, Merrey D, Sally H & De Jong I (2007) *Costs and performance of irrigation projects: A comparison of sub-Saharan Africa and other developing regions*. IWMI Research Report 109. Available at: http://www.iwmi.cgiar.org/publications/IWMI_Research_Reports/PDF/PUB109/RR109.pdf.
- IODParc (2013) *Impact evaluation of the Protracted Relief Programme II, Zimbabwe*. Unpublished document.
- IPCC (Intergovernmental Panel on Climate Change) (2007) *Climate change 2007 synthesis report*. Available at: http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm.



- IPCC (2011). *Managing the risks of extreme events and disasters to advance climate change adaptation: A special report of Working Group I and Working Group II of the Intergovernmental Panel on Climate Change*. Available at: <http://ipcc-wg2.gov/SREX/>.
- IWMI (International Water Management Institute) (2007) *Water for food, water for life: A comprehensive assessment of water management in agriculture*. Available at: <http://www.iwmi.cgiar.org/assessment/>.
- Jacoby H & Minten B (2005) *Is land titling in sub-Saharan African cost-effective? Evidence from Madagascar*. Available at: http://siteresources.worldbank.org/INTISPMA/Resources/Training-Events-and-Materials/Land_Titles_MG.pdf.
- Jalloh A, Nelson GC, Thomas TS, Zougmore R & Roy-Macauley H (2103). *West African agriculture and climate change: A comprehensive analysis*. Available at: <http://www.ifpri.org/sites/default/files/publications/rr178.pdf>.
- Jayne TS, Haggblade S, Minot N & Rashid S (2011) *Agricultural commercialization, rural transformation and poverty reduction: What have we learned about how to achieve this?* African Agricultural Markets Programme Policy Symposium. Available at: http://fsg.afre.msu.edu/aamp/Kigali%20Conference/Smallholder_commercialization_Synthesis2.pdf.
- Kimenyi MS, Routman B & Westbury A (2012) *CAADP at 10: Progress toward agricultural prosperity*. Africa Growth Initiative at Brookings Policy Paper. Available at: <http://www.brookings.edu/~media/research/files/papers/2012/12/africa%20agriculture/12%20caadp.pdf>.
- Kizito AM (2011) *The structure, conduct and performance of agricultural market information systems in sub-Saharan Africa*. Available at: http://aec.msu.edu/theses/fulltext/kizito_phd.pdf.
- Lafontaine A, Adejuwon JO, Dearden PN, Quesne G (2012) *Final evaluation of the IDRC/DFID Climate Change Adaptation in Africa programme*. Available at: <http://idl-bnc.idrc.ca/dspace/bitstream/10625/49107/1/IDL-49107.pdf>.
- Lipton M (2005) *The family farm in a globalizing world: The role of crop science in alleviating poverty*. IFPRI 2020 Discussion Paper 40. Available at: <http://www.ifpri.org/sites/default/files/pubs/2020/dp/vp40.pdf>.
- Lowder SK, Carisma B & Scoet J (2012). *Who invests in agriculture and how much? An empirical review of the relative size of various investments in agriculture in low- and middle-income countries*. Available at: <http://www.fao.org/docrep/017/ap854e/ap854e.pdf>.
- Lynam JK, Harmsen K & Sachdeva P (2010) *Report of the second external review of the sub-Saharan Africa challenge program (SSA-CP)*. Available at: http://www.sciencecouncil.cgiar.org/fileadmin/templates/ispc/documents/Publications/2e-Publications_Reviews_ChallengePrograms/SC_CPER-2_SSA_Dec2010.pdf.
- Marongwe L, Kwazira K, Jenrich M, Thierfelder C, Kassam A & Friedrich T (n.d.) *The role of conservation agriculture in increasing crop productivity for smallholder farmers in Zimbabwe*. Available at: http://aci.gov.au/files/node/14068/the_role_of_conservation_agriculture_in_increasing_17601.pdf.
- Martins P (2013) *Growth, employment and poverty in Africa: Tales of lions and cheetahs. Background paper prepared for the World Development Report 2013*. Available at: http://siteresources.worldbank.org/EXTNWDR2013/Resources/8258024-1320950747192/8260293-1320956712276/8261091-1348683883703/WDR2013_bp_Growth_Employment_and_Poverty_in_Africa.pdf.



- Mazvimavi K (2011) *Socio-economic analysis of conservation agriculture in southern Africa*. FAO Network Paper 02. Available at: <http://devstudies.wisc.edu/docs/Kizito%20REOSA%20Network%20Paper%202%20Socioeconomic%20Analysis.pdf>.
- Milder J, Majanen T & Scherr SJ (2011) *Performance and potential of conservation agriculture for climate change adaptation and mitigation in sub-Saharan Africa: An assessment of WWF and CARE projects in support of the WWF-CARE Alliance's Rural Futures Initiative*. Available at: http://www.foodgrainsbank.ca/uploads/CARE-WWF-EcoAgriculture_Conservation_Agriculture_in_Sub-Saharan_Africa_FINAL_REPORT_2011-02-2811.pdf.
- Minot N (2012) *Food price volatility in Africa: Has it really increased?* IFPRI Discussion Paper 01239. Available at: <http://www.ifpri.org/sites/default/files/publications/ifpridp01239.pdf>.
- Mitchell D (2011) *Biofuels in Africa: Opportunities, prospects and challenges*. World Bank Directions in Development. Available at: <https://openknowledge.worldbank.org/bitstream/handle/10986/2541/584380PUB0ID181Africa09780821385166.pdf?sequence=1>.
- Mo Ibrahim Foundation (2011) *African agriculture: From meeting needs to creating wealth*. Available at: <http://www.moibrahimfoundation.org/downloads/2011-facts-and-figures.pdf>.
- Ndiritu C, Karanja D & Vlek P (2007). *Sub-Saharan Africa Challenge Program external review*. Available at: http://library.cgiar.org/bitstream/handle/10947/4209/ssa_cp_externalreview_Jan2007.pdf?sequence=1.
- Parry M, Rosenzweig C, Iglesias A, Fischer G & Livermore M (1999) Climate change and world food security: A new assessment. *Global Environmental Change* 9 (Supplement 1): S51–S67. Available at: <http://www.sciencedirect.com/science/article/pii/S0959378099000187>.
- Portale E (2012) *Socio-economic sustainability of biofuel production in sub-Saharan Africa: Evidence from a jatropha outgrower model in rural tanzania*. Discussion Paper 2012-01, Belfer Center for Science and International Affairs. Available at: http://belfercenter.hks.harvard.edu/files/Portale_SocioEconomic_Sustainability_of_Biofuels_DP_2012.pdf.
- Rakotoarisoa MA, lafrate M & Paschali M (2011) *Why has Africa become a net food importer? Explaining Africa agricultural and food trade deficits*. FAO Trade and Markets Division. Available at: <http://www.fao.org/docrep/015/i2497e/i2497e00.pdf>.
- Ringler C, Bryan E, Hassan RM, Alemu T & Hillesland M (2011) *How can African agriculture adapt to climate change? Insights from Ethiopia and South Africa*. IFPRI Research Brief Series 15. Available at: <http://www.ifpri.org/sites/default/files/publications/rb15.pdf>.
- Rosegrant MW, Cai X & Cline SA (2002). *World water and food to 2025: Dealing with scarcity*. IFPRI. Available at: <http://www.ifpri.org/sites/default/files/pubs/pubs/books/water2025/water2025.pdf>.
- Rosegrant MW & Fan S (2008) *Investing in agriculture to overcome the world food crisis and reduce poverty and hunger*. IFPRI Policy Brief 3. Available at: <http://www.ifpri.org/sites/default/files/publications/bp003.pdf>.
- SADC (Southern African Development Community) (2003) *Regional indicative strategic development plan*. Available at: http://www.sadc.int/files/5713/5292/8372/Regional_Indicative_Strategic_Development_Plan.pdf.
- SADC (2011) *Desk assessment of the regional indicative strategic development plan 2005–2010*. Available at: http://www.sadc.int/files/4413/5292/8372/Regional_Indicative_Strategic_Development_Plan_Desk_Assessment.pdf.



- Stifel D, Minten B & Koro B (2012) *Economic benefits and returns to rural feeder roads: Evidence from a quasi-experimental setting in Ethiopia*. ESSP II Working Paper 40. Available at: <http://www.ifpri.org/sites/default/files/publications/esswp40.pdf>.
- Twomlow S, Urolov J, Jenrich M & Oldrieve B (2008) Lessons from the field: Zimbabwe's conservation agriculture task force. *Journal of SAT Agricultural Research* 6. Available at: <http://www.icrisat.org/journal/Volume6/aes/Twomlow.pdf>.
- UNEP (United Nations Environment Programme) (2008) *Terminal evaluation of the UNEP GEF project 'Enabling activities for the preparation of a national adaptation programme of action (NAPA)'*. Available at: http://www.unep.org/eou/Portals/52/Reports/NAPA_Final_Report.pdf.
- UNCTAD (United Nations Conference on Trade and Development) (2009) *World investment report: Transnational corporations, agricultural production and development*. Available at: http://unctad.org/en/docs/wir2009_en.pdf.
- Van der Molen P, Silayo EH & Tuladhar AM (2008) *A comparative study to land policy in 9 countries in Africa and Asia*. Available at: http://www.fig.net/pub/fig2008/papers/ts06b/ts06b_04_vandermolen_etal_3037.pdf.
- Von Braun J & Meinzen-Dick R (2009) *'Land grabbing' by foreign investors in developing countries: Risks and opportunities*. IFPRI Policy Brief 13. Available at: <http://www.ifpri.org/sites/default/files/publications/bp013all.pdf>.
- Von Maltitz G, Haywood, (2009) *Analysis of opportunities for biofuel production in sub-Saharan Africa*. CIFOR Environment Brief. Available at: http://www.cifor.org/publications/pdf_files/EnviBrief/04-EnviBrief.pdf.
- Von Maltitz G & Stafford W, Mapako M & Brent A (2011) *Assessing opportunities and constraints for biofuel development in sub-Saharan Africa*. Working Paper 58. CIFOR, Bogor, Indonesia. Available at: http://www.cifor.org/publications/pdf_files/WPapers/WP58CIFOR.pdf.
- World Bank (2008) *World development report: Agriculture for development*. Available at: http://siteresources.worldbank.org/INTWDR2008/Resources/WDR_00_book.pdf.
- World Bank (2009) *World development indicators*. Available at: <http://data.worldbank.org/products/data-books/WDI-2009>.
- World Bank (2011) *Climate-smart agriculture. increased productivity and food security, enhanced resilience and reduced carbon emissions for sustainable development. Opportunities and challenges for a converging agenda: Country examples*. Available at: http://climatechange.worldbank.org/sites/default/files/documents/CSA_Paper_SouthAfrica.pdf.
- World Bank (2012) *CAADP Multi Donor Trust Fund: Mid Term Review*. Available at: <http://www.nepad.org/system/files/CAADP%20MDTF%20MTR%20Workshop%20Outcomes%20042712%20FINAL.pdf>.
- World Bank (2013) *Growing Africa: Unlocking the potential of agribusiness*. Available at: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/03/12/000425962_20130312103050/Rendered/PDF/756630v10REPLA0frica0pub03011013web.pdf.
- WEF (World Economic Forum) (2011) *Water security: The water-food-energy-climate nexus*. Available at: http://www3.weforum.org/docs/WEF_WI_WaterSecurity_WaterFoodEnergyClimateNexus_2011.pdf.



You L (2008) *Irrigation investment needs in sub-Saharan Africa*, World Bank Africa infrastructure country diagnostic. IFPRI Background Paper 9. Available at: <http://www.eu-africa-infrastructure-tf.net/attachments/library/aicd-background-paper-9-irrig-invest-summary-en.pdf>.

Ziervogel G, Cartwright A, Tas A, Adejuwon J, Zermoglio F, Shale M & Smith B (2008) *Climate change and adaptation in African agriculture*. Stockholm Environment Institute. Available at: http://knowledgebase.terrafrica.org/fileadmin/user_upload/terrafrica/docs/Final_Rockefeller_Report4April08.pdf.

Zimmermann R, Brüntrup M, Kolavalli S & Flaherty K (2009) *Agricultural policies in sub-Saharan Africa: Understanding CAADP and APRM policy processes*. Available at: [http://www.die-gdi.de/CMS-Homepage/openwebcms3.nsf/\(ynDK_contentByKey\)/ANES-7X8J53/\\$FILE/Studies%2048.pdf](http://www.die-gdi.de/CMS-Homepage/openwebcms3.nsf/(ynDK_contentByKey)/ANES-7X8J53/$FILE/Studies%2048.pdf).



CONNECT • SHARE • REFORM